



STORM WATER QUALITY MANAGEMENT PLAN
WEST OAKS

APRIL 2019

City of Carlsbad, CA

prepared for:

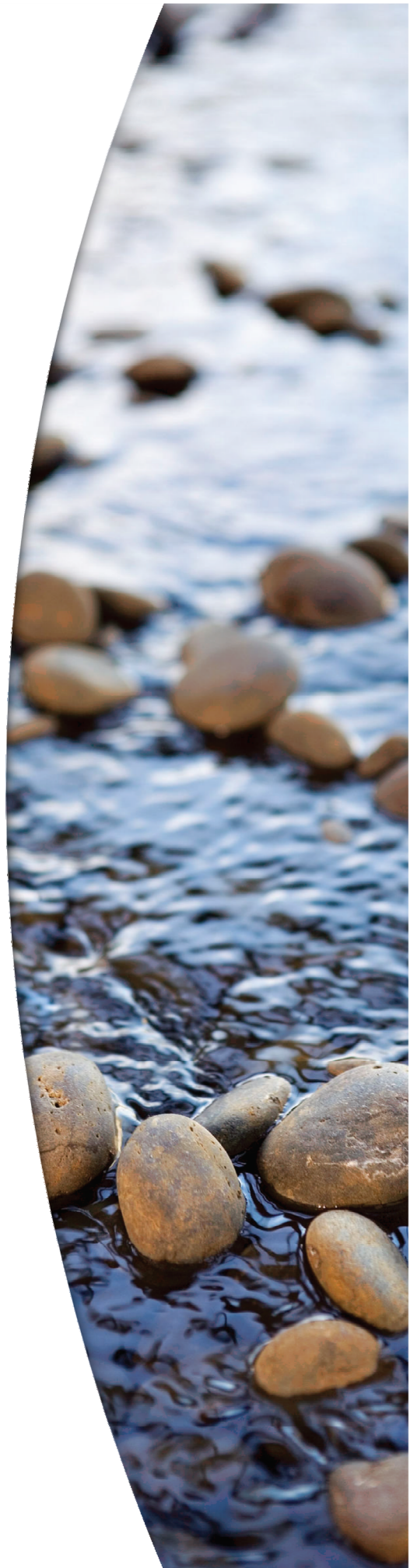
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Job # 02690-005-02

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CITY OF CARLSBAD

PRIORITY DEVELOPMENT PROJECT (PDP)
STORM WATER QUALITY MANAGEMENT PLAN (SWQMP)
FOR
West Oaks

GPA 16-04 | ZC 16-03 | LCPA 16-04 | LFMP 87-
05(F) | PUD 2018-0004 | SDP 16-20 | CDP 16-31 |
SUP 27-0005 | HMP 16-04 | MS 2018-0005

ENGINEER OF WORK:

Kenneth T. Kozlik, P.E. 71883

PREPARED FOR:

The Carlsbad West Oaks Project
Owner, LLC,
A Delaware Limited Liability
Company
2235 Encinitas Blvd. Suite 216
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PREPARED BY:

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April 2019

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CERTIFICATION PAGE

Project Name: West Oaks

Project ID: GPA 16-04 | ZC 16-03 | LCPA
16-04 | LFMP 87-05(F) | PUD 2018-0004 |
SDP 16-20 | CDP 16-31 | SUP 27-0005 |
HMP 16-04 | MS 2018-0005

I hereby declare that I am the Engineer in Responsible Charge of design of storm water BMPs for this project, and that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the requirements of the BMP Design Manual, which is based on the requirements of SDRWQCB Order No. R9-2013-0001 (MS4 Permit) or the current Order.

I have read and understand that the City Engineer 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 SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable source control and site design 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 the City Engineer is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

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

Kenneth T. Kozlik

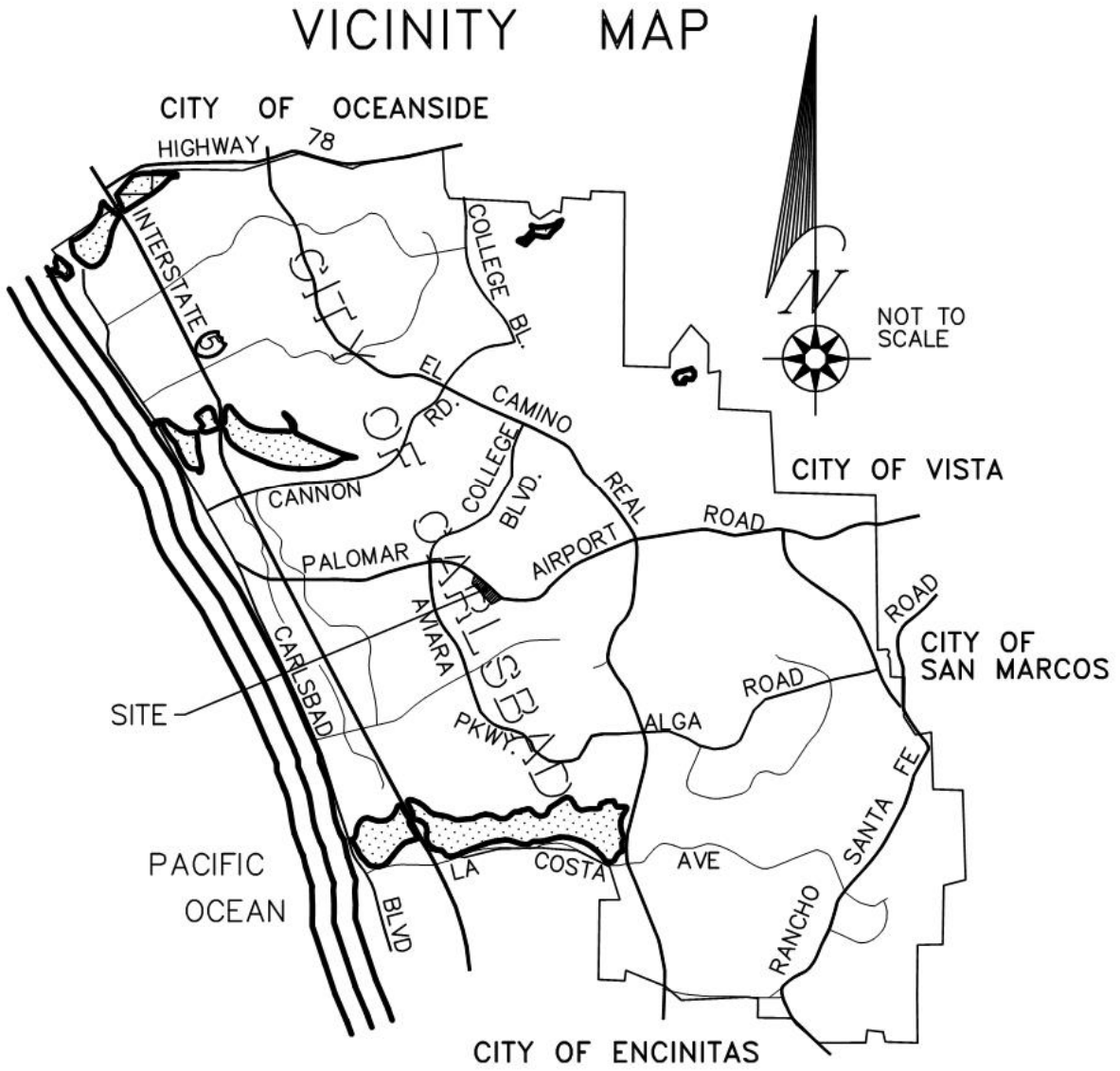
Print Name

Fuscoe Engineering

Company

Date

PROJECT VICINITY MAP





STORM WATER STANDARDS QUESTIONNAIRE E-34

Development Services
Land Development Engineering
1635 Faraday Avenue
(760) 602-2750
www.carlsbadca.gov

INSTRUCTIONS:

To address post-development pollutants that may be generated from development projects, the city requires that new development and significant redevelopment priority projects incorporate Permanent Storm Water Best Management Practices (BMPs) into the project design per Carlsbad BMP Design Manual (BMP Manual). To view the BMP Manual, refer to the Engineering Standards (Volume 5).

This questionnaire must be completed by the applicant in advance of submitting for a development application (subdivision, discretionary permits and/or construction permits). The results of the questionnaire determine the level of storm water standards that must be applied to a proposed development or redevelopment project. Depending on the outcome, your project will either be subject to **'STANDARD PROJECT'** requirements or be subject to **'PRIORITY DEVELOPMENT PROJECT' (PDP)** requirements.

Your responses to the questionnaire represent an initial assessment of the proposed project conditions and impacts. City staff has responsibility for making the final assessment after submission of the development application. If staff determines that the questionnaire was incorrectly filled out and is subject to more stringent storm water standards than initially assessed by you, this will result in the return of the development application as incomplete. In this case, please make the changes to the questionnaire and resubmit to the city.

If you are unsure about the meaning of a question or need help in determining how to respond to one or more of the questions, please seek assistance from Land Development Engineering staff.

A completed and signed questionnaire must be submitted with each development project application. Only one completed and signed questionnaire is required when multiple development applications for the same project are submitted concurrently.

PROJECT INFORMATION

PROJECT NAME: <u>West Oaks</u>	PROJECT ID:
ADDRESS: <u>West Oaks Way</u>	APN: <u>212-110-(01 to 08) & 212-040-26</u>
The project is (check one): <input checked="" type="checkbox"/> New Development <input type="checkbox"/> Redevelopment	
The total proposed disturbed area is: <u>341,596</u> ft ² (<u>7.84</u>) acres	
The total proposed newly created and/or replaced impervious area is: <u>265,603</u> ft ² (<u>6.10</u>) acres	
If your project is covered by an approved SWQMP as part of a larger development project, provide the project ID and the SWQMP # of the larger development project:	
Project ID _____ SWQMP #: _____	
Then, go to Step 1 and follow the instructions. When completed, sign the form at the end and submit this with your application to the city.	

**STEP 1
TO BE COMPLETED FOR ALL PROJECTS**

To determine if your project is a “development project”, please answer the following question:

YES NO

Is your project LIMITED TO routine maintenance activity and/or repair/improvements to an existing building or structure that do not alter the size (See Section 1.3 of the BMP Design Manual for guidance)?

If you answered “yes” to the above question, provide justification below then **go to Step 5**, mark the third box stating “my project is **not a ‘development project’** and not subject to the requirements of the BMP manual” and complete applicant information.

Justification/discussion: (e.g. the project includes only interior remodels within an existing building):

If you answered “no” to the above question, the project is a ‘**development project**’, **go to Step 2**.

**STEP 2
TO BE COMPLETED FOR ALL DEVELOPMENT PROJECTS**

To determine if your project is exempt from PDP requirements pursuant to MS4 Permit Provision E.3.b.(3), please answer the following questions:

Is your project LIMITED to one or more of the following:

YES NO

1. Constructing new or retrofitting paved sidewalks, bicycle lanes or trails that meet the following criteria:
 a) Designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas;
 b) Designed and constructed to be hydraulically disconnected from paved streets or roads;
 c) Designed and constructed with permeable pavements or surfaces in accordance with USEPA Green Streets guidance?

2. Retrofitting or redeveloping existing paved alleys, streets, or roads that are designed and constructed in accordance with the USEPA Green Streets guidance?

3. Ground Mounted Solar Array that meets the criteria provided in section 1.4.2 of the BMP manual?

If you answered “yes” to one or more of the above questions, provide discussion/justification below, then **go to Step 5**, mark the second box stating “my project is **EXEMPT** from PDP ...” and complete applicant information.

Discussion to justify exemption (e.g. the project redeveloping existing road designed and constructed in accordance with the USEPA Green Street guidance):

If you answered “no” to the above questions, your project is not exempt from PDP, **go to Step 3**.

**STEP 3
TO BE COMPLETED FOR ALL NEW OR REDEVELOPMENT PROJECTS**

To determine if your project is a PDP, please answer the following questions (MS4 Permit Provision E.3.b.(1)):

	YES	NO
1. Is your project a new development that creates 10,000 square feet or more of impervious surfaces collectively over the entire project site? <i>This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Is your project a redevelopment project creating and/or replacing 5,000 square feet or more of impervious surface collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surface? <i>This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Is your project a new or redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surface collectively over the entire project site and supports a restaurant? A restaurant is a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (Standard Industrial Classification (SIC) code 5812).	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Is your project a new or redevelopment project that creates 5,000 square feet or more of impervious surface collectively over the entire project site and supports a hillside development project? A hillside development project includes development on any natural slope that is twenty-five percent or greater.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Is your project a new or redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surface collectively over the entire project site and supports a parking lot? A parking lot is a land area or facility for the temporary parking or storage of motor vehicles used personally for business or for commerce.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Is your project a new or redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surface collectively over the entire project site and supports a street, road, highway freeway or driveway? <i>A street, road, highway, freeway or driveway is any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Is your project a new or redevelopment project that creates and/or replaces 2,500 square feet or more of impervious surface collectively over the entire site, and discharges directly to an Environmentally Sensitive Area (ESA)? <i>“Discharging Directly to” includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands).*</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. Is your project a new development or redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surface that supports an automotive repair shop? <i>An automotive repair shop is a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9. Is your project a new development or redevelopment project that creates and/or replaces 5,000 square feet or more of impervious area that supports a retail gasoline outlet (RGO)? <i>This category includes RGO's that meet the following criteria: (a) 5,000 square feet or more or (b) a project Average Daily Traffic (ADT) of 100 or more vehicles per day.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10. Is your project a new or redevelopment project that results in the disturbance of one or more acres of land and are expected to generate pollutants post construction?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11. Is your project located within 200 feet of the Pacific Ocean and (1) creates 2,500 square feet or more of impervious surface or (2) increases impervious surface on the property by more than 10%? (CMC 21.203.040)	<input type="checkbox"/>	<input checked="" type="checkbox"/>

If you answered “yes” to one or more of the above questions, your project is a **PDP**. If your project is a redevelopment project, **go to step 4**. If your project is a new project, **go to step 5**, check the first box stating “My project is a **PDP** ...” and complete applicant information.

If you answered “no” to all of the above questions, your project is a **‘STANDARD PROJECT.’** **Go to step 5**, check the second box stating “My project is a ‘STANDARD PROJECT’...” and complete applicant information.

**STEP 4
TO BE COMPLETED FOR REDEVELOPMENT PROJECTS THAT ARE PRIORITY DEVELOPMENT PROJECTS (PDP)
ONLY**

Complete the questions below regarding your redevelopment project (MS4 Permit Provision E.3.b.(2)): YES NO

Does the redevelopment project result in the creation or replacement of impervious surface in an amount of less than 50% of the surface area of the previously existing development? Complete the percent impervious calculation below: Existing impervious area (A) = _____ sq. ft. Total proposed newly created or replaced impervious area (B) = _____ sq. ft. Percent impervious area created or replaced (B/A)*100 = _____ %	<input type="checkbox"/>	<input type="checkbox"/>
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If you answered “yes”, the structural BMPs required for PDP apply only to the creation or replacement of impervious surface and not the entire development. **Go to step 5**, check the first box stating “My project is a **PDP ...**” and complete applicant information.

If you answered “no,” the structural BMP’s required for PDP apply to the entire development. **Go to step 5**, check the check the first box stating “My project is a **PDP ...**” and complete applicant information.

**STEP 5
CHECK THE APPROPRIATE BOX AND COMPLETE APPLICANT INFORMATION**

- My project is a **PDP** and must comply with **PDP** stormwater requirements of the BMP Manual. I understand I must prepare a Storm Water Quality Management Plan (**SWQMP**) for submittal at time of application.
 - My project is a **‘STANDARD PROJECT’** OR **EXEMPT** from PDP and must only comply with **‘STANDARD PROJECT’** stormwater requirements of the BMP Manual. As part of these requirements, I will submit a “*Standard Project Requirement Checklist Form E-36*” and incorporate low impact development strategies throughout my project.
- Note:** For projects that are close to meeting the PDP threshold, staff may require detailed impervious area calculations and exhibits to verify if ‘STANDARD PROJECT’ stormwater requirements apply.
- My Project is **NOT** a **‘development project’** and is not subject to the requirements of the BMP Manual.

Applicant Information and Signature Box

Applicant Name: Ken Kozlik Applicant Title: Civil Engineer

Applicant Signature: _____ Date: _____

* Environmentally Sensitive Areas include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Resources Control Board (Water Quality Control Plan for the San Diego Basin (1994) and amendments); water bodies designated with the RARE beneficial use by the State Water Resources Control Board (Water Quality Control Plan for the San Diego Basin (1994) and amendments); areas designated as preserves or their equivalent under the Multi Species Conservation Program within the Cities and County of San Diego; Habitat Management Plan; and any other equivalent environmentally sensitive areas which have been identified by the City.

