County of San Diego

Stormwater Quality Management Plan (SWQMP)

For Priority Development Projects (PDPs)

Use for all PDPs (see Storm Water Intake Form, Part 4)

Priority Development Project

Project Information	
Project Name	Smilax
Project Address	425 Smilax Rd., between Smilax Road (east) and poinsettia Avenue (west)
Assessor's Parcel # (APN)	217-191-02-00 & 217-191-03-00
Permit # / Record ID	TBD

Project Applicant / Project Proponent		
Name	KB Home Coastal, Inc.	
Address	9915 Mira Mesa Blvd., San Diego, CA 92131	
Phone	(858) 877-4262	**Email:** kbausback@kbhome.com

SWQMP Preparer		
Name	Alisa S. Vialpando	
Company (if applicable)	Hunsaker & Associates San Diego, Inc.	
Address	9707 Waples Street, San Diego, CA 92121	
Phone	(858)558-4500	**Email:** AVialpando@HunsakerSD.com
PE Number (if applicable)	47945	

Preparer's Certification

I understand that the County of San Diego has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the County of San Diego BMP Design Manual. The BMP Design Manual is a design manual for compliance with local County of San Diego Watershed Protection Ordinance (Sections 67.801 et seq.) and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2013-0001, as amended by Order No. R9-2015-0001 and Order No. R9-2015-0100) requirements for storm water management.

This SWQMP is intended to comply with applicable requirements of the BMP Design Manual. I certify that it has been completed to the best of my ability and accurately reflects the project being proposed and the applicable BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this SWQMP by County staff is confined to a review and does not relieve me as the person in charge of overseeing the selection and design of storm water BMPs for this project, of my responsibilities for project design.

Signature A. S. Vialpando **Date** July 8, 2020

SDC PDS RCVD 07-10-20

TM5634

COUNTY ACCEPTED

SWQMP Approved By:

Approval Date:

***Note* Approval does not constitute compliance with regulatory requirements.**

Submittal Record: List the dates of SWQMP and plan submittals and updates. Briefly describe key changes from previous versions. If responding to plan check comments, note this in the entry and attach the responses as applicable.

No.	Date	Summary of Changes
Preliminary Design / Planning / CEQA		
1	4/17/2019	Initial Submittal
2	12/3/2019	2nd Submittal
3	2/18/2020	3rd Submittal
4	7/8/2020	4th Submittal
No.	Date	Summary of Change
Final Design		
1	Date	Initial Submittal
2	Date	Summary of Change
3	Date	Summary of Change
4	Date	Summary of Change
No.	Date	Summary of Change
Plan Changes		
1	Date	Initial Submittal
2	Date	Summary of Change
3	Date	Summary of Change
4	Date	Summary of Change
No.	Date	Summary of Change

PDP SWQMP Submittal Checklist

SWQMP Tables: All of the eight tables below must be completed.

SWQMP Attachments[1]: Use the checklist below to identify which attachments will be included with this submittal. Attachments with boxes already checked (☒) are required for all projects. The applicability of other attachments will be determined upon completing this form.

☒ Attachment 1: Storm Water Intake Form

☒ Attachment 2: DMA Exhibits and Construction Plan Sheets

☐ Attachment 3: Source Control BMP Worksheet

☐ Attachment 4: Previous SWQMP Submittals

☒ Attachment 5: Existing Site and Drainage Description

☒ Attachment 6: Documentation of DMAs without Structural BMPs

☒ Attachment 7: Documentation of DMAs with Structural Pollutant Control BMPs

☒ Attachment 8: Documentation of DMAs with Structural Hydromodification Management BMPs

☐ Attachment 9: Management of Critical Coarse Sediment Yield Areas

☒ Attachment 10: Installation Verification Form

☒ Attachment 11: BMP Maintenance Agreements and Plans

☐ Attachment 12: Documentation of Alternative Compliance Projects (ACPs)

After completing the remainder of this form, check the applicable SWQMP Attachment boxes to summarize your selections.

[1] All SWQMP attachments are available at www.sandiego.gov/stormwater under the Development Resources tab. Some attachments are presented out of order because they are shared between multiple SWQMP forms.

Table 1 – Scope of SWQMP Submittal

Select one option below that describes the scope of this SWQMP Submittal. Document your selection as indicated.

SWQMP Scope	Required Documentation
☒ ***a. SWQMP addresses the entire project***	No additional documentation.
☐ ***b. SWQMP implements requirements of an earlier master SWQMP submittal***	Include a copy of the previous submittal as **Attachment 4**.
☐ ***c. First of multiple SWQMP submittals***	Use the spaces below to identify the elements addressed in this submittal and in future submittals.

(1) Elements addressed in current submittal (streets, common areas, first project phase, etc.):

(2) Elements to be addressed in future submittal(s) (individual lots, future project phases, etc.):

Table 2 – Baseline BMPs for Existing and Proposed Site Features

Site Features Select each feature that applies.		BMP Implementation Describe BMP implementation for each selected site feature.					
Group 1: Existing Natural Site Features [See BMPDM Sections 4.3.1 and 4.3.2]							
		Maintain & conserve natural features (SD-G)		Establish buffers for waterbodies (SD-H)			
		Full	Partial	Full	Partial		
☐	Natural waterbodies	☐	☐	☐	☐		
☐	Natural storage reservoirs & drainage corridors	☐	☐				
☐	Natural areas, soils, & vegetation (incl. trees)	☐	☐				
Group 2: Common Impervious Outdoor Site Features [See BMPDM Sections 4.3.3 and 4.3.5]							
		Disperse impervious areas (SD-B)		Use permeable materials (SD-D)		Minimize impervious areas (SD-I)	
		Full	Partial	Full	Partial		
☒	Streets and roads	☐	☐	☐	☐	☒ Check here to confirm that impervious surfaces have been minimized where applicable and feasible for all outdoor impervious areas. If not, explain in Table 3.	
☐	Sidewalks & walkways	☐	☐	☐	☐		
☒	Parking areas & lots	☐	☐	☐	☐		
☒	Driveways	☐	☐	☐	☐		
☐	Patios, decks, & courtyards	☐	☐	☐	☐		
☐	Hardcourt recreation areas	☐	☐	☐	☐		
☐	Add impervious feature	☐	☐	☐	☐		
☐	Add impervious feature	☐	☐	☐	☐		
☐	Add impervious feature	☐	☐	☐	☐		
Group 3: Other Outdoor Site Features [See BMPDM Sections 4.2.6, 4.3.4, 4.3.5, 4.3.7, and 4.3.8]							
☒	Rooftop areas	Disperse rooftop runoff (SD-B)		Install green roofs (optional; SD-C)		Use rain barrels to capture runoff (optional; SD-E)	
		Full	Partial	Full	Partial	Full	Partial
		☒	☐	☐	☐	☐	☐
☒	Landscaped areas	Use water-efficient landscaping (SD-J)		Install efficient irrigation systems (SD-K)		Minimize erosion of slopes and surfaces (SD-L)	
		Full	Partial	Full	Partial	Full	Partial
		☒	☐	☐	☐	☐	☐
☐	Water features (pools, spas, etc.)	Provide a designated washing area (SC-A)		Drain feature to the sanitary sewer (if allowed) (SC-B)		Drain feature to a pervious area (SC-C)	
		Full	Partial	Full	Partial	Full	Partial
		☐	☐	☐	☐	☐	☐

Note: Justification is required in Table 4 for any feature not selecting at least one BMP (either full or partial implementation). For Group 2 features this means not selecting either SD-B or SD-D. Additional justifications may be required on request by County staff. Also use Table 4 to describe sources or BMPs other than those listed.

Table 3 –Baseline BMPs for Pollutant-generating Sources (Group 4)

A. Requirements for Documentation
Select either or both as applicable.

Completion of Part B is not required because:

☐ This is a Small Residential Project, OR

☐ None of these sources or features is proposed.

☐ Source Control BMP Requirements Worksheet E.1-1 (SC in Appendix E of the BMP Design Manual) is included as Attachment 3 (optional unless requested by County staff).

B. Sources and BMPs
Select all proposed sources and features below. Then select the BMPs on the right to be implemented for each.

	SC-B Plumb to sanitary sewer	SC-C Drain feature to a pervious area	SC-D Provide containment for spills and discharges	SC-E Prevent contact with rainfall	SC-F Isolate flows from adjacent areas	SC-G Prevent wind dispersal	SC-H Label with stencils or signs
Common Source Areas							
☐ Trash & Refuse Storage	☐	---	☐	☐	☐	☐	---
☐ Materials & Equipment Storage	☐	---	☐	☐	☐	☐	---
☐ Loading & Unloading	☐	---	☐	☐	☐	---	---
☐ Fueling	☐	---	☐	☐	☐	---	---
☐ Maintenance & Repair	☐	---	☐	☐	☐	---	---
☐ Vehicle & Equipment Cleaning	☐	---	☐	☐	☐	---	---
☐ Food Preparation or Service	☐	---	☐	☐	☐	---	---
Distributed Features							
☒ Storm drain inlets & catch basins	---	---	---	---	---	---	☒
☐ Interior floor drains and sumps	☐	---	---	---	---	---	---
☒ Drain lines (air conditioning, etc.)	☒	☐	☐	---	---	---	---
☒ Fire test sprinkler discharges	☒	☒	☒	---	---	---	---

Provide the following in Table 4: (1) justification of any source area or feature with NO BMPs selected, (2) justification of individual unselected BMPs if requested by County staff, and (3) identification of any proposed pollutant-generating sources and BMPs not listed here.

Note: Pollutant-generating sources and features may not discharge directly to the MS4. Discharging to any of the stormwater BMPs identified in Table 5 Part B is also discouraged. If doing so, however, the source or feature area must be included in applicable DCV calculations.

Table 4 – Explanations and Justifications for Table 2 and 3 Baseline BMPs

☐ Check here if no explanations or justifications for Table 2 or 3 BMPs are required.

- Required Justifications: If NO BMPs are selected for a source or feature, justify why all BMPs are either not applicable or are infeasible. For Group 2 features NO BMPs means not selecting either SD-B or SD-D.
- If Requested: Justify why individual BMPs will not be implemented or will only be partially implemented.
- Additional Explanation: Describe any proposed features and/or BMPs not listed in Tables 2 or 3.

BMP-Feature Combination		Explanation
Feature	Trash and refuse	Per the VTM general design note 21, trash will be individually picked up
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	

2.b. Impervious area Includes the new and replaced pavement at the street widening of Smilax Road

Table 5: DMA Structural Compliance Strategies and Documentation

Part A – Selection and Application Structural Performance Standards

1. Selection of Standards (select one; see BMPDM Section 6.1)

☒ a. Pollutant control + hydromodification ☐ b. Pollutant control only (project is exempt from hydromodification requirements)

2. Application of Structural Performance Standards (select one; see BMPDM Section 1.7)

☒ New Development Projects: Standards apply to all impervious surfaces.

☒ Redevelopment Projects: Complete the calculations below. Select the applicable scenario based on the results.

a. Existing impervious area (ft^2)	b. Impervious area created / replaced (ft^2)	c. % Impervious created / replaced [(b/a)*100]
7846	134,838	17,13%

☒ Scenario 1: c is 50% or more: Performance standards apply to all impervious surfaces (a + b).

☐ Scenario 2: c is less than 50%: Performance standards apply only to created or replaced impervious surfaces (b only).

Part B – Compliance Strategies and Required Attachments

1.Complete and submit each of the applicable attachments on the right.

Att. 1	Att. 2	Att. 3	Att. 4	Att. 5
Storm Water Intake Form	DMA Exhibits and Construction Plan Sheets	Source Control BMP Worksheet (see Page 3)	Previous SWQMP Submittals (see Page 1)	Existing Site and Drainage Description
☒	☒	☐	☐	☒

2. Indicate each compliance strategy below that will be used for one or more DMAs on the site.

	Att. 6 DMAs without Structural BMPs	Att. 7 DMAs w/ Structural Pollutant Control BMPs	Att. 8 DMAs w/ Structural Hydromod. BMPs	Att. 9 Critical Coarse Sediment Yield Areas	Att. 10 Installation Verification Form	Att. 11 Maintenance Agreements/ Plans	Att. 12 Alternative Compliance Projects
☒Self-mitigating DMAs (BMPDM Section 5.2.1)	☒			☒			
☒De Minimis DMAs (BMPDM Section 5.2.2)	☒			☒			
☐Self-retaining DMAs (BMPDM Section 5.2.3)	☐			☐	☐		
Structural BMPs (select all that apply)							
☒Pollutant Control BMPs (BMPDM Section 5.4)		☒		☒	☒	☒	
☒Hydromodification BMPs (BMPDM Chapter 6)			☒	☒	☒	☒	
☐Alternative Compliance Project (BMPDM Section 1.8)				☐	☐	☐	☐

☒ Please check this box after you complete this list. Corresponding attachments will be automatically selected on the right.

- Attachments 1, 2, and 5 are required for all projects.

Table 6: Critical Coarse Sediment Yield Area (CCSYA) Requirements

o Identify one applicable compliance pathway for the PDP below.
o Document your selection in Attachment 9.

A. Hydromodification Management Exemption (BMPDM Sections 1.6 and 6.1)

☐ PDP is Exempt from Hydromodification Management Requirements

Select if hydromodification management exemption was selected in Table 4 Part A.1.

B. Watershed Management Area (WMAA) Mapping (BMPDM Appendix H.1.1.2)

☒ WMAA mapping demonstrates the following:

a. <5% of potential onsite CCYSAs will be impacted (built on or obstructed) SEE MAP NEXT PAGE

b. All potential upstream offsite CCYSAs will be bypassed

C. Resource Protection Ordinance (RPO) Methods (BMPDM Appendix H.1.1.1)

☐ RPO Scenario 1: PDP is subject to and in compliance with RPO requirements

a. Project requires one or more discretionary permits (RPO applicability is confirmed during discretionary review)

b. Onsite AND upstream offsite CCSYAs will be avoided and/or bypassed

☐ RPO Scenario 2: PDP is entirely exempt/not subject to RPO requirements[2]

a. Project does not require discretionary permits

b. Project will bypass all upstream offsite CCSYAs (no requirements for onsite CCSYAs)

D. No Net Impact Analysis (BMPDM Appendix H.4)

☐ Project demonstrates no net impact to receiving waters

[2] Does not include PDPs utilizing exemption(s) via RPO Section 86.604(e)(2)(cc) or 86.604(e)(3).


SMILAX
CRITICAL COARSE SEDIMENT YIELD AREAS
Legend
CCSYA
PROJECT SITE
78
Mimosa Ave
Ronald Packard Pkwy
Poinsettia Ave
Adeline Ct
Smilax Rd
N
500 ft
Google Earth
© 2018 Google

Table 7 –Minimum Construction Stormwater BMPs

Minimum Required BMPs by Activity Type Select all applicable activities and at least one BMP for each	References Caltrans[3]	 County of San Diego	
☒ **Erosion Control for Disturbed Slopes** (choose at least 1 per season)			
☒ Vegetation Stabilization Planting[4] (Summer)	SS-2, SS-4		
☒ Hydraulic Stabilization Hydroseeding[9] (Summer)	SS-4		
☒ Bonded Fiber Matrix or Stabilized Fiber Matrix[5] (Winter)	SS-3		
☐ Physical Stabilization Erosion Control Blanket[7] (Winter)	SS-7		
☒ **Erosion control for disturbed flat areas (slope < 5%)**			
☒ County Standard Lot Perimeter Protection Detail	SC-2	PDS 659[6]	
☒ Use of Item A erosion control measures on flat areas	SS-3, SS-4, SS-7		
☐ County Standard Desilting Basin (must treat all site runoff)	SC-2	PDS 660[7]	
☐ Mulch, straw, wood chips, soil application	SS-6, SS-8		
☒ **Energy dissipation (required to control velocity for concentrated runoff or dewatering discharge)**			
☒ Energy Dissipater Outlet Protection	SS-10	RSD D-40[8]	
☐ **Sediment control for all disturbed areas**			
☒ Silt Fence	SC-1		
☒ Fiber Rolls (Straw Wattles)	SC-5		
☒ Gravel & Sand Bags	SC-6, SC-8		
☐ Dewatering Filtration	NS-2		
☒ Storm Drain Inlet Protection	SC-10		
☐ Engineered Desilting Basin (sized for 10-year flow)	SC-2		
☒ **Preventing offsite tracking of sediment**			
☒ Stabilized Construction Entrance	TC-1		
☐ Construction Road Stabilization	TC-2		
☒ Entrance/Exit Tire Wash	TC-3		
☒ Entrance/Exit Inspection & Cleaning Facility	TC-1		
☒ Street Sweeping and Vacuuming	SC-7		
☒ **Materials Management**			
☒ Material Delivery & Storage	WM-1		
☒ Spill Prevention and Control	WM-4		
☒ **Waste Management[9]**			
☒ Waste Management Concrete Waste Management	WM-8		
☒ Solid Waste Management	WM-5		
☒ Sanitary Waste Management	WM-9		
☒ Hazardous Waste Management	WM-6		

[3] See Caltrans 2017 Storm Water Quality Handbooks, Construction Site BMP Manual, available at: (http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm)
[4] Planting or Hydroseeding may be installed between May 1st and August 15th. Slope irrigation must be in place and operable for slopes >3 feet. Vegetation must be watered and established prior to October 1st. A contingency physical BMP must be implemented by August 15th if vegetation is not established by that date. If landscaping is proposed, erosion control measures must also be used while landscaping is being established. Established vegetation must have a subsurface mat of intertwined mature roots with a uniform vegetative coverage of 70 percent of the natural vegetative coverage or more on all disturbed areas.
[5] All slopes over three feet must have established vegetative cover prior to final permit approval.
[6] County PDS 659. Standard Lot Perimeter Protection Design System (Bldg. Division)
[7] County PDS 660. County Standard Desilting Basin for Disturbed Areas of 1 Acre or Less Bldg. Division
[8] Regional Standard Drawing D-40 – Rip Rap Energy Dissipater (also acceptable for velocity reduction)
[9] Applicants are responsible to apply appropriate BMPs for specific wastes (e.g., BMP WM-8 for concrete).

Table 8 – Explanations and Justifications for Construction Phase BMPs

☒ **Check here if no explanations or justifications for Table 7 BMPs are required.**		
Justifications for Table 7 Temporary Construction Phase BMPs • **Required Justifications**: Justify all construction activity types for which NO BMPs were selected. • **If Requested**: Justify why specific individual BMPs were not selected. • **Additional Explanation**: Describe any proposed features and/or BMPs not listed in Table 7.		
Activity Type / BMP		**Explanation**
Activity Type	Activity Type	Explanation
BMP	BMP	
Activity Type	Activity Type	Explanation
BMP	BMP	
Activity Type	Activity Type	Explanation
BMP	BMP	
Activity Type	Activity Type	Explanation
BMP	BMP	
Activity Type	Activity Type	Explanation
BMP	BMP	
Activity Type	Activity Type	Explanation
BMP	BMP	
Activity Type	Activity Type	Explanation
BMP	BMP	

County of San Diego
Stormwater Quality Management Plan (SWQMP)
Attachment 1: Storm Water Intake Form for All Permit Applications

This form establishes Stormwater Quality Management Plan (SWQMP) requirements for Development Projects per Sections 67.809 and 67.811 of the County of San Diego Watershed Protection Ordinance (WPO). See Storm Water Intake Form Instructions for additional guidance and explanation of terms.

Part 1. Project Information	
Project Name:	Smilax
Record ID (Permit) No(s):	PDS2019-TM-5634
Assessor's Parcel No(s):	217-191-02-00 & 217-191-03-00
Street Address (or Intersection):	425 Smilax Rd., between Smilax Road (east) and poinsettia Avenue (west)
City, State, Zip:	Vista, California, 92081

Part 2. Applicant / Project Proponent Information	
Name:	Kurt Bausback.
Company:	KB Home Coastal, Inc.
Street Address:	9915 Mira Mesa Blvd.
City, State, Zip:	San Diego, CA 92131
Phone Number	(858) 877-4262
Email:	kbausback@kbhome.com

Part 3. Required Information for All Development Projects

Ⓐ 1. Existing (pre-development) impervious surfaces (ft^2)	2. Created or replaced impervious surfaces (ft^2)	3. Total disturbed area (acres or ft^2)
7,846	134,838	4.94 acres

Ⓑ ☐ Check here and provide a WDID# if this project is subject to the California Construction General Permit (Order No. 2009-0009-DWQ)[1]	WDID # (if issued)

For County Use Only	Reviewed By:	Review Date:
☐ Standard SWQMP	☐ PDP SWQMP	☐ Green Streets PDP Exemption SWQMP

[1] Available at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.html

Part 4. Priority Classification & SWQMP Form Selection

(A) *If your project is the following ... (select one)*	(B) *You must complete ...*
☐ **Standard Project** ☐ a. Project is East of the Pacific/Salton Sea Divide ☐ b. None of the PDP criteria below applies	→ **Standard *SWQMP Form***
☒ **Priority Development Project (PDP)** ☐ 1. Project is part of an existing PDP, OR ☒ 2. Project does any of the following: ☒ a. Creates or replaces a total of 10,000 ft² or more of impervious surface ☒ b. Creates or replaces a combined total of 5,000 ft² or more of impervious surface within one or more of the following uses: (1) parking lots; (2) streets, roads, highways, freeways, and/or driveways; (3) restaurants; and (4) hillsides ☐ c. Creates or replaces a combined total of 5,000 ft² or more of impervious surface within one or more of the following uses: (1) automotive repair shops; and (2) retail gasoline outlets ☐ d. Discharges directly to an Environmentally Sensitive Area (ESA) AND creates or replaces 2,500 ft² or more of impervious surface ☐ e. Disturbs one or more acres of land (43,560 ft²) and is expected to generate pollutants post-construction ☐ f. Is a redevelopment project that creates or replaces 5,000 ft² or more of impervious surface on a site already having at least 10,000 ft² of impervious surface	→ **PDP *SWQMP Form***
☐ **Green Streets PDP Exemption**[2]	→ **Green *Streets PDP Exemption SWQMP Form***

Part 5. Applicant Signature

I have reviewed the information in this form, and it is true and correct to the best of my knowledge.

Applicant / Project Proponent Signature: Date: 02/18/2020

- ***Upon completion*** *submit this form to the County.*
- ***If requested****, attach supporting documentation to justify selections made or exemptions claimed.*
- ***If this is a PDP that is part of a larger existing PDP****, you will be required to attach a copy of the existing SWQMP to the newer SWQMP submittal.*

[2] ***Green Streets PDP Exemption Projects*** are those claiming exemption from PDP classification per WPO Section 67.811(b)(2) because they consist exclusively of *either* 1) development of new sidewalks, bike lanes, and/or trails; *or* 2) improvements to existing roads, sidewalks, bike lanes, and/or trails.

2.0 General Requirements

- Attachment 2 consolidates exhibits and plans required for the entire project.
- Complete the table below to indicate which sub-attachments are included with the submittal. Sub-attachments that are not applicable can be excluded from the submittal.
- Unless otherwise stated, features and BMPs identified and described in each corresponding Attachment (6 through 9) must be shown on applicable DMA Exhibits and construction plans submitted for the project.

Sub-attachments	Requirement
☒ 2.1: DMA Exhibits	All PDPs
☒ 2.2: Individual Structural BMP DMA Mapbook	PDPs with structural BMPs
☒ 2.3: Construction Plan Sets	All projects

2.1 DMA Exhibits

- DMA Exhibits must show all DMAs on the project site. Exhibits must include all applicable features identified in applicable SWQMP attachments.
- Exhibits may be prepared individually for the BMPs associated with each applicable SWQMP Attachment (6, 7, 8, and/or 9) or combined into one or more consolidated exhibits.
- Use this checklist to ensure required information is included on each exhibit (copy as needed).

DMA Exhibit ID #:	1	
A. Features required for all exhibits		
1. Existing Site Features		
☒ Underlying hydrologic soil group (A, B, C, D)	☒ Topography and impervious areas	
☒ Approximate depth to groundwater	☒ Existing drainage network, directions, and offsite connections	
☒ Natural hydrologic features		
2. Drainage Management Area (DMA) Information		
☒ Proposed drainage network, directions, and offsite connections	☒ DMA boundaries, ID numbers, areas, and type (structural BMP, de minimis, etc.)	
3. Proposed Site Changes, Features, and BMPs		
☒ Proposed demolition and grading	☒ Construction BMPs[2]	
☒ Group 1, 2, and 3 Features[1]	☒ Baseline source control BMPs	
☒ Group 4 Features	☒ Baseline source control BMPs	
B. Proposed Features and BMPs Specific to Individual SWQMP Attachments[3]		
☒ Attachment 6	☒ SSD-BMP impervious dispersion areas	
	☐ SSD-BMP tree wells	
☒ Attachment 7	☒ Structural pollutant control BMPs	
☒ Attachment 8	☒ Structural hydromodification management BMPs	
	☒ Point(s) of Compliance (POC) for hydromodification management	
	☒ Proposed drainage boundary and drainage area to each POC	
☐ Attachment 9	☐ Onsite CCSYAs	☐ Bypass of onsite CCSYAs
		☐ Bypass of upstream offsite CCSYAs

[1] Group 1-4 features and baseline BMPs from PDP SWQMP Tables 2 and 3.
[2] Minimum Construction Stormwater BMPs from PDP SWQMP Table 7.
[3] Identify the location, ID numbers, type, and size/detail of BMPs.

LEGEND

- PROJECT BOUNDARY
- DMA BOUNDARY
- 00.00 ACRES — SUBAREA ACREAGE
- DMA 1 — DMA ICON
- STORM DRAIN
- INLET
- IMPERVIOUS - ROAD/SIDEWALK/ DRIVEWAY
- IMPERVIOUS- ROOF/BUILDING
- PERVIOUS - LANDSCAPE
- PERVIOUS - BASIN BOTTOM
- STREET WIDENING- IMPERVIOUS- ROAD
- SELF-MITIGATING AREA
- DE MINIMIS
- D — HYDROLOGIC SOIL TYPE
- X — POINT OF COMPLIANCE
- STRUCTURAL BMPS BIOFILTRATION BASIN
- RIPRAP
- PROPOSED STORM DRAIN INLET

SITE DESIGN BMPs

SD-3 MINIMIZE IMPERVIOUS AREAS
SD-4 MINIMIZE SOIL COMPACTION
SD-5 IMPERVIOUS AREA DISPERSION
SD-6 RUNOFF COLLECTION
SD-7 LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES

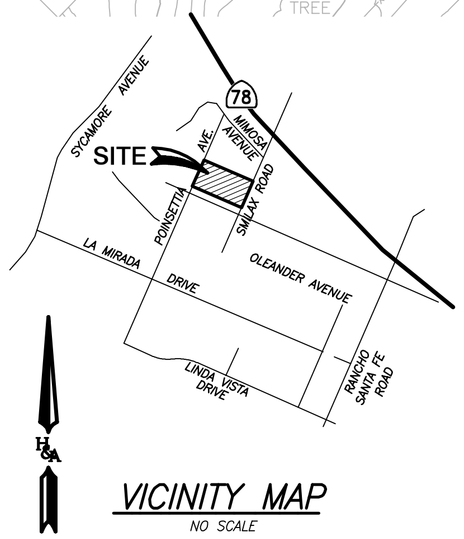
SOURCE CONTROL BMPs

SC-1 PREVENTION OF ILLICIT DISCHARGES TO MS4
SC-2 STORM DRAIN STENCILING OR SIGNAGE
SC-6 ADDITIONAL BMPS BASED ON POTENTIAL SOURCES OF RUNOFF POLLUTANTS
- SC-6A ON-SITE STORM DRAIN INLETS
- SC-6B INTERIOR FLOOR DRAINS AND ELEVATOR SHAFT SUMP PUMPS
- SC-6C INTERIOR PARKING GARAGES
- SC-6D NEED FOR FUTURE INDOOR & STRUCTURAL PEST CONTROL
- SC-6E LANDSCAPE/OUTDOOR PESTICIDE USE
- SC-6H REFUSE AREA
- SC-6O FIRE SPRINKLER TEST WATER
- SC-6P MISCELLANEOUS DRAIN OR WASH WATER
- SC-6Q PLAZAS, SIDEWALKS, AND PARKING LOTS

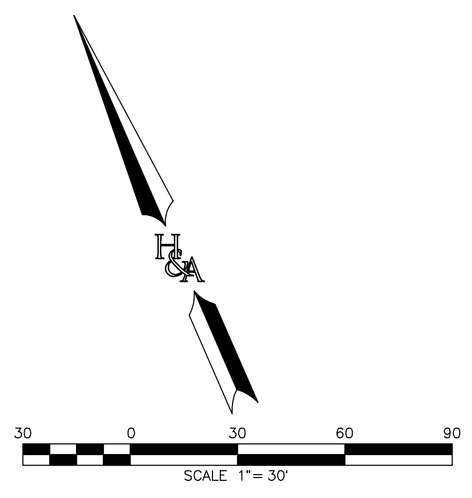
DMA #	a. DMA Area (ft2)	Incidental Impervious Area		Description
		b. Size (ft2)	c. %(b/a*100)	
1.1	193381	126730	66%	Tributary to basin
1.2	10852	7661	71%	Tributary to basin
3*	10335	0	0%	Self-metigating
4**	197	197	100%	De Minimis
5**	250	250	100%	De Minimis

*DMA3 IS A NATURAL OR LANDSCAPE AREA THAT DRAINS DIRECTLY OFFSITE AND MEET ALL THE SELF MITIGATING DMA REQUIREMENTS (5.2.1 SELF MITIGATING DMAS - BMP MANUAL)
** DMA4 AND DMA5 ARE DE MINIMIS AREAS THAT MEET ALL THE DE MINIMS DMA REQUIREMENTS (5.2.2 DE MINIMIS DMAS - BMP MANUAL)

		To BF-1-1			
		DMA1.1		DMA1.2 (Street Widening)	
	Runoff Factor	Area (ac.)	Summation RF x A	Area (ac.)	Summation RF x A
Roofs	0.90	1.537	1.383	0.000	0.000
Concrete or Asphalt	0.90	1.373	1.235	0.176	0.158
Much or Amended Soil	0.10	0.097	0.010	0.000	0.000
Compacted Soil	0.30	1.433	0.430	0.073	0.022
TOTAL AREA		4.439	3.058	0.249	0.180
WEIGHTED RUNOFF FACTOR			0.69		0.72



VICINITY MAP
NO SCALE



UNDERLYING SOIL GROUP : C & D
APPROXIMATE DEPTH TO GROUNDWATER > 15'
NO CRITICAL COARSE AREAS REQUIRE PRESERVATION

PREPARED BY:
HUNSAKER & ASSOCIATES SAN DIEGO, INC
PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(858)558-4500 FX(858)558-1414