This Box for City Use Only

	YES	NO
City Concurrence:	<input type="checkbox"/>	<input type="checkbox"/>
By: _____		
Date: _____		
Project ID: _____		

SITE INFORMATION CHECKLIST

Project Summary Information	
Project Name	West Oaks
Project ID	GPA 16-04 ZC 16-03 LCPA 16-04 LFMP 87-05(F) PUD 2018-0004 SDP 16-20 CDP 16-31 SUP 27-0005 HMP 16-04 MS 2018-0005
Project Address	West Oaks Way
Assessor's Parcel Number(s) (APN(s))	212-110-01, 212-110-02, 212-110-03, 212-110-04, 212-110-05, 212-110-06, 212-110-07, 212-110-08, 212-040-26
Project Watershed (Hydrologic Unit)	Carlsbad 904
Parcel Area	12.53 Acres (545,607 Square Feet)
Existing Impervious Area (subset of Parcel Area)	<u>1.41</u> Acres (61,420 Square Feet)
Area to be disturbed by the project (Project Area)	<u>7.84</u> Acres (341,596 Square Feet)
Project Proposed Impervious Area (subset of Project Area)	<u>6.10</u> Acres (265,603 Square Feet)
Project Proposed Pervious Area (subset of Project Area)	<u>1.75</u> Acres (76,263 Square Feet)
<p>Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.</p>	

Description of Existing Site Condition and Drainage Patterns

Current Status of the Site (select all that apply):

- Existing development
- Previously graded but not built out
- Agricultural or other non-impervious use
- Vacant, undeveloped/natural

Description / Additional

Information:

Existing Land Cover Includes (select all that apply):

- Vegetative Cover
- Non-Vegetated Pervious Areas
- Impervious Areas

Description / Additional Information:

Impervious areas include an existing street – West Oaks Way.

Underlying Soil belongs to Hydrologic Soil Group (select all that apply):

- NRCS Type A
- NRCS Type B
- NRCS Type C
- NRCS Type D

Approximate Depth to Groundwater (GW):

- GW Depth < 5 feet
- 5 feet < GW Depth < 10 feet (7-8 feet per Geotech testing)
- 10 feet < GW Depth < 20 feet
- GW Depth > 20 feet

Existing Natural Hydrologic Features (select all that apply):

- Watercourses
- Seeps
- Springs
- Wetlands
- None

Description / Additional Information: Natural features require the following on-site buffers: riparian buffer, 20' Uplands Buffer, and a Carlsbad Habitat Management buffer.

Description of Existing Site Topography and Drainage [How is storm water runoff conveyed from the site? At a minimum, this description should answer (1) whether existing drainage conveyance is natural or urban; (2) describe existing constructed storm water conveyance systems, if applicable; and (3) is runoff from offsite conveyed through the site? if so, describe]:

Existing drainage conveyance is a combination of natural and urban. On-site runoff flows through graded but undeveloped land, and is collected by the existing public road, West Oaks Way, which runs through the site. West Oaks Way is impervious and also contributes to onsite runoff. Off-site hillside runoff flows toward the site; this runoff is partially captured by existing storm drain to bypass the site, and partially captured by an existing concrete lined swale, which discharges to West Oaks Way. Stormwater runoff within West Oaks Way is captured by existing curb inlets. All existing storm drain discharges into the Canyon de las Encinas stream, and ultimately to the Pacific Ocean.

Description of Proposed Site Development and Drainage Patterns

Project Description / Proposed Land Use and/or Activities: Project proposes development of multi-family residential homes with parking lots, sidewalks, landscape, and pool.

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):

Buildings, Roadways, Parking lots, Hardscape, Sidewalks, Pool deck

List/describe proposed pervious features of the project (e.g., landscape areas):

Landscaping will be included in unpaved graded areas. Project will include biofiltration stormwater BMPs.

Does the project include grading and changes to site topography?

Yes

No

Description / Additional Information:

The site will be graded to accommodate buildings and pedestrian and vehicular access.

Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)?

Yes

No

Description / Additional Information:

New storm water conveyance system will be installed to divert off-site runoff from entering the site, and to route all on-site runoff into existing storm drains after pollutant and hydromodification control.

Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply):

- On-site storm drain inlets
- Interior floor drains and elevator shaft sump pumps
- Interior parking garages
- Need for future indoor & structural pest control
- Landscape/Outdoor Pesticide Use
- Pools, spas, ponds, decorative fountains, and other water features
- Food service
- Refuse areas
- Industrial processes
- Outdoor storage of equipment or materials
- Vehicle and Equipment Cleaning
- Vehicle/Equipment Repair and Maintenance
- Fuel Dispensing Areas
- Loading Docks
- Fire Sprinkler Test Water
- Miscellaneous Drain or Wash Water
- Plazas, sidewalks, and parking lots

Identification of Receiving Water Pollutants of Concern

Describe path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable):

The project site discharges into the Canyon de las Encinas stream located north of the project site. This hydrologic area discharges directly to the Pacific Ocean.

List any 303(d) impaired water bodies 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 for the impaired water bodies:

303(d) Impaired Water Body	Pollutant(s) Stressor(s)	TMDLs
Pacific Ocean Shoreline	Indicator Bacteria	Indicator Bacteria

Identification of Project Site Pollutants

Identify pollutants anticipated 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	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Nutrients	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Heavy Metals	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Organic Compounds	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Trash & Debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Oxygen Demanding Substances	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Oil & Grease	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Bacteria & Viruses	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pesticides	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Hydromodification Management Requirements

Do hydromodification management requirements apply (see Section 1.6 of the BMP Design Manual)?

- Yes, hydromodification management flow control structural BMPs required.
- No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
- No, the 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.
- No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides.

Description / Additional Information (to be provided if a 'No' answer has been selected above):

Critical Coarse Sediment Yield Areas*

***This Section only required if hydromodification management requirements apply**

Based on the maps provided within the WMAA, do potential critical coarse sediment yield areas exist within the project drainage boundaries?

- Yes
- No, No critical coarse sediment yield areas to be protected based on WMAA maps

If yes, have any of the optional analyses presented in Section 6.2 of the BMP Design Manual been performed?

- 6.2.1 Verification of Geomorphic Landscape Units (GLUs) Onsite
- 6.2.2 Downstream Systems Sensitivity to Coarse Sediment
- 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
- No optional analyses performed, the project will avoid critical coarse sediment yield areas identified based on WMAA maps

If optional analyses were performed, what is the final result?

- No critical coarse sediment yield areas to be protected based on verification of GLUs onsite
- Critical coarse sediment yield areas exist but additional analysis has determined that protection is not required. Documentation attached in Attachment 8 of the SWQMP.
- Critical coarse sediment yield areas exist and require protection. The project will implement management measures described in Sections 6.2.4 and 6.2.5 as applicable, and the areas are identified on the SWQMP Exhibit.

Discussion / Additional Information:

Flow Control for Post-Project Runoff*

***This Section only required if hydromodification management requirements apply**

List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit.

The points of compliance (POCs) will consist of the three existing storm drain discharges to Canyon de las Encinas.

Has a geomorphic assessment been performed for the receiving channel(s)?

- No, the low flow threshold is 0.1Q2 (default low flow threshold)
- Yes, the result is the low flow threshold is 0.1Q2
- Yes, the result is the low flow threshold is 0.3Q2
- Yes, the result is the low flow threshold is 0.5Q2

If a geomorphic assessment has been performed, provide title, date, and preparer:

Discussion / Additional Information: (optional)

Other Site Requirements and Constraints

When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or City codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.

Storm water design is limited by an onsite buffers, existing utility easements, and groundwater level at 7-8' below ground.

Optional Additional Information or Continuation of Previous Sections As Needed

This space provided for additional information or continuation of information from previous sections as needed.



STANDARD PROJECT REQUIREMENT CHECKLIST E-36

Development Services
Land Development Engineering
 1635 Faraday Avenue
 (760) 602-2750
 www.carlsbadca.gov

Project Information

Project Name: [West Oaks](#)

Project ID:

DWG No. or Building Permit No.:

Source Control BMPs

All development projects must implement source control BMPs SC-1 through SC-6 where applicable and feasible. See Chapter 4 and Appendix E.1 of the BMP Design Manual for information to implement source control BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E.1 of the Model BMP Design Manual. Discussion/justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion/justification must be provided. Please add attachments if more space is needed.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion/justification may be provided.

Source Control Requirement

Applied?

SC-1 Prevention of Illicit Discharges into the MS4

Yes No N/A

Discussion/justification if SC-1 not implemented:

SC-2 Storm Drain Stenciling or Signage

Yes No N/A

Discussion/justification if SC-2 not implemented:

SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal

Yes No N/A

Discussion/justification if SC-3 not implemented:

Source Control Requirement (continued)	Applied?		
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Discussion/justification if SC-4 not implemented:			
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Discussion/justification if SC-5 not implemented:			
SC-6 Additional BMPs based on Potential Sources of Runoff Pollutants must answer for each source listed below and identify additional BMPs. (See Table in Appendix E.1 of BMP Manual for guidance).			
<input checked="" type="checkbox"/> On-site storm drain inlets	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> Interior floor drains and elevator shaft sump pumps	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> Interior parking garages	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Need for future indoor & structural pest control	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Landscape/Outdoor Pesticide Use	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Pools, spas, ponds, decorative fountains, and other water features	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> Food service	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Refuse areas	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> Industrial processes	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> Outdoor storage of equipment or materials	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> Vehicle and Equipment Cleaning	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> Vehicle/Equipment Repair and Maintenance	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> Fuel Dispensing Areas	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> Loading Docks	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Fire Sprinkler Test Water	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> Miscellaneous Drain or Wash Water	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Plazas, sidewalks, and parking lots	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<p>For "Yes" answers, identify the additional BMP per Appendix E.1. Provide justification for "No" answers.</p> <p>Inlets: SWPPP, inlets marked with "No Dumping! Flows to Bay" or similar, regular maintenance</p> <p>Pest control: Building design that discourages pest entry, IPM plan</p> <p>Pesticide use: Landscaping designed/plant selection to minimize need for fertilizers/pesticides</p> <p>Pool: Regularly maintain per CASQA Storm Water Quality Handbook SC-72</p> <p>Refuse areas: Grading to minimize runoff, provide adequate # of receptacles, regular inspection/repair/trash pick-up</p> <p>Fire sprinkler test water: Drain to sanitary sewer</p> <p>Hardscape/parking lots: Regular sweeping, debris collection to prevent entry into the storm drain system, cleaning agents discharged into sanitary sewer</p>			

Site Design BMPs

All development projects must implement site design BMPs SD-1 through SD-8 where applicable and feasible. See Chapter 4 and Appendix E.2 thru E.6 of the BMP Design Manual for information to implement site design BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the site design BMPs as described in Chapter 4 and/or Appendix E.2 thru E.6 of the Model BMP Design Manual. Discussion / justification is not required.
- "No" means the BMPs is applicable to the project but it is not feasible to implement. Discussion/justification must be provided. Please add attachments if more space is needed.
- "N/A" means the BMPs is not applicable at the project site because the project does not include the feature that is addressed by the BMPs (e.g., the project site has no existing natural areas to conserve). Discussion/justification may be provided.

Source Control Requirement	Applied?		
SD-1 Maintain Natural Drainage Pathways and Hydrologic Features	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Discussion/justification if SD-1 not implemented:			
SD-2 Conserve Natural Areas, Soils, and Vegetation	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Discussion/justification if SD-2 not implemented:			
SD-3 Minimize Impervious Area	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Discussion/justification if SD-3 not implemented:			
SD-4 Minimize Soil Compaction	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Discussion/justification if SD-4 not implemented:			
SD-5 Impervious Area Dispersion	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Discussion/justification if SD-5 not implemented:			

Source Control Requirement (continued)	Applied?		
SD-6 Runoff Collection	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Discussion/justification if SD-6 not implemented:			
SD-7 Landscaping with Native or Drought Tolerant Species	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Discussion/justification if SD-7 not implemented:			
SD-8 Harvesting and Using Precipitation	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Discussion/justification if SD-8 not implemented: Harvest and Use Precipitation is infeasible to the project see attachment 1c.			

SUMMARY OF PDP STRUCTURAL BMPS

PDP Structural BMPs

All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s).

PDP structural BMPs must be verified by the City at the completion of construction. This may include requiring the project owner or project owner's representative to certify construction of the structural BMPs (see Section 1.12 of the BMP Design Manual). PDP structural BMPs must be maintained into perpetuity, and the City must confirm the maintenance (see Section 7 of the BMP Design Manual).

Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).

Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the BMP Design Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated together or separate.

Project requires hydromodification, thus structural BMP implementations are designed to integrate hydromodification flow control, pollutant control, and 100-Year detention storage, provided by the following configurations:

BMPs 1 – 5, 7, 8: Biofiltration (BF-1) BMP with additional ponding for hydromodification control, controlled by vertical orifices on the overflow riser. This typical structural BMP will include 12” of ponding, 18” engineered soil media, a 4” choker layer, and Rainstore³ vault storage at varying depths per each BMP. Treated stormwater will filter into the detention storage and outlet via a 12” perforated underdrain located 3” from the bottom of the vault storage.

BMP 6: Biofiltration (BF-1) BMP. Design is constrained by an existing 24” storm drain crossing, so the configuration detailed for BMPs 1 – 5, 7, & 8 must be modified to accommodate a shallower section above the existing storm drain. The Rainstore³ detention storage will be shifted so only a portion is underneath the biofiltration basin. The remaining portion of the biofiltration will be a standard section: 12” of ponding, 18” engineered soil media, a 4” choker layer, and a 12” aggregate layer with a perforated 6” underdrain, which will connect to the Rainstore³ storage.

[Continued from previous page – This page is reserved for continuation of description of general strategy for structural BMP implementation at the site.]

BMP 9: Biofiltration (BF-1) BMP with additional ponding for hydromodification control, controlled by a vertical orifice on the overflow riser. This structural BMP will include 18” of ponding, 18” engineered soil media, a 4” choker layer, and a 12” aggregate layer. Treated stormwater will outlet via a 6” perforated underdrain located 3” from the bottom of the aggregate layer, and this underdrain will connect to the Rainstore³ storage in BMP 8 for additional storage.

BMP 10: Biofiltration (BF-1) BMP with additional hydromodification control, controlled by a vertical orifice on the overflow riser, and an orifice on the underdrain pipe. This structural BMP will include 6” freeboard and 6” ponding above a bed consisting of: 18” engineered soil media, a 4” choker layer, and a 12” aggregate layer. Treated stormwater will outlet via a 6” perforated underdrain located 3” from the bottom of the aggregate layer, and this underdrain will outfall into the Canyon de las Encinas underneath the proposed bridge. This BMP will be located northwest of the bridge and abutting but not within existing Palomar Airport Road Right-of-Way. A trench drain will capture runoff from the bridge and convey to the basin via storm drain.

100-Year Detention

The 100-Year detention method chosen is underground tank storage through the application of Rainstore³. Rainstore³ tank storage consists of a structure of injection molded unit comprised of 36 cylindrical columns that occupy one square meter. The structural system of the units allow water to move freely through the units and its attachment design allows for various detention depths and configurations. The detention system will capture stormwater runoff that infiltrates through the biofiltration system and excess runoff captured by risers in each biofiltration basin. The detention vaults will be encased by an impermeable geotextile layer and a minimum of 20” of structural backfill compacted to 95% modified proctor density. Each detention vault will include a 12” storm drain outlet pipe to connect proposed drainage into existing storm drains.

Structural BMP Summary Information

Structural BMP 1-8

DWG: DMA Exhibit (Attachment 1a)

Type of structural BMP:

- Retention by harvest and use (HU-1)
- Retention by infiltration basin (INF-1)
- Retention by bioretention (INF-2)
- Retention by permeable pavement (INF-3)
- Partial retention by biofiltration with partial retention (PR-1)
- Biofiltration (BF-1)
- Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below)
- Detention pond or vault for hydromodification management
- Other (describe in discussion section below)

Purpose:

- Pollutant control only
- Hydromodification control only
- Combined pollutant control and hydromodification control
- Pre-treatment/forebay for another structural BMP
- Other (describe in discussion section below)

Discussion (as needed):

BMPs 1 – 8 will consist of biofiltration basins underlain by detention storage vaults.

Structural BMP Summary Information

Structural BMP 9

DWG: DMA Exhibit (Attachment 1a)

Type of structural BMP:

- Retention by harvest and use (HU-1)
- Retention by infiltration basin (INF-1)
- Retention by bioretention (INF-2)
- Retention by permeable pavement (INF-3)
- Partial retention by biofiltration with partial retention (PR-1)
- Biofiltration (BF-1)
- Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below)
- Detention pond or vault for hydromodification management
- Other (describe in discussion section below)

Purpose:

- Pollutant control only
- Hydromodification control only
- Combined pollutant control and hydromodification control
- Pre-treatment/forebay for another structural BMP
- Other (describe in discussion section below)

Discussion (as needed):

BMP 9 will consist of a biofiltration basin with underdrain piping to the detention storage of BMP 8.

Structural BMP Summary Information

Structural BMP 10

DWG: DMA Exhibit (Attachment 1a)

Type of structural BMP:

- Retention by harvest and use (HU-1)
- Retention by infiltration basin (INF-1)
- Retention by bioretention (INF-2)
- Retention by permeable pavement (INF-3)
- Partial retention by biofiltration with partial retention (PR-1)
- Biofiltration (BF-1)
- Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below)
- Detention pond or vault for hydromodification management
- Other (describe in discussion section below)

Purpose:

- Pollutant control only
- Hydromodification control only
- Combined pollutant control and hydromodification control
- Pre-treatment/forebay for another structural BMP
- Other (describe in discussion section below)

Discussion (as needed):

BMP 10 will consist of a biofiltration basin with underdrain piping that outlets to Encinas Creek.

ATTACHMENT 1

BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

Check which Items are Included behind this cover sheet:

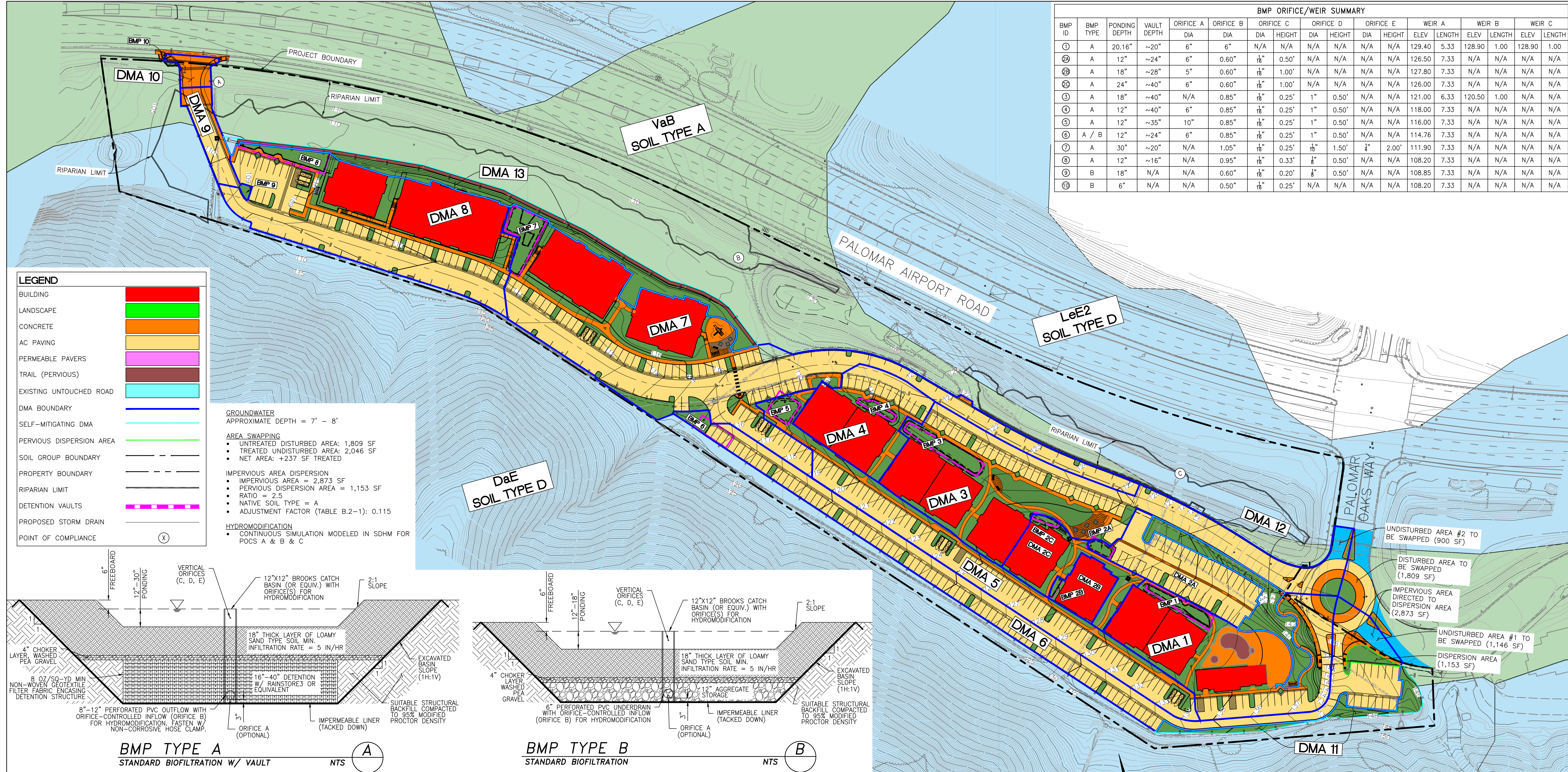
Attachment Sequence	Contents	Checklist
Attachment 1a	<p>DMA Exhibit (Required)</p> <p>See DMA Exhibit Checklist on the back of this Attachment cover sheet. (24"x36" Exhibit typically required)</p>	<input checked="" type="checkbox"/> Included
Attachment 1b	<p>Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)*</p> <p>*Provide table in this Attachment OR on DMA Exhibit in Attachment 1a</p>	<input checked="" type="checkbox"/> Included on DMA Exhibit in Attachment 1a <input type="checkbox"/> Included as Attachment 1b, separate from DMA Exhibit
Attachment 1c	<p>Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs)</p> <p>Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7.</p>	<input checked="" type="checkbox"/> Included <input type="checkbox"/> Not included because the entire project will use infiltration BMPs
Attachment 1d	<p>Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs)</p> <p>Refer to Appendices C and D of the BMP Design Manual to complete Form I-8.</p>	<input checked="" type="checkbox"/> Included <input type="checkbox"/> Not included because the entire project will use harvest and use BMPs
Attachment 1e	<p>Pollutant Control BMP Design Worksheets / Calculations (Required)</p> <p>Refer to Appendices B and E of the BMP Design Manual for structural pollutant control BMP design guidelines</p>	<input checked="" type="checkbox"/> Included

Use this checklist to ensure the required information has been included on the DMA Exhibit:

The DMA Exhibit must identify:

- Underlying hydrologic soil group
- Approximate depth to groundwater
- Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- Critical coarse sediment yield areas to be protected (if present)
- Existing topography and impervious areas
- Existing and proposed site drainage network and connections to drainage offsite
- Proposed grading
- Proposed impervious features
- Proposed design features and surface treatments used to minimize imperviousness
- Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
- Structural BMPs (identify location and type of BMP)

BMP ORIFICE/WEIR SUMMARY																	
BMP ID	BMP TYPE	PONDING DEPTH	VAULT DEPTH	ORIFICE A DIA	ORIFICE B DIA	ORIFICE C DIA	ORIFICE C HEIGHT	ORIFICE D DIA	ORIFICE D HEIGHT	ORIFICE E DIA	ORIFICE E HEIGHT	WEIR A ELEV	WEIR A LENGTH	WEIR B ELEV	WEIR B LENGTH	WEIR C ELEV	WEIR C LENGTH
1	A	20.16"	~20"	6"	6"	N/A	N/A	N/A	N/A	N/A	N/A	129.40	5.33	128.90	1.00	128.90	1.00
2a	A	12"	~24"	6"	0.60"	1/8"	0.50"	N/A	N/A	N/A	N/A	126.50	7.33	N/A	N/A	N/A	N/A
2b	A	18"	~28"	5"	0.60"	1/8"	1.00"	N/A	N/A	N/A	N/A	127.80	7.33	N/A	N/A	N/A	N/A
2c	A	24"	~40"	6"	0.60"	1/8"	1.00"	N/A	N/A	N/A	N/A	126.00	7.33	N/A	N/A	N/A	N/A
3	A	18"	~40"	N/A	0.85"	1/8"	0.25"	1"	0.50"	N/A	N/A	121.00	6.33	120.50	1.00	N/A	N/A
4	A	12"	~40"	6"	0.85"	1/8"	0.25"	1"	0.50"	N/A	N/A	118.00	7.33	N/A	N/A	N/A	N/A
5	A	12"	~35"	10"	0.85"	1/8"	0.25"	1"	0.50"	N/A	N/A	116.00	7.33	N/A	N/A	N/A	N/A
6	A / B	12"	~24"	6"	0.85"	1/8"	0.25"	1"	0.50"	N/A	N/A	114.76	7.33	N/A	N/A	N/A	N/A
7	A	30"	~20"	N/A	1.05"	1/8"	0.25"	1/8"	1.50"	3/4"	2.00"	111.90	7.33	N/A	N/A	N/A	N/A
8	A	12"	~16"	N/A	0.95"	1/8"	0.33"	3/4"	0.50"	N/A	N/A	108.20	7.33	N/A	N/A	N/A	N/A
9	B	18"	N/A	N/A	0.60"	1/8"	0.20"	3/4"	0.50"	N/A	N/A	108.85	7.33	N/A	N/A	N/A	N/A
10	B	6"	N/A	N/A	0.50"	1/8"	0.25"	N/A	N/A	N/A	N/A	108.20	7.33	N/A	N/A	N/A	N/A



GROUNDWATER
APPROXIMATE DEPTH = 7' - 8'

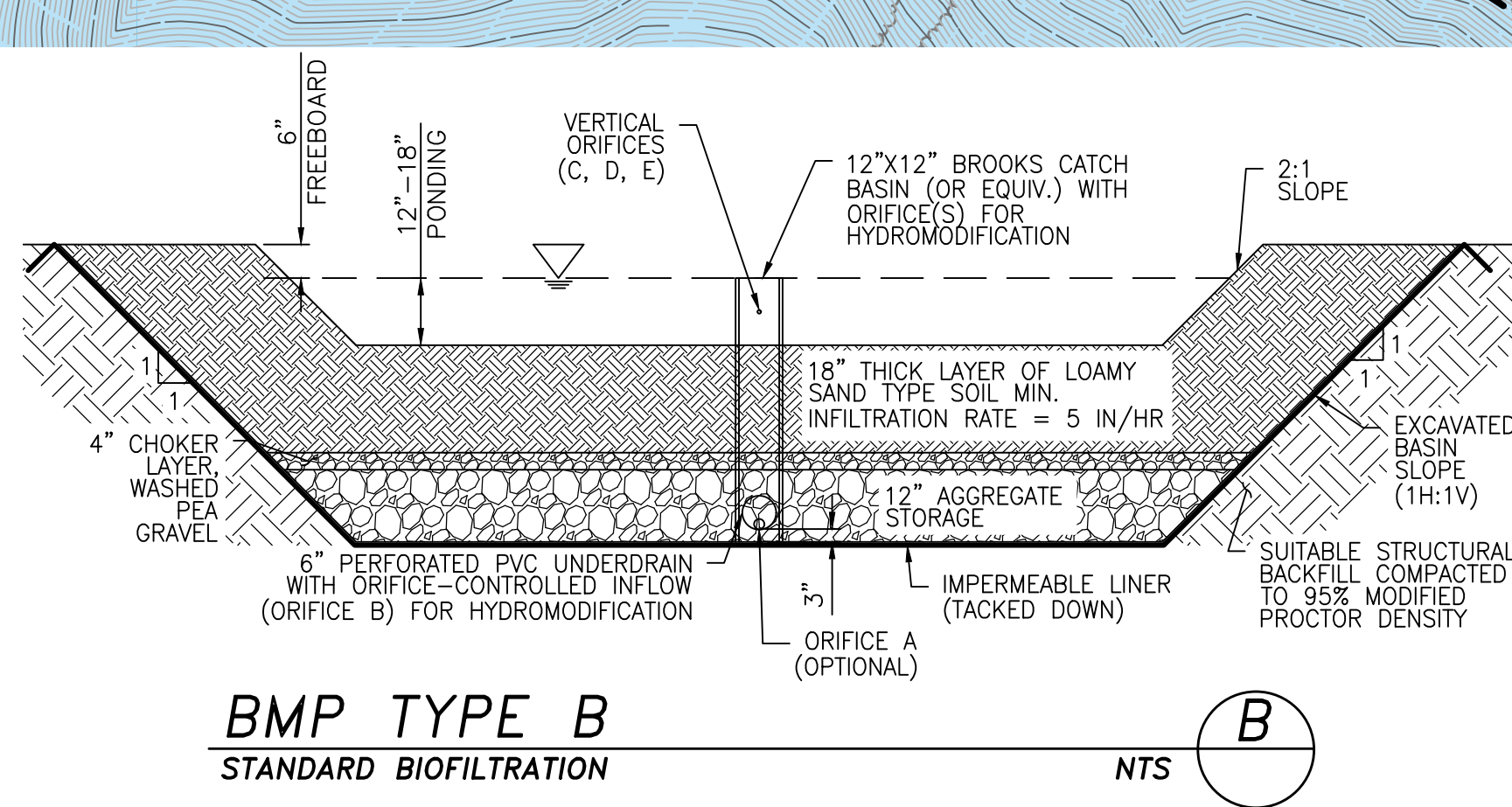
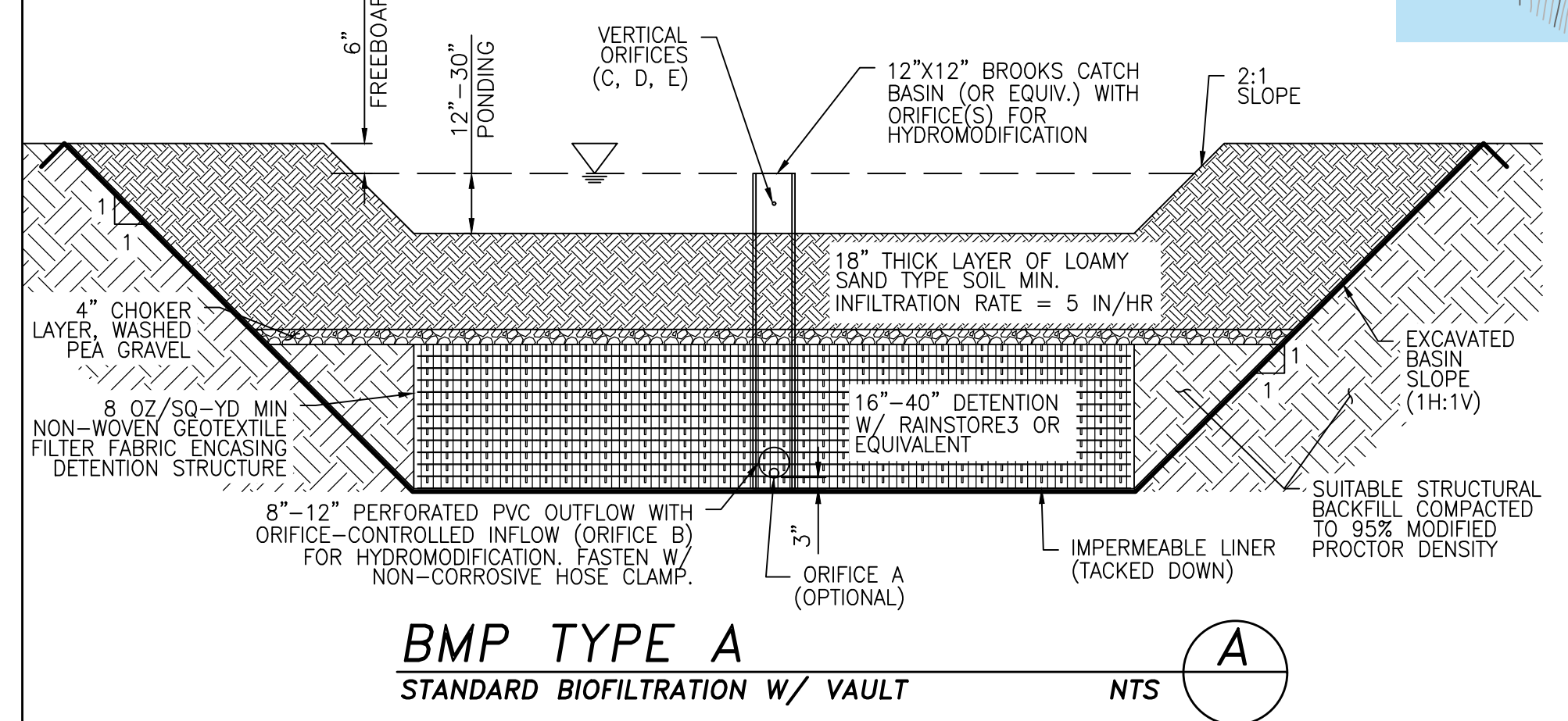
AREA SWAPPING
• UNTREATED DISTURBED AREA: 1,809 SF
• TREATED UNDISTURBED AREA: 2,046 SF
• NET AREA: +237 SF TREATED

IMPERVIOUS AREA DISPERSION
• IMPERVIOUS AREA = 2,873 SF
• PERVIOUS DISPERSION AREA = 1,153 SF
• RATIO = 2.5
• NATIVE SOIL TYPE = A
• ADJUSTMENT FACTOR (TABLE B.2-1): 0.115