SMILAX DMA MAP

COUNTY OF SAN DIEGO, CALIFORNIA

MAP 1 OF 1

W.O.# 0486-0174

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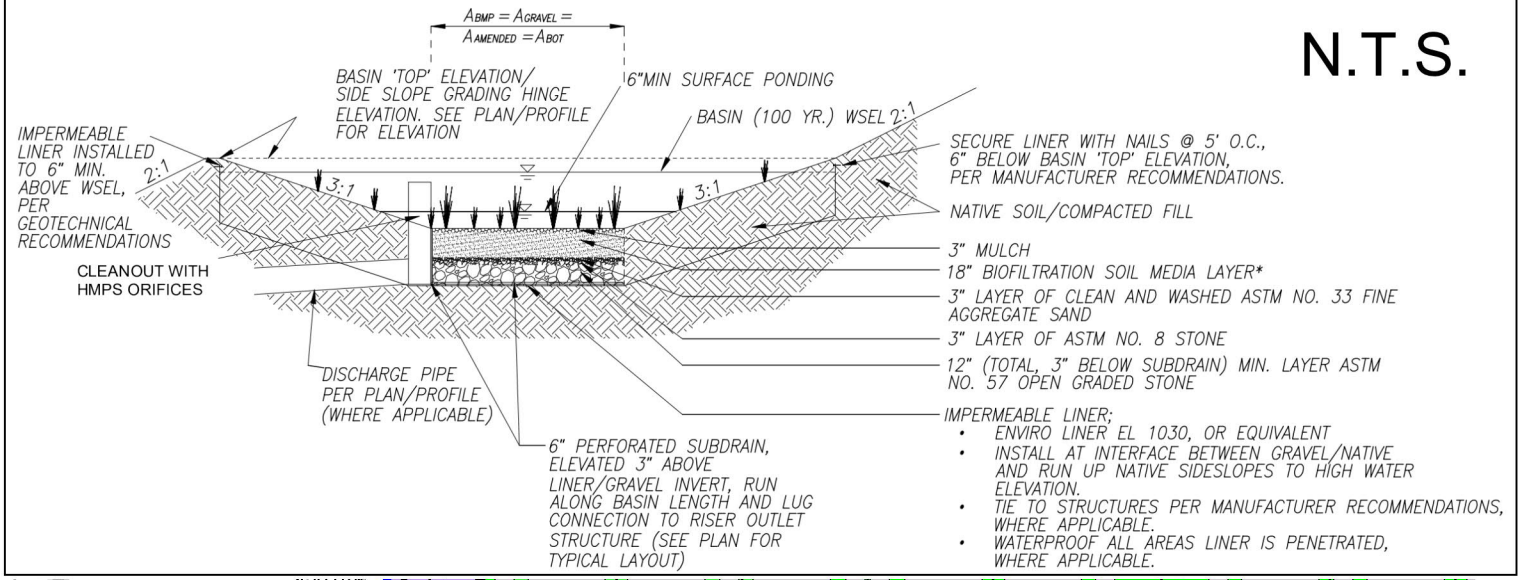
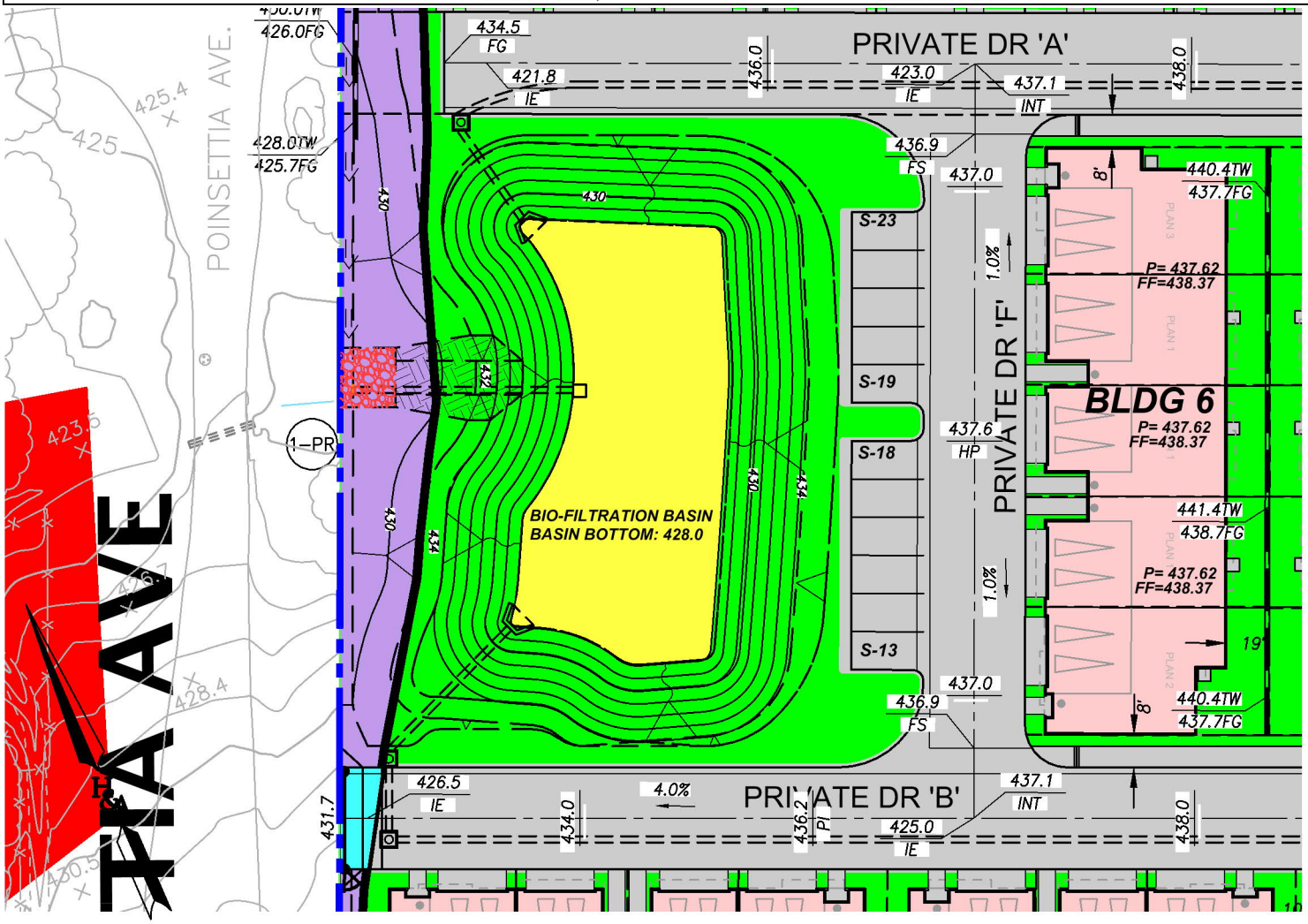
2.2 Individual Structural BMP DMA Mapbook

- Use this page as a cover sheet for the Structural DMA Mapbook.
- An individual Structural DMA Mapbook must be submitted for any project site with one or more structural BMPs. One Mapbook is required for each unique subsequent owner with responsibility for maintenance of a Structural BMP. Mapbook exhibits will be incorporated as exhibits in Stormwater Maintenance Agreements (SWMAs) and Maintenance Notifications (MNs). See Attachment 11 for additional information on maintenance agreements. If the Mapbook has been provided for each subsequent owner in Attachment 11, they are not required here.
- Place each map on 8.5"x11" paper.
- Show at a minimum the DMA, Structural BMP, Assessor's parcel boundaries with parcel numbers, and any existing hydrologic features within the DMA.

☒	All Mapbooks are attached
☐	All Mapbooks are in Attachment 11

N.T.S.





0 40 80 120

SCALE 1" =40'

ASSESSORS PARCEL NUMBER
217-191-02-00 & 217-191-03-00

PREPARED BY:
HUNSAKER & ASSOCIATES
SAN DIEGO, INC
PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(858)558-4500 FX(858)558-1414

BMP MAP 1- EXHIBIT #1
SMILAX
STORMWATER MAINTENANCE EXHIBIT
COUNTY OF SAN DIEGO, CALIFORNIA

W.O.# 0490-0174

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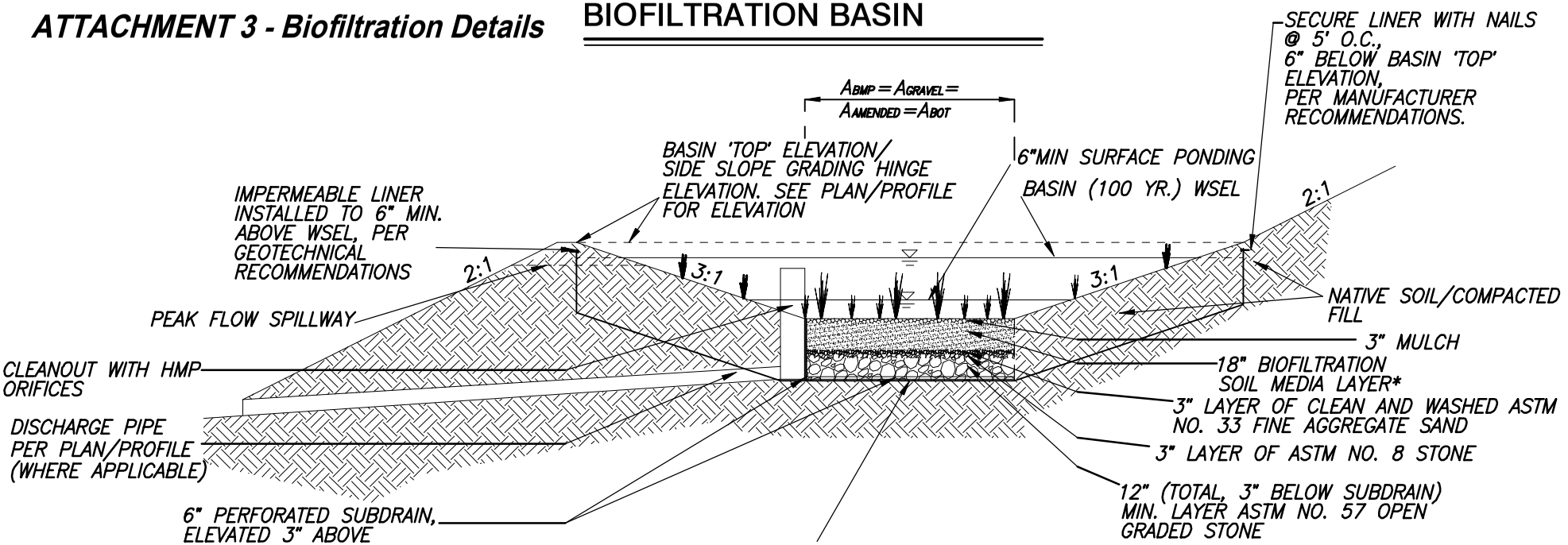
N.T.S.

ATTACHMENT 3 - Biofiltration Details

SOIL SECTION FOR WATER QUALITY/HYDROMODIFICATION BIOFILTRATION BASIN



IMPERMEABLE LINER;
- ENVIRO LINER EL 1030, OR EQUIVALENT
- INSTALL AT INTERFACE BETWEEN GRAVEL/NATIVE AND RUN UP NATIVE SIDESLOPES TO HIGH WATER ELEVATION.
- TIE TO STRUCTURES PER MANUFACTURER RECOMMENDATIONS, WHERE APPLICABLE.
- WATERPROOF ALL AREAS LINER IS PENETRATED, WHERE APPLICABLE.

BIORETENTION SOIL MEDIA (BSM):
- 18" MINIMUM THICKNESS.
- 70% TO 85% BY VOLUME WASHED SAND AND 15% TO 30% BY VOLUME COMPOST OR ALTERNATIVE ORGANIC AMENDMENT.
- BSM: THE C:N RATIO OF BSM SHALL BE BETWEEN 15 AND 40 TO REDUCE THE POTENTIAL FOR NITRATE LEACHING.
- MUST MAINTAIN A MINIMUM PERCOLATION RATE OF 5 INCHES PER HOUR THROUGHOUT THE LIFE OF THE FACILITY, AND IT MUST BE SUITABLE FOR MAINTAINING PLANT LIFE.
- FOR ADDITIONAL INFORMATION REFER TO APPENDIX F.3 OF THE COUNTY OF SAN DIEGO STORM WATER STANDARDS MANUAL.

NOTE: THIS DETAIL APPLIES TO BIOFILTRATION BASINS 'BF–1–1', '

PREPARED BY:
HUNSAKER & ASSOCIATES SAN DIEGO, INC
PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(858)558-4500 FX(858)558-1414

BMP MAP 1- EXHIBIT #2
SMILAX
STORMWATER MAINTENANCE EXHIBIT
COUNTY OF SAN DIEGO, CALIFORNIA

W.O.# 0490–0174

- DMAs, features, and BMPs identified and described in this attachment must also be shown on all applicable construction and landscape plans.
- As applicable, plan sheets must identify:
    - All features and BMPs identified in Sub-attachment 2.1 (DMA Exhibits).
    - The additional information listed below.
- Use this checklist to ensure required information is included on each plan (copy as needed).

Plan Type	
Required Information[4]	
☒ Structural BMP(s) and Significant Site Design BMPs (if applicable) with ID numbers.	
☒ The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit.	
☒ Details and specifications for construction of Structural BMP(s) and Significant Site Design BMPs (if applicable).	
☒ Signage indicating the location and boundary of structural BMP(s) as required by County staff.	
☒ How to access the structural BMP(s) to inspect and perform maintenance.	
☒ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds).	
☒ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP).	
☒ Recommended equipment to perform maintenance.	
☒ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management.	
☒ Include landscaping plan sheets (if available) showing vegetation requirements for vegetated structural BMP(s).	
☒ All BMPs must be fully dimensioned on the plans.	
☒ When proprietary BMPs are used, site-specific cross-section with outflow, inflow, and manufacturer model number must be provided. Photocopies of general brochures are not acceptable.	
☒ Include all source control and site design measures described in the SWQMP.	
☒ Include all construction BMPs described in the SWQMP.	

[4] For Building Permit Applications, refer to Form PDS 272, https://www.sandiegocounty.gov/content/dam/sdc/pds/docs/pds272.pdf

INSERT RELEVANT TM SHEETS

5.0 General Requirements

- Each Priority Development Project (PDP) must provide a description of existing site conditions and proposed changes to them, including changes to topography and drainage.
- Has a Drainage Report has been prepared for the PDP?

  ☒ Yes

  - Review of the Drainage Report must be concurrent with the PDP SWQMP.
  - Include the summary page of the Drainage Report with this cover page, and provide the following information:

    Title: Smilax

    Prepared By: Hunsaker & Associates San Diego, Inc.

    Date: 02/18/2020

  - Do not complete the rest of this attachment (also exclude these additional pages from your submittal). Additional documentation of site and drainage conditions is not required unless requested by County staff.

  ☐ No -- Complete and submit the remainder of this attachment below.

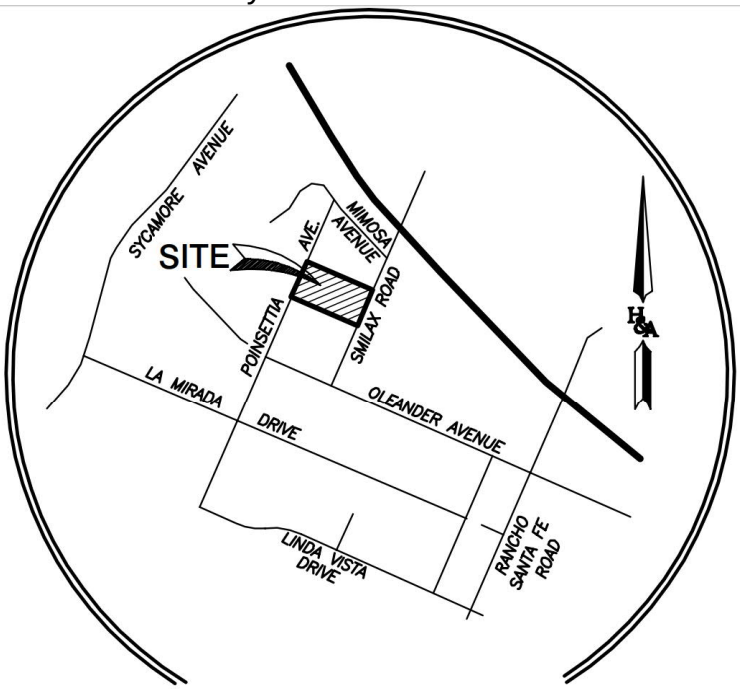
CHAPTER 1 EXECUTIVE SUMMARY

1.1 Introduction

Smilax project is located at 425 Smilax Road, south of the 78 Freeway between Smilax Road (east) and Poinsettia Avenue (west), with existing residential properties to the north and south, in the City of Vista, California. The property is within the unincorporated area of the County of San Diego. (See the Vicinity Map below) The development proposes multi-family structures containing 62 attached condominium within 4.90 acres, and removing and replacing existing sidewalk and curb with minor road widening to accommodate a lift turn pocket at Smilax Road.

The runoff generated from the road widening of Smilax Road, as proposed per this project, is captured by a proposed inlet located just north of the entrance which is sized\restricted only to capture the flow from the newly added or replaced pavement. The flow will be connected to the project drainage system via storm drain pipe sized minimally to convey only said flow, and routed though the project biofiltration basin (BF-1-1) to meet pollutant, flow control and detention requirements.

The site will also include two open spaces, a biofiltration basin, sidewalks, access road and private driveways. The lots are connected by private drives which are accessible via Smilax Rd on the east boundary and Poinsettia Ave on the west boundary.



VICINITY MAP

NTS

This report will analyze both the existing and proposed hydrologic conditions relative to development of the site. Proposed stormwater facilities include storm drain, curb inlets, catch basins, a water quality/ hydromodification and detention basin, brow ditches, and energy dissipation devices. The proposed basin for the site will not only act to address water quality, but will also address flow control hydromodification concerns and detention.

Potential failure of basin berm would not expose people or structures to a significant risk of loss, injury or death.

A separate report has been prepared which details the proposed treatment and flow control features for the project. Refer to the *Stormwater Quality Management Plan (SWQMP) for the Smilax* prepared by Hunsaker & Associates San Diego, Inc. (July 2020).

Summary of Existing Conditions

The existing condition hydrology map (Exhibit 1) is located in Chapter 5. An existing residential structure currently occupies the eastern portion of the northern parcel. Vegetation on the southern parcel and the western portion of the northern parcel, consist primarily of grasses, scattered weeds. The western portion of the northern parcel and the entire southern parcel have been periodically used for row crops. The site's drainage area is 6.45 acres, including the 1.58 acres off-site drainage area. The runoff from off-site area conveyed through the project site via overland flow. The existing topography of the site is gently sloping from southeasterly to northwesterly falling approximately 4% from a high point of about 467 feet to a low point of approximately 425 feet in elevation. The imperviousness of the site in its existing condition is approximately 10%.

The associated runoff coefficient for the subareas was weighed depending on the respective subarea imperviousness and in accordance with the San Diego County Hydrology Manual Table 3-1.
(0% imperviousness →C=0.35, 65% imperviousness →C=0.71...etc.)
An area-average runoff coefficient has been provided in Table-3 below. (From AES)

Runoff from the project site is conveyed via overland flow and then confluences with the offsite flows to be conveyed via 18" storm drain pipe crossing Poinsettia Ave at the middle of west border of the site. The out-flow is conveyed southwest via overland flow towards Oleander Ave., and eventually discharging into Agua Hedionda creek.

Table 1 below summarizes the 100-year existing condition peak flow at the downstream project boundary. A runoff coefficient was used per the Table 3-1 of the San Diego County Hydrology Manual. Supporting calculations for the data presented in Table 1 is located in Chapter 3 of this report. The corresponding hydrology map (Exhibit 1) is located in Chapter 5.

TABLE 1 - Summary of Existing Flows

Exhibit	Node Number on Exhibit	Discharge Location	Drainage Area (ac)	C Area-Average Runoff Coefficient	Tc (min)	I (in\hr)	V100* Velocity (ft\sec)	Q100-Year Peak Flow (cfs)
1	3	Middle of west border of the site	6.45	0.480	8.08	6.281	3.11	15.1

Summary of Developed Conditions

The post-developed condition of the site will consist of improvements consistent of multi-family structures containing 56 residential units, driveways, access roads, sidewalks, landscaped open spaces and removing and replacing existing sidewalk and curb with road widening to accommodate a lift turn pocket at Smilax Road. The run off from the widening area will be collected by a proposed curb inlet located north of the entrance and sized\restricted to capture just the flow generated from the newly added and replaced area. The flow will be conveyed via proposed storm drain to the proposed biofiltration basin BF-1-1.

The site also proposes an open space dedicated for a water quality basin facility. The water quality basin will treat onsite runoff and the street widening runoff, attenuate peak flows and aid in addressing flow control hydromodification. For additional discussion on the proposed water quality features of the site, refer to the *Stormwater Quality Management Plan for the Smilax* (July, 2020) prepared by Hunsaker & Associates San Diego, Inc. The infrastructure will include streets and associated utilities including a storm drain system (pipes, inlets, cleanouts) necessary to collect and convey site runoff through the project area. The site will not place housing within a 100-year flood hazard area. The site is located within an unmapped area per the FEMA website and will therefore not require a letter of map revision.

Cut and fill grading techniques are anticipated in order to bring the site to the desired grades. Based on existing and proposed site, maximum cut and fill thicknesses, appear to be on the order of approximately 10 feet, or less. Graded slopes are anticipated to heights of approximately 10 feet, or less, at gradients of 2:1 (H: V), or flatter. Several retaining walls are used as needed.

The proposed condition hydrology Exhibit 2 in Chapter 5 shows the developed site with its subareas to each inlet location. Street grades throughout the site vary between 1% and 4.0%. The general direction of flows for the subareas is relatively consistent with the existing condition. On-site runoff from 4.44 acres drainage area will be conveyed via storm drains towards the proposed water quality basin located at the west of the site to detain and attenuate the 100-year peak flows. At the eastern border of the site, there is a road widening area along Smilax Road. The runoff from Smilax Road widening,

entrance driveway, and the adjusted landscaped area (total of 0.25 acres) is collected by a proposed curb inlet locate north of the entrance and conveyed west via proposed storm drain to the project biofiltration basin BF-1-1. In order to capture the flow from the street widening added and replaced pavement and routed it to the proposed biofiltration basin, 0.05 acres at the eastern border of the site, which used to drain in south-north direction in the existing condition, is diverted west in the proposed condition to be treated in the biofiltration basin (BF-1-1). As a consequence, the project depicts an increase of 0.05 acres in the drainage area to the west as compared to existing condition.

The separate runoff from 1.81 acres, including off-site drainage area south and on-site self-mitigating pervious area north and west, is conveyed via brow ditches towards the middle of west border of the site and confluences with the onsite runoff, which has been routed through the respective basin outlet and spillway, the total runoff is conveyed via 18" storm drain pipe crossing Poinsettia Ave. The out-flow is conveyed southwest via overland flow towards Oleander Ave., and eventually discharging into Agua Hedionda Creek, as in pre-project condition.

The table below summarizes the Q100 flow at the discharge point.

TABLE 2 - Summary of Developed Flows

Exhibit	Node Number on Exhibit	Discharge Location	Drainage Area (ac)	100-Year Peak Flow (cfs)	Detained 100-Year Peak Flow (cfs)
2	15	Middle of west border of the site	6.50	24.51	12.36

The associated runoff coefficient for the residential areas was weighed depending on the respective subarea imperviousness and in accordance with the San Diego County Hydrology Manual Table 3-1.

(66% impervious →C=0.73, 21.6% impervious →C=0.43...etc) (For the street widening 70.68% imperviousness →C=0.742)

An area-average runoff coefficient has been provided in Table-3 below. (From AES)

Supporting calculations for the data presented in Table 2 is located in Chapter 3. The reduced flows at the discharge point can be attributed to the reduction in runoff coefficient compared to existing condition. The corresponding hydrology map (Exhibit 2) is located in Chapter 5.

Summary of Results

The proposed basin located at the west of the site will treat stormwater runoff prior to exiting the site. The basin will be constructed with an upper engineered soil layer to aid in the removal of pollutants generated by the site. In addition, the basin will be constructed with a lower gravel section which will be utilized for detention storage to

help in addressing flow control hydromodification. The outlet structure for the basin will consist of a riser box with a top opening and side orifices sized to moderate flow outlet to meet flow control requirements. Refer to the *Stormwater Quality Management Plan (SWQMP) for the Smilax* prepared by Hunsaker & Associates San Diego, Inc. (July, 2020).

Due to the increase of runoff coefficient compared with the existing condition, the peak flows generated from the site will be increased. Therefore, attenuation of peak flows is required. Peak flows will be attenuated within the detention basin to minimize the flows being generated from the site. Once runoff has been routed through the basin outlet structure and spillway, it confluences and with the separate off-site flows and then conveyed via existing 18" storm drain pipe crossing Poinsettia Ave as in pre-project condition.

The table below summarizes the comparison between the existing and proposed flow rates from the site.

TABLE 3 – Existing Condition vs. Proposed Condition

From the AES report See Chapter 3

	Discharge Location	**Area (ac)***	**C* Area-Average Runoff Coefficient**	**Tc* Time of Concentration (min)***	**I* Intensity (inch\hr)**	**V100** Velocity (ft\sec)**	**Q100* Peak Flow (cfs)***
Existing	Middle of west border of the site	6.45	0.48	8.08	6.281	3.11	15.29
Proposed Unmitigated	Middle of west border of the site	6.50	0.6875 On-site & 0.4742 Off-site	9.26	5.756	2.55	24.51
Proposed Mitigated	Middle of west border of the site	6.50	0.6875 On-site & 0.4742 Off-site	18.49	3.684	2.02	11.93

* From AES report

**Per the county comment; to provide preliminary velocity V100 in the pre-development condition a channel analysis has been provided assuming a 5' bottom width channel with 10:1 (H:V) side slopes.(See Chapter 3)

**To calculate the 100-year Velocity in the proposed condition, a weir analysis has been provided for the spillway (Mitigated and Unmitigated conditions). (See Chapter 3)

Rip rap is proposed at the storm drain discharge location at the basin will aid in dissipating outlet velocities. Brow ditches are proposed to collect and convey off-site

runoffs from south and north borders of the site. The brow ditch will continue along the northern and southern project boundaries and empty into the middle of west border of the site and then conveyed via existing18” storm drain pipe crossing Poinsettia Ave as in pre-project condition.

Design calculations for these brow ditches as well as the storm drain hydraulics will be conducted as part of the final engineering drainage study.

The proposed development will drain/convey its runoff towards the middle of west border of the site similar to existing conditions. However, the site will include a basin which will provide the added benefit of water quality treatment, flow control (HMP) measures, and peak flow attenuation. These benefits will provide improvements over the existing condition relative to erosion potential at the existing downstream discharge point.

Conclusion

As seen from table 3, the project attenuates flows to below pre-project conditions and as a result, there are no adverse effects to be expected downstream. Therefore, slope stability, vegetative stress, and other susceptible areas are not impacted.

References

San Diego County Hydrology Manual, County of San Diego Department of Public Works Flood Control Division, June 2003.

San Diego County Hydraulic Design Manual, County of San Diego Department of Public Works Flood Control Division, September 2014

San Diego County Drainage Design Manual, County of San Diego Department of Public Works Flood Control Division, July 2005

County of San Diego San Diego SUSMP, County of San Diego, January 2011

Stormwater Quality Management Plan for Smilax, Hunsaker & Associates San Diego, Inc., July 2020.

6.0 General Requirements

- Use this attachment to document all proposed (1) self-mitigating, (2) de minimis, and (3) self-retaining DMAs. Indicate under "DMA Compliance Option" below which design options will be used to satisfy structural performance requirements for one or more DMA.

DMA Compliance Option	Required Sub-attachments	BMPDM Design Resources
☒ Self-mitigating	• Sub-attachment 6.1	• BMPDM Section 5.2.1
☒ De minimis	• Sub-attachment 6.2	• BMPDM Section 5.2.2
☐ Self-retaining[1]	• Sub-attachment 6.3	• BMPDM Section 5.2.3 (all options)
<u>SSD-BMP Type(s)</u>		
☐ Impervious Area Dispersion	• Sub-attachment 6.3.1	• Fact Sheet SD-B (Appendix E.8)
☐ Tree Wells	• Sub-attachment 6.3.2	• Fact Sheet SD-A (Appendix E.7)

- Submit this cover page and all "Required Sub-attachments" listed for each selected DMA compliance option.
- See the BMPDM sections and appendices listed under "BMPDM Design Resources" for additional explanation of design requirements. Each constructed feature must <u>fully</u> satisfy the requirements described in these resources, and any other guidance identified by the County.
- <u>DMA Exhibits and Construction Plans</u>: DMAs, features, and BMPs identified and described in this attachment must be shown on DMA Exhibits and all applicable construction plans submitted for the project. See Attachment 2 for additional instruction on exhibits and plans.

[1] If "Self-retaining" is selected, also choose the types of Significant Site Design BMPs (SSD-BMPs) to be used. SSD-BMPs are Site Design BMPs that are sized and constructed to fully satisfy all applicable Structural Performance Standards for a DMA.

6.1 Self-mitigating DMAs (complete this page once for ALL self-mitigating DMAs)

Self-mitigating DMAs consist of natural or landscaped areas that drain directly offsite or to the public storm drain system. These DMAs are excluded from DCV calculations.

- Provide the information requested below for each proposed self-mitigating DMA. Add rows or copy the table if additional entries are needed.

DMA #	a. DMA Area (ft^2)	Incidental Impervious Area		Permit # and Sheet #
		b. Size(ft^2)	c. % (b/a*100)	
2	10,335	0	0	TBD
		0	0	

Natural and landscaped areas (west and border of the site) that drain directly offsite and meet all the self-mitigating DMAs requirements

- "DMA #", "DMA Area", and "Permit # and Sheet #" are required for all DMAs listed.
- "Incidental Impervious Area" calculations are required only where applicable (see below).
- Each self-mitigating DMA must <u>fully</u> satisfy all design requirements and restrictions described in BMPDM Section 5.2.1 and any other guidance or instruction identified by the County. Check the boxes below to confirm that all required conditions are satisfied <u>for every DMA listed</u>.

☒ Each DMA is hydraulically separate from other DMAs that contain permanent storm water pollutant control BMPs.

<u>Natural and Landscaped Areas</u>

☒ Each DMA consists solely of natural or landscaped areas, except for incidental impervious areas (see below).

☒ Each area drains directly offsite or to the public storm drain system.

☐ Soils are undisturbed native topsoil, or disturbed soils that have been amended and aerated to promote water retention characteristics equivalent to undisturbed native topsoil.

☒ Vegetation is native and/or non-native/non-invasive drought tolerant species that do not require regular application of fertilizers and pesticides.

<u>Incidental Impervious Areas (if applicable; see above)</u>

Minor impervious areas may be permitted within the DMA if they satisfy the following criteria:

☐ They are not hydraulically connected to other impervious areas (unless it is a storm water conveyance system such as a brow ditch).

☐ They comprise less than 5% of the total DMA. Calculate the % incidental impervious area in the table above (c= b/a). DMAs are <u>not</u> self-mitigating if this area is 5% or greater.

6.2 De Minimis DMAs (complete this page once for ALL de minimis DMAs)

De minimis DMAs consist of areas too small to be considered significant contributors of pollutants and not practicable to drain to a BMP. They are excluded from DCV calculations. Examples include driveway aprons connecting to existing streets, portions of sidewalks, retaining walls, and similar features at the external boundaries of a project.

- Provide the information requested below for each proposed de minimis DMA. Add rows or copy the table if additional entries are needed.

DMA #	DMA Area (ft^2)	Permit # and Sheet #
4	197	TBD
5	250	TBD

DMA 4 is the portion of the proposed drive way area (197 sf) that slopes away from the site to provide an emergency access.
DMA 5 is 250 sf of the northern portion of Smilax Road widening that can't be captured by the proposed inlet and it still drains north.
Note: The de minimis DMAs are not hydraulically connected.

- "DMA #", "DMA Area", and "Permit # and Sheet #" are required.
- Check the boxes below to confirm that each required condition is satisfied for ALL de minimis DMAs on the site.

  ☒ Each DMA listed is less than 250 square feet and not adjacent or hydraulically connected to each other.

  ☒ Each DMA listed <u>fully</u> satisfies all design requirements and restrictions described in BMPDM Section 5.2.2 De Minimis DMAs.

6.3 Self-retaining DMAs using Significant Site Design BMPs

Self-retaining DMAs use Site Design BMPs to fully-retain the entire DCV, at a minimum. Site Design BMPs that fully retain the DCV, at a minimum, therefore replacing the need for a Structural BMP (S-BMP), are classified as Significant Site Design BMPs (SSD-BMPs). To satisfy pollutant control requirements only, self-retaining means retention of the entire DCV. However, under some circumstances, a self-retaining DMA can also satisfy hydromodification management requirements by implementing BMPs that retain a greater volume of runoff.

- Provide the information requested below for each proposed self-retaining DMA. Add rows or copy the table if additional entries are needed.

DMA #	DMA Area (ft²)	BMP Type (choose one per DMA)		Permit # and Sheet #
		Dispersion Area (Att. 6.3.1)	Tree Wells (Att. 6.3.2)	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
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		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	

Copy and Paste table here for additional DMAs

- "DMA #", "DMA Area", and "Permit # and Sheet #" are required.
- Select one BMP Type per DMA. Provide detailed documentation for each DMA in Attachments 6.3.1 (Impervious Dispersion Areas) and/or 6.3.2 (Tree Wells) below.
- Each self-retaining DMA must <u>fully</u> satisfy all design requirements and restrictions described in BMPDM Section 5.2.3, applicable BMPDM Appendix E Fact Sheets, and any other guidance or instruction identified by the County.

[2]Applicants wishing to utilize parameters less conservative than listed here must submit modeling to support their proposal. Consult your project manager for more information.
[3]Including the permeable pavement.

6.3.1 Self-retaining DMAs with Impervious Dispersion Areas

Impervious area dispersion (dispersion) refers to the practice of effectively disconnecting impervious areas from directly draining to the storm drain system by routing runoff from impervious areas such as rooftops (through downspout disconnection), walkways, and driveways onto the surface of adjacent pervious areas. The intent is to slow runoff discharges and reduce volumes. Dispersion with partial or full infiltration results in significant volume reduction by means of infiltration and evapotranspiration. When adequately sized, dispersion can also be used to satisfy both the pollutant control and hydromodification management structural performance standards for a DMA.

- Each self-retaining DMA with impervious area dispersion must fully satisfy all design requirements and restrictions described in BMPDM Section 5.2.3, Fact Sheet SD-B: Impervious Area Dispersion, and any other guidance or instruction identified by the County.
- Documentation of compliance with all applicable conditions must be submitted with this sub-attachment using the Summary Sheet for DMAs with Impervious Area Dispersion on the next page. One version of this Summary Sheet must be completed for each applicable DMA.
- Applicants are responsible to comply with all other applicable requirements, regardless of whether they are included in the summary sheet.
- The following applies if the dispersion area is native soil (SD-B in Appendix E):
    - For pollutant control only, the DMA is considered self-retaining if the impervious to pervious ratio is:
        - 2:1 when the pervious area is composed of Hydrologic Soil Group A
        - 1:1 when the pervious area is composed of Hydrologic Soil Group B
- The following applies if the dispersion area includes amended soil (SD-B in Appendix E):
    - DMAs using impervious area dispersion can be considered to meet both pollutant control and hydromodification flow control requirements if the impervious to pervious area ratio is 1:1 or less and all other design requirements of SD-B are satisfied, including 11 inches of amended soil.
- The following apply if the dispersion area is permeable pavement (SD-D in Appendix E):
    - For pollutant control only, a DMA is considered self-retaining if the ratio of total drainage area (including permeable pavement) to area of permeable pavement is 1.5:1 or less, and all other design requirements of SD-D are satisfied.
    - Hydromodification management performance standards can be satisfied using permeable pavement only if constructed to Structural BMP specifications. In this case, the permeable pavement must be sized and constructed in accordance with the requirements of INF-3.

[2]Applicants wishing to utilize parameters less conservative than listed here must submit modeling to support their proposal. Consult your project manager for more information.
[3]Including the permeable pavement.

Summary Sheet for DMAs with Impervious Area Dispersion (Complete 1 sheet per DMA)

DMA #

A. Minimum Sizing Requirements

Verify that minimum standards are satisfied for the applicable dispersion area type below[2].

Native Soil (Pollutant Control Only) Select one and provide calculations below.

☐ Soil Group A: Ratio I:P is 2:1 or less ☐ Soil Group B: Ratio I:P is 1:1 or less

Impervious Area (ft^2)	Permeable Dispersion Area (ft^2)	Ratio I:P

Amended Soil (Pollutant Control plus Hydromodification Management)

Must satisfy both conditions and provide calculations below.

☐ Ratio I:P is 1:1 or less, AND

☐ 11 inches or more of the top of the pervious area consists of amended soils (Fact Sheet SD-F)

Impervious Area (ft^2)	Permeable Dispersion Area (ft^2)	Ratio I:P

Permeable Pavement (Pollutant Control Only) Provide calculations below.

☐ Ratio DMA area to area of permeable pavement is 1.5:1 or less

DMA Area[3] (ft^2)	Permeable Pavement Area (ft^2)	Ratio DMA:Pavement

B. Minimum Design Criteria

Check the boxes below to confirm that each design criterion has been satisfied for the DMA.

Impervious Areas:

☐ Are graded to ensure area that the full DCV drains to the dispersion area before the runoff discharges from the DMA.

Pervious Dispersion Areas:

☐ Are less than 5% slope and sheet flow over a distance of at least 10 feet from inflow to overflow route.

☐ Have inflow velocities of 3 ft/s or less OR use energy dissipation methods (e.g., riprap, level spreader) for concentrated inflows.

☐ Are densely and robustly vegetated with drought tolerant species.

☐ Consist of soil types capable of supporting or being amended to support vegetation (e.g., with sand or compost). If applicable, media amendments have been tested to verify that they are not a source of pollutants.

☐ Are owned by the project owner and will be dedicated to exclude future uses that might reduce their effectiveness.

Copy and Paste table here for additional DMAs

[2]Applicants wishing to utilize parameters less conservative than listed here must submit modeling to support their proposal. Consult your project manager for more information.

[3]Including the permeable pavement.

6.3.2 Self-retaining DMAs with Tree Wells

Trees wells can provide a variety of benefits such as interception and increased infiltration of rainfall, reduced erosion, energy conservation, air quality improvement, and aesthetic enhancement. They can also be used to satisfy both pollutant control and hydromodification management performance standards for a DMA.

- Each self-retaining DMA with tree wells must fully satisfy all design requirements and restrictions described in BMPDM Section 5.2.3, Fact Sheet SD-A: Tree Wells, and any other guidance or instruction identified by the County.
- For pollutant control only, the DMA must retain the entire DCV. For hydromodification management, an additional volume must be retained in accordance with the sizing requirements presented in the DCV multiplier table in Fact Sheet SD-A.
- Documentation of compliance with applicable conditions must be submitted using the Summary Sheet for Self-retaining DMAs with Tree Wells on the next page. One version of this Summary Sheet must be completed for each applicable DMA.
- If both pollutant control and hydromodification standards apply, the soil depth of all tree wells in the DMA must be selected before determining the Required Retention Volume (RRV). Each tree well must be constructed to the selected depth. For pollutant control only, tree wells within a DMA may be constructed to different soil depths.
- In most cases tree wells must use Amended Soil per Fact Sheet SD-F. However, Structural Soil is required in some cases (e.g., placing the tree well next to a curb). See Structural Requirements for Confined Tree Well Soil Volume in Fact Sheet SD-A for additional explanation. If applicable, list the DMAs and Tree Well #s below for all tree wells requiring Structural Soil.

DMA #	Tree Wells Requiring Structural Soil (list Tree Well #s)

- The Design Capture Volume (DCV) must be known for each DMA in order to determine the volume to be mitigated by the tree wells. Instructions for DCV calculation are provided in BMPDM Appendix B.1. An automated version of Worksheet B.1 (Calculation of Design Capture Volume) is available at www.sandiegocounty.gov/stormwater under the Development Resources tab.

Summary Sheet for Self-retaining DMAs with Tree Wells (complete one sheet per DMA)

DMA #:		DMA Area (ft^2):	
Required Retention Volume (RRV)			
a. Design Capture Volume (DCV; ft^3):			
b. DCV Multiplier (Fact Sheet SD-A)			
Applicable Structural Performance Standards (select one)	Tree well soil depth (inches)	Underlying soil type (A, B, C, or D)	DCV Multiplier
☐ Pollutant control only	Any	All	1.0
☐ Pollutant control plus hydromodification			
c. Required Retention Volume (ft^3) [DCV * DCV Multiplier]			

Tree Well Credit Volume (add records or copy this sheet as needed for additional tree wells)			
Provide the information below for each tree well or group of tree wells within the DMA. A single entry can be used for any group of tree wells of the same species and soil depth.			
Tree species or name		No. tree wells	
Mature Canopy Diameter (ft)		Credit Volume per tree well (ft^3)	
Tree well ID #(s)		Combined Volume (ft^3)	
Tree species or name		No. tree wells	
Mature Canopy Diameter (ft)		Credit Volume per tree well (ft^3)	
Tree well ID #(s)		Combined Volume (ft^3)	
Tree species or name		No. tree wells	
Mature Canopy Diameter (ft)		Credit Volume per tree well (ft^3)	
Tree well ID #(s)		Combined Volume (ft^3)	
Tree species or name		No. tree wells	
Mature Canopy Diameter (ft)		Credit Volume per tree well (ft^3)	
Tree well ID #(s)		Combined Volume (ft^3)	
Tree species or name		No. tree wells	
Mature Canopy Diameter (ft)		Credit Volume per tree well (ft^3)	
Tree well ID #(s)		Combined Volume (ft^3)	
Total Credit Volume (ft3) Add the combined volumes above. Total credit volume must equal or exceed the RRV.			

Copy and Paste table here for additional DMAs

7.0 General Requirements

- Submit this cover page and all required Sub-attachments for all structural BMPs proposed for the project.
- See the BMPDM sections and appendices listed under "BMPDM Design Resources" in the table below for additional explanation of design requirements. Constructed features must fully satisfy the requirements described in these resources, and any other guidance identified by the County.
- PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management. Completion of SWQMP Attachment 8 is also required for these BMPs.
- DMA Exhibits and Construction Plans: DMAs, features, and BMPs identified and described in this attachment must be shown on DMA Exhibits and all applicable construction plans submitted for the project. See Attachment 2 for additional instruction on exhibits and plans.
- Structural BMP Certification. All structural BMPs documented this attachment and in Attachment 8 must be certified by a registered engineer in Sub-attachment 7.1.
- Structural BMP Verification. Structural BMP installation must be verified by the County at the completion of construction. Applicants must complete an Installation Verification Form (Attachment 10).

Sub-attachments (check all that are completed)	Requirement	BMPDM Design Resources
☒ 7.1: Preparer's Certification	Required	• N/A
☒ 7.2: Structural BMP Strategy	Required	• BMPDM Sections 5.1., 5.3, 5.4, and Chapter 6 • BMPDM Appendix E (pages E-78 through E-210)
☒ 7.3: Structural BMP Checklist(s)	Required	
☒ 7.4: Stormwater Pollutant Control Worksheet Calculations	Required	• BMPDM Appendix B
☒ 7.5: Identification and Narrative of Receiving Water and Pollutants of Concern	Required if flow-thru BMPs are proposed	• N/A

7.1 Engineer of Work Certification for Structural BMPs

Project Name Smilax
Permit Application Number PDS2019-TM-5634

CERTIFICATION

I hereby declare that I am the Engineer in Responsible Charge of design of structural storm water best management practices (BMPs) for this project, and that I have exercised responsible charge over the design of the BMPs as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the PDP requirements of the County of San Diego BMP Design Manual, which is a design manual for compliance with local County of San Diego Watershed Protection Ordinance (Sections 67.801 et seq.) and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100) requirements for storm water management. I have read and understand that the County of San Diego has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the BMP Design Manual.

I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by County staff is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of structural storm water BMPs for this project, of my responsibilities for their design.

☒ In addition to the structural pollutant control BMPs described in this attachment, this certification applies to the Structural Hydromodification Management BMPs described in Attachment 8 (check if applicable).

Alisa S. Vialpando

Engineer of Work's Signature, PE Number & Expiration Date

Alisa S. Vialpando

Print Name

Hunsaker & Associates San Diego, Inc.

Company

7/8/20

Date

Engineer's Seal:

7.2.1 Narrative Strategy (Continue description on subsequent pages as necessary)

Describe the general strategy for structural BMP implementation at the project site. For pollutant control BMPs, your description must address the key points outlined in Section 5.1 of the BMP Design Manual, and the type of BMPs selected. For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate.

The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan was done based on the County of San Diego BMP Design Manual and the requirements of the San Diego Regional Water Quality Control Board Order R9-2013-0001. A biofiltration basin was designed to meet the Water Quality and Hydromodification Requirements. According to the Soils Report by Geosoils dated June 7, 2018 the soil type is D and has infiltration rates of about 0.0 – 0.06 inches/hour advising for no infiltration for the BMP. The basin was designed to capture 1.5 times the 85th percentile design capture volume (DCV) which is 10,000 cubic feet for this project with runoff factors being 0.9 for impervious surfaces, 0.3 for semi-pervious and 0.1 for pervious surfaces. The calculations are included in Attachment 1. The tributary areas to the BMP are shown on the DMA map.

7.2.2 Structural BMP Summary Table (Complete for all proposed structural BMPs)										
• List and provide the information requested below for all pollutant control and hydromodification management BMPs proposed for the project. • For each BMP listed, complete the Structural BMP Checklist on the next page. Copy the Checklist as many times as needed.										
			Structural BMP Type							
BMP ID #	DMA #	DMA Area (ft^2)	Harvest and Use	Infiltration	Unlined Biofiltration	Lined Biofiltration	Flow-thru treatment	Hydromodification Management[1]	Other	Permit # and Sheet #
BF1-1	1	4.44	☐	☐	☐	☒	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	
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			☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	

Copy and Paste table here for additional BMPs

[1] Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

7.3 Structural BMP Checklist (Complete once for each proposed structural BMP)

Structural BMP ID #	Permit # and Sheet #

BMP Type

Infiltration
- ☐ Infiltration basin (INF-1)
- ☐ Bioretention (INF-2)
- ☐ Permeable pavement (INF-3)

Unlined Biofiltration
- ☐ Biofiltration with partial retention (PR-1)

Lined Biofiltration
- ☒ Biofiltration (BF-1)
- ☐ Nutrient Sensitive Media Design (BF-2)
- ☐ Proprietary Biofiltration (BF-3)

Harvest and Use
- ☐ Cistern (HU-1)

Flow-thru Treatment (describe below)
- ☐ With prior lawful approval to meet earlier PDP requirements
- ☐ Pre-treatment/forebay for an onsite retention or biofiltration BMP[2]
- ☐ With alternative compliance

Hydromodification Management[3]
- ☐ Detention pond or vault
- ☐ Other (describe below)

BMP Purpose
- ☐ Pollutant control only
- ☐ Hydromodification control only
- ☒ Combined pollutant control and hydromodification
- ☐ Pre-treatment/forebay for another BMP
- ☐ Other (describe below)

BMP Verification (See BMPDM Section 8.3)

Provide name and contact information for the party responsible to sign BMP verification forms	KB Home Coastal, Inc.

BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)

BMP Maintenance Category	Cat. 1 ☒	Cat. 2 ☐	Cat. 3 ☐	Cat. 4 ☐
Final owner of BMP	☐ HOA	☐ Property Owner	☐ County	☐ Other (describe): TBD
Maintenance of BMP into perpetuity	☐ HOA	☐ Property Owner	☐ County	☐ Other (describe): TBD

Discussion (As needed; Continue on subsequent pages as necessary)

Copy and Paste table here for additional BMPs

[2] Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.
[3] Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

7.4 Storm Water Pollutant Control Worksheet Calculations

- Use this page as a cover sheet for the submittal of any required worksheets below.
- Complete the checklist to identify which BMPDM Appendix B (Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods) worksheets are included with this attachment.
- See BMPDM Appendix B for an explanation of the applicability of individual worksheets and detailed guidance on their completion.

Worksheet	Requirement
☒ Worksheet B.1 Calculation of Design Capture Volume (DCV)	Required
☒ Worksheet B.2 Retention Requirements	Required
☒ Worksheet B.3 BMP Performance	Required
☐ Worksheet B.4 Major Maintenance Intervals for Reduced-sized BMPs	If applicable
☐ Other worksheets	As required

County of San Diego Automated Stormwater Pollutant Control Worksheets
(Version 2.0)

WELCOME:

Welcome to the County of San Diego Automated Stormwater Pollutant Control Worksheets. These worksheets may be used to demonstrate compliance with stormwater pollutant control standards set forth in the 2013 MS4 Permit for Priority Development Projects and Green Street Projects.

INSTRUCTIONS:

General: To use this workbook, navigate to each of the worksheet tabs below and populate all yellow cells with project specific information. Yellow cells require user input, white cells are locked for editing and are automatically calculated, blue cells are also locked for editing and are automatically populated based on results from previous worksheet tabs, grey cells are items that do not require user input because of previous user inputs, orange cells represent warnings where supplemental information and/or revisions may be required for compliance. The worksheets are formatted to accommodate calculations for up to 10 drainage areas and associated BMPs. Each drainage area and BMP is represented as a discrete column with corresponding user inputs and calculations appearing in the rows below. Please note that projects with more than 10 drainage areas may need to use more than one workbook to accommodate the entire project.

Step 1. DCV: Provide the required inputs to determine the design capture volume for each PDP drainage area. The calculations in this worksheet determine the initial design capture volume and also apply any applicable reductions associated with site design techniques including dispersion to pervious surfaces, incorporation of tree wells, and incorporation of rain barrels.

Step 2. Retention Requirements: Provide required inputs to determine the minimum retention requirements for each drainage area.

Step 3. BMP Performance: Provide required inputs to determine the portion of the pollutant control performance standards that are satisfied by the proposed BMPs.

Reduced Size BMP Maintenance (optional): If BMPs with a footprint of less than 3% of the effective impervious tributary are proposed, provide required inputs to determine the anticipated frequency for major BMP maintenance activities.

DISCLAIMER:

The County of San Diego has developed this tool in an effort to streamline traditionally complex efforts associated with planning, design, submittal, and review of PDPs that are subject to stormwater pollutant control requirements set forth in the 2013 MS4 Permit. While the calculations performed herein are deemed to be in compliance with Permit requirements, applicants may elect to provide their own calculations. Use of this tool is optional and the County will not be held liable for any errors or other negative impacts associated with its use. In the event that the County performs updates to these worksheets, applicants that have not established reliance on previous versions of the worksheet via discretionary approval may be required to utilize the latest version of the worksheets. A summary of version releases is included below.

QUESTIONS:

-Questions relating to specific projects, submittal requirements, approval process, and/or policy-related issues should be directed your PDS Land Development Project Manager (link below).

PDS Land Development Project Manager

-General questions/comments on this worksheet may be directed to Charles Mohrlock in the County of San Diego Watershed Protection Program (link below).

charles.mohrlock@sdcounty.ca.gov

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	i	ii	iii	iv	v	vi	vii	viii	ix	x	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	DMA 1 & 2										unitless
	2	85th Percentile 24-hr Storm Depth	0.69										inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	134,391										sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)	65,614										sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)	4,228										sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	No	No	No	No	yes/no
	11	Impervious Surfaces Directed to Dispersion Area per SD-B (Ci=0.90)											sq-ft
	12	Semi-Pervious Surfaces Serving as Dispersion Area per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces Serving as Dispersion Area per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil Serving as Dispersion Area per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil Serving as Dispersion Area per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil Serving as Dispersion Area per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil Serving as Dispersion Area per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A											#
	19	Average Mature Tree Canopy Diameter											ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	204,233	0	0	0	0	0	0	0	0	0	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	26	Initial Design Capture Volume	8,103	0	0	0	0	0	0	0	0	0	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.69	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
	32	Design Capture Volume After Dispersion Techniques	8,103	0	0	0	0	0	0	0	0	0	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	36	Final Effective Tributary Area	140,921	0	0	0	0	0	0	0	0	0	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	8,103	0	0	0	0	0	0	0	0	0	cubic-feet

No Warning Messages

Automated Worksheet B.2: Retention Requirements (V2.0)

Category	#	Description	i	ii	iii	iv	v	vi	vii	viii	ix	x	Units
Basic Analysis	1	Drainage Basin ID or Name	DMA 1 & 2	-	-	-	-	-	-	-	-	-	unitless
	2	85th Percentile Rainfall Depth	0.69	-	-	-	-	-	-	-	-	-	inches
	3	Predominant NRCS Soil Type Within BMP Location	D										unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted										unitless
	5	Nature of Restriction	Soil Type										unitless
	6	Do Minimum Retention Requirements Apply to this Project?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No										yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	No										yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	~~0.000~~										in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	-	-	-	-	-	-	-	-	-	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	1.5%	-	-	-	-	-	-	-	-	-	percentage
	12	Fraction of DCV Requiring Retention	0.01	-	-	-	-	-	-	-	-	-	ratio
	13	Required Retention Volume	81	-	-	-	-	-	-	-	-	-	cubic-feet

No Warning Messages

Automated Worksheet B.3: BMP Performance (V2.0)

Category	#	Description	i	ii	iii	iv	v	vi	vii	viii	ix	x	Units
BMP Inputs	1	Drainage Basin ID or Name	DMA 1 & 2	-	-	-	-	-	-	-	-	-	sq-ft
	2	Design Infiltration Rate Recommended	0.000	-	-	-	-	-	-	-	-	-	in/hr
	3	Design Capture Volume Tributary to BMP	8,103	-	-	-	-	-	-	-	-	-	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated										unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined										unitless
	6	Does BMP Have an Underdrain?	Underdrain										unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard										unitless
	8	Provided Surface Area	4,228										sq-ft
	9	Provided Surface Ponding Depth	6										inches
	10	Provided Soil Media Thickness	24										inches
	11	Provided Gravel Thickness (Total Thickness)	15										inches
	12	Underdrain Offset	3										inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	1.00										inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	25	Calculated Retention Storage Drawdown Time	120	0	0	0	0	0	0	0	0	0	hours
	26	Efficacy of Retention Processes	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	979	0	0	0	0	0	0	0	0	0	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	7,124	0	0	0	0	0	0	0	0	0	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	0.0488	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	2.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	15.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	38	Drawdown Time for Surface Ponding	12	0	0	0	0	0	0	0	0	0	hours
	39	Drawdown Time for Effective Biofiltration Depth	31	0	0	0	0	0	0	0	0	0	hours
	40	Total Depth Biofiltered	18.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	10,686	0	0	0	0	0	0	0	0	0	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	6,551	0	0	0	0	0	0	0	0	0	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	5,343	0	0	0	0	0	0	0	0	0	cubic-feet
	44	Option 2 - Provided Storage Volume	5,343	0	0	0	0	0	0	0	0	0	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	-	-	-	-	-	-	-	-	-	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	48	Deficit of Effectively Treated Stormwater	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	cubic-feet

3"Mulch+18"Media+3" ASTM No. 33 Fine Sand

3" ASTM No.8 Stone + 12" Total Storage layer

No Warning Messages

Automated Worksheet B.4: Reduced Size BMP Maintenance Interval (V2.0)

Category	#	Description	i	ii	iii	iv	v	vi	vii	viii	ix	x	Units
Drainage Basin Info	1	Drainage Basin ID or Name	-	-	-	-	-	-	-	-	-	-	unitless
	2	Final Effective Tributary Area	-	-	-	-	-	-	-	-	-	-	sq-ft
	3	Provided BMP Surface Area	-	-	-	-	-	-	-	-	-	-	sq-ft
Biofiltration Clogging Inputs	4	Average Annual Precipitation											inches
	5	Load to Clog (default =2.0)											lb/sq-ft
	6	TSS Pretreatment Efficacy											yes/no
	7	Percentage "Commercial"											percentage
	8	Percentage "Education"											percentage
	9	Percentage "Industrial"											percentage
	10	Percentage "Low Traffic Areas"											percentage
	11	Percentage "Multi-Family Residential"											percentage
	12	Percentage "Roof Areas"											percentage
	13	Percentage "Single Family Residential"											percentage
	14	Percentage "Transportation"											percentage
	15	Percentage "Vacant/Open Space"											percentage
	16	Percentage "Steep Hillslopes"											percentage
Result	17	Total Percentage of Above Land Uses	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	percentage
	18	Average TSS Concentration for Tributary After Pretreatment	0	0	0	0	0	0	0	0	0	0	mg/L
	19	Average Annual Runoff Volume	0	0	0	0	0	0	0	0	0	0	cubic-feet
	20	Average Annual TSS Load	0	0	0	0	0	0	0	0	0	0	lb/yr
	21	Available Sediment Storage within BMP	0	0	0	0	0	0	0	0	0	0	lb
	22	Anticipated Major Maintenance Frequency	-	-	-	-	-	-	-	-	-	-	years

No Warning Messages

		To BF-1-1			
		DMA1.1		DMA1.2 (Street Widening)	
	Runoff Factor	Area (ac.)	Summation RF x A	Area (ac.)	Summation RF x A
Roofs	0.90	1.537	1.383	0.000	0.000
Concrete or Asphalt	0.90	1.373	1.235	0.176	0.158
Much or Amended Soil	0.10	0.097	0.010	0.000	0.000
Compacted Soil	0.30	1.433	0.430	0.073	0.022
TOTAL AREA		4.439	3.058	0.249	0.180
WEIGHTED RUNOFF FACTOR			0.69		0.72

`

DMA #	a. DMA Area (ft2)	Incidental Impervious Area		Description
		b. Size (ft2)	c. %(b/a*100)	
1.1	193381	126730	66%	Tributary to basin
1.2	10852	7661	71%	Tributary to basin
3*	10335	0	0%	Self-metigating
4**	197	197	100%	De Minimis
5**	250	250	100%	De Minimis

*DMA3 IS A NATURAL OR LANDSCAPE AREA THAT DRAINS DIRECTLY OFFSITE AND MEET ALL THE SELF MITIGATING DMA REQUIREMENTS (5.2.1 SELF MITIGATING DMAS - BMP MANUAL) ** DMA4 AND DMA5 ARE DE MINIMIS AREAS THAT MEET ALL THE DE MINIMS DMA REQUIREMENTS (5.2.2 DE MINIMIS DMAS - BMP MANUAL)

%85 P24= 0.69 in

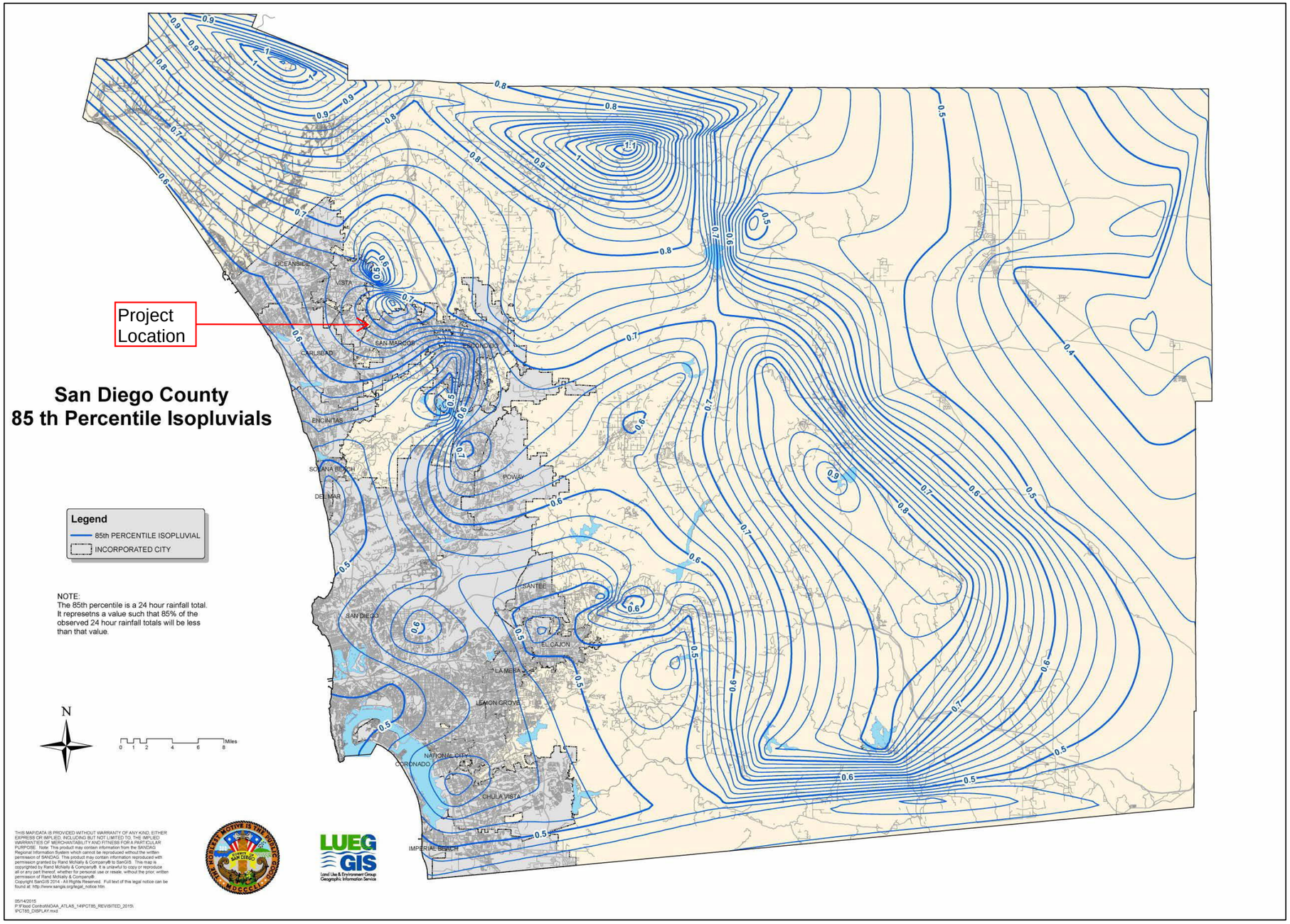


Figure B.1-1: 85th Percentile 24-hour Isopluvial Map

7.5 Identification and Narrative of Receiving Water and Pollutants of Concern

- Complete this sub-attachment only if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs. Unless excepted because of a Prior Lawful Approval[4], PDPs must also participate in an alternative compliance program[5].

A. General Description

Describe flow path of storm water from the project site discharge location(s), through urban storm conveyance systems as applicable, to receiving creeks, rivers, and lagoons as applicable, and ultimate discharge to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable).

Once runoff has been routed through the respective basin outlet structure and spillway, it confluences with separate offsite flows and is conveyed via existing 18" storm drain pipe crossing Poinsettia Ave. as in the existing conditions, at the middle of west border of the site,. The out-flow is conveyed southwest via overland flow towards Oleander Ave., and eventually discharging into Agua Hedionda Creek.

At the eastern border of the site, there is a zone of right of way dedication and potential road widening along Smilax Road. The project site plan has been set back from Smilax Road in order to accommodate these future potential widening improvements by others.
As a consequence, the project proposes a long driveway which results in a larger de-minimis area than is typical discharging to Smilax Road.

B. Water Body Impairments and Priorities

List any 303(d) impaired water bodies[6] within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:

303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs / WQIP Highest Priority Pollutant
Agua Hedionda Creek	Benthic Community Effects, Bifenthrin Chlorpyrifos Cypemethrin Malathion Manganese Nitrogen Phosphorus Selenium Total Dissolved Solids Toxicity	Indicator Bacteria
Buena Creek	DDT(Dichlorodiphenyltrichloroethane) Nitrate and Nitrite Nitrogen Phosphorus	Indicator Bacteria

[4] See BMPDM Appendix L: Prior Lawful Approval Requirements and Guidance.
[5] See SWQMP Attachment 12 (Alternative Compliance Projects) and BMPDM Appendix J (Offsite Alternative Compliance Requirements and Guidance).
[6] The current list of Section 303(d) impaired water bodies can be found at:
https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml

C. Identification of Project Site Pollutants Identify pollutants expected from the project site based on all proposed use(s) of the site (see BMP Design Manual Appendix B.6.		

Pollutant	Not Applicable to the Project Site	Anticipated from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment	☐	☒	☐
Nutrients	☐	☒	☐
Heavy Metals	☐	☒	☐
Organic Compounds	☐	☒	☐
Trash & Debris	☐	☒	☐
Oxygen Demanding Substances	☐	☒	☐
Oil & Grease	☐	☒	☐
Bacteria & Viruses	☐	☒	☐
Pesticides	☐	☒	☐

8.0 General Requirements

- Completion of this attachment is required for all PDPs subject to hydromodification management requirements (see PDP SWQMP Form Table 5). Do not submit this attachment if exempt from Hydromodification Management requirements. Document the PDP exemption in Attachment 9.
- Submit this cover page and all required Sub-attachments for all structural hydromodification management BMPs proposed for the project.
- Constructed features must fully satisfy the requirements described in applicable BMPDM sections and appendices, and any other guidance identified by the County.
- DMA Exhibits and Construction Plans: DMAs, features, and BMPs identified and described in this attachment must be shown on DMA Exhibits and all applicable construction plans submitted for the project. See Attachment 2 for additional instruction on exhibits and plans.
- Structural BMP Certification. All structural hydromodification management BMPs documented this attachment must be certified by a registered engineer in Attachment 7, Sub-attachment 7.1.
- Structural BMP Verification. BMP installation must be verified by the County at the completion of construction. Applicants must complete an Installation Verification Form (Attachment 10).

Sub-attachments (check all that are completed)
☒ 8.1: Flow Control Facility Design (required)[1] Submit using ☒ the Sub-attachment 8.1 cover sheet provided, or ☐ as a separate stand-alone document labeled Sub-attachment 8.1.
☒ 8.2: Hydromodification Management Points of Compliance (required) Complete the table provided in Sub-attachment 8.2.
8.3: Geomorphic Assessment of Receiving Channels 1. Has a geomorphic assessment been performed for the receiving channel(s)? ☒ No, the low flow threshold is 0.1Q2 (default low flow threshold)
☐ Yes (provide the information below): Low flow threshold: ☐ 0.1Q2 ☐ 0.3Q2 ☐ 0.5Q2
Title: Date: Preparer:
Submit using ☐ the Sub-attachment 8.3 cover sheet provided, or ☐ as a separate stand-alone document labeled Sub-attachment 8.3.
8.4: Vector Control Plan (required if BMPs will not drain in less than 96 hours) ☐ Included with this attachment ☒ Not required

[1] Including Structural BMP Drawdown Calculations and Overflow Design Summary. See BMPDM Chapter 6 and Appendix G for additional design guidance.

Insert Flow Control Facility Design behind this cover page or submit as a separate stand-alone document labeled Sub-attachment 8.1.