HYDROMODIFICATION
• CONTINUOUS SIMULATION MODELED IN SDHM FOR POCS A & B & C

LEGEND

- BUILDING
- LANDSCAPE
- CONCRETE
- AC PAVING
- PERMEABLE PAVERS
- TRAIL (PERVIOUS)
- EXISTING UNTOUCHED ROAD
- DMA BOUNDARY
- SELF-MITIGATING DMA
- PERVIOUS DISPERSION AREA
- SOIL GROUP BOUNDARY
- PROPERTY BOUNDARY
- RIPARIAN LIMIT
- DETENTION VAULTS
- PROPOSED STORM DRAIN
- POINT OF COMPLIANCE



BMP Summary

DMA ID / BMP ID	1	2a	2b	2c	3	4	5	6	7	8	9	10	11	12	13	
DMA Type	Drains to BMP	Drains to BMP	Drains to BMP	Drains to BMP	Drains to BMP	Drains to BMP	Drains to BMP	Drains to BMP	Drains to BMP	Drains to BMP	Drains to BMP	Drains to BMP	Self-Mitigating	Self-Mitigating	Self-Mitigating	
POC	C	B	B	B	B	B	B	B	A	A	A	A	C	C	A	
BMP Type	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Permeable Pavers				
BMP Soil	A	A	A	A	A	A	A	D	A	A	D	A	D	A	A	
Total Area (SF)	34,456	13,483	4,779	9,657	48,378	16,407	28,594	36,657	69,414	48,292	4,631	2,072	3,918	7,022	13,201	
Total Pervious (SF)	25%	8,614	5%	646	3%	155	44%	4,250	20%	9,676	25%	4,102	10%	2,859	12%	4,294
Total Impervious (SF)	75%	25,842	95%	12,837	97%	4,624	56%	5,407	80%	38,702	75%	12,305	90%	25,735	88%	32,363
Pervious Dispersion Area (SF)	0	0	0	0	0	0	0	1,153	0	0	0	0	0	0	0	0
Impervious Area for Dispersion (SF)	0	0	0	0	0	0	0	2,873	0	0	0	0	0	0	0	0
C weighted (adj. for Dispersion)	0.70	0.86	0.87	0.55	0.74	0.70	0.82	0.76	0.76	0.78	0.87	0.90	100%	3,918	100%	7,022
DCV (CF)	1,206	580	208	266	1,790	574	1,172	1,393	2,638	1,883	201	93	0%	0	0%	0
Biofiltration BMP (SF)	Proposed 754, Required 724	Proposed 350, Required 348	Proposed 155, Required 125	Proposed 170, Required 159	Proposed 1,594, Required 1,074	Proposed 350, Required 345	Proposed 704, Required 703	Proposed 857, Required 836	Proposed 1,758, Required 1,583	Proposed 1,650, Required 1,130	Proposed 198, Required 121	Proposed 58, Required 56				
BMP Elevations/Depths																
Top of Basin	129.90	127.00	128.30	126.50	121.50	118.50	116.50	115.36	112.40	108.70	109.35	108.70				
Freeboard Provided (IN)	6	6	6	6	6	6	6	6	6	6	6	6				
Ponding Elevation	129.40	126.50	127.80	126.00	121.00	118.00	116.00	114.76	111.90	108.20	108.85	108.20				
Total Ponding Depth (IN)	20.16	12	18	24	18	12	12	12	30	12	18	6				
WQ/Hydromod Ponding Depth (IN)	6	12	18	24	12	12	12	11	30	12	18	6				
Bottom of Basin	127.72	125.50	126.30	124.00	119.50	117.00	115.00	113.76	109.40	107.20	107.35	107.70				
Biofiltration Underdrain Invert	-	-	-	-	-	-	-	112.68	-	-	106.27	106.62				
RainStore3 Units	5	6	7	10	10	10	9	6	5	4	-	-				
RainStore3 Depth (IN)	19.69	23.62	27.56	39.37	39.37	39.37	35.43	23.62	19.69	15.75	-	-				
Detention Underdrain Invert	124.50	122.95	122.42	119.14	114.64	112.14	110.46	110.21	106.18	104.30	-	-				
Bottom of Detention	124.25	121.70	122.17	118.89	114.39	111.89	110.21	109.96	105.93	104.05	-	-				

CITY OF CARLSBAD ENGINEERING DEPARTMENT

WEST OAKS

RECORD COPY

DATE: _____ INITIAL: _____ REVISION DESCRIPTION: _____

DATE: _____ INITIAL: _____ DATE: _____ INITIAL: _____

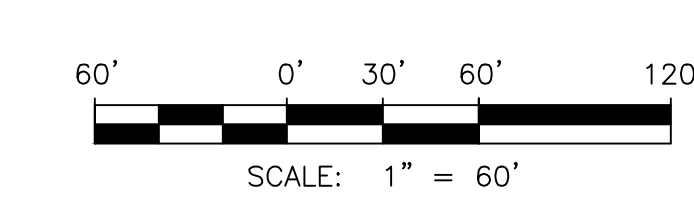
ENGINEER OF WORK: _____ OTHER APPROVAL: _____ CITY APPROVAL: _____

SHEET: _____ SHEETS: _____

PROJECT NO. _____ DRAWING NO. _____

DATE: _____ INITIAL: _____

FUSCOE ENGINEERING
6390 Greenwich Dr., Suite 170, San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335 • www.fuscoe.com



F:\Projects\2009\0051_Support Files\Reports\SWAMP\Metformants\Metformant 10 - DMA Exhibit.dwg (4/18/2019 9:25 AM) Plotted by: Sarah Fritz

Appendix H: Guidance for Investigation Potential Critical Coarse Sediment Yield Areas

Harvest and Use Feasibility Checklist		Form I-7
<p>1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?</p> <p><input checked="" type="checkbox"/> Toilet and urinal flushing</p> <p><input checked="" type="checkbox"/> Landscape irrigation</p> <p><input type="checkbox"/> Other: _____</p>		
<p>2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2.</p> <p>[Provide a summary of calculations here]</p> <p>192 Units x 2.0 Residents/Units = 384 Residents 384 Residents x 9.3 gal./day (Table B3.1) = 3,571 gal/day = 477 cf/day x 1.5 days = 716 cf</p> <p>Moderate Plant Water Use = 1,470 gal / acre / 36 hrs Proposed Planted Area = 1.80 acres 1,470 gal / acre x 1.80 acres / 7.48 gal / cf = 354 cf</p> <p>36 hr demand = 716 + 354 cf = 1,070 cf</p>		
<p>3. Calculate the DCV using worksheet B-2.1. DCV = <u>12,004 cf</u></p>		
<p>3a. Is the 36 hour demand greater than or equal to the DCV?</p> <p>↓ Yes / <input checked="" type="checkbox"/> No ⇒</p> <p>↓</p>	<p>3b. Is the 36 hour demand greater than 0.25DCV but less than the full DCV?</p> <p>↓ Yes / <input checked="" type="checkbox"/> No ⇒</p> <p>↓</p>	<p>3c. Is the 36 hour demand less than 0.25DCV?</p> <p><input checked="" type="checkbox"/> Yes</p> <p>↓</p>
<p>Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.</p>	<p>Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.</p>	<p>Harvest and use is considered to be infeasible.</p>
<p>Is harvest and use feasible based on further evaluation?</p> <p><input type="checkbox"/> Yes, refer to Appendix E to select and size harvest and use BMPs.</p> <p><input checked="" type="checkbox"/> No, select alternate BMPs.</p>		

Categorization of Infiltration Feasibility Condition

Form I-8

Part 1 – Full Infiltration Feasibility Screening Criteria

Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
1	<p>Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<p>Provide basis:</p> <p>Infiltration to be verified by testing per city's BMP Manual Appendix D. The underlying soil is primarily categorized as Type A.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
2	<p>Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<p>Provide basis:</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			

3	<p>Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<p>Provide basis: Ground water depth is estimated to be between 7' and 8' below ground surface, so a 10' separation to ground water is not available throughout the site. Infiltration will not be allowed onsite.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
4	<p>Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<p>Provide basis:</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
Part 1 Result*	<p>If all answers to rows 1-4 are “Yes” a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration.</p> <p>If any answer from row 1-4 is “No”, infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a “full infiltration” design. Proceed to Part 2</p>	<p>Full Infiltration Feasible</p> <input type="checkbox"/>	<p>Full Infiltration Infeasible</p> <input checked="" type="checkbox"/>

*To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings.

Categorization of Infiltration Feasibility Condition

Form I-8

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Provide basis:

Underlying soil group is primarily Type A.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

6	Can infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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Provide basis:

Ground water depth is estimated to be between 7' and 8' below ground surface, so a 10' separation to ground water is not available throughout the site. Infiltration will not be allowed onsite.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

7	<p>Can infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<p>Provide basis: Ground water depth is estimated to be between 7' and 8' below ground surface, so a 10' separation to ground water is not available throughout the site. Infiltration will not be allowed onsite.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
8	<p>Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<p>Provide basis:</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
Part 2 Result*	<p>If all answers to rows 1-4 are “Yes” a partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration.</p> <p>If any answer from row 5-8 is “No”, infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.</p>	<p>Partial Infiltration</p> <input type="checkbox"/>	<p>No Infiltration</p> <input checked="" type="checkbox"/>

*To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings.

County of San Diego Automated Stormwater Pollutant Control Worksheets (Version 1.3)

WELCOME:

Welcome to the County of San Diego Automated Stormwater Pollutant Control Worksheets. Priority Development Projects that are required to satisfy stormwater pollutant control performance standards set forth in the 2013 MS4 Permit may use these automated worksheets to calculate design capture volumes and determine what portion of pollutant control performance standards are satisfied by their project.

INSTRUCTIONS:

General: To use this workbook users must navigate to the appropriate worksheet tabs and populate yellow cells with project specific information. These worksheet tabs are formatted to accommodate calculations for up to 10 drainage areas and associated BMPs. Each drainage area and/or 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 their entire project. Yellow cells represent items that 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 represent items that typically require user input but may be omitted based on a previous user input, orange cells represent warnings where supplemental information and/or revisions may be required for compliance, and red cells represent errors associated with proposed stormwater pollutant control measures that negatively affect compliance.

Step 1. Navigate to the orange tab at the bottom of the workbook and provide required inputs to determine the structural BMP types that are acceptable for implementation at the project site.

Step 2. Navigate to the blue tab at the bottom of the workbook and provide the required inputs to determine the design capture volume for each PDP drainage area and identify what type of BMP this area drains to. 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. Upon completion of Step 2, applicants must proceed to Step 3 to ensure that appropriate stormwater pollutant control measures are applied to this volume.

Step 3. Examine the green tabs at the bottom of the workbook and identify which of these BMP types are implemented by the PDP. Click the green tab for each of the proposed BMP types and provide the required user inputs to determine the portion of the pollutant control performance standards that are satisfied by the proposed BMP. After providing appropriate inputs users should verify that no red error messages appear at the bottom of their worksheets and, if necessary, refine user inputs until satisfied with the proposed stormwater pollutant control approach. Once satisfied, applicants must proceed to Step 4 to facilitate their project submittal. Note: Users must ensure that all provided inputs are adequately represented in the accompanying stormwater management plans.

Step 4. Navigate to the purple "Summary" tab at the bottom of this workbook and examine the sheet for warning messages highlighted in red text at the bottom of the worksheet. Once satisfied with the overall results, print the summary sheet and all applicable supporting worksheets in color, 11x17 landscape format and include in Attachment 1a of the SWQMP submittal.

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

COUNTY OF SAN DIEGO AUTOMATED STORMWATER POLLUTANT CONTROL WORKSHEETS

Automated Worksheet B.3-1: Project-Scale BMP Feasibility Analysis (V1.3)

Category	#	Description	Value	Units
Capture & Use Inputs	0	Design Capture Volume for Entire Project Site	12,004	cubic-feet
	1	Proposed Development Type	Residential	unitless
	2	Number of Residents or Employees at Proposed Development	384	#
	3	Total Planted Area within Development	78,550	sq-ft
	4	Water Use Category for Proposed Planted Areas	Moderate	unitless
Infiltration Inputs	5	Is Average Site Design Infiltration Rate ≤ 0.500 Inches per Hour?	No	yes/no
	6	Is Average Site Design Infiltration Rate ≤ 0.010 Inches per Hour?	No	yes/no
	7	Is Infiltration of the Full DCV Anticipated to Produce Negative Impacts?	Yes	yes/no
	8	Is Infiltration of Any Volume Anticipated to Produce Negative Impacts?	Yes	yes/no
Calculations	9	36-Hour Toilet Use Per Resident or Employee	1.86	cubic-feet
	10	Subtotal: Anticipated 36 Hour Toilet Use	716	cubic-feet
	11	Anticipated 1 Acre Landscape Use Over 36 Hours	196.52	cubic-feet
	12	Subtotal: Anticipated Landscape Use Over 36 Hours	354	cubic-feet
	13	Total Anticipated Use Over 36 Hours	1,071	cubic-feet
	14	Total Anticipated Use / Design Capture Volume	0.09	cubic-feet
	15	Are Full Capture and Use Techniques Feasible for this Project?	No	unitless
	16	Is Full Retention Feasible for this Project?	No	yes/no
	17	Is Partial Retention Feasible for this Project?	No	yes/no
Result	18	Feasibility Category	5	1, 2, 3, 4, 5

Worksheet B.3-1 General Notes:

- A. Applicants may use this worksheet to determine the types of structural BMPs that are acceptable for implementation at their project site (as required in Section 5 of the BMPDM). User input should be provided for yellow shaded cells, values for all other cells will be automatically generated. Projects demonstrating feasibility or potential feasibility via this worksheet are encouraged to incorporate capture and use features in their project.
- B. Negative impacts associated with retention may include geotechnical, groundwater, water balance, or other issues identified by a geotechnical engineer and substantiated through completion of Form I-8.
- C. Feasibility Category 1: Applicant must implement capture & use, retention, and/or infiltration elements for the entire DCV.
- D. Feasibility Category 2: Applicant must implement capture & use elements for the entire DCV.
- E. Feasibility Category 3: Applicant must implement retention and/or infiltration elements for all DMAs with Design Infiltration Rates greater than 0.50 in/hr.
- F. Feasibility Category 4: Applicant must implement standard unlined biofiltration BMPs sized at $\geq 3\%$ of the effective impervious tributary area for all DMAs with Design Infiltration Rates of 0.011 to 0.50 in/hr. Applicants may be permitted to implement lined BMPs, reduced size BMPs, and/or specialized biofiltration BMPs provided additional criteria identified in "Supplemental Retention Criteria for Non-Standard Biofiltration BMPs" are satisfied.
- G. Feasibility Category 5: Applicant must implement standard lined biofiltration BMPs sized at $\geq 3\%$ of the effective impervious tributary area for all DMAs with Design Infiltration Rates of 0.010 in/hr or less. Applicants may also be permitted to implement reduced size and/or specialized biofiltration BMPs provided additional criteria identified in "Supplemental Retention Criteria for Non-Standard Biofiltration BMPs" are satisfied.
- H. PDPs participating in an offsite alternative compliance program are not held to the feasibility categories presented herein.