Sub-attachment 8.1
Flow Control Facility Design

Hydromodification Management Plan

INTRODUCTION

This report summarizes the approach used to model the proposed Smilax project site within San Diego County, CA using the Environmental Protection Agency (EPA) Storm Water Management Model 5.1 (SWMM). SWMM models were prepared for the pre and post developed conditions at the site in order to determine if the proposed biofiltration and hydromodification/detention basin facility has sufficient footprint and storage to meet the current Hydromodification Management Plan (HMP) requirements from the Regional Water Quality Control Board (RWQCB).

SWMM MODEL DEVELOPMENT

Two (2) SWMM models were prepared for this study, one for the points of compliance (POCs) in existing conditions and one for POCs in the proposed condition. For all SWMM models, flow duration curves were prepared to demonstrate that the proposed biofiltration & hydromodification and detention basin footprint will be sufficient to meet the current HMP requirements.

The inputs required to develop SWMM models include rainfall, watershed characteristics, and BMP configurations. The Oceanside Rain Gage from the Project Clean Water website was used for this study, since it is the most representative of the project site precipitation.

Evaporation for the site was modeled using average monthly values from the San Diego County hourly dataset. The site was modeled with hydrologic soil group D soil as determined from both the San Diego County Hydrology Manual soil map and the USGS Survey web-based Soil Survey Map. Other SWMM inputs for the subareas are discussed in the attachment to this document where the selection of the parameters is explained in detail.

BIOFILTRATION MODELING

Developed storm water runoff is routed through one (1) biofiltration & hydromodification and detention basin, location of basin can be found on the Proposed Hydromodification Map. The basin was modeled using the bioretention LID module within SWMM. The bioretention module can model the underground gravel storage layer, underdrain with an orifice plate, amended soil layer, and a surface storage pond up to the elevation of the invert of the bottom orifice. A separate diversion and detention basin were used to model the portion of the storage pond between the base orifice invert elevations and the spillway elevation from the biofiltration basin, according to the assumptions explained in the appendix. Once runoff has been routed through the respective basin outlet structure and spillway, it flows to the POC and then conveyed with the off-site runoffs via existing storm drain crossing Poinsettia Ave.

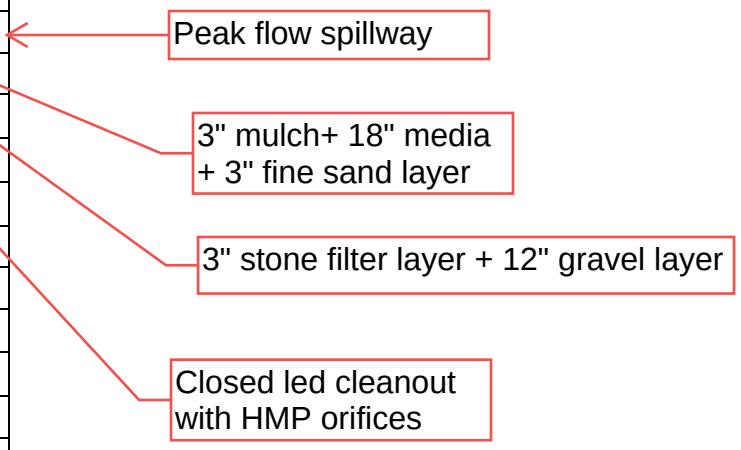
Basin Discussion:

Flow control in the basin is achieved using multiple orifices on a concrete cleanout box. The size, number and location of the orifices are presented in the Basin Table below. The basin also contains an emergency overflow riser that is only utilized in storm events equal to or larger than the 100 year storm. Sizing and further peak flow discussion is in the Drainage Study Smilax.

Basin Table

	BF-1-1
Weir Height (ft)*	4
Weir Length (ft)	8
Amended Soil Depth (in)	24
Storage Depth (in)	15
Approx. Dimensions (LxW)	2'x2'
Top Orifice	
No. of Orifices	1
Diameter (in)	3
Invert Height (ft)*	3.0
Middle Orifice	
No. of Orifices	1
Diameter (in)	2
Invert Height (ft)*	1.0
Bottom Orifice	
No. of Orifices	1
Diameter (in)	1
Invert Height (ft)*	0.5
Sub-Drain Orifice	
No. of Orifices	1
Diameter (in)	3

*From finish grade



FLOW DURATION CURVE COMPARISON

The Flow Duration Curves (FDC) for the site were compared at POCs by exporting the hourly runoff time series results from SWMM to a spreadsheet. The FDC was compared between 10% of the existing condition Q_2 (based on accepting an assumption of high susceptibility for downstream channel erosion as required if no soils tests are completed) up to the existing condition Q_{10}. The Q_2 and Q_{10} were determined using a partial duration statistical analysis of the runoff time series in an Excel spreadsheet using the Cunnane plotting position method (which is the preferred plotting methodology in the HMP Permit). As the SWMM Model is a statistical analysis based on the Weibull Plotting Position Method, the Weibull Method was also used within the spreadsheet to ensure that the results were similar to those obtained by the SWMM Model.

The range between 10% of Q_2 and Q_{10} was divided into 100 equal time intervals; the number of hours that each flow rate was exceeded was counted from the hourly series. Additionally, the intermediate peaks with a return period "i" were obtained (Q_i with i=3 to 9). For the purpose of the plot, the values were presented as percentage of time exceeded for each flow rate.

The FDC comparison at POC-1 is illustrated in Figure 1 in logarithmic scale. POC-1 corresponds with the point located downstream of the discharge of Basin 1. Attachment 10 of this HMP Study provides detailed drainage exhibit for the post-developed condition.

As can be seen in Figure 1 the FDC for the proposed condition with the basin is within 110% of the curve for the existing condition. The additional runoff volume generated from developing the site will be released to the downstream storm drain at a flow rate below the 10% Q_2 lower threshold. Additionally, the project will not increase peak flow rates between the Q_2 and the Q_{10}, as shown in the graphic and also in the attached table.

SUMMARY & CONCLUSION

The total project area to POC-1 is identical in pre and post project condition. The proposed biofiltration and hydromodification/detention facility mitigate increased flow frequencies as a result of development. At the eastern border of the site, there is a road widening area along Smilax Road. The runoff from Smilax Road widening, entrance driveway, and the adjusted landscaped area (total of 0.25 acres) is collected by a proposed curb inlet locate north of the entrance and conveyed west via proposed storm drain to the project biofiltration basin BF-1-1. In order to capture the flow from the street widening added and replaced pavement and routed it to the proposed biofiltration basin, about 0.05 acres at the eastern border of the site, which used to drain in south-north direction in the existing condition, is diverted west in the proposed condition to be treated in the biofiltration basin (BF-1-1). As a consequence, the project depicts an increase in the drainage area to the west as compared to existing condition.

Area Summary

	Existing (AC)	Proposed (AC)
POC 1	4.44	4.44
TOTAL	4.44	4.44

This study has demonstrated that the proposed biofiltration and hydromodification/detention footprint at the Smilax site is sufficient to meet the current HMP criteria if the biofiltration cross-section area, volume and outlet structures recommended within this attachment are incorporated within the proposed project site.

KEY ASSUMPTIONS

1. D Soils are representative of the existing conditions for the site.

ATTACHMENTS

1. Flow Duration Curve Analysis
2. Elevation vs. Area Curves vs. Discharge Curves to be used in SWMM
3. Biofiltration Details
4. SWMM Input Data (Existing and Proposed Models)
5. SWMM Screens and Explanation of Significant Variables
6. Drying Time of the Surface Layer of Biofiltration cells
7. Hydromodification Watershed Maps

Flow duration curve shall not exceed the existing conditions by more than 10% neither in peak flow nor duration.

The figure on the following page illustrates that the flow duration curve in post-development conditions after the proposed BMPs is below the existing flow duration curve. The flow duration curve table following the curve shows that if the interval 0.10Q 2 – Q 10 is divided in 100 sub-intervals, then a) the post development divided by pre-development durations are never larger than 110% (the permit allows up to 110%); and b) there are no more than 10 intervals in the range 101%-110% which would imply an excess over 10% of the length of the curve (the permit allows less than 10% of excesses measured as 101-110%).

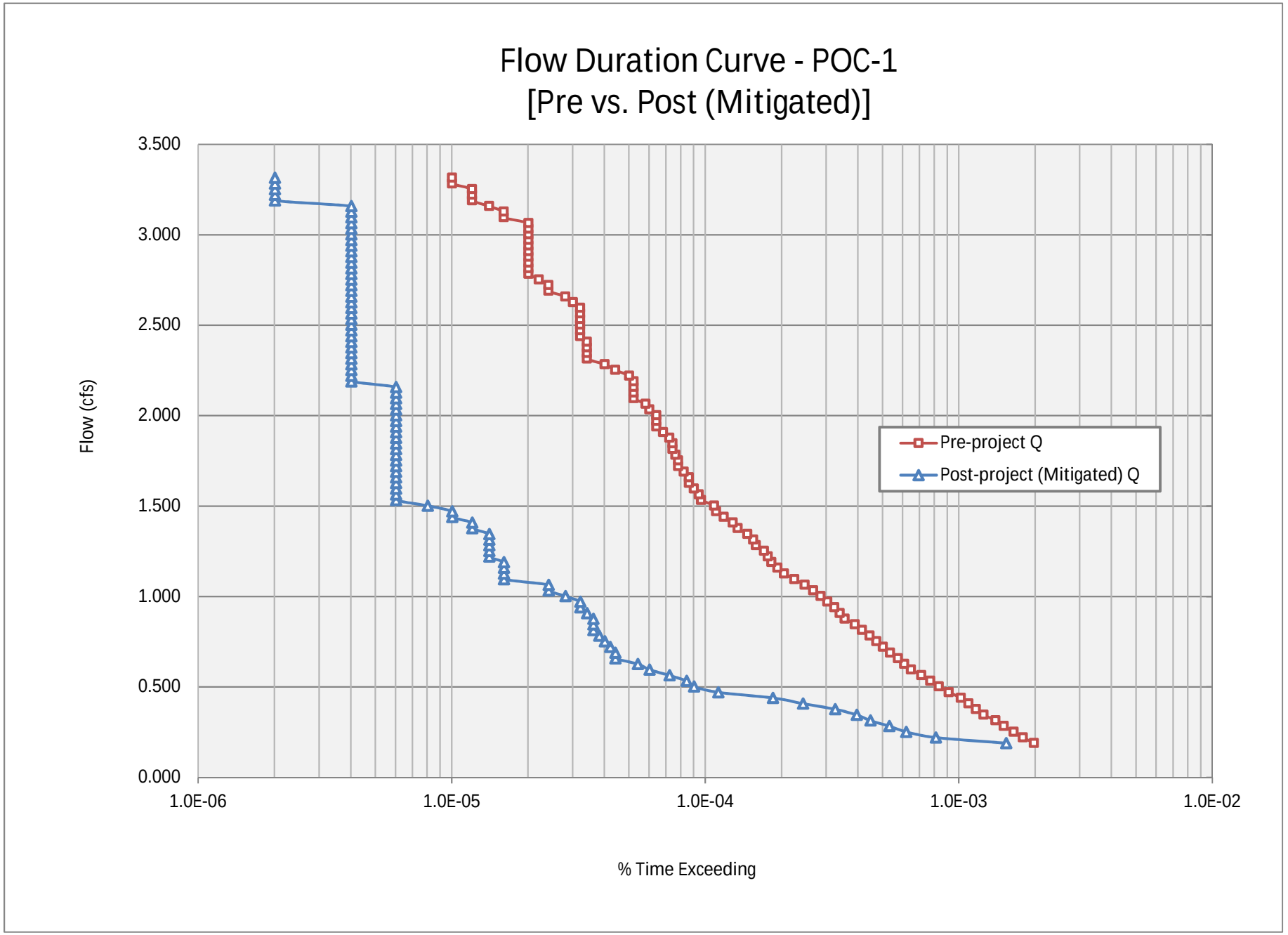
Consequently, the design passes the hydromodification test.

It is important to note that the flow duration curve can be expressed in the "x" axis as percentage of time, hours per year, total number of hours, or any other similar time variable. As those variables only differ by a multiplying constant, their plot in logarithmic scale is going to look exactly the same and compliance can be observed regardless of the variable selected. The selection of a logarithmic scale in lieu of the normal scale is preferred, as differences between the pre-development and post-development curves can be seen more clearly in the entire range of analysis. Both graphics are presented for reference.

In terms of the "y" axis, the peak flow value is the variable of choice. As an additional analysis performed by H&A, not only the range of analysis is clearly depicted (10% of Q 2 to Q 10) but also all intermediate flows are shown (30% of Q 2 , 50% of Q 2 , Q 2 , Q 3 , Q 4 , Q 5 , Q 6 , Q 7 , Q 8 and Q 9) in order to demonstrate compliance at any range Q x – Q x+1 . It must be pointed out that one of the limitations of both the SWMM and SDHM models is that the intermediate analysis is not performed (to obtain Q i from i = 2 to 10).

The largest "n" peak flows are attached in this appendix, as well as the values of Q_i with a return period "i", from i=2 to 10. The Q i values are also added into the flow-duration plot.

ATTACHMENT 1 - Flow Duration Curve Analysis, Plot & Table



Smilax	POC-1

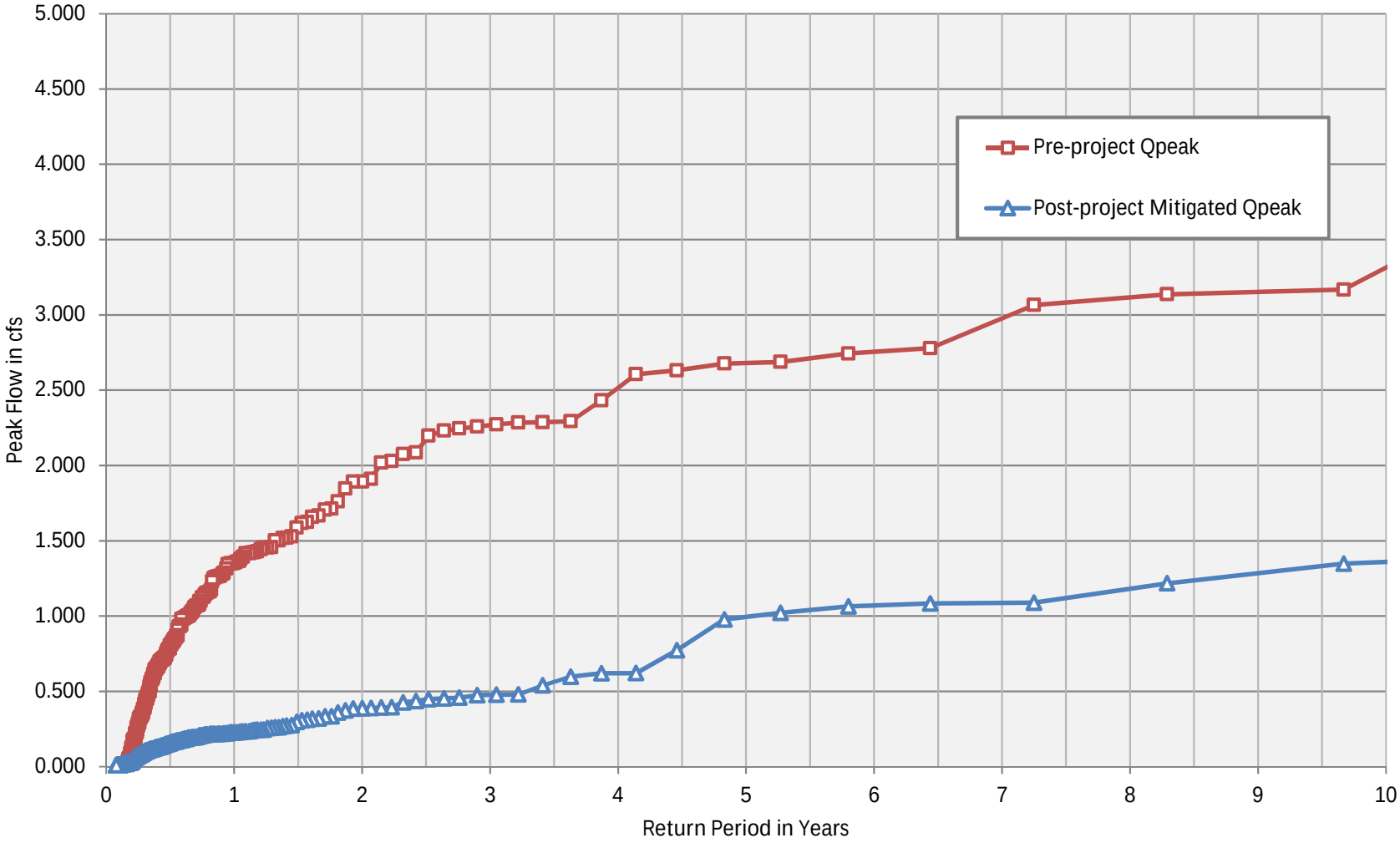
Low-flow Threshold: 10%
0.1xQ2 (Pre): 0.189 cfs
Q10 (Pre): 3.314 cfs
Ordinate #: 100
Incremental Q (Pre): 0.03125 cfs
Total Hourly Data: 497370 hours

The proposed BMP: PASSED

Interval	Pre-project Flow (cfs)	Pre-project Hours	Pre-project % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
0	0.189	987	1.98E-03	766	1.54E-03	78%	Pass
1	0.221	893	1.80E-03	404	8.12E-04	45%	Pass
2	0.252	820	1.65E-03	309	6.21E-04	38%	Pass
3	0.283	750	1.51E-03	265	5.33E-04	35%	Pass
4	0.314	696	1.40E-03	223	4.48E-04	32%	Pass
5	0.346	624	1.25E-03	197	3.96E-04	32%	Pass
6	0.377	582	1.17E-03	162	3.26E-04	28%	Pass
7	0.408	544	1.09E-03	121	2.43E-04	22%	Pass
8	0.439	508	1.02E-03	92	1.85E-04	18%	Pass
9	0.471	455	9.15E-04	56	1.13E-04	12%	Pass
10	0.502	416	8.36E-04	45	9.05E-05	11%	Pass
11	0.533	385	7.74E-04	42	8.44E-05	11%	Pass
12	0.564	355	7.14E-04	36	7.24E-05	10%	Pass
13	0.595	323	6.49E-04	30	6.03E-05	9%	Pass
14	0.627	304	6.11E-04	27	5.43E-05	9%	Pass
15	0.658	287	5.77E-04	22	4.42E-05	8%	Pass
16	0.689	267	5.37E-04	22	4.42E-05	8%	Pass
17	0.720	250	5.03E-04	21	4.22E-05	8%	Pass
18	0.752	236	4.74E-04	20	4.02E-05	8%	Pass
19	0.783	222	4.46E-04	19	3.82E-05	9%	Pass
20	0.814	207	4.16E-04	18	3.62E-05	9%	Pass
21	0.845	194	3.90E-04	18	3.62E-05	9%	Pass
22	0.877	177	3.56E-04	18	3.62E-05	10%	Pass
23	0.908	169	3.40E-04	17	3.42E-05	10%	Pass
24	0.939	161	3.24E-04	16	3.22E-05	10%	Pass
25	0.970	151	3.04E-04	16	3.22E-05	11%	Pass
26	1.002	142	2.86E-04	14	2.81E-05	10%	Pass
27	1.033	133	2.67E-04	12	2.41E-05	9%	Pass
28	1.064	123	2.47E-04	12	2.41E-05	10%	Pass
29	1.095	112	2.25E-04	8	1.61E-05	7%	Pass
30	1.127	102	2.05E-04	8	1.61E-05	8%	Pass
31	1.158	96	1.93E-04	8	1.61E-05	8%	Pass
32	1.189	91	1.83E-04	8	1.61E-05	9%	Pass
33	1.220	88	1.77E-04	7	1.41E-05	8%	Pass
34	1.252	85	1.71E-04	7	1.41E-05	8%	Pass
35	1.283	79	1.59E-04	7	1.41E-05	9%	Pass
36	1.314	77	1.55E-04	7	1.41E-05	9%	Pass
37	1.345	73	1.47E-04	7	1.41E-05	10%	Pass
38	1.377	67	1.35E-04	6	1.21E-05	9%	Pass
39	1.408	64	1.29E-04	6	1.21E-05	9%	Pass
40	1.439	59	1.19E-04	5	1.01E-05	8%	Pass
41	1.470	55	1.11E-04	5	1.01E-05	9%	Pass
42	1.502	54	1.09E-04	4	8.04E-06	7%	Pass
43	1.533	48	9.65E-05	3	6.03E-06	6%	Pass
44	1.564	47	9.45E-05	3	6.03E-06	6%	Pass
45	1.595	45	9.05E-05	3	6.03E-06	7%	Pass
46	1.627	43	8.65E-05	3	6.03E-06	7%	Pass
47	1.658	43	8.65E-05	3	6.03E-06	7%	Pass
48	1.689	41	8.24E-05	3	6.03E-06	7%	Pass

Interval	Pre-project Flow (cfs)	Pre-project Hours	Pre-project % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
49	1.720	39	7.84E-05	3	6.03E-06	8%	Pass
50	1.752	39	7.84E-05	3	6.03E-06	8%	Pass
51	1.783	38	7.64E-05	3	6.03E-06	8%	Pass
52	1.814	37	7.44E-05	3	6.03E-06	8%	Pass
53	1.845	37	7.44E-05	3	6.03E-06	8%	Pass
54	1.877	36	7.24E-05	3	6.03E-06	8%	Pass
55	1.908	34	6.84E-05	3	6.03E-06	9%	Pass
56	1.939	32	6.43E-05	3	6.03E-06	9%	Pass
57	1.970	32	6.43E-05	3	6.03E-06	9%	Pass
58	2.002	32	6.43E-05	3	6.03E-06	9%	Pass
59	2.033	30	6.03E-05	3	6.03E-06	10%	Pass
60	2.064	29	5.83E-05	3	6.03E-06	10%	Pass
61	2.095	26	5.23E-05	3	6.03E-06	12%	Pass
62	2.127	26	5.23E-05	3	6.03E-06	12%	Pass
63	2.158	26	5.23E-05	3	6.03E-06	12%	Pass
64	2.189	26	5.23E-05	2	4.02E-06	8%	Pass
65	2.220	25	5.03E-05	2	4.02E-06	8%	Pass
66	2.252	22	4.42E-05	2	4.02E-06	9%	Pass
67	2.283	20	4.02E-05	2	4.02E-06	10%	Pass
68	2.314	17	3.42E-05	2	4.02E-06	12%	Pass
69	2.345	17	3.42E-05	2	4.02E-06	12%	Pass
70	2.376	17	3.42E-05	2	4.02E-06	12%	Pass
71	2.408	17	3.42E-05	2	4.02E-06	12%	Pass
72	2.439	16	3.22E-05	2	4.02E-06	13%	Pass
73	2.470	16	3.22E-05	2	4.02E-06	13%	Pass
74	2.501	16	3.22E-05	2	4.02E-06	13%	Pass
75	2.533	16	3.22E-05	2	4.02E-06	13%	Pass
76	2.564	16	3.22E-05	2	4.02E-06	13%	Pass
77	2.595	16	3.22E-05	2	4.02E-06	13%	Pass
78	2.626	15	3.02E-05	2	4.02E-06	13%	Pass
79	2.658	14	2.81E-05	2	4.02E-06	14%	Pass
80	2.689	12	2.41E-05	2	4.02E-06	17%	Pass
81	2.720	12	2.41E-05	2	4.02E-06	17%	Pass
82	2.751	11	2.21E-05	2	4.02E-06	18%	Pass
83	2.783	10	2.01E-05	2	4.02E-06	20%	Pass
84	2.814	10	2.01E-05	2	4.02E-06	20%	Pass
85	2.845	10	2.01E-05	2	4.02E-06	20%	Pass
86	2.876	10	2.01E-05	2	4.02E-06	20%	Pass
87	2.908	10	2.01E-05	2	4.02E-06	20%	Pass
88	2.939	10	2.01E-05	2	4.02E-06	20%	Pass
89	2.970	10	2.01E-05	2	4.02E-06	20%	Pass
90	3.001	10	2.01E-05	2	4.02E-06	20%	Pass
91	3.033	10	2.01E-05	2	4.02E-06	20%	Pass
92	3.064	10	2.01E-05	2	4.02E-06	20%	Pass
93	3.095	8	1.61E-05	2	4.02E-06	25%	Pass
94	3.126	8	1.61E-05	2	4.02E-06	25%	Pass
95	3.158	7	1.41E-05	2	4.02E-06	29%	Pass
96	3.189	6	1.21E-05	1	2.01E-06	17%	Pass
97	3.220	6	1.21E-05	1	2.01E-06	17%	Pass
98	3.251	6	1.21E-05	1	2.01E-06	17%	Pass
99	3.283	5	1.01E-05	1	2.01E-06	20%	Pass
100	3.314	5	1.01E-05	1	2.01E-06	20%	Pass

Peak Flow Frequency Curves - POC-1



Peak Flow Frequency Summary

Return Period	Pre-project Qpeak (cfs)	Post-project - Mitigated Q (cfs)	Reduction (cfs)
LF = 0.1xQ2	0.189	0.039	0.151
2-year	1.893	0.387	1.506
5-year	2.681	0.994	1.687
10-year	3.314	1.359	1.954

ATTACHMENT 2 - Elevation vs. Area Curves vs. Discharge Curves to be used in SWMM

Elevation vs. Area

For the portion of the flow diverted in the LID Control to the receiving detention basin, a pond is used to route the hydrographs. The elevation vs area curve in the model is calculated in Excel and imported into the model at a 0.1 ft interval range.

Elevation vs Discharge

The total discharge peak flow is imported from an Excel spreadsheet that calculated the elevation vs discharge of the multiple outlet system.

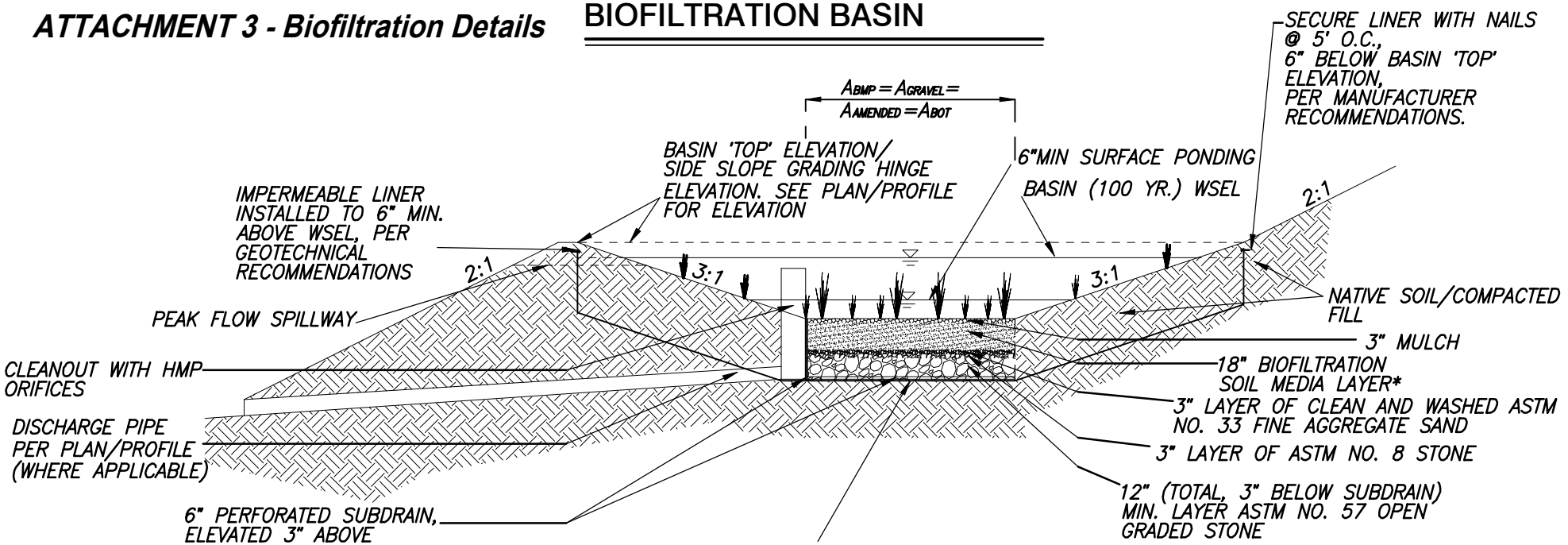
The orifices have been selected to maximize their size while still restricting flows to conform to the required 10% of the Q2 event flow as mandated in the Final Hydromodification Management Plan by Brown & Caldwell, dated March 2011. While we acknowledge that these orifices are small, to increase the size of these outlets would impact the basins' ability to restrict flows beneath the HMP thresholds, thus preventing the BMP from conformance with HMP requirements.

In order to prevent blockage of the orifices, a debris screen will be fitted to the base invert of the lower orifices located within the detention basin. Regular maintenance of the riser and orifices will be performed to ensure potential blockages are minimized. A detail of the orifice and riser structure is provided in Attachment 5 of this attachment. The stage-storage and stage-discharge calculations have been provided on the following pages.

N.T.S.

ATTACHMENT 3 - Biofiltration Details

SOIL SECTION FOR WATER QUALITY/HYDROMODIFICATION BIOFILTRATION BASIN



IMPERMEABLE LINER;
- ENVIRO LINER EL 1030, OR EQUIVALENT
- INSTALL AT INTERFACE BETWEEN GRAVEL/NATIVE AND RUN UP NATIVE SIDESLOPES TO HIGH WATER ELEVATION.
- TIE TO STRUCTURES PER MANUFACTURER RECOMMENDATIONS, WHERE APPLICABLE.
- WATERPROOF ALL AREAS LINER IS PENETRATED, WHERE APPLICABLE.

BIORETENTION SOIL MEDIA (BSM):
- 18" MINIMUM THICKNESS.
- 70% TO 85% BY VOLUME WASHED SAND AND 15% TO 30% BY VOLUME COMPOST OR ALTERNATIVE ORGANIC AMENDMENT.
- BSM: THE C:N RATIO OF BSM SHALL BE BETWEEN 15 AND 40 TO REDUCE THE POTENTIAL FOR NITRATE LEACHING.
- MUST MAINTAIN A MINIMUM PERCOLATION RATE OF 5 INCHES PER HOUR THROUGHOUT THE LIFE OF THE FACILITY, AND IT MUST BE SUITABLE FOR MAINTAINING PLANT LIFE.
- FOR ADDITIONAL INFORMATION REFER TO APPENDIX F.3 OF THE COUNTY OF SAN DIEGO STORM WATER STANDARDS MANUAL.

NOTE: THIS DETAIL APPLIES TO BIOFILTRATION BASINS 'BF–1–1', '

PREPARED BY:

HUNSAKER & ASSOCIATES SAN DIEGO, INC

PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(858)558-4500 FX(858)558-1414

BMP MAP 1- EXHIBIT #2

SMILAX

STORMWATER MAINTENANCE EXHIBIT

COUNTY OF SAN DIEGO, CALIFORNIA

W.O.# 0490–0174

ATTACHMENT 4 - SWMM Input Data (Existing and Proposed Models)

SWMM Model Flow Coefficient Calculation

Basin 1

PARAMETER	ABBREV.	Bio-Retention Cell LID BMP		
Ponding Depth	PD	6	in	
Bioretention Soil Layer	S	24	in	
Gravel Layer	G	12	in	
TOTAL		3.5	ft	
		42	in	
Orifice Coefficient	c_g	0.6	--	
Low Flow Orifice Diameter	D	1	in	
Drain (Flow) exponent	n	0.5	--	
Flow Rate (volumetric)	Q	0.049	cfs	div cutoff flow
Ponding Depth Surface Area	A_{PD}	4690	ft^2	
Bioretention Surface Area	A_S, A_G	4228	ft^2	
	A_S, A_G	0.0971	ac	
Porosity of Bioretention Soil	n	0.40	-	
Flow Rate (per unit area)	q	1.248	in/hr	
Effective Ponding Depth	PD_{eff}	6.33	in	
Flow Coefficient	C	0.1937	--	

Smilax Stage Storage	
BF-1-1	
depth	area
0.00	4228
0.05	4274
0.10	4320
0.15	4367
0.20	4413
0.25	4459
0.30	4505
0.35	4552
0.40	4598
0.45	4644
0.50	4690
0.55	4737
0.60	4783
0.65	4829
0.70	4875
0.75	4921
0.80	4968
0.85	5014
0.90	5060
0.95	5106
1.00	5153
1.05	5201
1.10	5249
1.15	5297
1.20	5345
1.25	5392
1.30	5440
1.35	5488
1.40	5536
1.45	5584
1.50	5632
1.55	5680
1.60	5728
1.65	5776
1.70	5824
1.75	5872
1.80	5920
1.85	5968
1.90	6016
1.95	6064
2.00	6112
2.05	6164
2.10	6216
2.15	6267
2.20	6319
2.25	6371
2.30	6423
2.35	6475
2.40	6526
2.45	6578
2.50	6630
2.55	6682
2.60	6733
2.65	6785
2.70	6837
2.75	6889
2.80	6941
2.85	6992
2.90	7044
2.95	7096
3.00	7148
3.05	7204
3.10	7260
3.15	7316
3.20	7371

Smilax Stage Storage	
BF-1-1	
3.25	7427
3.30	7483
3.35	7539
3.40	7595
3.45	7651
3.50	7707
3.55	7763
3.60	7819
3.65	7875
3.70	7930
3.75	7986
3.80	8042
3.85	8098
3.90	8154
3.95	8210
4.00	8266
4.05	8323
4.10	8381
4.15	8438
4.20	8496
4.25	8554
4.30	8611
4.35	8669
4.40	8726
4.45	8784
4.50	8841
4.55	8899
4.60	8956
4.65	9014
4.70	9071
4.75	9129
4.80	9186
4.85	9244
4.90	9302
4.95	9359
5.00	9417
5.05	9477
5.10	9537
5.15	9598
5.20	9658
5.25	9718
5.30	9779
5.35	9839
5.40	9900
5.45	9960
5.50	10020
5.55	10081
5.60	10141
5.65	10201
5.70	10262
5.75	10322
5.80	10383
5.85	10443
5.90	10503
5.95	10564
6.00	10624

Smilax HMP-1

Discharge vs Elevation Table

Bottom orifice diameter:	1 "	Top orifice diameter:	3 "
Number:	1	Number:	1
Cg-low:	0.61	Cg-low:	0.61
invert elev:	0.50 ft	invert elev:	3.00 ft
Middle orifice diameter:	2 "	Emergency weir:	
number of orif:	1	Invert:	4.00 ft
Cg-middle:	0.61	Weir Length (ft)	8.00 ft
invert elev: 1.00 ft Spi 2x2		Spillway	

h (ft)	H/D-low -	H/D-mid -	H/D-top -	H/D-peak -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qtop-orif (cfs)	Qtop-weir (cfs)	Qtot-top (cfs)	Qpeak-top (cfs)	Qtot (cfs)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.000
0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.000
0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.000
0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.000
0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.000
0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.000
0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.000
0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.000
0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.000
0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.000
0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.000
0.55	0.60	0.00	0.00	0.00	0.00	0.00	0.002	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.002
0.60	1.20	0.00	0.00	0.00	0.01	0.01	0.006	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.006
0.65	1.80	0.00	0.00	0.00	0.01	0.01	0.009	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.009
0.70	2.40	0.00	0.00	0.00	0.01	0.01	0.011	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.011
0.75	3.00	0.00	0.00	0.00	0.01	0.01	0.012	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.012
0.80	3.60	0.00	0.00	0.00	0.01	0.02	0.014	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.014
0.85	4.20	0.00	0.00	0.00	0.01	0.03	0.015	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.015
0.90	4.80	0.00	0.00	0.00	0.02	0.07	0.016	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.016
0.95	5.40	0.00	0.00	0.00	0.02	0.16	0.017	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.017
1.00	6.00	0.00	0.00	0.00	0.02	0.34	0.018	0.00	0.00	0.000	0.00	0.00	0.000	0.000	0.018
1.05	6.60	0.30	0.00	0.00	0.02	0.65	0.019	0.00	0.00	0.003	0.00	0.00	0.000	0.000	0.022
1.10	7.20	0.60	0.00	0.00	0.02	1.15	0.020	0.01	0.01	0.012	0.00	0.00	0.000	0.000	0.032
1.15	7.80	0.90	0.00	0.00	0.02	1.92	0.021	0.03	0.02	0.025	0.00	0.00	0.000	0.000	0.046
1.20	8.40	1.20	0.00	0.00	0.02	3.03	0.022	0.04	0.04	0.036	0.00	0.00	0.000	0.000	0.058
1.25	9.00	1.50	0.00	0.00	0.02	4.60	0.022	0.04	0.05	0.044	0.00	0.00	0.000	0.000	0.066
1.30	9.60	1.80	0.00	0.00	0.02	6.74	0.023	0.05	0.06	0.050	0.00	0.00	0.000	0.000	0.073
1.35	10.20	2.10	0.00	0.00	0.02	9.61	0.024	0.06	0.07	0.055	0.00	0.00	0.000	0.000	0.079
1.40	10.80	2.40	0.00	0.00	0.02	13.38	0.025	0.06	0.08	0.060	0.00	0.00	0.000	0.000	0.085
1.45	11.40	2.70	0.00	0.00	0.03	18.22	0.025	0.06	0.08	0.065	0.00	0.00	0.000	0.000	0.090
1.50	12.00	3.00	0.00	0.00	0.03	24.36	0.026	0.07	0.08	0.069	0.00	0.00	0.000	0.000	0.095
1.55	12.60	3.30	0.00	0.00	0.03	32.03	0.027	0.07	0.08	0.073	0.00	0.00	0.000	0.000	0.100
1.60	13.20	3.60	0.00	0.00	0.03	41.50	0.027	0.08	0.09	0.077	0.00	0.00	0.000	0.000	0.104
1.65	13.80	3.90	0.00	0.00	0.03	53.07	0.028	0.08	0.12	0.080	0.00	0.00	0.000	0.000	0.109
1.70	14.40	4.20	0.00	0.00	0.03	67.08	0.029	0.08	0.17	0.084	0.00	0.00	0.000	0.000	0.113
1.75	15.00	4.50	0.00	0.00	0.03	83.87	0.029	0.09	0.26	0.087	0.00	0.00	0.000	0.000	0.117
1.80	15.60	4.80	0.00	0.00	0.03	103.84	0.030	0.09	0.41	0.090	0.00	0.00	0.000	0.000	0.120
1.85	16.20	5.10	0.00	0.00	0.03	127.43	0.031	0.09	0.62	0.094	0.00	0.00	0.000	0.000	0.124
1.90	16.80	5.40	0.00	0.00	0.03	155.09	0.031	0.10	0.93	0.097	0.00	0.00	0.000	0.000	0.128
1.95	17.40	5.70	0.00	0.00	0.03	187.34	0.032	0.10	1.36	0.099	0.00	0.00	0.000	0.000	0.131
2.00	18.00	6.00	0.00	0.00	0.03	224.72	0.032	0.10	1.94	0.102	0.00	0.00	0.000	0.000	0.134
2.05	18.60	6.30	0.00	0.00	0.03	267.80	0.033	0.11	2.71	0.105	0.00	0.00	0.000	0.000	0.138
2.10	19.20	6.60	0.00	0.00	0.03	317.23	0.033	0.11	3.70	0.108	0.00	0.00	0.000	0.000	0.141
2.15	19.80	6.90	0.00	0.00	0.03	373.67	0.034	0.11	4.96	0.110	0.00	0.00	0.000	0.000	0.144
2.20	20.40	7.20	0.00	0.00	0.03	437.84	0.034	0.11	6.53	0.113	0.00	0.00	0.000	0.000	0.147
2.25	21.00	7.50	0.00	0.00	0.03	510.51	0.035	0.12	8.47	0.115	0.00	0.00	0.000	0.000	0.150
2.30	21.60	7.80	0.00	0.00	0.04	592.48	0.035	0.12	10.84	0.118	0.00	0.00	0.000	0.000	0.153
2.35	22.20	8.10	0.00	0.00	0.04	684.63	0.036	0.12	13.70	0.120	0.00	0.00	0.000	0.000	0.156
2.40	22.80	8.40	0.00	0.00	0.04	787.87	0.036	0.12	17.13	0.123	0.00	0.00	0.000	0.000	0.159
2.45	23.40	8.70	0.00	0.00	0.04	903.17	0.037	0.12	21.20	0.125	0.00	0.00	0.000	0.000	0.162
2.50	24.00	9.00	0.00	0.00	0.04	1031.55	0.037	0.13	26.00	0.127	0.00	0.00	0.000	0.000	0.164
2.55	24.60	9.30	0.00	0.00	0.04	1174.09	0.038	0.13	31.61	0.129	0.00	0.00	0.000	0.000	0.167
2.60	25.20	9.60	0.00	0.00	0.04	1331.93	0.038	0.13	38.14	0.132	0.00	0.00	0.000	0.000	0.170
2.65	25.80	9.90	0.00	0.00	0.04	1506.26	0.039	0.13	45.70	0.134	0.00	0.00	0.000	0.000	0.172
2.70	26.40	10.20	0.00	0.00	0.04	1698.35	0.039	0.14	54.39	0.136	0.00	0.00	0.000	0.000	0.175
2.75	27.00	10.50	0.00	0.00	0.04	1909.52	0.040	0.14	64.34	0.138	0.00	0.00	0.000	0.000	0.178
2.80	27.60	10.80	0.00	0.00	0.04	2141.14	0.040	0.14	75.67	0.140	0.00	0.00	0.000	0.000	0.180
2.85	28.20	11.10	0.00	0.00	0.04	2394.66	0.041	0.14	88.53	0.142	0.00	0.00	0.000	0.000	0.183
2.90	28.80	11.40	0.00	0.00	0.04	2671.61	0.041	0.14	103.06	0.144	0.00	0.00	0.000	0.000	0.185
2.95	29.40	11.70	0.00	0.00	0.04	2973.56	0.041	0.15	119.42	0.146	0.00	0.00	0.000	0.000	0.187
3.00	30.00	12.00	0.00	0.00	0.04	3302.17	0.042	0.15	137.77	0.148	0.00	0.00	0.000	0.000	0.190
3.05	30.60	12.30	0.20	0.00	0.04	3659.16	0.042	0.15	158.29	0.150	0.00	0.00	0.004	0.000	0.196
3.10	31.20	12.60	0.40	0.00	0.04	4046.33	0.043	0.15	181.17	0.152	0.00	0.02	0.016	0.000	0.210
3.15	31.80	12.90	0.60	0.00	0.04	4465.55	0.043	0.15	206.59	0.154	0.04	0.03	0.034	0.000	0.230
3.20	32.40	13.20	0.80	0.00	0.04	4918.76	0.044	0.16	234.76	0.155	0.07	0.06	0.056	0.000	0.255
3.25	33.00	13.50	1.00	0.00	0.04	5408.00	0.044	0.16	265.90	0.157	0.08	0.08	0.081	0.000	0.282
3.30	33.60	13.80	1.20	0.00	0.04	5935.36	0.044	0.16	300.23	0.159	0.10	0.11	0.101	0.000	0.304
3.35	34.20	14.10	1.40	0.00	0.04	6503.02	0.045	0.16	337.99	0.161	0.11	0.13	0.114	0.000	0.320
3.40	34.80	14.40	1.60	0.00	0.05	7113.25	0.045	0.16	379.44	0.163	0.13	0.16	0.126	0.000	0.334
3.45	35.40	14.70	1.80	0.00	0.05	7768.41	0.046	0.16	424.82	0.164	0.14	0.18	0.137	0.000	0.347
3.50	36.00	15.00	2.00	0.00	0.05	8470.91	0.046	0.17	474.42	0.166	0.15	0.20	0.147	0.000	0.359
3.55	36.60	15.30	2.20	0.00	0.05	9223.28	0.046	0.17	528.52	0.168	0.16	0.21	0.157	0.000	0.371
3.60	37.20	15.60	2.40	0.00	0.05	10028.13	0.047	0.17	587.42	0.169	0.17	0.22	0.166	0.000	0.382
3.65	37.80	15.90	2.60	0.00	0.05	10888.14	0.047	0.17	651.41	0.171	0.17	0.22	0.174	0.000	0.392
3.70	38.40	16.20	2.80	0.00	0.05	11806.11	0.047	0.17	720.84	0.173	0.18	0.22	0.182	0.000	0.402
3.75	39.00	16.50	3.00	0.00	0.05	12784.92	0.048	0.17	796.03	0.174	0.19	0.22	0.190	0.000	0.412

h (ft)	H/D-low -	H/D-mid -	H/D-top -	H/D-peak -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qtop-orif (cfs)	Qtop-weir (cfs)	Qtot-top (cfs)	Qpeak-top (cfs)	Qtot (cfs)
3.80	39.60	16.80	3.20	0.00	0.05	13827.53	0.048	0.18	877.34	0.176	0.20	0.22	0.197	0.000	0.422
3.85	40.20	17.10	3.40	0.00	0.05	14937.02	0.049	0.18	965.12	0.178	0.20	0.24	0.205	0.000	0.431
3.90	40.80	17.40	3.60	0.00	0.05	16116.54	0.049	0.18	1059.76	0.179	0.21	0.26	0.212	0.000	0.440
3.95	41.40	17.70	3.80	0.00	0.05	17369.36	0.049	0.18	1161.65	0.181	0.22	0.30	0.218	0.000	0.448
4.00	42.00	18.00	4.00	0.00	0.05	18698.83	0.050	0.18	1271.19	0.182	0.22	0.37	0.225	0.000	0.457
4.05	42.60	18.30	4.20	0.07	0.05	20108.43	0.050	0.18	1388.80	0.184	0.23	0.47	0.231	0.298	0.763
4.10	43.20	18.60	4.40	0.15	0.05	21601.72	0.050	0.19	1514.93	0.185	0.24	0.62	0.237	0.842	1.316
4.15	43.80	18.90	4.60	0.22	0.05	23182.36	0.051	0.19	1650.01	0.187	0.24	0.83	0.243	1.548	2.029
4.20	44.40	19.20	4.80	0.30	0.05	24854.13	0.051	0.19	1794.53	0.189	0.25	1.12	0.249	2.383	2.872
4.25	45.00	19.50	5.00	0.37	0.05	26620.91	0.051	0.19	1948.96	0.190	0.25	1.49	0.255	3.330	3.826
4.30	45.60	19.80	5.20	0.45	0.05	28486.69	0.052	0.19	2113.80	0.192	0.26	1.96	0.260	4.377	4.881
4.35	46.20	20.10	5.40	0.52	0.05	30455.58	0.052	0.19	2289.57	0.193	0.27	2.57	0.266	5.516	6.027
4.40	46.80	20.40	5.60	0.60	0.05	32531.79	0.052	0.19	2476.80	0.194	0.27	3.32	0.271	6.739	7.258
4.45	47.40	20.70	5.80	0.67	0.05	34719.63	0.053	0.20	2676.05	0.196	0.28	4.24	0.277	8.042	8.567
4.50	48.00	21.00	6.00	0.75	0.05	37023.56	0.053	0.20	2887.86	0.197	0.28	5.36	0.282	9.419	9.951
4.55	48.60	21.30	6.20	0.82	0.05	39448.12	0.053	0.20	3112.84	0.199	0.29	6.70	0.287	10.866	11.405
4.60	49.20	21.60	6.40	0.90	0.05	41997.99	0.054	0.20	3351.59	0.200	0.29	8.31	0.292	12.381	12.927
4.65	49.80	21.90	6.60	0.97	0.05	44677.97	0.054	0.20	3604.71	0.202	0.30	10.20	0.297	13.961	14.513
4.70	50.40	22.20	6.80	1.05	0.05	47492.96	0.054	0.20	3872.86	0.203	0.30	12.42	0.302	15.602	16.161
4.75	51.00	22.50	7.00	1.12	0.05	50448.01	0.055	0.20	4156.69	0.205	0.31	15.00	0.306	17.303	17.869
4.80	51.60	22.80	7.20	1.20	0.06	53548.26	0.055	0.21	4456.87	0.206	0.31	17.99	0.311	19.062	19.634
4.85	52.20	23.10	7.40	1.27	0.06	56799.02	0.055	0.21	4774.09	0.207	0.32	21.43	0.316	20.877	21.455
4.90	52.80	23.40	7.60	1.35	0.06	60205.68	0.056	0.21	5109.08	0.209	0.32	25.37	0.320	22.746	23.330
4.95	53.40	23.70	7.80	1.42	0.06	63773.78	0.056	0.21	5462.57	0.210	0.32	29.87	0.325	24.667	25.258
5.00	54.00	24.00	8.00	1.50	0.06	67509.00	0.056	0.21	5835.30	0.211	0.33	34.96	0.329	26.640	27.237
5.05	54.60	24.30	8.20	1.57	0.06	71417.13	0.057	0.21	6228.06	0.213	0.33	40.72	0.333	28.663	29.266
5.10	55.20	24.60	8.40	1.65	0.06	75504.11	0.057	0.21	6641.63	0.214	0.34	47.20	0.338	30.734	31.343
5.15	55.80	24.90	8.60	1.72	0.06	79776.00	0.057	0.22	7076.84	0.215	0.34	54.47	0.342	32.853	33.468
5.20	56.40	25.20	8.80	1.80	0.06	84239.00	0.058	0.22	7534.51	0.217	0.35	62.59	0.346	35.019	35.640
5.25	57.00	25.50	9.00	1.87	0.06	88899.46	0.058	0.22	8015.51	0.218	0.35	71.64	0.350	37.231	37.857
5.30	57.60	25.80	9.20	1.95	0.06	93763.84	0.058	0.22	8520.71	0.219	0.35	81.69	0.354	39.487	40.118
5.35	58.20	26.10	9.40	2.02	0.06	98838.78	0.059	0.22	9051.01	0.221	0.36	92.82	0.358	41.786	42.424
5.40	58.80	26.40	9.60	2.10	0.06	104131.02	0.059	0.22	9607.34	0.222	0.36	105.11	0.362	44.129	44.772
5.45	59.40	26.70	9.80	2.17	0.06	109647.47	0.059	0.22	10190.63	0.223	0.37	118.66	0.366	46.514	47.163
5.50	60.00	27.00	10.00	2.25	0.06	115395.17	0.059	0.22	10801.86	0.224	0.37	133.55	0.370	48.941	49.595
5.55	60.60	27.30	10.20	2.32	0.06	121381.33	0.060	0.23	11442.02	0.226	0.37	149.88	0.374	51.408	52.068
5.60	61.20	27.60	10.40	2.40	0.06	127613.27	0.060	0.23	12112.11	0.227	0.38	167.75	0.378	53.916	54.581
5.65	61.80	27.90	10.60	2.47	0.06	134098.49	0.060	0.23	12813.17	0.228	0.38	187.26	0.382	56.463	57.133
5.70	62.40	28.20	10.80	2.55	0.06	140844.63	0.061	0.23	13546.27	0.229	0.39	208.52	0.386	59.048	59.724
5.75	63.00	28.50	11.00	2.62	0.06	147859.48	0.061	0.23	14312.48	0.231	0.39	231.66	0.389	61.672	62.353
5.80	63.60	28.80	11.20	2.70	0.06	155150.98	0.061	0.23	15112.92	0.232	0.39	256.77	0.393	64.334	65.021
5.85	64.20	29.10	11.40	2.77	0.06	162727.25	0.062	0.23	15948.71	0.233	0.40	284.00	0.397	67.033	67.725
5.90	64.80	29.40	11.60	2.85	0.06	170596.52	0.062	0.23	16821.01	0.234	0.40	313.47	0.400	69.769	70.466
5.95	65.40	29.70	11.80	2.92	0.06	178767.23	0.062	0.24	17731.01	0.236	0.40	345.31	0.404	72.541	73.243
6.00	66.00	30.00	12.00	3.00	0.06	187247.94	0.062	0.24	18679.90	0.237	0.41	379.66	0.407	75.349	76.056

Draw Down*				
Elevation	Q_{AVG} (CFS)	$DV_{n, n+1}$ (CF)	DT (HR)	Total T
0.00	0.045	212.6	1.31	53.85
0.05	0.045	214.9	1.33	52.54
0.10	0.045	217.2	1.34	51.21
0.15	0.045	219.5	1.35	49.87
0.20	0.045	221.8	1.37	48.52
0.25	0.045	224.1	1.38	47.15
0.30	0.045	226.4	1.40	45.77
0.35	0.045	228.7	1.41	44.37
0.40	0.045	231.0	1.43	42.96
0.45	0.045	233.4	1.44	41.53
0.50	0.046	235.7	1.42	40.09
0.55	0.049	238.0	1.34	38.67
0.60	0.053	240.3	1.27	37.33
0.65	0.055	242.6	1.23	36.06
0.70	0.056	244.9	1.21	34.83
0.75	0.058	247.2	1.19	33.62
0.80	0.059	249.5	1.17	32.44
0.85	0.060	251.9	1.16	31.26
0.90	0.062	254.2	1.15	30.11
0.95	0.063	256.5	1.14	28.96
1.00	0.065	258.8	1.10	27.82
1.05	0.072	261.2	1.00	26.72
1.10	0.084	263.6	0.87	25.71
1.15	0.097	266.0	0.76	24.84
1.20	0.107	268.4	0.70	24.08
1.25	0.115	270.8	0.66	23.38
1.30	0.121	273.2	0.63	22.72
1.35	0.127	275.6	0.60	22.10
1.40	0.132	278.0	0.58	21.49
1.45	0.138	280.4	0.57	20.91
1.50	0.142	282.8	0.55	20.34
1.55	0.147	285.2	0.54	19.79
1.60	0.151	287.6	0.53	19.25
1.65	0.156	290.0	0.52	18.73
1.70	0.160	292.4	0.51	18.21

Elevation	Q_{AVG} (CFS)	$DV_{n, n+1}$ (CF)	DT (HR)	Total T
1.75	0.163	294.8	0.50	17.70
1.80	0.167	297.2	0.49	17.20
1.85	0.171	299.6	0.49	16.70
1.90	0.174	302.0	0.48	16.22
1.95	0.178	304.4	0.48	15.74
2.00	0.181	306.9	0.47	15.26
2.05	0.184	309.5	0.47	14.79
2.10	0.188	312.1	0.46	14.32
2.15	0.191	314.7	0.46	13.86
2.20	0.194	317.3	0.45	13.40
2.25	0.197	319.8	0.45	12.95
2.30	0.200	322.4	0.45	12.50
2.35	0.203	325.0	0.45	12.05
2.40	0.205	327.6	0.44	11.60
2.45	0.208	330.2	0.44	11.16
2.50	0.211	332.8	0.44	10.72
2.55	0.214	335.4	0.44	10.28
2.60	0.216	338.0	0.43	9.84
2.65	0.219	340.6	0.43	9.41
2.70	0.221	343.1	0.43	8.98
2.75	0.224	345.7	0.43	8.55
2.80	0.226	348.3	0.43	8.12
2.85	0.229	350.9	0.43	7.69
2.90	0.231	353.5	0.42	7.26
2.95	0.234	356.1	0.42	6.84
3.00	0.238	358.8	0.42	6.42
3.05	0.248	361.6	0.40	6.00
3.10	0.265	364.4	0.38	5.59
3.15	0.287	367.2	0.35	5.21
3.20	0.314	370.0	0.33	4.86
3.25	0.338	372.8	0.31	4.53
3.30	0.357	375.6	0.29	4.22
3.35	0.372	378.4	0.28	3.93
3.40	0.385	381.1	0.27	3.65
3.45	0.398	383.9	0.27	3.37
3.50	0.410	386.7	0.26	3.10
3.55	0.421	389.5	0.26	2.84
3.60	0.432	392.3	0.25	2.58
3.65	0.442	395.1	0.25	2.33
3.70	0.452	397.9	0.24	2.08
3.75	0.462	400.7	0.24	1.84
3.80	0.471	403.5	0.24	1.60
3.85	0.480	406.3	0.24	1.36
3.90	0.489	409.1	0.23	1.13
3.95	0.498	411.9	0.23	0.89
4.00	0.655	414.7	0.18	0.66

Elevation	Q_{AVG} (CFS)	$DV_{n, n+1}$ (CF)	DT (HR)	Total T
4.05	1.084	417.6	0.11	0.49
4.10	1.717	420.5	0.07	0.38
4.15	2.495	423.4	0.05	0.31
4.20	3.394	426.2	0.03	0.27
4.25	4.399	429.1	0.03	0.23
4.30	5.499	432.0	0.02	0.20
4.35	6.687	434.9	0.02	0.18
4.40	7.957	437.7	0.02	0.16
4.45	9.304	440.6	0.01	0.15
4.50	10.723	443.5	0.01	0.13
4.55	12.211	446.4	0.01	0.12
4.60	13.765	449.3	0.01	0.11
4.65	15.382	452.1	0.01	0.10
4.70	17.060	455.0	0.01	0.10
4.75	18.796	457.9	0.01	0.09
4.80	20.590	460.8	0.01	0.08
4.85	22.438	463.6	0.01	0.08
4.90	24.339	466.5	0.01	0.07
4.95	26.292	469.4	0.00	0.06
5.00	28.296	472.3	0.00	0.06
5.05	30.349	475.4	0.00	0.05
5.10	32.451	478.4	0.00	0.05
5.15	34.599	481.4	0.00	0.05
5.20	36.793	484.4	0.00	0.04
5.25	39.033	487.4	0.00	0.04
5.30	41.316	490.5	0.00	0.04
5.35	43.643	493.5	0.00	0.03
5.40	46.013	496.5	0.00	0.03
5.45	48.424	499.5	0.00	0.03
5.50	50.876	502.5	0.00	0.02
5.55	53.347	505.5	0.00	0.02
5.60	55.857	508.6	0.00	0.02
5.65	58.428	511.6	0.00	0.02
5.70	61.039	514.6	0.00	0.01
5.75	63.687	517.6	0.00	0.01
5.80	66.373	520.6	0.00	0.01
5.85	69.095	523.7	0.00	0.01
5.90	71.854	526.7	0.00	0.00
5.95	74.649	529.7	0.00	0.00
6.00				0.00

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[TITLE]
;;Project Title/Notes
Smilax SWMM Model- Existing Condition

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           08/28/1951
START_TIME           05:00:00
REPORT_START_DATE    08/28/1951
REPORT_START_TIME    05:00:00
END_DATE             05/23/2008
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         0:01:00
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.557
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .06    .08    .11    0.15   .18    0.19   0.2    0.19   0.15   0.11   .08    .06
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
Oceanside        VOLUME    1:00     1.0      TIMESERIES Oceanside

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack

;;-------------- ---------------- ---------------- -------- -------- -------- -------- --------
----------------
;Existing Area to be developed (including portion of the street widening)
DMA1-EX          Oceanside        POC1Ex           4.65     0.0      279      5.0      0

;Selfmitigating
SM1              Oceanside        POC1Ex           0.24     0        400      4.4      0


[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA1-EX          .012       0.15       .05        .1         25         OUTLET
SM1              0.012      0.15       0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
```

```
;;-------------- ---------- ---------- ----------
DMA1-EX          9          0.025      0.3
SM1              9          0.025      0.3

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC1Ex           0          FREE                        NO

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Oceanside        FILE "OCEANSIDE.prn"

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 798.851 3861.367 2824.444 6414.111
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC1Ex           1740.113           3977.401

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA1-EX          1497.424           4458.652
SM1              2425.364           4411.596

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Oceanside        1855.795           4796.248
```

1516_Smilax_POC1-PR -un.inp

Unmitigated Conditions

```
[TITLE]
;;Project Title/Notes
Smilax-POC1-PR

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           08/28/1951
START_TIME           05:00:00
REPORT_START_DATE    08/28/1951
REPORT_START_TIME    05:00:00
END_DATE             05/23/2008
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         0:01:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.557
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .06    .08    .11    0.15   .18    .21    0.2    0.19   0.15   0.11   .08    .06
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
Oceanside        VOLUME    1:00     1.0      TIMESERIES Oceanside

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack

;;-------------- ---------------- ---------------- -------- -------- -------- -------- --------
----------------
BasinBF-1-1      Oceanside        POC-1            0.24     0        50       .01      0

;DEVELOPED AREA
DMA-1.1          Oceanside        BasinBF-1-1      4.20     69.3     213      4.0      0

DMA1.2           Oceanside        BASINBF-1-1      0.25     70.60    150      4.5      0

;SELFMITIGATING AREA
SM1              Oceanside        POC-1            0.24     0        400      4.38     0


[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
BasinBF-1-1      0.012      0.15       0.05       0.1        25         OUTLET
DMA-1.1          0.012      0.15       0.05       0.1        25         OUTLET
```

```
DMA1.2           0.012      0.15       0.05       0.1        25         OUTLET
SM1              0.012      0.15       0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
BasinBF-1-1      1.5        .3         .33
DMA-1.1          9          0.01875    .30
DMA1.2           9          .01875     .3
SM1              9          .025       .3

[LID_CONTROLS]
;;Name           Type/Layer Parameters
;;-------------- ---------- ----------
BF-1-1           BC
BF-1-1           SURFACE    6          0          0          0          5
BF-1-1           SOIL       18         0.4        0.2        0.1        5          5          1.5
BF-1-1           STORAGE    15         .67        0          0
BF-1-1           DRAIN      0.1945     0.5        3          6

[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSat    FromImp    ToPerv     RptFile
            DrainTo
;;-------------- ---------------- ------- ---------- ---------- ---------- ---------- ----------
------------------------ ----------------

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC-1            0          FREE                        NO

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
Outlet-BF-1-1    Rating     0.00       0.000
Outlet-BF-1-1               0.05       0.002
Outlet-BF-1-1               0.10       0.006
Outlet-BF-1-1               0.15       0.009
Outlet-BF-1-1               0.20       0.011
Outlet-BF-1-1               0.25       0.012
Outlet-BF-1-1               0.30       0.014
Outlet-BF-1-1               0.35       0.015
Outlet-BF-1-1               0.40       0.016
Outlet-BF-1-1               0.45       0.017
Outlet-BF-1-1               0.50       0.018
Outlet-BF-1-1               0.55       0.022
Outlet-BF-1-1               0.60       0.032
Outlet-BF-1-1               0.65       0.046
Outlet-BF-1-1               0.70       0.058
Outlet-BF-1-1               0.75       0.066
Outlet-BF-1-1               0.80       0.073
Outlet-BF-1-1               0.85       0.079
Outlet-BF-1-1               0.90       0.085
Outlet-BF-1-1               0.95       0.090
Outlet-BF-1-1               1.00       0.095
Outlet-BF-1-1               1.05       0.100
Outlet-BF-1-1               1.10       0.104
Outlet-BF-1-1               1.15       0.109
Outlet-BF-1-1               1.20       0.113
Outlet-BF-1-1               1.25       0.117
Outlet-BF-1-1               1.30       0.120
Outlet-BF-1-1               1.35       0.124
Outlet-BF-1-1               1.40       0.128
Outlet-BF-1-1               1.45       0.131
Outlet-BF-1-1               1.50       0.134
Outlet-BF-1-1               1.55       0.138
Outlet-BF-1-1               1.60       0.141
Outlet-BF-1-1               1.65       0.144
Outlet-BF-1-1               1.70       0.147
Outlet-BF-1-1               1.75       0.150
Outlet-BF-1-1               1.80       0.153
Outlet-BF-1-1               1.85       0.156
Outlet-BF-1-1               1.90       0.159
```

```
Outlet-BF-1-1              1.95       0.162
Outlet-BF-1-1              2.00       0.164
Outlet-BF-1-1              2.05       0.167
Outlet-BF-1-1              2.10       0.170
Outlet-BF-1-1              2.15       0.172
Outlet-BF-1-1              2.20       0.175
Outlet-BF-1-1              2.25       0.178
Outlet-BF-1-1              2.30       0.180
Outlet-BF-1-1              2.35       0.183
Outlet-BF-1-1              2.40       0.185
Outlet-BF-1-1              2.45       0.187
Outlet-BF-1-1              2.50       0.190
Outlet-BF-1-1              2.55       0.196
Outlet-BF-1-1              2.60       0.210
Outlet-BF-1-1              2.65       0.230
Outlet-BF-1-1              2.70       0.255
Outlet-BF-1-1              2.75       0.282
Outlet-BF-1-1              2.80       0.304
Outlet-BF-1-1              2.85       0.320
Outlet-BF-1-1              2.90       0.334
Outlet-BF-1-1              2.95       0.347
Outlet-BF-1-1              3.00       0.359
Outlet-BF-1-1              3.05       0.371
Outlet-BF-1-1              3.10       0.382
Outlet-BF-1-1              3.15       0.392
Outlet-BF-1-1              3.20       0.402
Outlet-BF-1-1              3.25       0.412
Outlet-BF-1-1              3.30       0.422
Outlet-BF-1-1              3.35       0.431
Outlet-BF-1-1              3.40       0.440
Outlet-BF-1-1              3.45       0.448
Outlet-BF-1-1              3.50       0.457
Outlet-BF-1-1              3.55       0.763
Outlet-BF-1-1              3.60       1.316
Outlet-BF-1-1              3.65       2.029
Outlet-BF-1-1              3.70       2.872
Outlet-BF-1-1              3.75       3.826
Outlet-BF-1-1              3.80       4.881
Outlet-BF-1-1              3.85       6.027
Outlet-BF-1-1              3.90       7.258
Outlet-BF-1-1              3.95       8.567
Outlet-BF-1-1              4.00       9.951
Outlet-BF-1-1              4.05       11.405
Outlet-BF-1-1              4.10       12.927
Outlet-BF-1-1              4.15       14.513
Outlet-BF-1-1              4.20       16.161
Outlet-BF-1-1              4.25       17.869
Outlet-BF-1-1              4.30       19.634
Outlet-BF-1-1              4.35       21.455
Outlet-BF-1-1              4.40       23.330
Outlet-BF-1-1              4.45       25.258
Outlet-BF-1-1              4.50       27.237
Outlet-BF-1-1              4.55       29.266
Outlet-BF-1-1              4.60       31.343
Outlet-BF-1-1              4.65       33.468
Outlet-BF-1-1              4.70       35.640
Outlet-BF-1-1              4.75       37.857
Outlet-BF-1-1              4.80       40.118
Outlet-BF-1-1              4.85       42.424
Outlet-BF-1-1              4.90       44.772
Outlet-BF-1-1              4.95       47.163
Outlet-BF-1-1              5.00       49.595
Outlet-BF-1-1              5.05       52.068
Outlet-BF-1-1              5.10       54.581
Outlet-BF-1-1              5.15       57.133
Outlet-BF-1-1              5.20       59.724
Outlet-BF-1-1              5.25       62.353
Outlet-BF-1-1              5.30       65.021
Outlet-BF-1-1              5.35       67.725
Outlet-BF-1-1              5.40       70.466
Outlet-BF-1-1              5.45       73.243
Outlet-BF-1-1              5.50       76.056
;
```