COUNTY OF SAN DIEGO AUTOMATED STORMWATER POLLUTANT CONTROL WORKSHEETS

Automated Worksheet B.1-1: Calculation of Design Capture Volume (V1.3)

Category	#	Description	<i>i</i>	<i>ii</i>	<i>iii</i>	<i>iv</i>	<i>v</i>	<i>vi</i>	<i>vii</i>	<i>viii</i>	<i>ix</i>	<i>x</i>	Units
Standard Drainage Basin Inputs	0	Drainage Basin ID or Name	1	2a	2b	2c	3	4	5	6	7	8	unitless
	1	Basin Drains to the Following BMP Type	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	unitless
	2	85th Percentile 24-hr Storm Depth	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	inches
	3	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	in/hr
	4	Impervious Surfaces <u>Not Directed to Dispersion Area</u> (C=0.90)	25,842	12,837	4,624	5,407	38,702	12,305	25,735	29,490	57,339	40,785	sq-ft
	5	Semi-Pervious Surfaces <u>Not Serving as Dispersion Area</u> (C=0.30)											sq-ft
	6	Engineered Pervious Surfaces <u>Not Serving as Dispersion Area</u> (C=0.10)											sq-ft
	7	Natural Type A Soil <u>Not Serving as Dispersion Area</u> (C=0.10)	8,614	646	155	4,250	9,676	4,102	2,859		12,075	7,507	sq-ft
	8	Natural Type B Soil <u>Not Serving as Dispersion Area</u> (C=0.14)											sq-ft
	9	Natural Type C Soil <u>Not Serving as Dispersion Area</u> (C=0.23)											sq-ft
	10	Natural Type D Soil <u>Not Serving as Dispersion Area</u> (C=0.30)							3,141			sq-ft	
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	11	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	No	Yes	No	No	yes/no
	12	Impervious Surfaces Directed to Dispersion Area per SD-B (Ci=0.90)								2,873			sq-ft
	13	Semi-Pervious Surfaces Serving as Dispersion Area per SD-B (Ci=0.30)											sq-ft
	14	Engineered Pervious Surfaces Serving as Dispersion Area per SD-B (Ci=0.10)											sq-ft
	15	Natural Type A Soil Serving as Dispersion Area per SD-B (Ci=0.10)								1,153			sq-ft
	16	Natural Type B Soil Serving as Dispersion Area per SD-B (Ci=0.14)											sq-ft
	17	Natural Type C Soil Serving as Dispersion Area per SD-B (Ci=0.23)											sq-ft
	18	Natural Type D Soil Serving as Dispersion Area per SD-B (Ci=0.30)											sq-ft
	19	Number of Tree Wells Proposed per SD-A											#
	20	Average Mature Tree Canopy Diameter											ft
21	Number of Rain Barrels Proposed per SD-E											#	
22	Average Rain Barrel Size											gal	
Treatment Train Inputs & Calculations	23	Does BMP Overflow to Stormwater Features in <u>Downstream</u> Drainage?	No	No	No	No	No	No	No	No	No	No	unitless
	24	Identify Downstream Drainage Basin Providing Treatment in Series											unitless
	25	Percent of Upstream Flows Directed to Downstream Dispersion Areas											percent
	26	Upstream Impervious Surfaces Directed to Dispersion Area (Ci=0.90)	0	0	0	0	0	0	0	0	0	0	cubic-feet
	27	Upstream Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	0	0	0	0	0	0	0	0	0	0	cubic-feet
Initial Runoff Factor Calculation	28	Total Tributary Area	34,456	13,483	4,779	9,657	48,378	16,407	28,594	36,657	69,414	48,292	sq-ft
	29	Initial Runoff Factor for Standard Drainage Areas	0.70	0.86	0.87	0.55	0.74	0.70	0.82	0.84	0.76	0.78	unitless
	30	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.00	0.00	unitless
	31	Initial Weighted Runoff Factor	0.70	0.86	0.87	0.55	0.74	0.70	0.82	0.82	0.76	0.78	unitless
Dispersion Area Adjustments	32	Initial Design Capture Volume	1,206	580	208	266	1,790	574	1,172	1,503	2,638	1,883	cubic-feet
	33	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	2,873	0	0	sq-ft
	34	Total Pervious Dispersion Area	0	0	0	0	0	0	0	1,153	0	0	sq-ft
	35	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2.50	n/a	n/a	ratio
	36	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.11	1.00	1.00	ratio
	37	Runoff Factor After Dispersion Techniques	0.70	0.86	0.87	0.55	0.74	0.70	0.82	0.76	0.76	0.78	unitless
Tree & Barrel Adjustments	38	Design Capture Volume After Dispersion Techniques	1,206	580	208	266	1,790	574	1,172	1,393	2,638	1,883	cubic-feet
	39	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	40	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	41	Final Adjusted Runoff Factor	0.70	0.86	0.87	0.55	0.74	0.70	0.82	0.76	0.76	0.78	unitless
	42	Final Effective Tributary Area	24,119	11,595	4,158	5,311	35,800	11,485	23,447	27,859	52,755	37,668	sq-ft
	43	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	110	0	0	cubic-feet
	44	Final Design Capture Volume Tributary to BMP	1,206	580	208	266	1,790	574	1,172	1,393	2,638	1,883	cubic-feet

Worksheet B.1-1 General Notes:

A. Applicants may use this worksheet to calculate design capture volumes for up to 10 drainage areas User input must be provided for yellow shaded cells, values for all other cells will be automatically generated, errors/notifications will be highlighted in red and summarized below. Upon completion of this worksheet, proceed to the appropriate BMP Sizing worksheet(s).

COUNTY OF SAN DIEGO AUTOMATED STORMWATER POLLUTANT CONTROL WORKSHEETS

Automated Worksheet B.1-1: Calculation of Design Capture Volume (V1.3)

Category	#	Description	<i>i</i>	<i>ii</i>	<i>iii</i>	<i>iv</i>	<i>v</i>	<i>vi</i>	<i>vii</i>	<i>viii</i>	<i>ix</i>	<i>x</i>	Units	
Standard Drainage Basin Inputs	0	Drainage Basin ID or Name	9	10									unitless	
	1	Basin Drains to the Following BMP Type	Biofiltration	Biofiltration									unitless	
	2	85th Percentile 24-hr Storm Depth	0.60	0.60									inches	
	3	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000	0.000									in/hr	
	4	Impervious Surfaces <u>Not Directed to Dispersion Area</u> (C=0.90)	4,399	2,072									sq-ft	
	5	Semi-Pervious Surfaces <u>Not Serving as Dispersion Area</u> (C=0.30)											sq-ft	
	6	Engineered Pervious Surfaces <u>Not Serving as Dispersion Area</u> (C=0.10)											sq-ft	
	7	Natural Type A Soil <u>Not Serving as Dispersion Area</u> (C=0.10)		0									sq-ft	
	8	Natural Type B Soil <u>Not Serving as Dispersion Area</u> (C=0.14)											sq-ft	
	9	Natural Type C Soil <u>Not Serving as Dispersion Area</u> (C=0.23)											sq-ft	
10	Natural Type D Soil <u>Not Serving as Dispersion Area</u> (C=0.30)	232										sq-ft		
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	11	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	No	No	No	No	yes/no	
	12	Impervious Surfaces Directed to Dispersion Area per SD-B (Ci=0.90)											sq-ft	
	13	Semi-Pervious Surfaces Serving as Dispersion Area per SD-B (Ci=0.30)											sq-ft	
	14	Engineered Pervious Surfaces Serving as Dispersion Area per SD-B (Ci=0.10)											sq-ft	
	15	Natural Type A Soil Serving as Dispersion Area per SD-B (Ci=0.10)											sq-ft	
	16	Natural Type B Soil Serving as Dispersion Area per SD-B (Ci=0.14)											sq-ft	
	17	Natural Type C Soil Serving as Dispersion Area per SD-B (Ci=0.23)											sq-ft	
	18	Natural Type D Soil Serving as Dispersion Area per SD-B (Ci=0.30)											sq-ft	
	19	Number of Tree Wells Proposed per SD-A											#	
	20	Average Mature Tree Canopy Diameter											ft	
21	Number of Rain Barrels Proposed per SD-E											#		
22	Average Rain Barrel Size											gal		
Treatment Train Inputs & Calculations	23	Does BMP Overflow to Stormwater Features in <u>Downstream</u> Drainage?	No	No	No	No	No	No	No	No	No	No	unitless	
	24	Identify Downstream Drainage Basin Providing Treatment in Series											unitless	
	25	Percent of Upstream Flows Directed to Downstream Dispersion Areas											percent	
	26	Upstream Impervious Surfaces Directed to Dispersion Area (Ci=0.90)	0	0	0	0	0	0	0	0	0	0	cubic-feet	
	27	Upstream Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	0	0	0	0	0	0	0	0	0	0	cubic-feet	
Initial Runoff Factor Calculation	28	Total Tributary Area	4,631	2,072	0	0	0	0	0	0	0	0	sq-ft	
	29	Initial Runoff Factor for Standard Drainage Areas	0.87	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	30	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	0.00	unitless
	31	Initial Weighted Runoff Factor	0.87	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	32	Initial Design Capture Volume	201	93	0	0	0	0	0	0	0	0	0	cubic-feet
Dispersion Area Adjustments	33	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft	
	34	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft	
	35	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	n/a	ratio
	36	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	1.00	ratio
	37	Runoff Factor After Dispersion Techniques	0.87	0.90	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
	38	Design Capture Volume After Dispersion Techniques	201	93	0	0	0	0	0	0	0	0	0	cubic-feet
Tree & Barrel Adjustments	39	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet	
	40	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet	
Results	41	Final Adjusted Runoff Factor	0.87	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless	
	42	Final Effective Tributary Area	4,029	1,865	0	0	0	0	0	0	0	0	sq-ft	
	43	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	0	cubic-feet
	44	Final Design Capture Volume Tributary to BMP	201	93	0	0	0	0	0	0	0	0	0	cubic-feet

Worksheet B.1-1 General Notes:

A. Applicants may use this worksheet to calculate design capture volumes for up to 10 drainage areas User input must be provided for yellow shaded cells, values for all other cells will be automatically generated, errors/notifications will be highlighted in red and summarized below. Upon completion of this worksheet, proceed to the appropriate BMP Sizing worksheet(s).

COUNTY OF SAN DIEGO AUTOMATED STORMWATER POLLUTANT CONTROL WORKSHEETS

Automated Worksheet B.5-1: Sizing Lined or Unlined Biofiltration BMPs (V1.3)

Category	#	Description	<i>i</i>	<i>ii</i>	<i>iii</i>	<i>iv</i>	<i>v</i>	<i>vi</i>	<i>vii</i>	<i>viii</i>	<i>ix</i>	<i>x</i>	Units	
BMP Inputs	0	Drainage Basin ID or Name	1	2a	2b	2c	3	4	5	6	7	8	sq-ft	
	1	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	in/hr	
	2	Effective Tributary Area	24,119	11,595	4,158	5,311	35,800	11,485	23,447	27,859	52,755	37,668	sq-ft	
	3	Minimum Biofiltration Footprint Sizing Factor	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	ratio	
	4	Design Capture Volume Tributary to BMP	1,206	580	208	266	1,790	574	1,172	1,393	2,638	1,883	cubic-feet	
	5	Is Biofiltration Basin Impermeably Lined or Unlined?	Lined	Lined	Lined	Lined	Lined	Lined	Lined	Lined	Lined	Lined	unitless	
	6	Provided Biofiltration BMP Surface Area	754	350	155	170	1,594	350	704	857	1,758	1,650	sq-ft	
	7	Provided Surface Ponding Depth	6	12	18	24	12	12	12	12	11	30	12	inches
	8	Provided Soil Media Thickness	18	18	18	18	18	18	18	18	18	18	18	inches
	9	Provided Depth of Gravel Above Underdrain Invert	9	9	9	9	9	9	9	9	9	9	9	inches
	10	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	6.00	0.60	0.60	0.60	0.85	0.85	0.85	0.85	1.05	0.95	inches	
11	Provided Depth of Gravel Below the Underdrain	3	3	3	3	3	3	3	3	3	3	inches		
Retention Calculations	12	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet	
	13	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	
	14	Gravel Pore Space Available for Retention	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless	
	15	Effective Retention Depth	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	inches	
	16	Calculated Retention Storage Drawdown (Including 6 Hr Storm)	120	120	120	120	120	120	120	120	120	120	hours	
	17	Volume Retained by BMP	57	26	12	13	120	26	53	64	132	124	cubic-feet	
	18	Fraction of DCV Retained	0.05	0.05	0.06	0.05	0.07	0.05	0.05	0.05	0.05	0.07	ratio	
	19	Portion of Retention Performance Standard Satisfied	0.06	0.06	0.07	0.06	0.08	0.06	0.06	0.06	0.06	0.08	ratio	
	20	Fraction of DCV Retained (normalized to 36-hr drawdown)	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.04	ratio	
21	Design Capture Volume Remaining for Biofiltration	1,170	563	202	258	1,718	557	1,137	1,351	2,559	1,808	cubic-feet		
Biofiltration Calculations	22	Max Hydromod Flow Rate through Underdrain	1.4948	0.0170	0.0182	0.0194	0.0340	0.0340	0.0340	0.0336	0.0628	0.0425	CFS	
	23	Max Soil Filtration Rate Allowed by Underdrain Orifice	85.65	2.10	5.09	4.94	0.92	4.20	2.09	1.69	1.54	1.11	in/hr	
	24	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	
	25	Soil Media Filtration Rate to be used for Sizing	5.00	2.10	5.00	4.94	0.92	4.20	2.09	1.69	1.54	1.11	in/hr	
	26	Depth Biofiltered Over 6 Hour Storm	30.00	12.57	30.00	29.63	5.53	25.19	12.53	10.16	9.26	6.67	inches	
	27	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	
	28	Effective Depth of Biofiltration Storage	13.20	19.20	25.20	31.20	19.20	19.20	19.20	18.24	37.20	19.20	inches	
	29	Drawdown Time for Surface Ponding	1	6	4	5	13	3	6	7	19	11	hours	
	30	Drawdown Time for Effective Biofiltration Depth	3	9	5	6	21	5	9	11	24	17	hours	
	31	Total Depth Biofiltered	43.20	31.77	55.20	60.83	24.73	44.39	31.73	28.40	46.46	25.87	inches	
	32	Option 1 - Biofilter 1.50 DCV: Target Volume	1,755	845	303	387	2,577	836	1,706	2,027	3,839	2,712	cubic-feet	
	33	Option 1 - Provided Biofiltration Volume	1,755	845	303	387	2,577	836	1,706	2,027	3,839	2,712	cubic-feet	
	34	Option 2 - Store 0.75 DCV: Target Volume	878	422	152	194	1,289	418	853	1,013	1,919	1,356	cubic-feet	
	35	Option 2 - Provided Storage Volume	829	422	152	194	1,289	418	853	1,013	1,919	1,356	cubic-feet	
	36	Portion of Biofiltration Performance Standard Satisfied	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio	
Result	37	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no	
	38	Overall Portion of Performance Standard Satisfied	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio	
	39	This BMP Overflows to the Following Drainage Basin	-	-	-	-	-	-	-	-	-	-	unitless	
	40	Deficit of Effectively Treated Stormwater	0	0	0	0	0	0	0	0	0	0	cubic-feet	

Worksheet B.5-1 General Notes:

A. Applicants may use this worksheet to size Lined or Unlined Biofiltration BMPs (BF-1, PR-1) for up to 10 basins. User input must be provided for yellow shaded cells, values for blue cells are automatically populated based on user inputs from previous worksheets, values for all other cells will be automatically generated, errors/notifications will be highlighted in red/orange and summarized below. BMPs fully satisfying the pollutant control performance standards will have a deficit treated volume of zero and be highlighted in green.

COUNTY OF SAN DIEGO AUTOMATED STORMWATER POLLUTANT CONTROL WORKSHEETS

Automated Worksheet B.5-1: Sizing Lined or Unlined Biofiltration BMPs (V1.3)

Category	#	Description	<i>i</i>	<i>ii</i>	<i>iii</i>	<i>iv</i>	<i>v</i>	<i>vi</i>	<i>vii</i>	<i>viii</i>	<i>ix</i>	<i>x</i>	Units
BMP Inputs	0	Drainage Basin ID or Name	9	10	-	-	-	-	-	-	-	-	sq-ft
	1	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000	0.000	-	-	-	-	-	-	-	-	in/hr
	2	Effective Tributary Area	4,029	1,865	-	-	-	-	-	-	-	-	sq-ft
	3	Minimum Biofiltration Footprint Sizing Factor	0.030	0.030	-	-	-	-	-	-	-	-	ratio
	4	Design Capture Volume Tributary to BMP	201	93	-	-	-	-	-	-	-	-	cubic-feet
	5	Is Biofiltration Basin Impermeably Lined or Unlined?	Lined	Lined									unitless
	6	Provided Biofiltration BMP Surface Area	198	58									sq-ft
	7	Provided Surface Ponding Depth	18	6									inches
	8	Provided Soil Media Thickness	18	18									inches
	9	Provided Depth of Gravel Above Underdrain Invert	9	9									inches
	10	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	0.60	0.50									inches
11	Provided Depth of Gravel Below the Underdrain	3	3									inches	
Retention Calculations	12	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	13	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
	14	Gravel Pore Space Available for Retention	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	15	Effective Retention Depth	0.90	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	16	Calculated Retention Storage Drawdown (Including 6 Hr Storm)	120	120	0	0	0	0	0	0	0	0	hours
	17	Volume Retained by BMP	15	4	0	0	0	0	0	0	0	0	cubic-feet
	18	Fraction of DCV Retained	0.07	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	19	Portion of Retention Performance Standard Satisfied	0.08	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	20	Fraction of DCV Retained (normalized to 36-hr drawdown)	0.04	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
21	Design Capture Volume Remaining for Biofiltration	193	90	0	0	0	0	0	0	0	0	cubic-feet	
Biofiltration Calculations	22	Max Hydromod Flow Rate through Underdrain	0.0182	0.0108	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	CFS
	23	Max Soil Filtration Rate Allowed by Underdrain Orifice	3.98	8.08	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	in/hr
	24	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
	25	Soil Media Filtration Rate to be used for Sizing	3.98	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	26	Depth Biofiltered Over 6 Hour Storm	23.89	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	inches
	27	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
	28	Effective Depth of Biofiltration Storage	25.20	13.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	29	Drawdown Time for Surface Ponding	5	1	0	0	0	0	0	0	0	0	hours
	30	Drawdown Time for Effective Biofiltration Depth	6	3	0	0	0	0	0	0	0	0	hours
	31	Total Depth Biofiltered	49.09	43.20	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	inches
	32	Option 1 - Biofilter 1.50 DCV: Target Volume	290	135	0	0	0	0	0	0	0	0	cubic-feet
	33	Option 1 - Provided Biofiltration Volume	290	135	0	0	0	0	0	0	0	0	cubic-feet
	34	Option 2 - Store 0.75 DCV: Target Volume	145	68	0	0	0	0	0	0	0	0	cubic-feet
	35	Option 2 - Provided Storage Volume	145	64	0	0	0	0	0	0	0	0	cubic-feet
	36	Portion of Biofiltration Performance Standard Satisfied	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
Result	37	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	-	-	-	-	-	-	-	-	yes/no
	38	Overall Portion of Performance Standard Satisfied	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	39	This BMP Overflows to the Following Drainage Basin	-	-	-	-	-	-	-	-	-	-	unitless
	40	Deficit of Effectively Treated Stormwater	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	cubic-feet

Worksheet B.5-1 General Notes:

A. Applicants may use this worksheet to size Lined or Unlined Biofiltration BMPs (BF-1, PR-1) for up to 10 basins. User input must be provided for yellow shaded cells, values for blue cells are automatically populated based on user inputs from previous worksheets, values for all other cells will be automatically generated, errors/notifications will be highlighted in red/orange and summarized below. BMPs fully satisfying the pollutant control performance standards will have a deficit treated volume of zero and be highlighted in green.