```
;Basin#1
StorageBF-1-1    Storage    0.0        4671
StorageBF-1-1               0.1        4717
StorageBF-1-1               0.2        4764
StorageBF-1-1               0.3        4810
StorageBF-1-1               0.4        4856
StorageBF-1-1               0.5        4902
StorageBF-1-1               0.6        4948
StorageBF-1-1               0.7        4994
StorageBF-1-1               0.8        5040
StorageBF-1-1               0.9        5087
StorageBF-1-1               1.0        5133
StorageBF-1-1               1.1        5182
StorageBF-1-1               1.2        5231
StorageBF-1-1               1.3        5280
StorageBF-1-1               1.4        5329
StorageBF-1-1               1.5        5378
StorageBF-1-1               1.6        5426
StorageBF-1-1               1.7        5475
StorageBF-1-1               1.8        5524
StorageBF-1-1               1.9        5573
StorageBF-1-1               2.0        5622
StorageBF-1-1               2.1        5671
StorageBF-1-1               2.2        5720
StorageBF-1-1               2.3        5769
StorageBF-1-1               2.4        5818
StorageBF-1-1               2.5        5867
StorageBF-1-1               2.6        5916
StorageBF-1-1               2.7        5965
StorageBF-1-1               2.8        6014
StorageBF-1-1               2.9        6063
StorageBF-1-1               3.0        6112
StorageBF-1-1               3.1        6164
StorageBF-1-1               3.2        6216
StorageBF-1-1               3.3        6267
StorageBF-1-1               3.4        6319
StorageBF-1-1               3.5        6371
StorageBF-1-1               3.6        6423
StorageBF-1-1               3.7        6475
StorageBF-1-1               3.8        6526
StorageBF-1-1               3.9        6578
StorageBF-1-1               4.0        6630
StorageBF-1-1               4.1        6682
StorageBF-1-1               4.2        6733
StorageBF-1-1               4.3        6785
StorageBF-1-1               4.4        6837
StorageBF-1-1               4.5        6889
StorageBF-1-1               4.6        6941
StorageBF-1-1               4.7        6992
StorageBF-1-1               4.8        7044
StorageBF-1-1               4.9        7096
StorageBF-1-1               5.0        7148
StorageBF-1-1               5.1        7202
StorageBF-1-1               5.2        7257
StorageBF-1-1               5.3        7312
StorageBF-1-1               5.4        7366
StorageBF-1-1               5.5        7421

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;Oceanside Rain Gage
Oceanside        FILE "OCEANSIDE.prn"

[REPORT]
;;Reporting Options
INPUT      NO
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]
```

```
[MAP]
DIMENSIONS 370.141 4295.274 847.527 4772.674
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            714.703            4339.304

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
BasinBF-1-1      391.840            4641.276
BasinBF-1-1      391.840            4641.276
BasinBF-1-1      391.840            4641.251
DMA-1.1          481.039            4640.063
DMA1.2           456.956            4696.488
SM1              716.187            4476.834

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Oceanside        590.379            4592.981
```

Proposed Mitigated

```
[TITLE]
;;Project Title/Notes
Smilax-POC1-PR

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           08/28/1951
START_TIME           05:00:00
REPORT_START_DATE    08/28/1951
REPORT_START_TIME    05:00:00
END_DATE             05/23/2008
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         0:01:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.557
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .06    .08    .11    0.15   .18    .21    0.2    0.19   0.15   0.11   .08    .06
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
Oceanside        VOLUME    1:00     1.0      TIMESERIES Oceanside

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack

;;-------------- ---------------- ---------------- -------- -------- -------- -------- --------
----------------
BasinBF-1-1      Oceanside        DIV-1            0.24     0        50       .01      0

;DEVELOPED AREA
DMA-1.1          Oceanside        BasinBF-1-1      4.20     69.3     213      4.0      0

DMA1.2           Oceanside        BASINBF-1-1      0.249    70.6     150      4.5      0

;SELFMITIGATING AREA
SM1              Oceanside        POC-1            0.24     0        400      4.38     0


[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
BasinBF-1-1      0.012      0.15       0.05       0.1        25         OUTLET
DMA-1.1          0.012      0.15       0.05       0.1        25         OUTLET
```

```
DMA1.2           0.012      0.15       0.05       0.1        25         OUTLET
SM1              0.012      0.15       0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
BasinBF-1-1      1.5        .3         .33
DMA-1.1          9          0.01875    .30
DMA1.2           9          .01875     .3
SM1              9          .025       .3

[LID_CONTROLS]
;;Name           Type/Layer Parameters
;;-------------- ---------- ----------
BF-1-1           BC
BF-1-1           SURFACE    6          0          0          0          5
BF-1-1           SOIL       24         0.4        0.2        0.1        5          5          1.5
BF-1-1           STORAGE    15         .67        0          0
BF-1-1           DRAIN      0.1937     0.5        3          6

[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSat    FromImp    ToPerv     RptFile
            DrainTo
;;-------------- ---------------- ------- ---------- ---------- ---------- ---------- ----------
------------------------ ----------------
BasinBF-1-1      BF-1-1           1       4210       50         0          100        0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC-1            0          FREE                        NO

[DIVIDERS]
;;Name           Elevation  Diverted Link    Type       Parameters
;;-------------- ---------- ---------------- ---------- ----------
DIV-1            0          Bypass-1         CUTOFF     0.049      0          0          0          0


[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap
Psi      Ksat     IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- -------- --------
         -------- --------
;Basin BF-1-1
Stor-BF-1-1      0        5.5        0          TABULAR    StorageBF-1-1                0        1

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow
MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ----------
----------
Bypass-1         DIV-1            Stor-BF-1-1      400        0.01       0          0          0          0

UD-1             DIV-1            POC-1            400        0.01       0          0          0          0


[OUTLETS]
;;Name           From Node        To Node          Offset     Type            QTable/Qcoeff    Qexpon
Gated
;;-------------- ---------------- ---------------- ---------- --------------- ---------------- ----------
--------
Outlet-BF-1-1    Stor-BF-1-1      POC-1            0          TABULAR/DEPTH   Outlet-BF-1-1               NO


[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
Bypass-1         DUMMY        0                0          0          0          1
UD-1             CIRCULAR     0.5              0          0          0          1

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
```

Outlet-BF-1-1	Rating	0.00	0.000
Outlet-BF-1-1		0.05	0.002
Outlet-BF-1-1		0.10	0.006
Outlet-BF-1-1		0.15	0.009
Outlet-BF-1-1		0.20	0.011
Outlet-BF-1-1		0.25	0.012
Outlet-BF-1-1		0.30	0.014
Outlet-BF-1-1		0.35	0.015
Outlet-BF-1-1		0.40	0.016
Outlet-BF-1-1		0.45	0.017
Outlet-BF-1-1		0.50	0.018
Outlet-BF-1-1		0.55	0.022
Outlet-BF-1-1		0.60	0.032
Outlet-BF-1-1		0.65	0.046
Outlet-BF-1-1		0.70	0.058
Outlet-BF-1-1		0.75	0.066
Outlet-BF-1-1		0.80	0.073
Outlet-BF-1-1		0.85	0.079
Outlet-BF-1-1		0.90	0.085
Outlet-BF-1-1		0.95	0.090
Outlet-BF-1-1		1.00	0.095
Outlet-BF-1-1		1.05	0.100
Outlet-BF-1-1		1.10	0.104
Outlet-BF-1-1		1.15	0.109
Outlet-BF-1-1		1.20	0.113
Outlet-BF-1-1		1.25	0.117
Outlet-BF-1-1		1.30	0.120
Outlet-BF-1-1		1.35	0.124
Outlet-BF-1-1		1.40	0.128
Outlet-BF-1-1		1.45	0.131
Outlet-BF-1-1		1.50	0.134
Outlet-BF-1-1		1.55	0.138
Outlet-BF-1-1		1.60	0.141
Outlet-BF-1-1		1.65	0.144
Outlet-BF-1-1		1.70	0.147
Outlet-BF-1-1		1.75	0.150
Outlet-BF-1-1		1.80	0.153
Outlet-BF-1-1		1.85	0.156
Outlet-BF-1-1		1.90	0.159
Outlet-BF-1-1		1.95	0.162
Outlet-BF-1-1		2.00	0.164
Outlet-BF-1-1		2.05	0.167
Outlet-BF-1-1		2.10	0.170
Outlet-BF-1-1		2.15	0.172
Outlet-BF-1-1		2.20	0.175
Outlet-BF-1-1		2.25	0.178
Outlet-BF-1-1		2.30	0.180
Outlet-BF-1-1		2.35	0.183
Outlet-BF-1-1		2.40	0.185
Outlet-BF-1-1		2.45	0.187
Outlet-BF-1-1		2.50	0.190
Outlet-BF-1-1		2.55	0.196
Outlet-BF-1-1		2.60	0.210
Outlet-BF-1-1		2.65	0.230
Outlet-BF-1-1		2.70	0.255
Outlet-BF-1-1		2.75	0.282
Outlet-BF-1-1		2.80	0.304
Outlet-BF-1-1		2.85	0.320
Outlet-BF-1-1		2.90	0.334
Outlet-BF-1-1		2.95	0.347
Outlet-BF-1-1		3.00	0.359
Outlet-BF-1-1		3.05	0.371
Outlet-BF-1-1		3.10	0.382
Outlet-BF-1-1		3.15	0.392
Outlet-BF-1-1		3.20	0.402
Outlet-BF-1-1		3.25	0.412
Outlet-BF-1-1		3.30	0.422
Outlet-BF-1-1		3.35	0.431
Outlet-BF-1-1		3.40	0.440
Outlet-BF-1-1		3.45	0.448
Outlet-BF-1-1		3.50	0.457
Outlet-BF-1-1		3.55	0.763
Outlet-BF-1-1		3.60	1.316

```
Outlet-BF-1-1               3.65       2.029
Outlet-BF-1-1               3.70       2.872
Outlet-BF-1-1               3.75       3.826
Outlet-BF-1-1               3.80       4.881
Outlet-BF-1-1               3.85       6.027
Outlet-BF-1-1               3.90       7.258
Outlet-BF-1-1               3.95       8.567
Outlet-BF-1-1               4.00       9.951
Outlet-BF-1-1               4.05       11.405
Outlet-BF-1-1               4.10       12.927
Outlet-BF-1-1               4.15       14.513
Outlet-BF-1-1               4.20       16.161
Outlet-BF-1-1               4.25       17.869
Outlet-BF-1-1               4.30       19.634
Outlet-BF-1-1               4.35       21.455
Outlet-BF-1-1               4.40       23.330
Outlet-BF-1-1               4.45       25.258
Outlet-BF-1-1               4.50       27.237
Outlet-BF-1-1               4.55       29.266
Outlet-BF-1-1               4.60       31.343
Outlet-BF-1-1               4.65       33.468
Outlet-BF-1-1               4.70       35.640
Outlet-BF-1-1               4.75       37.857
Outlet-BF-1-1               4.80       40.118
Outlet-BF-1-1               4.85       42.424
Outlet-BF-1-1               4.90       44.772
Outlet-BF-1-1               4.95       47.163
Outlet-BF-1-1               5.00       49.595
Outlet-BF-1-1               5.05       52.068
Outlet-BF-1-1               5.10       54.581
Outlet-BF-1-1               5.15       57.133
Outlet-BF-1-1               5.20       59.724
Outlet-BF-1-1               5.25       62.353
Outlet-BF-1-1               5.30       65.021
Outlet-BF-1-1               5.35       67.725
Outlet-BF-1-1               5.40       70.466
Outlet-BF-1-1               5.45       73.243
Outlet-BF-1-1               5.50       76.056
;
;Basin#1
StorageBF-1-1    Storage    0.0        4690
StorageBF-1-1               0.1        4737
StorageBF-1-1               0.2        4783
StorageBF-1-1               0.3        4829
StorageBF-1-1               0.4        4875
StorageBF-1-1               0.5        4921
StorageBF-1-1               0.6        4968
StorageBF-1-1               0.7        5014
StorageBF-1-1               0.8        5060
StorageBF-1-1               0.9        5106
StorageBF-1-1               1.0        5153
StorageBF-1-1               1.1        5201
StorageBF-1-1               1.2        5249
StorageBF-1-1               1.3        5297
StorageBF-1-1               1.4        5345
StorageBF-1-1               1.5        5392
StorageBF-1-1               1.6        5440
StorageBF-1-1               1.7        5488
StorageBF-1-1               1.8        5536
StorageBF-1-1               1.9        5584
StorageBF-1-1               2.0        5632
StorageBF-1-1               2.1        5680
StorageBF-1-1               2.2        5728
StorageBF-1-1               2.3        5776
StorageBF-1-1               2.4        5824
StorageBF-1-1               2.5        5872
StorageBF-1-1               2.6        5920
StorageBF-1-1               2.7        5968
StorageBF-1-1               2.8        6016
StorageBF-1-1               2.9        6064
StorageBF-1-1               3.0        6112
StorageBF-1-1               3.1        6164
StorageBF-1-1               3.2        6216
```

```
StorageBF-1-1               3.3        6267
StorageBF-1-1               3.4        6319
StorageBF-1-1               3.5        6371
StorageBF-1-1               3.6        6423
StorageBF-1-1               3.7        6475
StorageBF-1-1               3.8        6526
StorageBF-1-1               3.9        6578
StorageBF-1-1               4.0        6630
StorageBF-1-1               4.1        6682
StorageBF-1-1               4.2        6733
StorageBF-1-1               4.3        6785
StorageBF-1-1               4.4        6837
StorageBF-1-1               4.5        6889
StorageBF-1-1               4.6        6941
StorageBF-1-1               4.7        6992
StorageBF-1-1               4.8        7044
StorageBF-1-1               4.9        7096
StorageBF-1-1               5.0        7148
StorageBF-1-1               5.1        7204
StorageBF-1-1               5.2        7260
StorageBF-1-1               5.3        7316
StorageBF-1-1               5.4        7371
StorageBF-1-1               5.5        7427

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;Oceanside Rain Gage
Oceanside        FILE "OCEANSIDE.prn"

[REPORT]
;;Reporting Options
INPUT      NO
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 370.141 4295.274 847.527 4772.674
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            714.703            4339.304
DIV-1            394.239            4517.096
Stor-BF-1-1      403.883            4335.057

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
BasinBF-1-1      391.840            4641.276
BasinBF-1-1      391.840            4641.276
BasinBF-1-1      391.840            4641.251
DMA-1.1          481.039            4640.063
DMA1.2           456.956            4696.488
SM1              716.187            4476.834

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Oceanside        590.379            4592.981
```

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.014)

Smilax SWMM Model- Existing Condition

****
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 08/28/1951 05:00:00
Ending Date 05/23/2008 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	275.164	675.250
Evaporation Loss	10.894	26.734
Infiltration Loss	216.496	531.279
Surface Runoff	52.586	129.046
Final Storage	0.000	0.000
Continuity Error (%)	-1.749	

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	52.586	17.136
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	52.586	17.136
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	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6	Peak Runoff	Runoff Coeff

gal CFS

DMA1-EX	675.25	0.00	26.82	532.55	0.00	127.49	127.49	16.10	4.73	0.189
SM1	675.25	0.00	25.04	506.70	0.00	159.12	159.12	1.04	0.27	0.236

Analysis begun on: Tue Jul 7 10:43:34 2020
Analysis ended on: Tue Jul 7 10:43:50 2020
Total elapsed time: 00:00:16

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

Smilax-POC1-PR

Proposed Unmitigated

```
************************************************************
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 ........... 08/28/1951 05:00:00
Ending Date ............. 05/23/2008 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


**************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
**************************     ---------       -------
Total Precipitation ......       277.415       675.250
Evaporation Loss .........        31.859        77.547
Infiltration Loss ........       144.522       351.777
Surface Runoff ...........       104.053       253.273
Final Storage ............         0.012         0.030
Continuity Error (%) .....        -1.092


**************************        Volume         Volume
Flow Routing Continuity        acre-feet      10^6 gal
**************************     ---------      ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......       104.053        33.907
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........       104.053        33.907
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
***************************

-----------------------------------------------------------------------------------------------------------
                          Total      Total      Total      Total      Total       Total     Peak  Runoff
                         Precip      Runon       Evap      Infil     Runoff      Runoff   Runoff   Coeff
Subcatchment                 in         in         in         in         in    10^6 gal      CFS
-----------------------------------------------------------------------------------------------------------
BasinBF-1-1              675.25    8357.11      43.43    3971.99    5042.34       32.86     4.89   0.558
DMA-1.1                  675.25       0.00      82.86     148.97     449.55       51.27     4.96   0.666
DMA1.2                   675.25       0.00      77.55     138.12     470.43        3.19     0.30   0.697
```

SM1	675.25	0.00	18.61	503.31	160.31	1.04	0.27	0.237

Analysis begun on: Tue Jul 07 13:58:17 2020
Analysis ended on: Tue Jul 07 13:58:33 2020
Total elapsed time: 00:00:16

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

Smilax-POC1-PR

Proposed Mitigated

****
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 ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... KINWAVE
Starting Date 08/28/1951 05:00:00
Ending Date 05/23/2008 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
Routing Time Step ..... 60.00 sec

Runoff Quantity Continuity	Volume acre-feet	Depth inches
Initial LID Storage	0.019	0.047
Total Precipitation	277.359	675.250
Evaporation Loss	35.811	87.184
Infiltration Loss	117.502	286.067
Surface Runoff	125.903	306.521
LID Drainage	0.940	2.288
Final Storage	0.032	0.078
Continuity Error (%)	-1.013	

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	126.843	41.334
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	107.827	35.137
Flooding Loss	18.047	5.881
Evaporation Loss	2.336	0.761
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	-1.077	

****
Highest Flow Instability Indexes
****
All links are stable.

****
Routing Time Step Summary
****

Minimum Time Step	:	60.00 sec
Average Time Step	:	60.00 sec
Maximum Time Step	:	60.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	1.01
Percent Not Converging	:	0.00

****
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
BasinBF-1-1	675.25	8366.73	248.07	2638.49	6180.93	40.28	5.18	0.684
DMA-1.1	675.25	0.00	82.49	148.08	450.20	51.34	4.96	0.667
DMA1.2	675.25	0.00	77.37	137.83	470.65	3.18	0.30	0.697
SM1	675.25	0.00	18.64	502.22	161.24	1.05	0.27	0.239

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow in	Evap Loss in	Infil Loss in	Surface Outflow in	Drain Outflow in	Initial Storage in	Final Storage in	Continuity Error %
BasinBF-1-1	BF-1-1	675.25	558.45	0.00	0.00	116.71	2.40	2.48	0.00

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
POC-1	OUTFALL	0.01	0.50	0.50	0 02:17	0.50
DIV-1	DIVIDER	0.01	0.50	0.50	0 01:41	0.50
Stor-BF-1-1	STORAGE	0.03	3.80	3.80	18857 12:19	3.77

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
POC-1	OUTFALL	0.27	4.84	18857 12:19	1.05	35.1	0.000
DIV-1	DIVIDER	5.18	5.18	18857 12:16	40.3	40.3	0.000
Stor-BF-1-1	STORAGE	0.00	5.13	18857 12:16	0	31.9	0.023

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CFS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 gal	Maximum Ponded Volume 1000 ft3
DIV-1	7167.73	0.04	9626 09:59	5.880	0.000

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
Stor-BF-1-1	0.163	0	2	0	21.220	64	18857 12:18	4.79

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
POC-1	9.97	0.03	4.84	35.134
System	9.97	0.03	4.84	35.134

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
Bypass-1	DUMMY	5.13	18857 12:16			
UD-1	CONDUIT	0.01	11772 16:24	0.16	1.08	1.00
Outlet-BF-1-1	DUMMY	4.79	18857 12:19			

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
UD-1	7162.03	7162.03	7162.03	683.02	7162.03

Analysis begun on: Tue Jul 07 13:48:31 2020
Analysis ended on: Tue Jul 07 13:49:16 2020
Total elapsed time: 00:00:45

ATTACHMENT 5 - SWMM Explanation of Significant Variables

In the prior section the viewer can view the associated input and output parameters within the EPA-SWMM Model in both pre-development and post-development conditions. Each portion, i.e., sub-catchments, outfalls, storage units, LID controls for the bio-retention cells, ponding on top of the bio-retention (modeled as a storage unit), weir as a discharge, and outfalls (point of compliance), are also shown.

Variables for modeling are associated with typical recommended values by the EPA-SWMM model, typical values found in technical literature (such as Maidment's Handbook of Hydrology). Recommended values for the SWMM model have been attained from the interim Orange County criteria established for their SWMM calibration. Currently, no recommended values have been established by the San Diego County HMP Permit for the SWMM Model.

Soil characteristics of the existing soils were determined from the USGS sources.

Some values incorporated within the SWMM model have been determined from the professional experience of H&A using conservative assumption that have a tendency to increase the size of the needed BMP and also generate a long-term runoff as a percentage of rainfall similar to those measured in gage stations in Southern California by the USGS.

Description of model parameters and assumptions:

N-Imperv – Manning's N for impervious surfaces
- 0.012 (typical)

N-Perv – Manning's N for pervious surfaces
- 0.15 (typical)

Dstore-Imperv – Depth of depression storage on impervious area (in)
- 0.05 (typical)

Dstore-Perv – Depth of depression storage on pervious area (in)
- 0.1 (typical)

%Zero-Imperv – Percentage of impervious area with no depression storage (%)
- 25 (typical)

Suction Head – Soil capillary suction head (in)

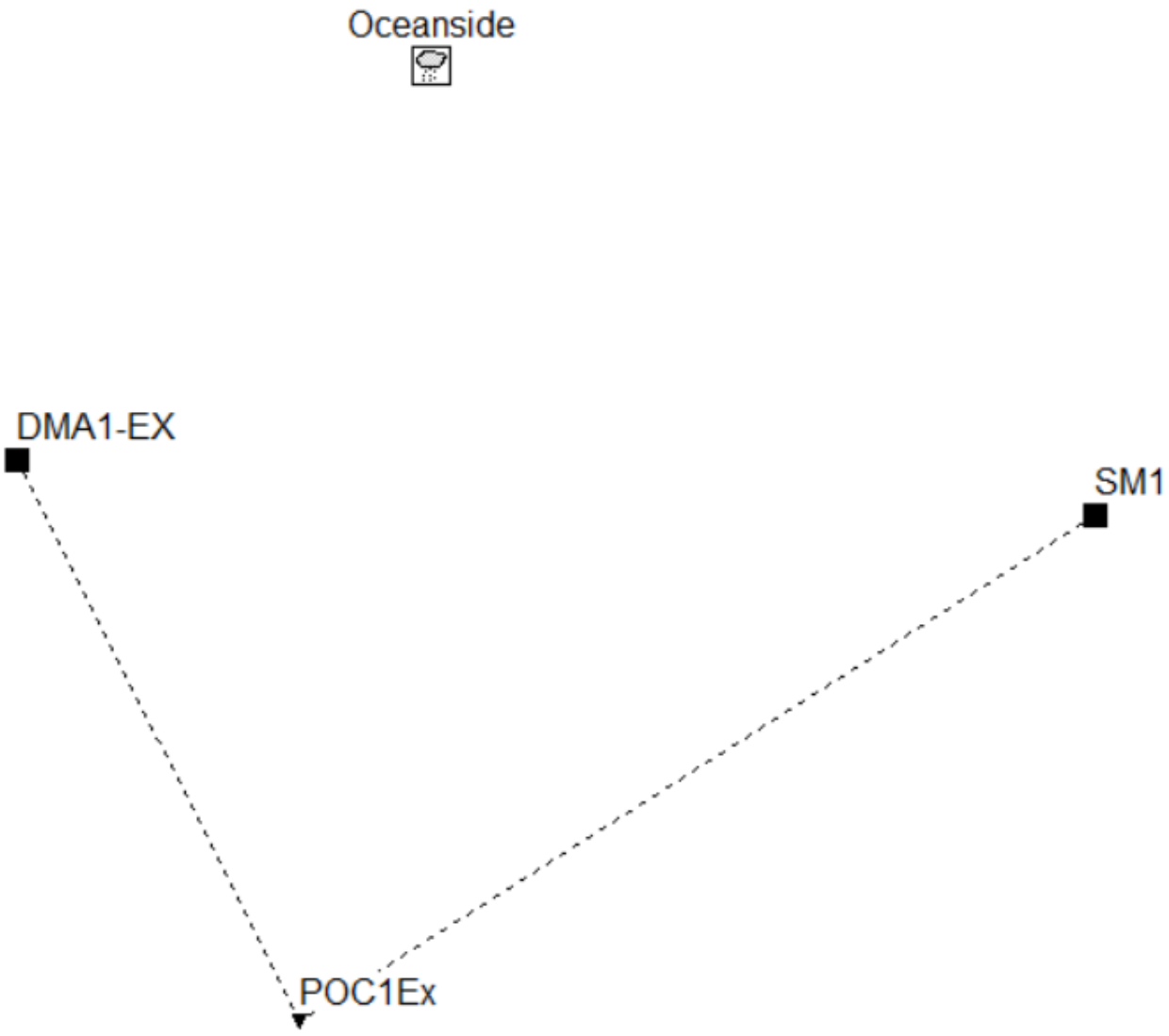
Conductivity – Soil saturated hydraulic conductivity (in/hr)
- -75% of these values if subcatchment is graded/compacted

Initial Deficit – Initial moisture deficit (fraction)

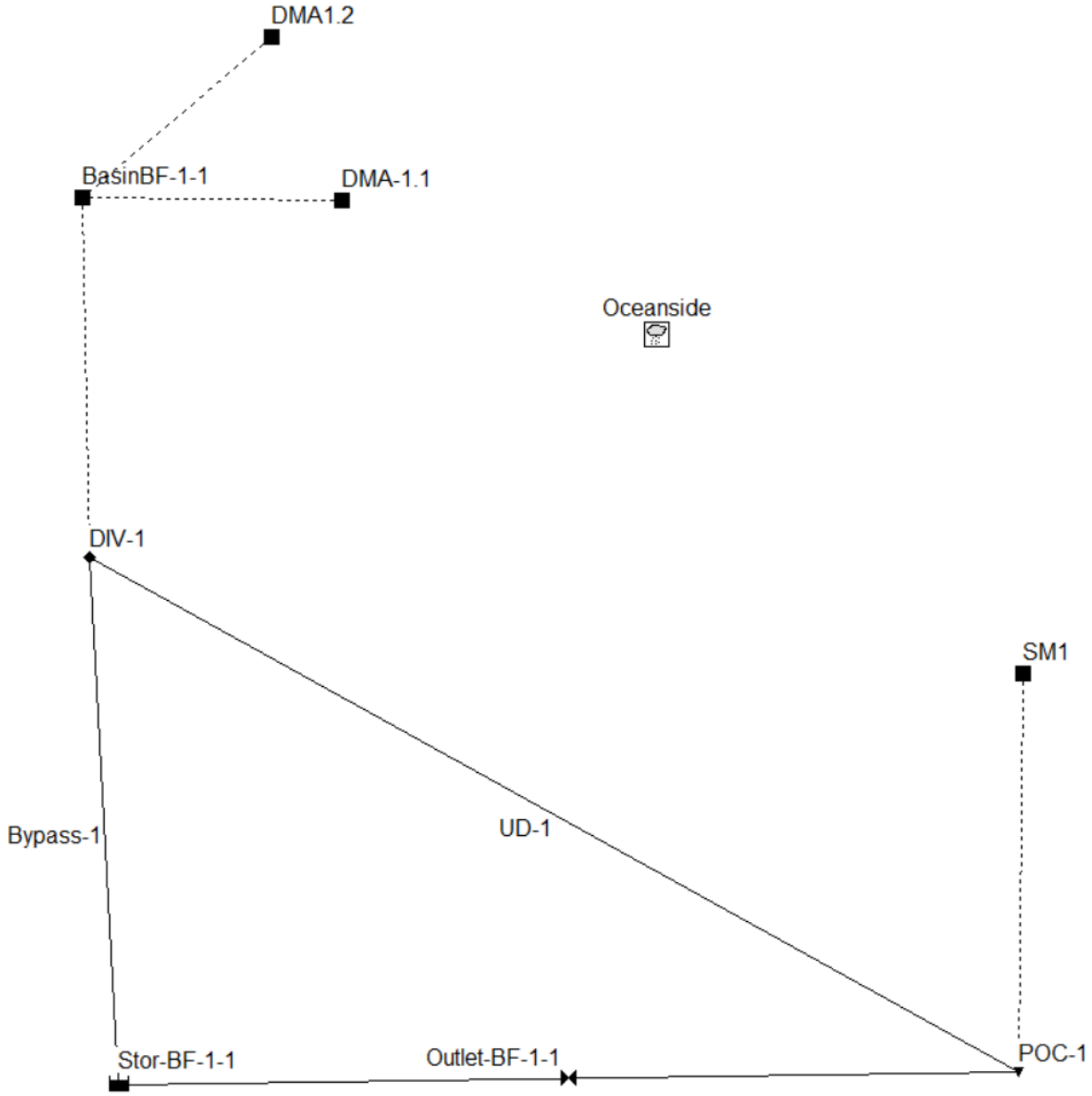
Soil Type	Suction Head	Conductivity	Initial Deficit
A	1.5	0.3	0.33
B	3	0.2	0.32
C	6	0.1	0.31
D	9	0.025	0.30

NOTE: These values are based on County of San Diego's BMP Manual Effective January 1, 2019 in Appendix G.

POC 1 – Pre-Developed Condition



POC 1 – Developed Condition



EXPLANATION OF SELECTED VARIABLES

Parameters for the pre- and post-developed models include soil types D in accordance with the San Diego County Hydrology Manual and the USGS Soil Survey Map (attached at the end of this appendix). Suction head, conductivity and initial deficit corresponds to average values expected for the soil types, according to sources consulted, professional experience, and approximate values obtained by the interim Orange County modeling approach.

H&A selected infiltration values, such that the percentage of total precipitation that becomes runoff, is realistic for soil type D and slightly smaller than measured values for Southern California watersheds.

Selection of a Kinematic Approach: As the continuous model is based on hourly rainfall, and the time of concentration for the pre-development and post-development conditions is significantly smaller than 60 minutes, precise routing of the flows through the impervious surfaces, the underdrain pipe system, and the discharge pipe was considered unnecessary. The truncation error of the precipitation into hourly steps is much more significant than the precise routing in a system where the time of concentration is much smaller than 1 hour.

Sub-catchments BF 1-1

The area of Prop-X + BF-X must be equal to the area of the development tributary to that particular bio-retention facility. Five (5) decimal places were given regarding the areas of the bio-retention to insure that the area used by the program for the LID subroutine corresponds exactly with these tributaries.

LID Control Editor: Explanation of Significant Variables

INFILTRATION

Height:

The storage depth variable within the SWMM model is representative of the storage volume provided in the vault.

Seepage Rate:

The seepage rate is directly input from the geotechnical report.

Clogging factor:

A clogging factor was not used (0 indicates that there is no clogging assumed within the model). The reason for this is related to the fairness of a comparison with the SDHM model and the HMP sizing tables: a clogging factor was not considered, and instead, a conservative value of infiltration was recommended.

BIORETENTION

Storage Depth:

The storage depth variable within the SWMM model is representative of the storage volume provided beneath the engineered soil and mulch components of the biofiltration facility. This storage volume is comprised of a gravel located bed beneath a layer of engineered soil and a 0.25 foot (3-inch) layer of landscaping mulch.

Porosity:

A porosity value of 0.4 has been selected for the model. The amended soil is to be highly sandy in content in order to have a saturated hydraulic conductivity of approximately 5 in/hr.

H&A considers such a value to be slightly high; however, in order to comply with the HMP Permit, the value recommended by the Copermittees for the porosity of amended soil is 0.4, per Appendix A of the Final Hydromodification Management Plan by Brown & Caldwell, dated March 2011.

Void Ratio:

The ratio of the void volume divided by the soil volume is directly related to porosity as n/(1-n). As the underdrain layer is composed of gravel, a porosity value of 0.4 has been selected, which results in a void ratio of 0.4/(1-0.4) = 0.67 for the gravel detention layer.

Clogging factor:

A clogging factor was not used (0 indicates that there is no clogging assumed within the model). The reason for this is related to the fairness of a comparison with the SDHM model and the HMP sizing tables: a clogging factor was not considered, and instead, a conservative value of infiltration was recommended.

Drain (Flow) coefficient:

The flow coefficient in the SWMM Model is the coefficient needed to transform the orifice equation into a general power law equation of the form:

$$q = C(H - H_D)^n \quad (1)$$

where q is the peak flow in in/hr, n is the exponent (typically 0.5 for orifice equation), H D is the elevation of the centroid of the orifice in inches (assumed equal to the invert of the orifice for small orifices and in our design equal to 0) and H is the depth of the water in inches.

The general orifice equation can be expressed as:

$$Q = \frac{\pi}{4} c_g \frac{D^2}{144} \sqrt{2g \frac{(H - H_D)}{12}} \quad (2)$$

where Q is the peak flow in cfs, D is the diameter in inches, c g is the typical discharge coefficient for orifices (0.61-0.63 for thin walls and around 0.75-0.8 for thick walls), g is the acceleration of gravity in ft/s^2, and H and H D are defined above and are also used in inches in Equation (2).

Cutoff Flow:

This is the only significant variable in the diversion, as the type of diversion is defined by this value. Any excess of flow over this value will be diverted into a pond subroutine (the surface stage of the biofiltration basin) and routed there. The determination of this value equates to the value obtained with equation (2) above, plus 1%, when H = depth of gravel layer and H_D=0 (orifice situated at the datum). Thus, once flows exceed the maximum discharge the LID orifice experiences a head of the storage depth, ponding occurs within the bioretention basin, routing these additional flows via the pond riser.

Note:

The complete storage and rating curves and the respective explanation is shown at the end of this appendix. A variable area vs. elevation storage curve was used for the final model, and a discharge that is a function of the outlet structure in the surface was used also.

ATTACHMENT 6 - Drying Time of the Surface Layer of Bio-retention cells

The LID subroutine of the SWMM Model does not increase the discharge of the lower LID orifice once the storage layer is full (in other words, it does not consider the influence of the pressure in the amended soil layer). The discharge of the lower LID orifice when the surface layer is full is considered constant by the model and equal to the discharge of the lower orifice when the storage layer is full (equal to the cutoff flows).

The drying time interval between an elevation yi and another elevation $yi - \Delta y$ can be obtained by:

$$\Delta t_i(hours) = \frac{(Q(yi)+Q(yi-\Delta y))}{7200\ (V(yi)-V(yi-\Delta y))} = \frac{Q_{ave}}{3600\ \Delta V}$$

$$t = \sum_{i=1}^{n} \Delta t_i\ (hours)$$

Q_{ave} represents the average discharge between elevation y_i and y_{i+1} obtained by $\frac{Q(yi)+Q(yi-\Delta y)}{2}$ where ΔV represents the fraction of the volume that must be discharged at a peak flow $Q_{ave}(V(yi) - V(yi - \Delta y))$.

The volume and the discharge change as the elevation changes; the calculation takes into account this change.

ATTACHMENT 7 – Hydromodification Watershed Maps

LEGEND

- PROJECT BOUNDARY
- DMA 1 BOUNDARY
- XX.XX *ACRES* — SUBAREA ACREAGE
- DMA 1 — DMA ICON
- DMA1-PERVIOUS - LANDSCAPE / TO BE DEVELOPED
- D — HYDROLOGIC SOIL TYPE
- X — POINT OF COMPLIANCE

SELF TREATING AREA NOT TRIBUTARY TO BASIN

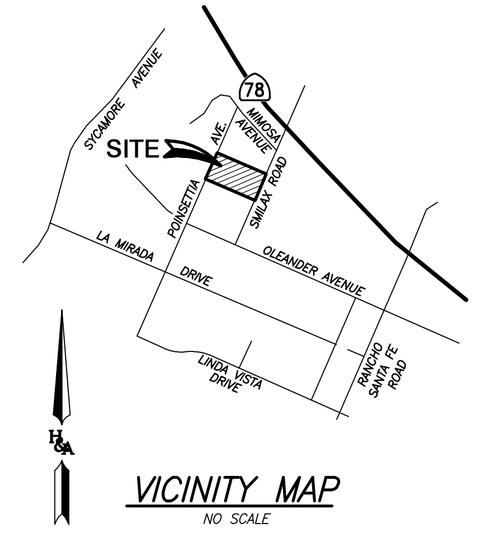
- SM1-PERVIOUS - LANDSCAPE / SELF-MITIGATING AREAS

DMA 1

4.65 *ACRES*

D

1-EX



VICINITY MAP

NO SCALE

UNDERLYING SOIL GROUP : C & D
APPROXIMATE DEPTH TO GROUNDWATER > 15'
NO CRITICAL COARSE AREAS REQUIRE PRESERVATION

30 0 30 60 90

SCALE 1" = 30'

Smilax POC 1 HMP Calculations					
Pre-Developed Condition					
POC	Type	% Imperviousness	Total Area	Pervious Area	Impervious Area
DMA1-EX	To Be Dev	0.0%	4.65	4.65	0.00
SM1	Selfmitigating	0.0%	0.24	0.24	0.00
Total POC-1-EX		0.0%	4.89	4.89	0.00

PREPARED BY:

HUNSAKER & ASSOCIATES SAN DIEGO, INC

PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(858)558-4500 FX(858)558-1414

PREDEVELOPED CONDITION
HYDROMODIFICATION MAP

SMILAX

COUNTY OF SAN DIEGO, CALIFORNIA

MAP 1 OF 1

W.O.# 0490-0174

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LEGEND

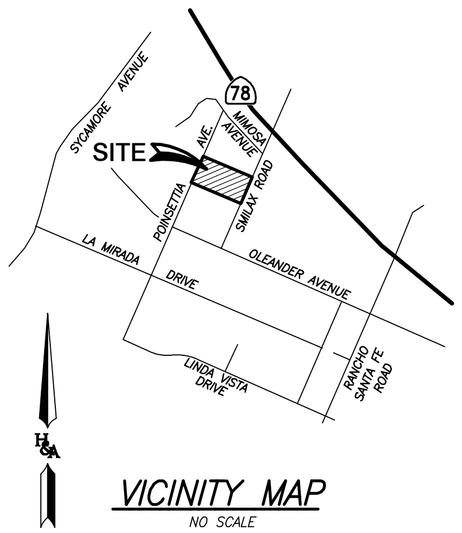
- PROJECT BOUNDARY
- DMA BOUNDARY
- XX.XX ACRES — SUBAREA ACREAGE
- DMA 1 — DMA ICON
- D — HYDROLOGIC SOIL TYPE
- X — POINT OF COMPLIANCE
- STRUCTURAL BMPS BIOFILTRATION BASIN

AREA TRIBUTARY TO POC-1

- DMA 1.1 & DMA 1.2- IMPERVIOUS AREA
- DMA 1.1 & DMA 1.2- PERVIOUS AREA\ LANDSCAPE
- BASIN BF-1-1
- BASIN BOTTOM AREA
- DE MINIMIS AREA

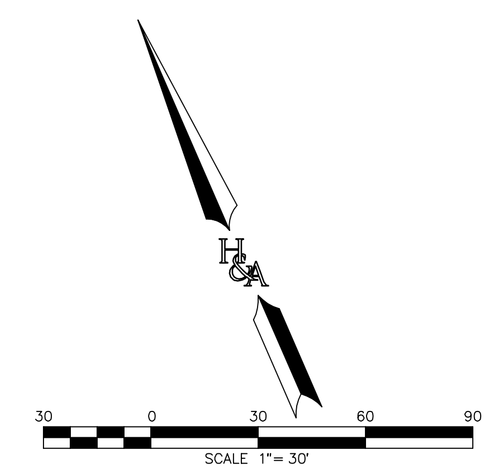
SELF MITIGATING AREA NOT TRIBUTARY TO BASIN

- SELF MITIGATING -PERVIOUS AREA\ LANDSCAPE



VICINITY MAP
NO SCALE

UNDERLYING SOIL GROUP : C & D
APPROXIMATE DEPTH TO GROUNDWATER > 15'
NO CRITICAL COARSE AREAS REQUIRE PRESERVATION



Post-Developed Condition					
POC	Type	% Imperviousness	Total Area	Pervious Area	Impervious Area
DMA1.1	Roof-Roadway	69.3%	4.20	1.29	2.91
BF-1	Biofiltration Basin	0.0%	0.24	0.24	0.00
DMA1.2	street Widening	70.6%	0.25	0.07	0.18
SM1	Selfmitigating	0.0%	0.24	0.24	0.00
TOTAL AREA TO POC-1-PR			4.93	1.84	3.09

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PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(858)558-4500 · FX(858)558-1414

DEVELOPED CONDITION
HYDROMODIFICATION MAP

SMILAX

COUNTY OF SAN DIEGO, CALIFORNIA

MAP 1 OF 1

W.O.# 0480-0174

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8.2 Hydromodification Management Points of Compliance

- List and describe all points of compliance (POCs) for flow control for hydromodification management.
- For each POC, provide a POC identification name or number, and a receiving channel identification name or number correlating to the project's HMP Exhibit (see Attachment 2).

POC name or #	Channel name or #	POC Description
1	existing 18"storm drain crossing Poinsettia Ave	Once runoff has been routed through the respective basin outlet structure and spillway, it flows to the POC and then conveyed with the off-site runoffs

8.3 Geomorphic Assessment of Receiving Water Channels

Insert Geomorphic Assessment behind this cover page or submit as a separate stand-alone document labeled Sub-attachment 8.3.

Insert Vector Control Plan behind this cover page or submit as a separate stand-alone document labeled Sub-attachment 8.4.

9.0 General Requirements

- Complete the table below to indicate which compliance pathway was selected in PDP SWQMP Table 6. Include the corresponding sub-attachment with your SWQMP submittal. Other sub-attachments do not need to be included.
- See the BMPDM sections and appendices listed under "BMPDM Design Resources" for additional explanation of design requirements. Constructed features must fully satisfy the requirements described in these resources, and any other guidance identified by the County.
- DMA Exhibits and Construction Plans: CCSYAs and applicable BMPs identified and described in this attachment must be shown on DMA Exhibits and all applicable construction plans submitted for the project. See Attachment 2 for additional instruction on exhibits and plans.

Sub-attachments	BMPDM Design Resources
☐ 9.1: Documentation of Hydromodification Management Exemption[1]	Section 1.6
☒ 9.2: Watershed Management Area Analysis (WMAA) Mapping[1]	Appendix H.1.1.2
☐ 9.3: Resource Protection Ordinance (RPO) Methods	Appendix H.1.1.1
☐ 9.4: No Net Impact Analysis	Appendix H.4

[1] The San Diego County Regional comprehensive WMAA mapping data can be found on the Project Clean Water website here: http://www.projectcleanwater.org/download/wmaa_attc_data/

9.1 Documentation of Hydromodification Management Exemption (BMPDM Section 1.6)

- If the PDP is exempt from hydromodification management requirements (see Table 4 Part A.1 of the PDP SWQMP), use this Sub-attachment to document the exemption.
- Select the type of exemption below that applies and provide an explanation of the selection, including maps or other applicable documentation. Additional documentation may be requested by County staff.

Exemption Type per BMPDM Figure 1-2 (select one)
☐ a. The proposed project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
☐ b. The proposed project will discharge runoff directly to conveyance channels whose bed and bank are concrete lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
☒ c. The proposed project will discharge runoff directly to an area identified by the County as appropriate for an exemption by the WMAA for the watershed in which the project resides[2].
Explanation (add or attach pages as necessary)

[2] This option must include an analysis of the project using the methodology presented in Attachment E of the Regional Watershed Management Area Analysis.

9.2 Watershed Management Area Analysis (WMAA) Mapping (BMPDM Appendix H.1.1.2)

Watershed Management Area Analysis (WMAA) mapping is a simple way to screen projects to determine the presence of onsite or offsite upstream Potential Critical Coarse Sediment Yield Areas (PCCSYAs). The San Diego County Regional WMAA mapping data can be found on the Project Clean Water website here: http://www.projectcleanwater.org/download/wmaa_attc_data/ .[3]

- Based on the WMAA map and the proposed project design, demonstrate below that both of the following conditions apply to the PDP:

  (a) Less than 5% of PCCSYAs will be impacted (built on or obstructed) by the PDP, and

  (b) All upstream offsite PCCYSAs will be bypassed (see BMPDM Appendix H.3).

A. Mapping Results -- At a minimum, show: (1) the project footprint, (2) areas of proposed development, (3) impacted onsite PCCSYAs, (4) offsite tributary areas[4], and (5) bypass of upstream offsite PCCSYAs.

[3] Applicants may refine initial mapping results using options identified in BMPDM Appendix H.1.2.
[4] Tributary areas must be shown to demonstrate that upstream offsite PCCSYAs do not exist. If bypassing these areas, only the bypass should be shown.

B. Explanation -- Provide documentation as needed to demonstrate that (1) impacts to PCCSYAs are below 5%, and (2) upstream offsite PCCYSAs are effectively bypassed. Add pages as necessary.


SMILAX
CRITICAL COARSE SEDIMENT YIELD AREAS
Legend
CCSYA
PROJECT SITE
78
Mimosa Ave
Ronald Packard Pkwy
Poinsettia Ave
Adeline Ct
Smilax Rd
N
500 ft
Google Earth
© 2018 Google

9.3 Resource Protection Ordinance (RPO) Methods (BMPDM Appendix H.1.1.1)

- Either of two Resource Protection Ordinance (RPO) methods may also be used to demonstrate compliance with CCSYA requirements. Select either option and document the selection below:

  ☐ RPO Scenario 1: PDP is subject to and in compliance with RPO requirements[5]

  - o Select if the project requires one or more discretionary permits;
  - o Demonstrate that onsite AND upstream offsite CCSYAs will be avoided and/or bypassed.

  ☐ RPO Scenario 2: PDP is entirely exempt/not subject to RPO requirements[6]

  - o Select if the project does not require discretionary permits;
  - o Demonstrate that all upstream offsite CCSYAs will be bypassed[7].

A. Mapping Results -- At a minimum, show as applicable: (1) the project footprint, (2) areas of proposed development, (3) locations of onsite and upstream offsite CCSYAs, and (4) bypass of all identified CCSYAs.

[5] RPO applicability is normally confirmed during discretionary review. Check with your project manager if you're not sure of your status.
[6] Does not include PDPs utilizing exemption(s) via RPO Section 86.604(e)(2)(cc) or 86.604(e)(3).
[7] This scenario does not impose requirements for onsite CCSYAs.

B. Explanation -- Provide documentation as needed to demonstrate that (1) onsite CCSYAs are avoided and bypassed [if applicable], and (2) upstream offsite CCYSAs are effectively bypassed. Add pages as necessary.

9.4 No Net Impact Analysis (BMPDM Appendix H.4)

- When impacts to CCSYAs cannot be avoided or effectively bypassed, applicants must demonstrate that their project generates no net impact to the receiving water per the performance metrics identified in BMPDM Appendix H.4.
- Use the space below to document that the PDP will generate no net impact to any receiving water.

No Net Impact Analysis (add or attach pages as necessary)

This form must be accepted by the County prior to the release of construction permits or granting of occupancy for applicable portions of a Priority Development Project (PDP). Its purpose is to provide documentation of the final installation of permanent Best Management Practices (BMPs) used to satisfy Structural Performance Standards for the development project. Compliance with these standards reduces the discharge of pollutants and flows from the completed project site. Applicable standards may be satisfied using Structural BMPs (S-BMPs), Significant Site Design BMPs (SSD-BMPs), or both. Applicants are responsible for providing all requested information. Do not leave any fields blank; indicate N/A for any requested item that is not applicable.

PART 1 General Project and Applicant Information

Provided for reference only, at this time, a part of Tentative Map processing.

Table 1: Project and Applicant Information

A. Project Summary Information	**ID No. IVF-20___-____ To be assigned by DPW-WPP**
Project Name	Smilax
Record ID (e.g. grading/improvement plan number, building permit)	TBD
Project Address	425 Smilax Rd., Vista, California 92081
Assessor's Parcel Number(s) APN(s)	217-191-02-00 & 217-191-03-00
Project Watershed (complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	Carlsbad HU, Agua Hedionda HA, Buena HAS 904.32
B. Owner Information	
Name	KB Home Coastal, Inc.
Address	9915 Mira Mesa Blvd.
Email Address	kbausback@kbhome.com
Phone Number	(858) 877-4262

**THIS PAGE IS FOR PARTIAL RECORD PLAN VERIFICATIONS ONLY **

If this is a partial Installation Verification Form submittal, list ALL DMAs and BMPs for the Priority Development Project in Table 2. Provide acceptance information where applicable.

Table 2: Information for Partial IVF Submittals

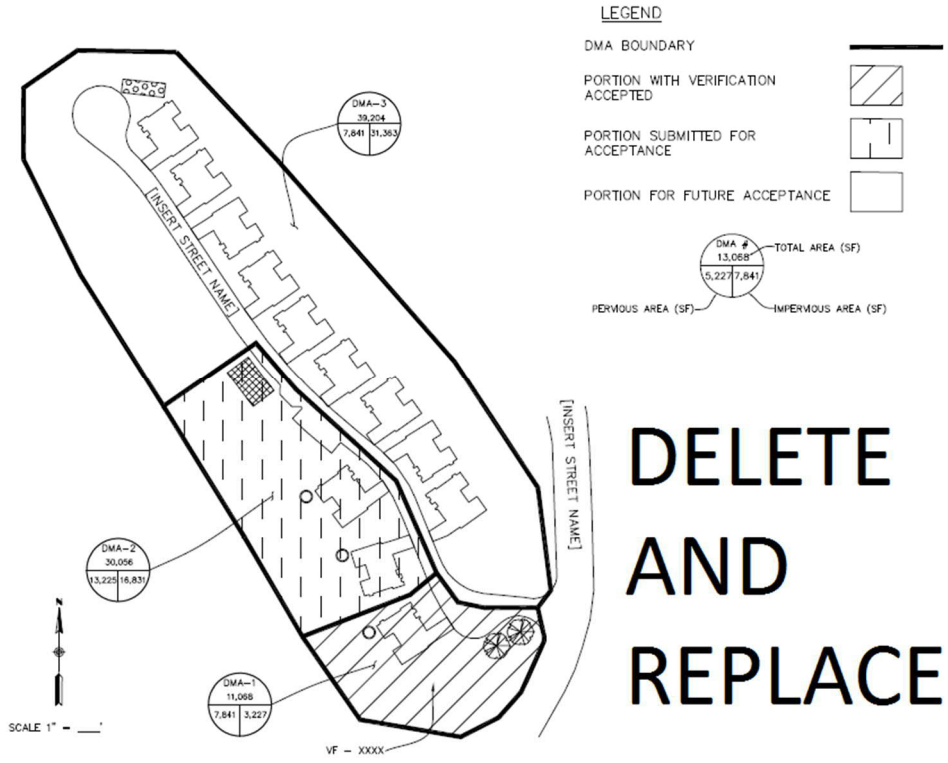
A: DMA and BMP Information

DMA #	Structural and Significant Site Design BMPs	WPP Acceptance Date	IVF ID No. (e.g. 2018-001)

B: DMA and BMP Map

Please attach a map showing (1) all DMAs for the project site, (2) the DMAs and/or lots accepted under previous Verification Forms, and (3) the locations of Structural BMPs and Significant Site Design BMPs previously accepted.

SAMPLE DMA MAP



PART 2 DMA and BMP Inventory Information

Use this table to document Structural BMPs (S-BMPs) and Significant Site Design BMPs (SSD-BMPs) for the PDP. All DMAs that are not self-mitigating or de minimis must have at least one Structural BMP or Significant Site Design BMP.

- In Part A, list all Structural BMPs (including both Pollutant Control and/or Hydromodification as applicable) by DMA.
- Complete Part B for all DMAs that contain only Significant Site Design BMPs. SSD-BMPs are Site Design BMPs (SD-BMPs) that are sized and constructed to satisfy Structural Performance Standards for a DMA.
- Documentation of SD-BMPs is not required in this table for any DMA that also contains S-BMPs.
- The information provided for each BMP in the table must match that provided in the Stormwater Quality Management Plan (SWQMP), construction plans, maintenance agreements, and other relevant project documentation.

Table 3: Required Information for Structural BMPs and Significant Site Design BMPs

DMA #	BMP Information			Maintenance Category	Maintenance Agreement or Maintenance Notification Recorded Doc. #	Construction Plan Sheet #	Landscape Plan # & Sheet # (For Vegetated BMPs Only)	FOR DPW-WPP USE ONLY Reviewer concurs that the BMP(s) may be accepted into inventory (date and initial)
	Quantity	Description/Type of Structural BMP	BMP ID #(s)					
Part A Structural BMPs (S-BMPs)								
Add rows as needed								
Part B Significant Site Design BMPs (SSD-BMPs)								
		Choose an item.		---	---			
		Choose an item.		---	---			
		Choose an item.		---	---			
Add rows as needed								

PART 3 Required Attachments for All BMPs Listed in Table 3

For ALL projects, submit the following to the County inspector (check all that are attached):

☐ Photographs: Labeled photographs illustrating proper construction of each S-BMP or SSD-BMP.

☐ Maintenance Agreements: Copies of all approved and recorded Storm Water Maintenance Agreements (SWMAs) or Maintenance Notifications (MNs) for all S-BMPs.

Note: All BMPs proposed for County ownership will remain the responsibility of the owner listed on Page 1 until a signed Letter of Acceptance of Completion is received by the DPW Watershed Protection Program.

For Grading and Improvement projects only, ALSO submit:

☐ Construction Plans: An 11" X 17" copy of the most current applicable approved Construction Plan sheets:

- ☐ Grading Plans, AND/OR
- ☐ Improvement Plans, AND/OR
- ☐ Precise Grading Plan(s) (only for residential subdivisions with tract homes), AND/OR
- ☐ Other (Please specify) Click here to enter text.

Note: For each Construction Plan, the sheets submitted must incorporate all of the following:

- ☐ A BMP Table, AND
- ☐ A plan/cross-section of each verified as-built BMP, AND
- ☐ The location of each verified as-built BMP

☐ Landscape Plans: An 11" X 17" copy of the most current applicable Landscape Plan sheets where the BMPs are required to be vegetated, including:

- ☐ The Certification of Completion (Form 407), AND
- ☐ The Certificate of Approval from PDS Landscape Architect

Note: For each Landscape Plan, the sheets submitted must show the location of each verified as-built BMP.

Required only for Verifications for Partial Record Plans

☐ If this is a partial record plan verification, please include the following:

- ☐ A list of previously submitted Verification Forms (Table 2, A)
- ☐ A map of DMAs and BMPs (Table 2, B)

PART 4 Preparer's Certification

By signing below, I certify that the BMP(s) listed in Table 3 of this Verification Form have been constructed and all are in substantial conformance with the approved plans and applicable regulations. I understand the County reserves the right to inspect the above BMPs to verify compliance with the approved plans and Watershed Protection Ordinance (WPO). Should it be determined that the BMPs were not constructed to plan or code, corrective actions may be necessary before permits can be closed.

Note: Structural BMPs (Table 3, Part A) must be certified by a licensed professional engineer.

Please sign and, if applicable, provide your seal below.

[SEAL]

Preparer's Printed Name:

Click here to enter text.

Email: Click here to enter text.

Phone Number: Click here to enter text.

Preparer's Signed Name:

Date: Click here to enter text.

COUNTY - OFFICIAL USE ONLY:

For County Inspectors

County Department: _____

Date verification received from EOW: _____

By signing below, County Inspector concurs that every noted BMP has been installed per plan.

Inspector Name: _____

Inspector's Signature: _____ Date: _____

For Building Division Only

Inspection Supervisor Name: _____

Inspector Supervisor's Signature: _____ Date: _____

PDCI & Building, along with the rest of this package, please provide to DPW WPP:

☐ A copy of the final accepted SWQMP and any accepted addendum

For Watershed Protection Program Only

Date Received: _____

WPP Reviewer: _____

WPP Reviewer concurs that the BMPs accepted in Part 2 above may be entered into inventory.

WPP Reviewer's Signature: _____ Date: _____

11.0 Cover Sheet and General Requirements

- All Structural BMPs must have a plan and mechanism to ensure on-going maintenance. Use the table below to document the types of agreements to be submitted for the PDP and submit them under cover of this sheet.
- See BMPDM Section 7.3 for a description of maintenance categories and responsibilities. Note that since Category 3 and 4 BMPs are County-maintained, they do not require maintenance agreements.

a. Applicability of Maintenance Agreements

Check the boxes below to indicate which types of agreements are included with this attachment.

☒ Maintenance Notification (Category 1 BMPs)

- Exhibit A: Project Site Vicinity; Project Site Map; and a map for each BMP and its Drainage Management Area
- Exhibit B: BMP Maintenance Plan (see below)

☐ Stormwater Maintenance Agreement (Category 2 BMPs)

- Exhibit A: Legal Description of Property
- Exhibit B: BMP Maintenance Plan (see below)
- Exhibit C: Project Site Vicinity Map

Maintenance agreement templates and instructions are provided on the County's website:

www.sandiegocounty.gov/stormwater under the Development Resources tab.

PDP applicants contact County staff to ensure they have the most current forms.

b. Maintenance Plan Requirements

Use this checklist to confirm that each maintenance plan includes the following that as applicable.

☐ Specific maintenance indicators and actions for proposed structural BMP(s). These must be based on based on maintenance indicators presented in BMP Design Fact Sheets in Appendix E and enhanced to reflect actual proposed components of the structural BMP(s).