COUNTY OF SAN DIEGO AUTOMATED STORMWATER POLLUTANT CONTROL WORKSHEETS

Summary of Stormwater Pollutant Control Calculations (V1.3)

Category	#	Description	<i>i</i>	<i>ii</i>	<i>iii</i>	<i>iv</i>	<i>v</i>	<i>vi</i>	<i>vii</i>	<i>viii</i>	<i>ix</i>	<i>x</i>	Units
General Info	0	Drainage Basin ID or Name	1	2a	2b	2c	3	4	5	6	7	8	unitless
	1	85th Percentile Storm Depth	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	inches
	2	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	in/hr
	3	Total Tributary Area	34,456	13,483	4,779	9,657	48,378	16,407	28,594	36,657	69,414	48,292	sq-ft
	4	85th Percentile Storm Volume (Rainfall Volume)	1,723	674	239	483	2,419	820	1,430	1,833	3,471	2,415	cubic-feet
Initial DCV	5	Initial Weighted Runoff Factor	0.70	0.86	0.87	0.55	0.74	0.70	0.82	0.82	0.76	0.78	unitless
	6	Initial Design Capture Volume	1,206	580	208	266	1,790	574	1,172	1,503	2,638	1,883	cubic-feet
Site Design Volume Reductions	7	Dispersion Area Reductions	0	0	0	0	0	0	0	110	0	0	cubic-feet
	8	Tree Well and Rain Barrel Reductions	0	0	0	0	0	0	0	0	0	0	cubic-feet
BMP Volume Reductions	9	Effective Area Tributary to BMP	24,119	11,595	4,158	5,311	35,800	11,485	23,447	27,859	52,755	37,668	square feet
	10	Final Design Capture Volume Tributary to BMP	1,206	580	208	266	1,790	574	1,172	1,393	2,638	1,883	cubic-feet
	11	Basin Drains to the Following BMP Type	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	Biofiltration	unitless
	12	Volume Retained by BMP (normalized to 36 hour drawdown)	36	17	6	8	72	17	35	42	79	75.32	cubic-feet
Total Volume Reductions	13	Total Fraction of Initial DCV Retained within DMA	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.10	0.03	0.04	fraction
	14	Percent of Average Annual Runoff Retention Provided	4.6%	4.6%	4.6%	4.6%	6.1%	4.6%	4.6%	15.2%	4.6%	6.1%	%
	15	Percent of Average Annual Runoff Retention Required	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	%
Performance Standard	16	Percent of Pollution Control Standard Satisfied	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	%
Treatment Train	17	Discharges to Secondary Treatment in Drainage Basin	-	-	-	-	-	-	-	-	-	-	unitless
	18	Impervious Surface Area Still Requiring Treatment	0	0	0	0	0	0	0	0	0	0	square feet
	19	Impervious Surfaces Directed to Downstream Dispersion Area	-	-	-	-	-	-	-	-	-	-	square feet
	20	Impervious Surfaces Not Directed to Downstream Dispersion Area	-	-	-	-	-	-	-	-	-	-	square feet
Result	21	Deficit of Effectively Treated Stormwater	0	0	0	0	0	0	0	0	0	0	cubic-feet

Summary Notes:

All fields in this summary worksheet are populated based on previous user inputs. If applicable, drainage basin elements that require revisions and/or supplemental information outside the scope of these worksheets are highlighted in orange and summarized in the red text below. If all drainage basins achieve full compliance without a need for supplemental information, a green message will appear below.

-Congratulations, all specified drainage basins and BMPs are in compliance with stormwater pollutant control requirements. Include 11x17 color prints of this summary sheet and supporting worksheet calculations as part of the SWQMP submittal package.

False

COUNTY OF SAN DIEGO AUTOMATED STORMWATER POLLUTANT CONTROL WORKSHEETS

Summary of Stormwater Pollutant Control Calculations (V1.3)

Category	#	Description	<i>i</i>	<i>ii</i>	<i>iii</i>	<i>iv</i>	<i>v</i>	<i>vi</i>	<i>vii</i>	<i>viii</i>	<i>ix</i>	<i>x</i>	Units
General Info	0	Drainage Basin ID or Name	9	10	-	-	-	-	-	-	-	-	unitless
	1	85th Percentile Storm Depth	0.60	0.60	-	-	-	-	-	-	-	-	inches
	2	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000	0.000	-	-	-	-	-	-	-	-	in/hr
	3	Total Tributary Area	4,631	2,072	-	-	-	-	-	-	-	-	sq-ft
	4	85th Percentile Storm Volume (Rainfall Volume)	232	104	-	-	-	-	-	-	-	-	cubic-feet
Initial DCV	5	Initial Weighted Runoff Factor	0.87	0.90	-	-	-	-	-	-	-	-	unitless
	6	Initial Design Capture Volume	201	93	-	-	-	-	-	-	-	-	cubic-feet
Site Design Volume Reductions	7	Dispersion Area Reductions	0	0	-	-	-	-	-	-	-	-	cubic-feet
	8	Tree Well and Rain Barrel Reductions	0	0	-	-	-	-	-	-	-	-	cubic-feet
BMP Volume Reductions	9	Effective Area Tributary to BMP	4,029	1,865	-	-	-	-	-	-	-	-	square feet
	10	Final Design Capture Volume Tributary to BMP	201	93	-	-	-	-	-	-	-	-	cubic-feet
	11	Basin Drains to the Following BMP Type	Biofiltration	Biofiltration	-	-	-	-	-	-	-	-	unitless
	12	Volume Retained by BMP (normalized to 36 hour drawdown)	8	3	-	-	-	-	-	-	-	-	cubic-feet
Total Volume Reductions	13	Total Fraction of Initial DCV Retained within DMA	0.04	0.03	-	-	-	-	-	-	-	-	fraction
	14	Percent of Average Annual Runoff Retention Provided	6.1%	4.6%	-	-	-	-	-	-	-	-	%
	15	Percent of Average Annual Runoff Retention Required	4.5%	4.5%	-	-	-	-	-	-	-	-	%
Performance Standard	16	Percent of Pollution Control Standard Satisfied	100.0%	100.0%	-	-	-	-	-	-	-	-	%
Treatment Train	17	Discharges to Secondary Treatment in Drainage Basin	-	-	-	-	-	-	-	-	-	-	unitless
	18	Impervious Surface Area Still Requiring Treatment	0	0	-	-	-	-	-	-	-	-	square feet
	19	Impervious Surfaces Directed to Downstream Dispersion Area	-	-	-	-	-	-	-	-	-	-	square feet
	20	Impervious Surfaces Not Directed to Downstream Dispersion Area	-	-	-	-	-	-	-	-	-	-	square feet
Result	21	Deficit of Effectively Treated Stormwater	0	0	-	-	-	-	-	-	-	-	cubic-feet

Summary Notes:

All fields in this summary worksheet are populated based on previous user inputs. If applicable, drainage basin elements that require revisions and/or supplemental information outside the scope of these worksheets are highlighted in orange and summarized in the red text below. If all drainage basins achieve full compliance without a need for supplemental information, a green message will appear below.

-Congratulations, all specified drainage basins and BMPs are in compliance with stormwater pollutant control requirements. Include 11x17 color prints of this summary sheet and supporting worksheet calculations as part of the SWQMP submittal package.

False

**ATTACHMENT 2
BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES**

[This is the cover sheet for Attachment 2.]

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 2a	Hydromodification Management Exhibit (Required)	<input checked="" type="checkbox"/> Included, See DMA Exhibit in Attachment 1A See Hydromodification Management Exhibit Checklist on the back of this
Attachment 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	<input type="checkbox"/> Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) <input checked="" type="checkbox"/> Not applicable Optional analyses for Critical Coarse Sediment Yield Area Determination <input type="checkbox"/> 6.2.1 Verification of Geomorphic Landscape Units Onsite <input type="checkbox"/> 6.2.2 Downstream Systems Sensitivity to Coarse Sediment <input type="checkbox"/> 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
Attachment 2c	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	<input checked="" type="checkbox"/> Not performed <input type="checkbox"/> Included
Attachment 2d	Flow Control Facility Design and Structural BMP Drawdown Calculations (Required) See Chapter 6 and Appendix G of the BMP Design Manual	<input checked="" type="checkbox"/> Included, Hydromodification modeled using continuous simulation in SDHM; results included.

Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

The Hydromodification Management Exhibit must identify:

- Underlying hydrologic soil group
- Approximate depth to groundwater
- Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- Critical coarse sediment yield areas to be protected (if present)
- Existing topography
- Existing and proposed site drainage network and connections to drainage offsite
- Proposed grading
- Proposed impervious features
- Proposed design features and surface treatments used to minimize imperviousness
- Point(s) of Compliance (POC) for Hydromodification Management
- Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
- Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail)

SDHM 3.1
PROJECT REPORT

Project Name: POC A
Site Name: West Oaks
Site Address: West Oaks Way
City : Carlsbad
Report Date: 4/8/2019
Gage : OCEANSID
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version Date: 2018/07/12

Low Flow Threshold for POC 1 : 10 Percent of the 2 Year

High Flow Threshold for POC 1: 10 year

PREDEVELOPED LAND USE

Name : Existing Basin 100
Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
A,NatVeg,Flat	.31
C,NatVeg,Steep	.05
D,NatVeg,Flat	.28
D,NatVeg,Steep	5.28
A,Urban,Flat	2.36
D,Urban,Flat	.63

Pervious Total 8.91

<u>Impervious Land Use</u>	<u>acre</u>
IMPERVIOUS-FLAT	0.59

Impervious Total 0.59

Basin Total 9.5

Element Flows To:		
Surface	Interflow	Groundwater

MITIGATED LAND USE

Name : EXISTING BASIN 100

Bypass: Yes

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
A,NatVeg,Flat	.22
D,NatVeg,Steep	5.29
C,NatVeg,Steep	.05
A,Urban,Flat	.98
D,NatVeg,Flat	.26

Pervious Total 6.8

<u>Impervious Land Use</u>	<u>acre</u>
IMPERVIOUS-FLAT	0.02

Impervious Total 0.02

Basin Total 6.82

Element Flows To:		
Surface	Interflow	Groundwater

Name : DMA 7

Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
D,Urban,Flat	.09
A,Urban,Flat	.1

Pervious Total 0.19

<u>Impervious Land Use</u>	<u>acre</u>
IMPERVIOUS-FLAT	1.32

Impervious Total 1.32

Basin Total 1.51

Element Flows To:		
Surface	Interflow	Groundwater
Surface filtration 7	Surface filtration 7	

Name : DMA 8

Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
A,Urban,Flat	.07
D,Urban,Flat	.06
Pervious Total	0.13
<u>Impervious Land Use</u>	<u>acre</u>
IMPERVIOUS-FLAT	0.94
Impervious Total	0.94
Basin Total	1.07

Element Flows To:

Surface	Interflow	Groundwater
Surface filtration 8	Surface filtration 8	

Name : DMA 9

Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
Pervious Total	0
<u>Impervious Land Use</u>	<u>acre</u>
IMPERVIOUS-FLAT	0.1
Impervious Total	0.1
Basin Total	0.1

Element Flows To:

Surface	Interflow	Groundwater
Surface filtration 9	Surface filtration 9	

Name : DMA 10

Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
Pervious Total	0
<u>Impervious Land Use</u>	<u>acre</u>
IMPERVIOUS-FLAT	0.04
Impervious Total	0.04
Basin Total	0.04

Element Flows To:

Surface	Interflow	Groundwater
Surface iltration 10	Surface iltration 10	

Name : Biofiltration 7
 Bottom Length: 175.80 ft.
 Bottom Width: 10.00 ft.
 Material thickness of first layer: 1.5
 Material type for first layer: ESM
 Material thickness of second layer: 0.333
 Material type for second layer: GRAVEL
 Material thickness of third layer: 2.17
 Material type for third layer: GRAVEL
Underdrain used
 Underdrain Diameter (feet): 0.67
 Orifice Diameter (in.): 1.05
 Offset (in.): 0
 Flow Through Underdrain (ac-ft.): 43.207
 Total Outflow (ac-ft.): 46.868
 Percent Through Underdrain: 92.19
Discharge Structure
 Riser Height: 2.5 ft.
 Riser Diameter: 12 in.
 Orifice 1 Diameter: 0.0625 in. Elevation: 0.25 ft.
 Orifice 2 Diameter: 0.1 in. Elevation: 1.5 ft.
 Orifice 3 Diameter: 0.25 in. Elevation: 2 ft.

Element Flows To:

Outlet 1	Outlet 2
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Biofiltration 7 Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>Infilt(cfs)</u>
106.18	0.0404	0.0000	0.0000	0.0000
106.26	0.0404	0.0009	0.0000	0.0000
106.33	0.0404	0.0019	0.0000	0.0000
106.41	0.0404	0.0028	0.0000	0.0000
106.49	0.0404	0.0037	0.0000	0.0000

106.56	0.0404	0.0047	0.0000	0.0000
106.64	0.0404	0.0056	0.0000	0.0000
106.72	0.0404	0.0065	0.0000	0.0000
106.80	0.0404	0.0075	0.0000	0.0000
106.87	0.0404	0.0084	0.0000	0.0000
106.95	0.0404	0.0093	0.0000	0.0000
107.03	0.0404	0.0102	0.0000	0.0000
107.10	0.0404	0.0112	0.0000	0.0000
107.18	0.0404	0.0121	0.0000	0.0000
107.26	0.0404	0.0130	0.0000	0.0000
107.33	0.0404	0.0140	0.0000	0.0000
107.41	0.0404	0.0149	0.0000	0.0000
107.49	0.0404	0.0158	0.0000	0.0000
107.57	0.0404	0.0168	0.0000	0.0000
107.64	0.0404	0.0177	0.0000	0.0000
107.72	0.0404	0.0190	0.0000	0.0000
107.80	0.0404	0.0203	0.0000	0.0000
107.87	0.0404	0.0216	0.0000	0.0000
107.95	0.0404	0.0229	0.0000	0.0000
108.03	0.0404	0.0241	0.0000	0.0000
108.10	0.0404	0.0254	0.0000	0.0000
108.18	0.0404	0.0267	0.0000	0.0000
108.26	0.0404	0.0280	0.0000	0.0000
108.33	0.0404	0.0293	0.0000	0.0000
108.41	0.0404	0.0306	0.0000	0.0000
108.49	0.0404	0.0319	0.0000	0.0000
108.57	0.0404	0.0332	0.0000	0.0000
108.64	0.0404	0.0345	0.0000	0.0000
108.72	0.0404	0.0357	0.0000	0.0000
108.80	0.0404	0.0370	0.0000	0.0000
108.87	0.0404	0.0383	0.0000	0.0000
108.95	0.0404	0.0396	0.0000	0.0000
109.03	0.0404	0.0409	0.0000	0.0000
109.10	0.0404	0.0422	0.0000	0.0000
109.18	0.0404	0.0435	0.0000	0.0000
109.26	0.0404	0.0448	0.0000	0.0000
109.34	0.0404	0.0461	0.0000	0.0000
109.41	0.0404	0.0473	0.0000	0.0000
109.49	0.0404	0.0486	0.0000	0.0000
109.57	0.0404	0.0499	0.0000	0.0000
109.64	0.0404	0.0512	0.0000	0.0000
109.72	0.0404	0.0525	0.0000	0.0000
109.80	0.0404	0.0538	0.0000	0.0000
109.87	0.0404	0.0551	0.0000	0.0000
109.95	0.0404	0.0564	0.0000	0.0000
110.03	0.0404	0.0577	0.0000	0.0000
110.10	0.0404	0.0589	0.0000	0.0000
110.18	0.0404	0.0602	0.0000	0.0000
110.18	0.0404	0.0603	0.0000	0.0000