☐ Access to inspect and perform maintenance on the structural BMP(s).

☐ Features to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds).

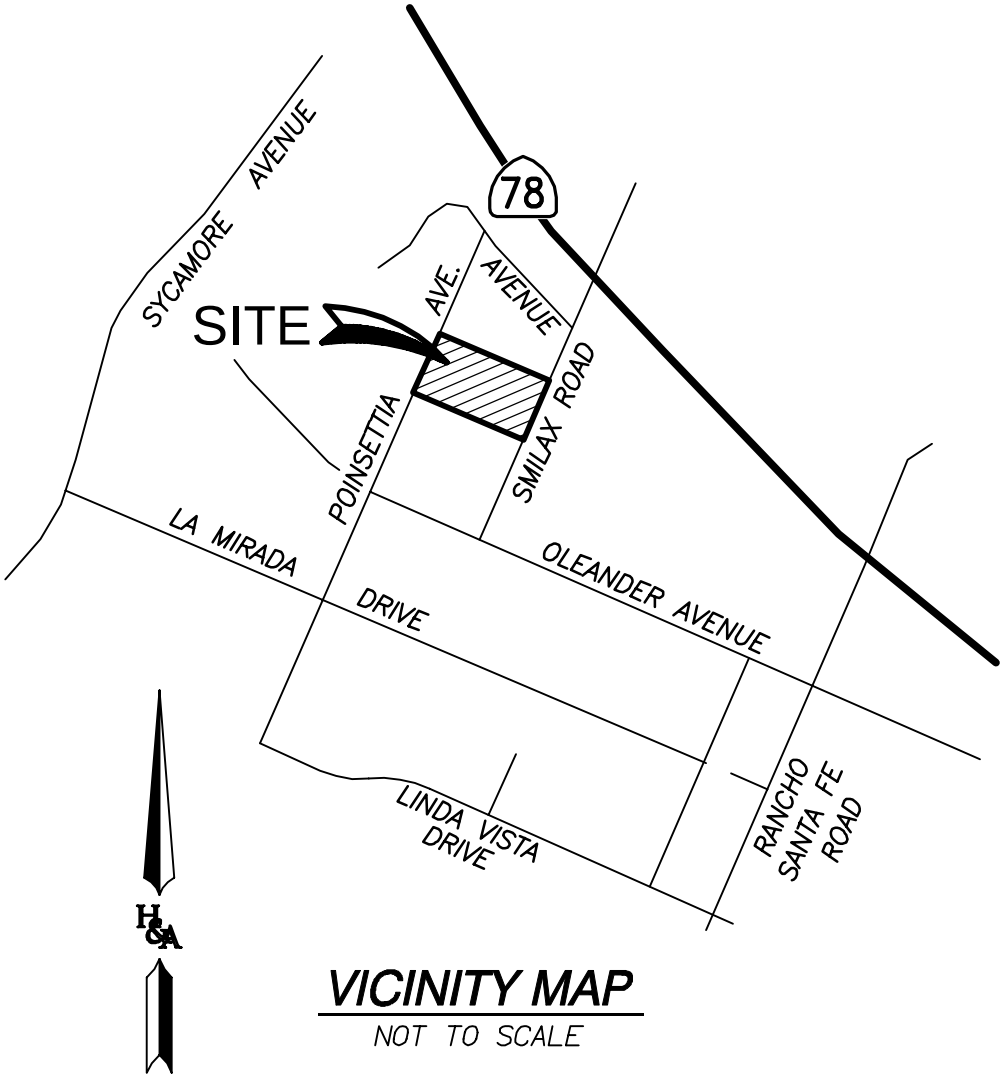
☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable.

☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP).

☐ Recommended equipment to perform maintenance.

☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management.

EXHIBIT "A-1"



VICINITY MAP

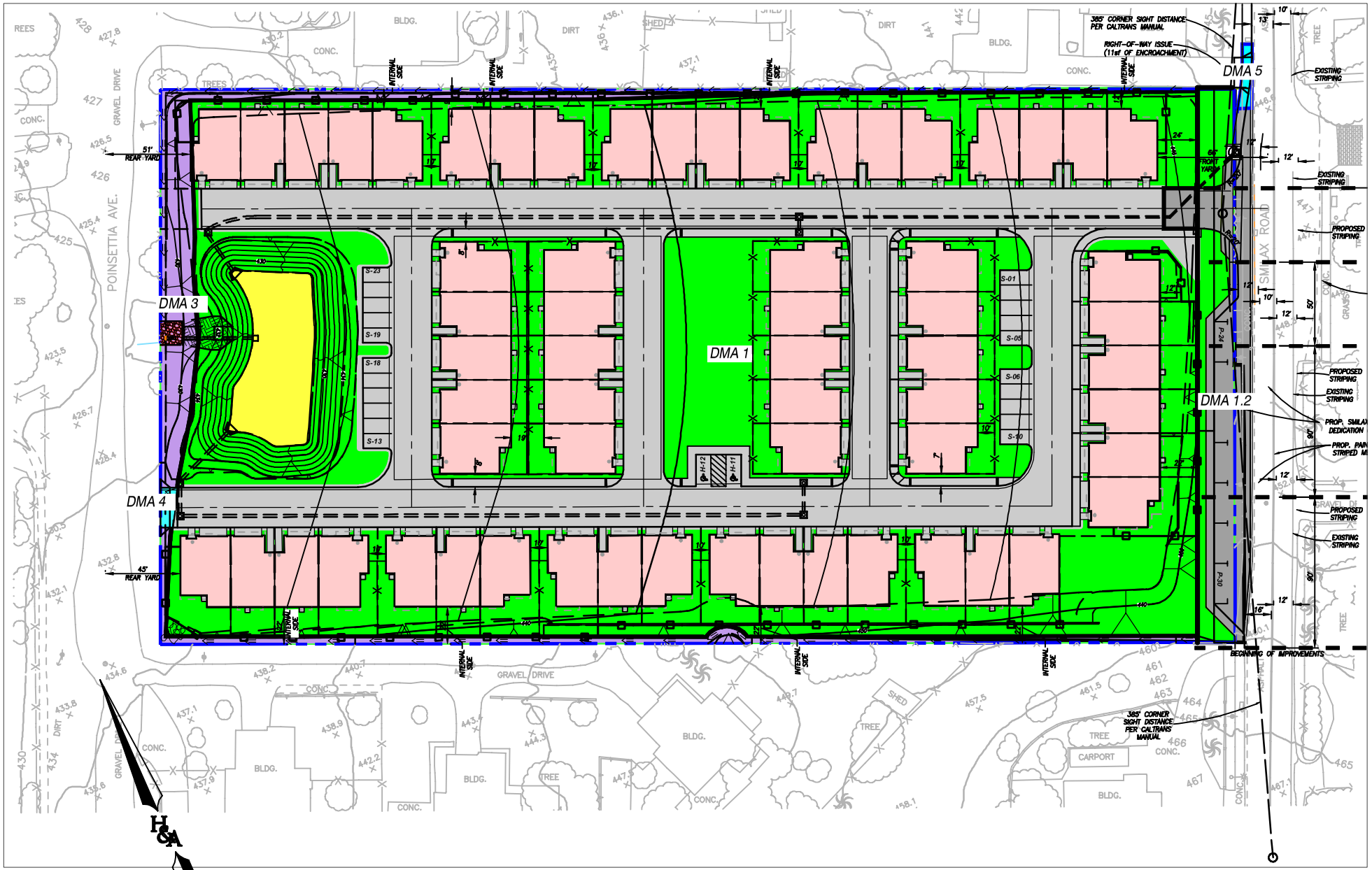
NOT TO SCALE

PROJECT VICINITY MAP

SMILAX

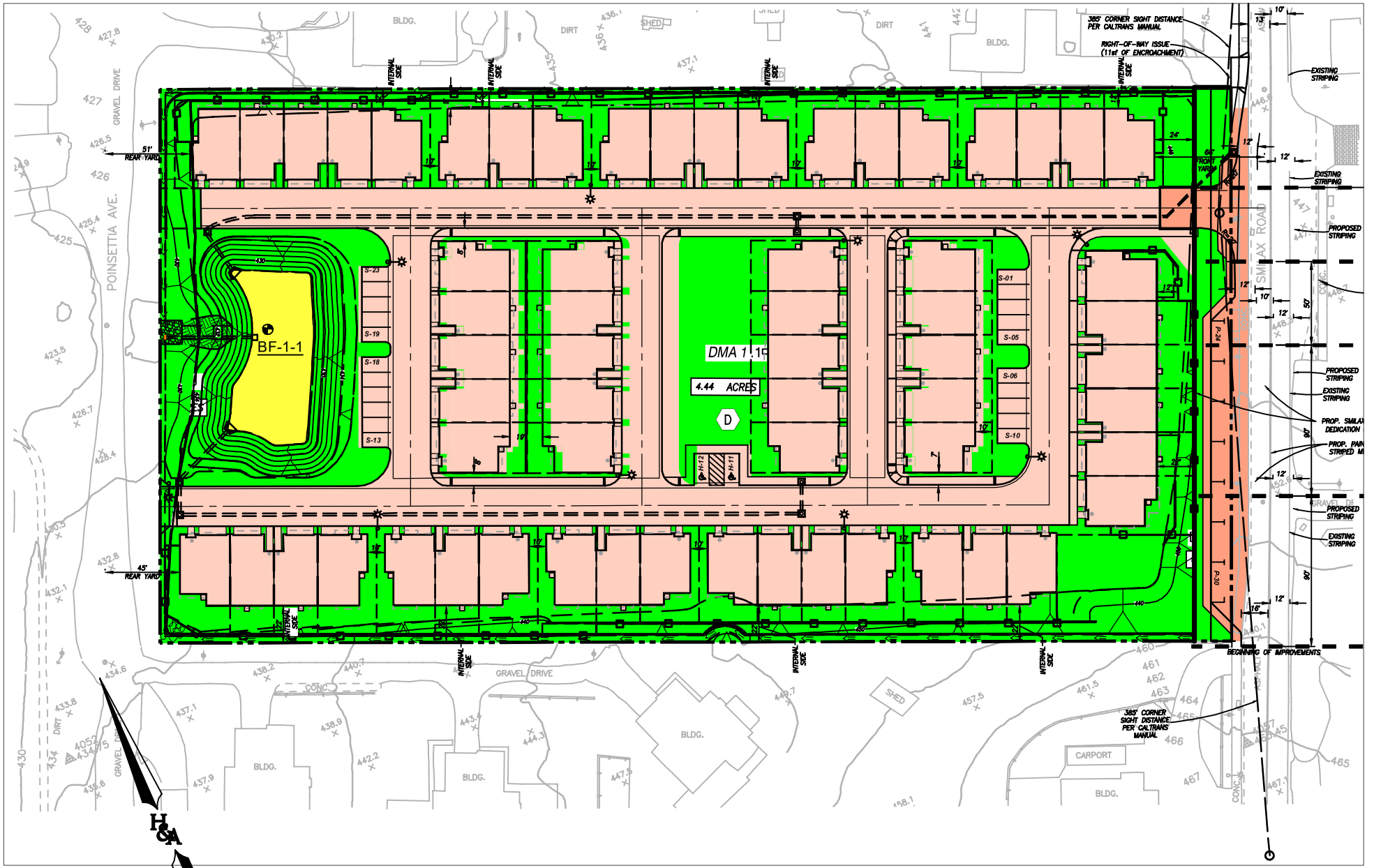
STORMWATER MAINTENANCE EXHIBITS

EXHIBIT "A-2"



BMP MAP
SMILAX
STORMWATER MAINTENANCE EXHIBITS

EXHIBIT "A-3"



H&A

0 80 160 240

SCALE 1" =80'

BMP MAP
SMILAX
STORMWATER MAINTENANCE EXHIBITS

E.19 BF-1 Biofiltration

Location: 43rd Street and Logan Avenue, San Diego, California

MS4 Permit Category
Biofiltration

Manual Category
Biofiltration

Applicable Performance Standard
Pollutant Control
Flow Control

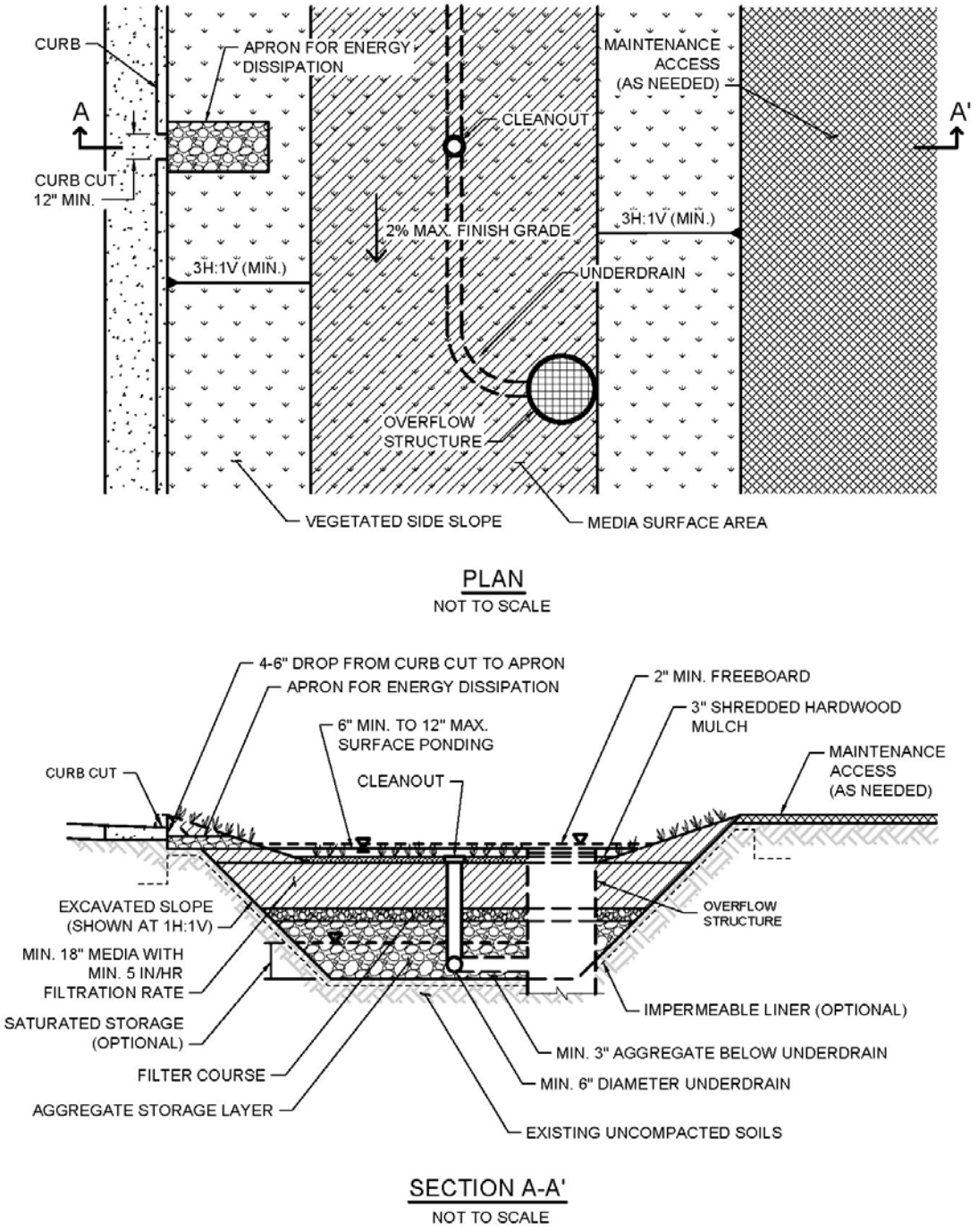
Primary Benefits
Treatment
Volume Reduction (Incidental)
Peak Flow Attenuation (Optional)

Description

Biofiltration (Bioretention with underdrain) facilities are vegetated surface water systems that filter water through vegetation, and soil or engineered media prior to discharge via underdrain or overflow to the downstream conveyance system. Bioretention with underdrain facilities are commonly incorporated into the site within parking lot landscaping, along roadsides, and in open spaces. Because these types of facilities have limited or no infiltration, they are typically designed to provide enough hydraulic head to move flows through the underdrain connection to the storm drain system. Treatment is achieved through filtration, sedimentation, sorption, biochemical processes and plant uptake.

Typical biofiltration components include:

- Inflow distribution mechanisms (e.g, perimeter flow spreader or filter strips)
- Energy dissipation mechanism for concentrated inflows (e.g., splash blocks or riprap)
- Shallow surface ponding for captured flows
- Side slope and basin bottom vegetation selected based on expected climate and ponding depth
- Non-floating mulch layer
- Media layer (planting mix or engineered media) capable of supporting vegetation growth
- Filter course layer consisting of aggregate to prevent the migration of fines into uncompacted native soils or the aggregate storage layer
- Aggregate storage layer with underdrain(s)
- Impermeable liner or uncompacted native soils at the bottom of the facility
- Overflow structure



Typical plan and Section view of a Biofiltration BMP

Design Adaptations for Project Goals

Biofiltration Treatment BMP for storm water pollutant control. The system is lined or un-lined to provide incidental infiltration, and an underdrain is provided at the bottom to carry away filtered

runoff. This configuration is considered to provide biofiltration treatment via flow through the media layer. Storage provided above the underdrain within surface ponding, media, and aggregate storage is considered included in the biofiltration treatment volume. Saturated storage within the aggregate storage layer can be added to this design by raising the underdrain above the bottom of the aggregate storage layer or via an internal weir structure designed to maintain a specific water level elevation.

Integrated storm water flow control and pollutant control configuration. The system can be designed to provide flow rate and duration control by primarily providing increased surface ponding and/or having a deeper aggregate storage layer above the underdrain. This will allow for significant detention storage, which can be controlled via inclusion of an outlet structure at the downstream end of the underdrain.

Recommended Siting Criteria

	Siting Criteria	*Intent/Rationale*
☐	Placement observes geotechnical recommendations regarding potential hazards (e.g., slope stability, landslides, liquefaction zones) and setbacks (e.g., slopes, foundations, utilities).	Must not negatively impact existing site geotechnical concerns.
☐	An impermeable liner or other hydraulic restriction layer is included if site constraints indicate that infiltration or lateral flows should not be allowed.	Lining prevents storm water from impacting groundwater and/or sensitive environmental or geotechnical features. Incidental infiltration, when allowable, can aid in pollutant removal and groundwater recharge.
☐	Contributing tributary area must be ≤ 5 acres (≤ 1 acre preferred).	Bigger BMPs require additional design features for proper performance. Contributing tributary area greater than 5 acres may be allowed at the discretion of County staff if the following conditions are met: 1) incorporate design features (e.g. flow spreaders) to minimize short circuiting of flows in the BMP and 2) incorporate additional design features requested by County staff for proper performance of the regional BMP.
☐	Finish grade of the facility is ≤ 2%.	Flatter surfaces reduce erosion and channelization within the facility.

Design Criteria and Considerations

Biofiltration must meet the following design criteria. Deviations from the below criteria may be approved at the discretion of County staff if it is determined to be appropriate:

Siting and Design		*Intent/Rationale*
Surface Ponding		
☐	Surface ponding is limited to a 24-hour drawdown time.	Surface ponding limited to 24 hour for plant health. Surface ponding drawdown time greater than 24-hours but less than 96 hours may be allowed at the discretion of County staff if certified by a landscape architect or agronomist.
☐	Surface ponding depth is ≥ 6 and ≤ 12 inches.	Surface ponding capacity lowers subsurface storage requirements. Deep surface ponding raises safety concerns. Surface ponding depth greater than 12 inches (for additional pollutant control or surface outlet structures or flow-control orifices) may be allowed at the discretion of County staff if the following conditions are met: 1) surface ponding depth drawdown time is less than 24 hours; and 2) safety issues and fencing requirements are considered (typically ponding greater than 18" will require a fence and/or flatter side slopes) and 3) potential for elevated clogging risk is considered.
☐	A minimum of 2 inches of freeboard is provided.	Freeboard provides room for head over overflow structures and minimizes risk of uncontrolled surface discharge.
☐	Side slopes are stabilized with vegetation and are = 3H:1V or shallower.	Gentler side slopes are safer, less prone to erosion, able to establish vegetation more quickly and easier to maintain.
Vegetation		

Siting and Design		*Intent/Rationale*
☐	Plantings are suitable for the climate and expected ponding depth. A plant list to aid in selection can be found in Appendix F.	Plants suited to the climate and ponding depth are more likely to survive.
☐	An irrigation system with a connection to water supply should be provided as needed.	Seasonal irrigation might be needed to keep plants healthy.
Mulch (Mandatory)		
☐	3 inches of well-aged, shredded hardwood mulch.	Mulch will suppress weeds and maintain moisture for plant growth.
Media Layer		
☐	Media maintains a minimum filtration rate of 5 in/hr over lifetime of facility. An initial filtration rate of 8 to 12 in/hr is recommended to allow for clogging over time; the initial filtration rate should not exceed 12 inches per hour.	A filtration rate of at least 5 inches per hour allows soil to drain between events. The initial rate should be higher than long term target rate to account for clogging over time. However an excessively high initial rate can have a negative impact on treatment performance, therefore an upper limit is needed.
☐	Media is a minimum 18 inches deep, meeting either of these two media specifications: Appendix F.2 Biofiltration Soil Media (BSM) **or** County of San Diego Low Impact Development Handbook: Appendix G -Bioretention Soil Specification (June 2014, unless superseded by more recent edition). Alternatively, for proprietary designs and custom media mixes not meeting the media specifications, the media meets the pollutant treatment performance criteria in Section F.1.1.	A deep media layer provides additional filtration and supports plants with deeper roots. Standard specifications must be followed. For non-standard or proprietary designs, compliance with F.1.1 ensures that adequate treatment performance will be provided.

Siting and Design		*Intent/Rationale*
☐	Media surface area is 3% of contributing area times adjusted runoff factor or greater. Unless demonstrated that the BMP surface area can be smaller than 3%.	Greater surface area to tributary area ratios: a) maximizes volume retention as required by the MS4 Permit and b) decrease loading rates per square foot and therefore increase longevity. Adjusted runoff factor is to account for site design BMPs implemented upstream of the BMP (such as rain barrels, impervious area dispersion, etc.). Refer to Appendix B guidance. If media surface area is under 3% of contributing area, refer to Sediment Loading calculations in Appendix B.
☐	Where receiving waters are impaired or have a TMDL for nutrients, the system is designed with nutrient sensitive media design (see fact sheet BF-2).	Potential for pollutant export is partly a function of media composition; media design must minimize potential for export of nutrients, particularly where receiving waters are impaired for nutrients.
Filter Course Layer		
☐	A filter course is used to prevent migration of fines through layers of the facility. Filter fabric is not used.	Migration of media can cause clogging of the aggregate storage layer void spaces or subgrade. Filter fabric is more likely to clog.
☐	Filter course is washed and free of fines.	Washing aggregate will help eliminate fines that could clog the facility and impede infiltration.
☐	Filter course calculations assessing suitability for particle migration prevention have been completed.	Gradation relationship between layers can evaluate factors (e.g., bridging, permeability, and uniformity) to determine if particle sizing is appropriate or if an intermediate layer is needed.
Aggregate Storage Layer		

Siting and Design		*Intent/Rationale*
☐	Class 2 Permeable per Caltrans specification 68-1.025 is recommended for the storage layer. Washed, open-graded crushed rock may be used, however a 4-6 inch washed pea gravel filter course layer at the top of the crushed rock is required.	Washing aggregate will help eliminate fines that could clog the aggregate storage layer void spaces or subgrade.
☐	The depth of aggregate provided (12-inch typical) and storage layer configuration is adequate for providing conveyance for underdrain flows to the outlet structure.	Proper storage layer configuration and underdrain placement will minimize facility drawdown time.
Inflow, Underdrain, and Outflow Structures		
☐	Inflow, underdrains and outflow structures are accessible for inspection and maintenance.	Maintenance will prevent clogging and ensure proper operation of the flow control structures.
☐	Inflow velocities are limited to 3 ft/s or less or use energy dissipation methods. (e.g., riprap, level spreader) for concentrated inflows.	High inflow velocities can cause erosion, scour and/or channeling.
☐	Curb cut inlets are at least 12 inches wide, have a 4-6 inch reveal (drop) and an apron and energy dissipation as needed.	Inlets must not restrict flow and apron prevents blockage from vegetation as it grows in. Energy dissipation prevents erosion.
☐	Underdrain outlet elevation should be a minimum of 3 inches above the bottom elevation of the aggregate storage layer.	A minimal separation from subgrade or the liner lessens the risk of fines entering the underdrain and can improve hydraulic performance by allowing perforations to remain unblocked.
☐	Minimum underdrain diameter is 6 inches.	Smaller diameter underdrains are prone to clogging.
Inflow, Underdrain, and Outflow Structures		
☐	Underdrains are made of slotted, PVC pipe conforming to ASTM D 3034 or equivalent or corrugated, HDPE pipe conforming to AASHTO 252M or equivalent.	Slotted underdrains provide greater intake capacity, clog resistant drainage, and reduced entrance velocity into the pipe, thereby reducing the chances of solids migration.

Siting and Design		*Intent/Rationale*
☐	An underdrain cleanout with a minimum 6-inch diameter and lockable cap is placed every 250 to 300 feet as required based on underdrain length.	Properly spaced cleanouts will facilitate underdrain maintenance.
☐	Overflow is safely conveyed to a downstream storm drain system or discharge point Size overflow structure to pass 100-year peak flow for on-line infiltration basins and water quality peak flow for off-line basins.	Planning for overflow lessens the risk of property damage due to flooding.

Conceptual Design and Sizing Approach for Storm Water Pollutant Control Only

To design biofiltration for storm water pollutant control only (no flow control required), the following steps should be taken:

1. Verify that siting and design criteria have been met, including placement requirements, contributing tributary area, maximum side and finish grade slopes, and the recommended media surface area tributary ratio.
2. Calculate the DCV per Appendix B based on expected site design runoff for tributary areas.
3. Use the sizing worksheet presented in Appendix B.5 to size biofiltration BMPs.

Conceptual Design and Sizing Approach when Storm Water Flow Control is Applicable

Control of flow rates and/or durations will typically require significant surface ponding and/or aggregate storage volumes, and therefore the following steps should be taken prior to determination of storm water pollutant control design. Pre-development and allowable post-project flow rates and durations should be determined as discussed in Chapter 6 of the manual.

1. Verify that siting and design criteria have been met, including placement requirements, contributing tributary area, maximum side and finish grade slopes, and the recommended media surface area tributary ratio.
2. Iteratively determine the facility footprint area, surface ponding and/or aggregate storage layer depth required to provide detention storage to reduce flow rates and durations to allowable limits. Flow rates and durations can be controlled from detention storage by altering outlet structure orifice size(s) and/or water control levels. Multi-level orifices can be used within an outlet structure to control the full range of flows.
3. If bioretention with underdrain cannot fully provide the flow rate and duration control required by this manual, an upstream or downstream structure with significant storage volume

such as an underground vault can be used to provide remaining controls.

4. After bioretention with underdrain has been designed to meet flow control requirements, calculations must be completed to verify if storm water pollutant control requirements to treat the DCV have been met.

Maintenance Overview

Normal Expected Maintenance. Biofiltration requires routine maintenance to: remove accumulated materials such as sediment, trash or debris; maintain vegetation health; maintain infiltration capacity of the media layer; replenish mulch; and maintain integrity of side slopes, inlets, energy dissipators, and outlets. A summary table of standard inspection and maintenance indicators is provided within this Fact Sheet.

Non-Standard Maintenance or BMP Failure. If any of the following scenarios are observed, the BMP is not performing as intended to protect downstream waterways from pollution and/or erosion. Corrective maintenance, increased inspection and maintenance, BMP replacement, or a different BMP type will be required.

- The BMP is not drained between storm events. Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging of the media layer, filter course, aggregate storage layer, underdrain, or outlet structure. The specific cause of the drainage issue must be determined and corrected.

- Sediment, trash, or debris accumulation greater than 25% of the surface ponding volume within one month. This means the load from the tributary drainage area is too high, reducing BMP function or clogging the BMP. This would require pretreatment measures within the tributary area draining to the BMP to intercept the materials. Pretreatment components, especially for sediment, will extend the life of components that are more expensive to replace such as media, filter course, and aggregate layers.

- Erosion due to concentrated storm water runoff flow that is not readily corrected by adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the County reviewer shall be contacted prior to any additional repairs or reconstruction.

Other Special Considerations. Biofiltration is a vegetated structural BMP. Vegetated structural BMPs that are constructed in the vicinity of, or connected to, an existing jurisdictional water or wetland could inadvertently result in creation of expanded waters or wetlands. As such, vegetated structural BMPs have the potential to come under the jurisdiction of the United States Army Corps of Engineers, SDRWQCB, California Department of Fish and Wildlife, or the United States Fish and

Wildlife Service. This could result in the need for specific resource agency permits and costly mitigation to perform maintenance of the structural BMP. Along with proper placement of a structural BMP, routine maintenance is key to preventing this scenario.

Sediment Loading. Consider the effects of BMP design and tributary area land uses on the clogging potential of the BMP. Complete the sediment loading analysis included in Appendix F.

Summary of Standard Inspection and Maintenance

The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district.

Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.

Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation or compaction of the media layer.	• Inspect monthly. If the BMP is 25% full* or more in one month, increase inspection frequency to monthly plus after every 0.1-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Obstructed inlet or outlet structure	Clear blockage.	• Inspect monthly and after every 0.5-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable	• Inspect annually. • Maintain when needed.

Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintain when needed.
Dead or diseased vegetation	Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintain when needed.
Overgrown vegetation	Mow or trim as appropriate.	• Inspect monthly. • Maintain when needed.
2/3 of mulch has decomposed, or mulch has been removed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches.	• Inspect monthly. • Replenish mulch annually, or more frequently when needed based on inspection.
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.	• Inspect monthly. • Maintain when needed.

Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the County reviewer shall be contacted prior to any additional repairs or reconstruction.	• Inspect after every 0.5-inch or larger storm event. If erosion due to storm water flow has been observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintain when needed. If the issue is not corrected by restoring the BMP to the original plan and grade, the County reviewer shall be contacted prior to any additional repairs or reconstruction.
Standing water in BMP for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains, or repairing/replacing clogged or compacted soils.	• Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintain when needed.

Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology	If mosquitos/larvae are observed: first, immediately remove any standing water by dispersing to nearby landscaping; second, make corrective measures as applicable to restore BMP drainage to prevent standing water. If mosquitos persist following corrective measures to remove standing water, or if the BMP design does not meet the 96-hour drawdown criteria due to release rates controlled by an orifice installed on the underdrain, the County reviewer shall be contacted to determine a solution. A different BMP type, or a Vector Management Plan prepared with concurrence from the County of San Diego Department of Environmental Health, may be required.	• Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintain when needed.
Underdrain clogged	Clear blockage.	Inspect if standing water is observed for longer than 24-96 hours following a storm event. Maintain when needed.

"25% full" is defined as ¼ of the depth from the design bottom elevation to the crest of the outflow structure (e.g., if the height to the outflow opening is 12 inches from the bottom elevation, then the materials must be removed when there is 3 inches of accumulation – this should be marked on the outflow structure).

E.20 BF-2 Nutrient Sensitive Media Design

Some studies of bioretention with underdrains have observed export of nutrients, particularly inorganic nitrogen (nitrate and nitrite) and dissolved phosphorus. This has been observed to be a short-lived phenomenon in some studies or a long term issue in some studies. The composition of the soil media, including the chemistry of individual elements is believed to be an important factor in the potential for nutrient export. Organic amendments, often compost, have been identified as the most likely source of nutrient export. The quality and stability of organic amendments can vary widely.

The biofiltration media specifications contained in Appendix F.2 of this Manual and also contained in the County of San Diego Low Impact Development Handbook: Appendix G -Bioretention Soil Specification (June 2014, unless superseded by more recent edition) were developed with consideration of the potential for nutrient export. These specifications include criteria for individual component characteristics and quality in order to control the overall quality of the blended mixes. As of the publication of this manual, the specifications contained in Appendix F.2 of the County of San Diego BMP Design Manual provide more detail regarding mix design and quality control.

The specifications noted above were developed for general purposes to meet permeability and treatment goals. In cases where the BMP discharges to receiving waters with nutrient impairments or nutrient TMDLs, the biofiltration media should be designed with the specific goal of minimizing the potential for export of nutrients from the media. Therefore, in addition to adhering to the County media specifications, the following guidelines should be followed:

1. Select plant palette to minimize plant nutrient needs

A landscape architect or agronomist should be consulted to select a plant palette that minimizes nutrient needs. Utilizing plants with low nutrient needs results in less need to enrich the biofiltration soil mix. If nutrient quantity is then tailored to plants with lower nutrient needs, these plants will generally have less competition from weeds, which typically need higher nutrient content. The following practices are recommended to minimize nutrient needs of the plant palette:

- **Utilize native, drought-tolerant plants and grasses where possible.** Native plants generally have a broader tolerance for nutrient content, and can be longer lived in leaner/lower nutrient soils.

- **Start plants from smaller starts or seed.** Younger plants are generally more tolerant of lower nutrient levels and tend to help develop soil structure as they grow. Given the lower cost of smaller plants, the project should be able to accept a plant mortality rate that is somewhat higher than starting from larger plants and providing high organic content.

2. Minimize excess nutrients in media mix

Once the low-nutrient plant palette is established (item 1), the landscape architect and/or agronomist should be consulted to assist in the design of a biofiltration media to balance the interests of plant

establishment, water retention capacity (irrigation demand), and the potential for nutrient export. Specifications for Biofiltration Soil Media outlined in Appendix F, particularly sections 803-2.5.4 and 803-5.5.5 shall be followed along with the following guidelines:**The mix should not exceed the nutrient needs of plants.** In conventional landscape design, the nutrient needs of plants are often exceeded intentionally in order to provide a factor of safety for plant survival. This practice must be avoided in biofiltration media as excess nutrients will increase the chance of export. The mix designer should keep in mind that nutrients can be added later (through mulching, tilling of amendments into the surface), but it is not possible to remove nutrients, once added.

- **The actual nutrient content and organic content of the selected organic amendment source should be determined when specifying mix proportions.** Nutrient content (i.e., C:N ratio; plant extractable nutrients) and organic content (i.e, % organic material) are relatively inexpensive to measure via standard agronomic methods and can provide important information about mix design. If mix design relies on approximate assumption about nutrient/organic content and this is not confirmed with testing (or the results of prior representative testing), it is possible that the mix could contain much more nutrient than intended.

- **Nutrients are better retained in soils with higher cation exchange capacity.** Cation exchange capacity can be increased through selection of organic material with naturally high cation exchange capacity, such as peat or coconut coir pith, and/or selection of inorganic material with high cation exchange capacity such as some sands or engineered minerals (e.g., low P-index sands, zeolites, rhyolites, etc). Including higher cation exchange capacity materials would tend to reduce the net export of nutrients. Natural silty materials also provide cation exchange capacity; however potential impacts to permeability need to be considered.

- **Focus on soil structure as well as nutrient content.** Soil structure is loosely defined as the ability of the soil to conduct and store water and nutrients as well as the degree of aeration of the soil. Soil structure can be more important than nutrient content in plant survival and biologic health of the system. If a good soil structure can be created with very low amounts of organic amendment, plants survivability should still be provided. While soil structure generally develops with time, biofiltration media can be designed to promote earlier development of soil structure. Soil structure is enhanced by the use of amendments with high humus content (as found in well-aged organic material). In addition, soil structure can be enhanced through the use of organic material with a distribution of particle sizes (i.e., a more heterogeneous mix).

- **Consider alternatives to compost.** Compost, by nature, is a material that is continually evolving and decaying. It can be challenging to determine whether tests previously done on a given compost stock are still representative. It can also be challenging to determine how the properties of the compost will change once placed in the media bed. More stable materials such as aged coco coir pith, peat, biochar, shredded bark, and/or other amendments should be considered.

With these considerations, it is anticipated that less than 10 percent organic amendment by volume could be used, while still balancing plant survivability and water retention. If compost is used,

designers should strongly consider utilizing less than 10 percent by volume.

3. Design with partial retention and/or internal water storage

An internal water storage zone, as described in Fact Sheet PR-1 is believed to improve retention of nutrients. For lined systems, an internal water storage zone worked by providing a zone that fluctuates between aerobic and anaerobic conditions, resulting in nitrification/denitrification. In soils that will allow infiltration, a partial retention design (PR-1) allows significant volume reduction and can also promote nitrification/denitrification.

Acknowledgment: This fact sheet has been adapted from the Orange County Technical Guidance Document (May 2011). It was originally developed based on input from: Deborah Deets, City of Los Angeles Bureau of Sanitation, Drew Ready, Center for Watershed Health, Rick Fisher, ASLA, City of Los Angeles Bureau of Engineering, Dr. Garn Wallace, Wallace Laboratories, Glen Dake, GDML, and Jason Schmidt, Tree People. The guidance provided herein does not reflect the individual opinions of any individual listed above and should not be cited or otherwise attributed to those listed.

Maintenance Overview

Refer to maintenance information provided in the Biofiltration (BF-1) Fact Sheet. Adjust maintenance actions and reporting if required based on the specific media design.

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E.21 BF-3 Proprietary Biofiltration Systems

The purpose of this fact sheet is to help explain the potential role of proprietary BMPs in meeting biofiltration requirements, when full retention of the DCV is not feasible. The fact sheet does not describe design criteria like the other fact sheets in this appendix because this information varies by BMP product model.

Criteria for Use of a Proprietary BMP as a Biofiltration BMP

A proprietary BMP may be acceptable as a "biofiltration BMP" under the following conditions:

(1) The BMP meets the minimum design criteria listed in Appendix F, including the selection criteria (i.e. only allowed in No Infiltration Condition and where site-specific documentation demonstrates that the use of larger footprint biofiltration BMPs (i.e. 3 %) would be infeasible) and the pollutant treatment performance standard in Appendix F.1.1;

(2) The BMP is designed and maintained in a manner consistent with its performance certifications (See explanation in Appendix F.1.2); and

(3) The BMP is acceptable at the discretion of County staff. While the County has no obligation to accept the use of any proposed proprietary BMP, applicants will be provided a written explanation describing the rationale for the rejection of any proposed devices.

Guidance for Sizing a Proprietary BMP as a Biofiltration BMP

Proprietary biofiltration BMPs must meet the same sizing guidance as non-proprietary BMPs. Sizing is typically based on capturing and treating 1.50 times the DCV not reliably retained. Guidance for sizing biofiltration BMPs to comply with requirements of this manual is provided in Appendix F.1.2.

Maintenance Overview

Refer to manufacturer for maintenance information

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APPENDIX-1

PRELIMINARY DRAINAGE STUDY
for
SMILAX

INSERT DRAINAGE STUDY

APPENDIX-2
GEOTECHNICAL FEASIBILITY REVIEW

INSERT GEOTECHNICAL REPORT