Surface filtration 7 Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>To Amended(cfs)</u>	<u>Wetted Surface</u>
4.0030	0.0404	0.0603	0.0000	0.2139	0.0000
4.0800	0.0404	0.0634	0.0000	0.2139	0.0000
4.1569	0.0404	0.0665	0.0000	0.2244	0.0000
4.2339	0.0404	0.0696	0.0002	0.2348	0.0000
4.3108	0.0404	0.0727	0.0008	0.2452	0.0000

4.3878	0.0404	0.0758	0.0021	0.2557	0.0000
4.4647	0.0404	0.0789	0.0030	0.2661	0.0000
4.5417	0.0404	0.0820	0.0035	0.2765	0.0000
4.6186	0.0404	0.0851	0.0054	0.2870	0.0000
4.6956	0.0404	0.0882	0.0063	0.2974	0.0000
4.7726	0.0404	0.0913	0.0079	0.3079	0.0000
4.8495	0.0404	0.0944	0.0086	0.3183	0.0000
4.9265	0.0404	0.0975	0.0099	0.3287	0.0000
5.0034	0.0404	0.1006	0.0105	0.3392	0.0000
5.0804	0.0404	0.1037	0.0116	0.3496	0.0000
5.1573	0.0404	0.1068	0.0121	0.3601	0.0000
5.2343	0.0404	0.1100	0.0130	0.3705	0.0000
5.3113	0.0404	0.1131	0.0135	0.3809	0.0000
5.3882	0.0404	0.1162	0.0143	0.3914	0.0000
5.4652	0.0404	0.1193	0.0148	0.4018	0.0000
5.5421	0.0404	0.1224	0.0155	0.4123	0.0000
5.6191	0.0404	0.1255	0.0159	0.4227	0.0000
5.6960	0.0404	0.1286	0.0166	0.4331	0.0000
5.7730	0.0404	0.1317	0.0170	0.4436	0.0000
5.8499	0.0404	0.1348	0.0177	0.4540	0.0000
5.9269	0.0404	0.1379	0.0180	0.4644	0.0000
6.0039	0.0404	0.1410	0.0186	0.4749	0.0000
6.0808	0.0404	0.1441	0.0194	0.4853	0.0000
6.1578	0.0404	0.1472	0.0206	0.4958	0.0000
6.2347	0.0404	0.1503	0.0220	0.5062	0.0000
6.3117	0.0404	0.1534	0.0227	0.5166	0.0000
6.3886	0.0404	0.1565	0.0230	0.5271	0.0000
6.4656	0.0404	0.1596	0.0232	0.5375	0.0000
6.5425	0.0404	0.1628	0.0238	0.5480	0.0000
6.6195	0.0404	0.1659	0.0247	0.5584	0.0000
6.6965	0.0404	0.1690	0.0259	0.5688	0.0000
6.7734	0.0404	0.1721	0.0271	0.5793	0.0000
6.8504	0.0404	0.1752	0.0283	0.5897	0.0000
6.9273	0.0404	0.1783	0.0295	0.6002	0.0000
7.0030	0.0404	0.1813	0.0306	0.6104	0.0000

Name : Surface filtration 7

Element Flows To:

Outlet 1 **Outlet 2**
 Biofiltration 7

Name : Biofiltration 8

Bottom Length: 165.00 ft.

Bottom Width: 10.00 ft.

Material thickness of first layer: 1.5

Material type for first layer: ESM

Material thickness of second layer: 0.333

Material type for second layer: GRAVEL

Material thickness of third layer: 1.52

Material type for third layer: GRAVEL

Underdrain used

Underdrain Diameter (feet): 0.67

Orifice Diameter (in.): 0.95

Offset (in.): 0
 Flow Through Underdrain (ac-ft.): 28.445
 Total Outflow (ac-ft.): 33.323
 Percent Through Underdrain: 85.36
Discharge Structure
 Riser Height: 1 ft.
 Riser Diameter: 12 in.
 Orifice 1 Diameter: 0.0625 in. Elevation: 0.33 ft.
 Orifice 2 Diameter: 0.125 in. Elevation: 0.5 ft.

 Element Flows To:
 Outlet 1 Outlet 2

Biofiltration 8 Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>Infilt(cfs)</u>
104.30	0.0379	0.0000	0.0000	0.0000
104.35	0.0379	0.0006	0.0000	0.0000
104.41	0.0379	0.0012	0.0000	0.0000
104.46	0.0379	0.0018	0.0000	0.0000
104.51	0.0379	0.0024	0.0000	0.0000
104.57	0.0379	0.0030	0.0004	0.0000
104.62	0.0379	0.0036	0.0008	0.0000
104.67	0.0379	0.0042	0.0016	0.0000
104.73	0.0379	0.0048	0.0027	0.0000
104.78	0.0379	0.0055	0.0042	0.0000
104.83	0.0379	0.0061	0.0049	0.0000
104.89	0.0379	0.0067	0.0052	0.0000
104.94	0.0379	0.0073	0.0061	0.0000
104.99	0.0379	0.0079	0.0065	0.0000
105.05	0.0379	0.0085	0.0073	0.0000
105.10	0.0379	0.0091	0.0077	0.0000
105.15	0.0379	0.0097	0.0083	0.0000
105.21	0.0379	0.0103	0.0087	0.0000
105.26	0.0379	0.0109	0.0093	0.0000
105.31	0.0379	0.0115	0.0096	0.0000
105.37	0.0379	0.0121	0.0101	0.0000
105.42	0.0379	0.0127	0.0104	0.0000
105.47	0.0379	0.0133	0.0109	0.0000
105.53	0.0379	0.0139	0.0112	0.0000
105.58	0.0379	0.0145	0.0116	0.0000
105.63	0.0379	0.0152	0.0119	0.0000
105.69	0.0379	0.0158	0.0123	0.0000
105.74	0.0379	0.0164	0.0126	0.0000
105.79	0.0379	0.0170	0.0130	0.0000
105.85	0.0379	0.0178	0.0132	0.0000
105.90	0.0379	0.0186	0.0136	0.0000
105.95	0.0379	0.0195	0.0138	0.0000
106.01	0.0379	0.0203	0.0142	0.0000
106.06	0.0379	0.0212	0.0144	0.0000
106.11	0.0379	0.0220	0.0147	0.0000
106.17	0.0379	0.0228	0.0149	0.0000
106.22	0.0379	0.0237	0.0153	0.0000
106.27	0.0379	0.0245	0.0155	0.0000

106.33	0.0379	0.0254	0.0158	0.0000
106.38	0.0379	0.0262	0.0159	0.0000
106.43	0.0379	0.0270	0.0160	0.0000
106.49	0.0379	0.0279	0.0160	0.0000
106.54	0.0379	0.0287	0.0160	0.0000
106.59	0.0379	0.0295	0.0160	0.0000
106.65	0.0379	0.0304	0.0164	0.0000
106.70	0.0379	0.0312	0.0171	0.0000
106.75	0.0379	0.0321	0.0178	0.0000
106.81	0.0379	0.0329	0.0186	0.0000
106.86	0.0379	0.0337	0.0195	0.0000
106.91	0.0379	0.0346	0.0203	0.0000
106.97	0.0379	0.0354	0.0210	0.0000
107.02	0.0379	0.0363	0.0218	0.0000
107.07	0.0379	0.0371	0.0225	0.0000
107.13	0.0379	0.0379	0.0232	0.0000
107.18	0.0379	0.0388	0.0239	0.0000
107.23	0.0379	0.0396	0.0246	0.0000
107.29	0.0379	0.0404	0.0252	0.0000
107.34	0.0379	0.0413	0.0259	0.0000
107.39	0.0379	0.0421	0.0265	0.0000
107.45	0.0379	0.0430	0.0271	0.0000
107.50	0.0379	0.0438	0.0277	0.0000
107.55	0.0379	0.0446	0.0283	0.0000
107.61	0.0379	0.0455	0.0289	0.0000
107.65	0.0379	0.0462	0.0295	0.0000

Surface filtration 8 Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>To Amended(cfs)</u>	<u>Wetted Surface</u>
3.3530	0.0379	0.0462	0.0000	0.1978	0.0000
3.4063	0.0379	0.0482	0.0000	0.1978	0.0000
3.4597	0.0379	0.0502	0.0000	0.2046	0.0000
3.5130	0.0379	0.0523	0.0000	0.2113	0.0000
3.5663	0.0379	0.0543	0.0000	0.2181	0.0000
3.6196	0.0379	0.0563	0.0000	0.2249	0.0000
3.6730	0.0379	0.0583	0.0000	0.2317	0.0000
3.7263	0.0379	0.0603	0.0000	0.2385	0.0000
3.7796	0.0379	0.0624	0.0000	0.2453	0.0000
3.8330	0.0379	0.0644	0.0000	0.2521	0.0000
3.8863	0.0379	0.0664	0.0001	0.2589	0.0000
3.9396	0.0379	0.0684	0.0002	0.2657	0.0000
3.9930	0.0379	0.0704	0.0002	0.2724	0.0000
4.0463	0.0379	0.0725	0.0003	0.2792	0.0000
4.0996	0.0379	0.0745	0.0003	0.2860	0.0000
4.1529	0.0379	0.0765	0.0003	0.2928	0.0000
4.2063	0.0379	0.0785	0.0003	0.2996	0.0000
4.2596	0.0379	0.0805	0.0004	0.3064	0.0000
4.3129	0.0379	0.0826	0.0004	0.3132	0.0000
4.3663	0.0379	0.0846	0.0166	0.3200	0.0000
4.4196	0.0379	0.0866	0.1823	0.3268	0.0000
4.4729	0.0379	0.0886	0.4367	0.3336	0.0000
4.5263	0.0379	0.0906	0.7436	0.3403	0.0000
4.5796	0.0379	0.0927	1.0736	0.3471	0.0000
4.6329	0.0379	0.0947	1.3964	0.3539	0.0000
4.6862	0.0379	0.0967	1.6835	0.3607	0.0000
4.7396	0.0379	0.0987	1.9131	0.3675	0.0000
4.7929	0.0379	0.1007	2.0775	0.3743	0.0000

4.8462	0.0379	0.1028	2.1912	0.3811	0.0000
4.8530	0.0379	0.1030	2.3291	0.3819	0.0000

Name : Surface filtration 8

Element Flows To:

Outlet 1	Outlet 2
Biofiltration 8	

Name : Biofiltration 9

Bottom Length: 19.80 ft.

Bottom Width: 10.00 ft.

Material thickness of first layer: 1.5

Material type for first layer: ESM

Material thickness of second layer: 0.333

Material type for second layer: GRAVEL

Material thickness of third layer: 1

Material type for third layer: GRAVEL

Underdrain used

Underdrain Diameter (feet): 0.5

Orifice Diameter (in.): 0.6

Offset (in.): 3

Flow Through Underdrain (ac-ft.): 3.124

Total Outflow (ac-ft.): 3.325

Percent Through Underdrain: 93.95

Discharge Structure

Riser Height: 1.5 ft.

Riser Diameter: 12 in.

Orifice 1 Diameter: 0.0625 in. **Elevation:** 0.2 ft.

Orifice 2 Diameter: 0.125 in. **Elevation:** 0.5 ft.

Element Flows To:

Outlet 1	Outlet 2
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Biofiltration 9 Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>Infilt(cfs)</u>
106.27	0.0045	0.0000	0.0000	0.0000
106.32	0.0045	0.0001	0.0000	0.0000
106.38	0.0045	0.0001	0.0000	0.0000
106.43	0.0045	0.0002	0.0000	0.0000
106.48	0.0045	0.0003	0.0000	0.0000
106.54	0.0045	0.0004	0.0000	0.0000
106.59	0.0045	0.0004	0.0000	0.0000
106.64	0.0045	0.0005	0.0000	0.0000
106.69	0.0045	0.0006	0.0000	0.0000
106.75	0.0045	0.0007	0.0000	0.0000
106.80	0.0045	0.0007	0.0000	0.0000
106.85	0.0045	0.0008	0.0000	0.0000
106.91	0.0045	0.0009	0.0000	0.0000
106.96	0.0045	0.0009	0.0000	0.0000

107.01	0.0045	0.0010	0.0000	0.0000
107.07	0.0045	0.0011	0.0000	0.0000
107.12	0.0045	0.0012	0.0000	0.0000
107.17	0.0045	0.0012	0.0000	0.0000
107.23	0.0045	0.0013	0.0000	0.0000
107.28	0.0045	0.0014	0.0000	0.0000
107.33	0.0045	0.0014	0.0000	0.0000
107.39	0.0045	0.0015	0.0000	0.0000
107.44	0.0045	0.0016	0.0000	0.0000
107.49	0.0045	0.0017	0.0000	0.0000
107.54	0.0045	0.0017	0.0000	0.0000
107.60	0.0045	0.0018	0.0000	0.0000
107.65	0.0045	0.0019	0.0000	0.0000
107.70	0.0045	0.0020	0.0000	0.0000
107.76	0.0045	0.0020	0.0000	0.0000
107.81	0.0045	0.0021	0.0000	0.0000
107.86	0.0045	0.0022	0.0000	0.0000
107.92	0.0045	0.0023	0.0000	0.0000
107.97	0.0045	0.0024	0.0000	0.0000
108.02	0.0045	0.0025	0.0000	0.0000
108.08	0.0045	0.0026	0.0000	0.0000
108.13	0.0045	0.0027	0.0000	0.0000
108.18	0.0045	0.0028	0.0000	0.0000
108.24	0.0045	0.0029	0.0000	0.0000
108.29	0.0045	0.0030	0.0000	0.0000
108.34	0.0045	0.0031	0.0000	0.0000
108.39	0.0045	0.0032	0.0000	0.0000
108.45	0.0045	0.0033	0.0000	0.0000
108.50	0.0045	0.0034	0.0000	0.0000
108.55	0.0045	0.0035	0.0000	0.0000
108.61	0.0045	0.0036	0.0000	0.0000
108.66	0.0045	0.0037	0.0000	0.0000
108.71	0.0045	0.0038	0.0000	0.0000
108.77	0.0045	0.0039	0.0000	0.0000
108.82	0.0045	0.0040	0.0000	0.0000
108.87	0.0045	0.0041	0.0000	0.0000
108.93	0.0045	0.0042	0.0000	0.0000
108.98	0.0045	0.0043	0.0000	0.0000
109.03	0.0045	0.0044	0.0000	0.0000
109.08	0.0045	0.0045	0.0000	0.0000
109.10	0.0045	0.0046	0.0000	0.0000

Surface filtration 9 Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>To Amended(cfs)</u>	<u>Wetted Surface</u>
2.8330	0.0045	0.0046	0.0000	0.0237	0.0000
2.8861	0.0045	0.0048	0.0000	0.0237	0.0000
2.9392	0.0045	0.0050	0.0000	0.0245	0.0000
2.9923	0.0045	0.0053	0.0000	0.0254	0.0000
3.0454	0.0045	0.0055	0.0000	0.0262	0.0000
3.0985	0.0045	0.0058	0.0000	0.0270	0.0000
3.1517	0.0045	0.0060	0.0000	0.0278	0.0000
3.2048	0.0045	0.0063	0.0000	0.0286	0.0000
3.2579	0.0045	0.0065	0.0000	0.0294	0.0000
3.3110	0.0045	0.0067	0.0000	0.0302	0.0000
3.3641	0.0045	0.0070	0.0000	0.0310	0.0000
3.4172	0.0045	0.0072	0.0000	0.0318	0.0000
3.4703	0.0045	0.0075	0.0000	0.0327	0.0000

3.5234	0.0045	0.0077	0.0000	0.0335	0.0000
3.5765	0.0045	0.0079	0.0000	0.0343	0.0000
3.6296	0.0045	0.0082	0.0000	0.0351	0.0000
3.6828	0.0045	0.0084	0.0000	0.0359	0.0000
3.7359	0.0045	0.0087	0.0000	0.0367	0.0000
3.7890	0.0045	0.0089	0.0000	0.0375	0.0000
3.8421	0.0045	0.0092	0.0000	0.0383	0.0000
3.8952	0.0045	0.0094	0.0000	0.0391	0.0000
3.9483	0.0045	0.0096	0.0008	0.0400	0.0000
4.0014	0.0045	0.0099	0.0011	0.0408	0.0000
4.0545	0.0045	0.0101	0.0017	0.0416	0.0000
4.1076	0.0045	0.0104	0.0019	0.0424	0.0000
4.1607	0.0045	0.0106	0.0023	0.0432	0.0000
4.2139	0.0045	0.0108	0.0025	0.0440	0.0000
4.2670	0.0045	0.0111	0.0028	0.0448	0.0000
4.3201	0.0045	0.0113	0.0030	0.0456	0.0000
4.3732	0.0045	0.0116	0.0033	0.0464	0.0000
4.4263	0.0045	0.0118	0.0034	0.0473	0.0000
4.4794	0.0045	0.0121	0.0037	0.0481	0.0000
4.5325	0.0045	0.0123	0.0038	0.0489	0.0000
4.5856	0.0045	0.0125	0.0040	0.0497	0.0000
4.6387	0.0045	0.0128	0.0041	0.0505	0.0000
4.6918	0.0045	0.0130	0.0043	0.0513	0.0000
4.7450	0.0045	0.0133	0.0044	0.0521	0.0000
4.7981	0.0045	0.0135	0.0046	0.0529	0.0000
4.8330	0.0045	0.0137	0.0047	0.0535	0.0000

Name : Surface filtration 9

Element Flows To:

Outlet 1	Outlet 2
Biofiltration 9	

Name : DMA 13 - Self Mitigating

Bypass: Yes

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
A,Urban,Flat	.3

Pervious Total	0.3
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<u>Impervious Land Use</u>	<u>acre</u>
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Impervious Total	0
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Basin Total	0.3
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Element Flows To:

Surface	Interflow	Groundwater
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Name : Biofiltration 10
Bottom Length: 19.33 ft.
Bottom Width: 3.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 0.333
Material type for second layer: GRAVEL
Material thickness of third layer: 1
Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 0.5
Orifice Diameter (in.): 0.5
Offset (in.): 3
Flow Through Underdrain (ac-ft.): 1.205
Total Outflow (ac-ft.): 1.339
Percent Through Underdrain: 89.97
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.
Orifice 1 Diameter: 0.0625 in. **Elevation:** 0.25 ft.

Element Flows To:
Outlet 1 **Outlet 2**

Biofiltration 10 Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>Infilt(cfs)</u>
106.62	0.001331	0.000000	0.0000	0.0000
106.67	0.001331	0.000019	0.0000	0.0000
106.72	0.001331	0.000038	0.0000	0.0000
106.76	0.001331	0.000057	0.0000	0.0000
106.81	0.001331	0.000076	0.0000	0.0000
106.86	0.001331	0.000095	0.0000	0.0000
106.91	0.001331	0.000114	0.0000	0.0000
106.95	0.001331	0.000133	0.0000	0.0000
107.00	0.001331	0.000152	0.0000	0.0000
107.05	0.001331	0.000171	0.0000	0.0000
107.10	0.001331	0.000190	0.0000	0.0000
107.14	0.001331	0.000209	0.0000	0.0000
107.19	0.001331	0.000228	0.0000	0.0000
107.24	0.001331	0.000247	0.0000	0.0000
107.29	0.001331	0.000266	0.0000	0.0000
107.33	0.001331	0.000285	0.0000	0.0000
107.38	0.001331	0.000304	0.0000	0.0000
107.43	0.001331	0.000323	0.0000	0.0000
107.48	0.001331	0.000342	0.0000	0.0000
107.52	0.001331	0.000361	0.0000	0.0000
107.57	0.001331	0.000380	0.0000	0.0000
107.62	0.001331	0.000399	0.0000	0.0000
107.67	0.001331	0.000418	0.0000	0.0000

107.72	0.001331	0.000437	0.0000	0.0000
107.76	0.001331	0.000456	0.0000	0.0000
107.81	0.001331	0.000475	0.0000	0.0000
107.86	0.001331	0.000495	0.0000	0.0000
107.91	0.001331	0.000514	0.0000	0.0000
107.95	0.001331	0.000533	0.0000	0.0000
108.00	0.001331	0.000552	0.0000	0.0000
108.05	0.001331	0.000571	0.0000	0.0000
108.10	0.001331	0.000590	0.0000	0.0000
108.14	0.001331	0.000616	0.0000	0.0000
108.19	0.001331	0.000642	0.0000	0.0000
108.24	0.001331	0.000669	0.0000	0.0000
108.29	0.001331	0.000695	0.0000	0.0000
108.33	0.001331	0.000721	0.0000	0.0000
108.38	0.001331	0.000747	0.0000	0.0000
108.43	0.001331	0.000774	0.0000	0.0000
108.48	0.001331	0.000800	0.0000	0.0000
108.52	0.001331	0.000826	0.0000	0.0000
108.57	0.001331	0.000853	0.0000	0.0000
108.62	0.001331	0.000879	0.0000	0.0000
108.67	0.001331	0.000905	0.0000	0.0000
108.72	0.001331	0.000932	0.0000	0.0000
108.76	0.001331	0.000958	0.0000	0.0000
108.81	0.001331	0.000984	0.0000	0.0000
108.86	0.001331	0.001011	0.0000	0.0000
108.91	0.001331	0.001037	0.0000	0.0000
108.95	0.001331	0.001063	0.0000	0.0000
109.00	0.001331	0.001090	0.0000	0.0000
109.05	0.001331	0.001116	0.0000	0.0000
109.10	0.001331	0.001142	0.0000	0.0000
109.14	0.001331	0.001168	0.0000	0.0000
109.19	0.001331	0.001195	0.0000	0.0000
109.24	0.001331	0.001221	0.0000	0.0000
109.29	0.001331	0.001247	0.0000	0.0000
109.33	0.001331	0.001274	0.0000	0.0000
109.38	0.001331	0.001300	0.0000	0.0000
109.43	0.001331	0.001326	0.0000	0.0000
109.45	0.001331	0.001339	0.0000	0.0000

Surface iltration 10 Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>To Amended(cfs)</u>	<u>Wetted Surface</u>
2.8330	0.001331	0.001339	0.0000	0.0069	0.0000
2.8806	0.001331	0.001403	0.0000	0.0069	0.0000
2.9282	0.001331	0.001466	0.0000	0.0071	0.0000
2.9758	0.001331	0.001530	0.0000	0.0074	0.0000
3.0235	0.001331	0.001593	0.0000	0.0076	0.0000
3.0711	0.001331	0.001656	0.0000	0.0078	0.0000
3.1187	0.001331	0.001720	0.0000	0.0080	0.0000
3.1663	0.001331	0.001783	0.0000	0.0082	0.0000
3.2139	0.001331	0.001847	0.0000	0.0084	0.0000
3.2615	0.001331	0.001910	0.0000	0.0086	0.0000
3.3092	0.001331	0.001973	0.0000	0.0088	0.0000
3.3568	0.001331	0.002037	0.0000	0.0091	0.0000
3.4044	0.001331	0.002100	0.0000	0.0093	0.0000
3.4520	0.001331	0.002164	0.0000	0.0095	0.0000
3.4996	0.001331	0.002227	0.0000	0.0097	0.0000
3.5472	0.001331	0.002290	0.0000	0.0099	0.0000

3.5948	0.001331	0.002354	0.0000	0.0101	0.0000
3.6425	0.001331	0.002417	0.0000	0.0103	0.0000
3.6901	0.001331	0.002481	0.0000	0.0105	0.0000
3.7377	0.001331	0.002544	0.0000	0.0108	0.0000
3.7853	0.001331	0.002607	0.0000	0.0110	0.0000
3.8329	0.001331	0.002671	0.0000	0.0112	0.0000
3.8805	0.001331	0.002734	0.0000	0.0114	0.0000
3.9282	0.001331	0.002798	0.0000	0.0116	0.0000
3.9758	0.001331	0.002861	0.0004	0.0118	0.0000
4.0234	0.001331	0.002924	0.0006	0.0120	0.0000
4.0710	0.001331	0.002988	0.0010	0.0123	0.0000
4.1186	0.001331	0.003051	0.0012	0.0125	0.0000
4.1662	0.001331	0.003115	0.0014	0.0127	0.0000
4.2138	0.001331	0.003178	0.0016	0.0129	0.0000
4.2615	0.001331	0.003241	0.0018	0.0131	0.0000
4.3091	0.001331	0.003305	0.0019	0.0133	0.0000
4.3330	0.001331	0.003337	0.0021	0.0134	0.0000

Name : Surface iltration 10

Element Flows To:

Outlet 1 **Outlet 2**
 Biofiltration 10

ANALYSIS RESULTS

Predeveloped Landuse Totals for POC #1

Total Pervious Area:8.91
Total Impervious Area:0.59

Mitigated Landuse Totals for POC #1

Total Pervious Area:7.42
Total Impervious Area:2.42

Flow Frequency Return Periods for Predeveloped. POC #1

<u>Return Period</u>	<u>Flow(cfs)</u>
2 year	2.396973
5 year	3.943249
10 year	5.566506
25 year	7.150371

Flow Frequency Return Periods for Mitigated. POC #1

<u>Return Period</u>	<u>Flow(cfs)</u>
2 year	2.279818
5 year	3.772484
10 year	5.597138
25 year	7.565611

POC #1

The Facility PASSED

The Facility **PASSED.**

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.2397	787	720	91	Pass
0.2935	658	608	92	Pass
0.3473	555	526	94	Pass
0.4011	485	454	93	Pass
0.4549	418	380	90	Pass
0.5087	344	319	92	Pass
0.5625	285	282	98	Pass
0.6163	256	262	102	Pass
0.6701	238	238	100	Pass
0.7240	223	218	97	Pass
0.7778	200	203	101	Pass
0.8316	191	190	99	Pass
0.8854	180	179	99	Pass
0.9392	167	162	97	Pass
0.9930	155	151	97	Pass
1.0468	147	137	93	Pass
1.1006	139	126	90	Pass
1.1544	126	117	92	Pass
1.2082	117	109	93	Pass
1.2620	107	102	95	Pass
1.3158	99	95	95	Pass
1.3696	92	91	98	Pass
1.4234	90	83	92	Pass
1.4772	87	79	90	Pass
1.5310	86	76	88	Pass
1.5849	81	69	85	Pass
1.6387	77	64	83	Pass
1.6925	68	58	85	Pass
1.7463	66	55	83	Pass
1.8001	60	53	88	Pass
1.8539	59	50	84	Pass
1.9077	56	48	85	Pass
1.9615	52	47	90	Pass
2.0153	50	43	86	Pass
2.0691	46	39	84	Pass
2.1229	42	38	90	Pass
2.1767	38	38	100	Pass
2.2305	38	36	94	Pass
2.2843	37	34	91	Pass
2.3381	35	34	97	Pass
2.3919	34	33	97	Pass
2.4457	33	33	100	Pass
2.4996	29	32	110	Pass
2.5534	28	31	110	Pass
2.6072	26	28	107	Pass
2.6610	24	26	108	Pass
2.7148	24	23	95	Pass
2.7686	22	22	100	Pass

2.8224	22	22	100	Pass
2.8762	20	21	104	Pass
2.9300	19	21	110	Pass
2.9838	18	19	105	Pass
3.0376	17	18	105	Pass
3.0914	16	17	106	Pass
3.1452	16	17	106	Pass
3.1990	16	17	106	Pass
3.2528	16	17	106	Pass
3.3066	16	16	100	Pass
3.3605	15	16	106	Pass
3.4143	15	15	100	Pass
3.4681	15	14	93	Pass
3.5219	15	14	93	Pass
3.5757	15	14	93	Pass
3.6295	14	13	92	Pass
3.6833	14	13	92	Pass
3.7371	14	11	78	Pass
3.7909	13	9	69	Pass
3.8447	11	8	72	Pass
3.8985	10	8	80	Pass
3.9523	8	8	100	Pass
4.0061	8	8	100	Pass
4.0599	8	8	100	Pass
4.1137	8	8	100	Pass
4.1675	8	8	100	Pass
4.2214	8	7	87	Pass
4.2752	8	6	75	Pass
4.3290	8	6	75	Pass
4.3828	8	6	75	Pass
4.4366	8	6	75	Pass
4.4904	8	6	75	Pass
4.5442	8	6	75	Pass
4.5980	7	6	85	Pass
4.6518	7	6	85	Pass
4.7056	7	6	85	Pass
4.7594	6	6	100	Pass
4.8132	6	6	100	Pass
4.8670	6	6	100	Pass
4.9208	6	6	100	Pass
4.9746	6	6	100	Pass
5.0284	6	6	100	Pass
5.0823	6	6	100	Pass
5.1361	6	6	100	Pass
5.1899	6	6	100	Pass
5.2437	6	6	100	Pass
5.2975	6	5	83	Pass
5.3513	6	5	83	Pass
5.4051	5	5	100	Pass
5.4589	5	5	100	Pass
5.5127	5	4	80	Pass
5.5665	4	4	100	Pass

Drawdown Time Results

POC #2 was not reported because POC must exist in both scenarios and both scenarios must have been run. POC #3 was not reported because POC must exist in both scenarios and both scenarios must have been run. POC #4 was not reported because POC must exist in both scenarios and both scenarios must have been run. **Perlnd and Implnd Changes**

No changes have been made.

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SDHM 3.1
PROJECT REPORT

Project Name: POC B
Site Name: West Oaks
Site Address: West Oaks Way
City : Carlsbad
Report Date: 4/8/2019
Gage : OCEANSID
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version Date: 2018/07/12

Low Flow Threshold for POC 2 : 10 Percent of the 2 Year

High Flow Threshold for POC 2: 10 year

PREDEVELOPED LAND USE

Name : Existing Basin 200
Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
A,NatVeg,Steep	.3
C,NatVeg,Steep	1.15
D,NatVeg,Steep	6.14
A,Urban,Flat	1.9
D,Urban,Flat	.75
Pervious Total	10.24
<u>Impervious Land Use</u>	<u>acre</u>
IMPERVIOUS-FLAT	0.45
IMPERVIOUS-STEEP	0.31
Impervious Total	0.76
Basin Total	11

Element Flows To:		
Surface	Interflow	Groundwater

MITIGATED LAND USE

Name : DMA 2a
Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
Pervious Total	0
<u>Impervious Land Use</u>	<u>acre</u>
IMPERVIOUS-FLAT	0.29
Impervious Total	0.29
Basin Total	0.29

Element Flows To:		
Surface	Interflow	Groundwater
Surface iltration 2a	Surface iltration 2a	

Name : DMA 3
Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
A,Urban,Flat	.18
Pervious Total	0.18
<u>Impervious Land Use</u>	<u>acre</u>
IMPERVIOUS-FLAT	0.89
Impervious Total	0.89
Basin Total	1.07

Element Flows To:		
Surface	Interflow	Groundwater
Surface iltration 3	Surface iltration 3	

Name : Biofiltration 3
Bottom Length: 159.40 ft.
Bottom Width: 10.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 0.333

Material type for second layer: GRAVEL
 Material thickness of third layer: 3.35
 Material type for third layer: GRAVEL

Underdrain used

Underdrain Diameter (feet): 1
 Orifice Diameter (in.): 0.85
 Offset (in.): 0
 Flow Through Underdrain (ac-ft.): 29.073
 Total Outflow (ac-ft.): 31.571
 Percent Through Underdrain: 92.09

Discharge Structure

Riser Height: 1 ft.
 Riser Diameter: 12 in.
 Orifice 1 Diameter: 0.0625 in. Elevation: 0.25 ft.
 Orifice 2 Diameter: 1 in. Elevation: 0.5 ft.

Element Flows To:

Outlet 1 Outlet 2

Biofiltration 3 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
117.50	0.0366	0.0000	0.0000	0.0000
117.57	0.0366	0.0008	0.0000	0.0000
117.65	0.0366	0.0016	0.0000	0.0000
117.72	0.0366	0.0024	0.0002	0.0000
117.79	0.0366	0.0032	0.0007	0.0000
117.87	0.0366	0.0040	0.0017	0.0000
117.94	0.0366	0.0048	0.0019	0.0000
118.01	0.0366	0.0056	0.0033	0.0000
118.09	0.0366	0.0064	0.0057	0.0000
118.16	0.0366	0.0073	0.0058	0.0000
118.23	0.0366	0.0081	0.0058	0.0000
118.31	0.0366	0.0089	0.0069	0.0000
118.38	0.0366	0.0097	0.0074	0.0000
118.45	0.0366	0.0105	0.0081	0.0000
118.53	0.0366	0.0113	0.0085	0.0000
118.60	0.0366	0.0121	0.0090	0.0000
118.68	0.0366	0.0129	0.0093	0.0000
118.75	0.0366	0.0137	0.0098	0.0000
118.82	0.0366	0.0145	0.0101	0.0000
118.90	0.0366	0.0153	0.0105	0.0000
118.97	0.0366	0.0161	0.0108	0.0000
119.04	0.0366	0.0172	0.0112	0.0000
119.12	0.0366	0.0184	0.0114	0.0000
119.19	0.0366	0.0195	0.0118	0.0000
119.26	0.0366	0.0206	0.0120	0.0000
119.34	0.0366	0.0217	0.0124	0.0000
119.41	0.0366	0.0228	0.0126	0.0000
119.48	0.0366	0.0239	0.0130	0.0000
119.56	0.0366	0.0250	0.0132	0.0000
119.63	0.0366	0.0262	0.0136	0.0000
119.70	0.0366	0.0273	0.0143	0.0000
119.78	0.0366	0.0284	0.0151	0.0000

119.85	0.0366	0.0295	0.0159	0.0000
119.92	0.0366	0.0306	0.0167	0.0000
120.00	0.0366	0.0317	0.0176	0.0000
120.07	0.0366	0.0329	0.0180	0.0000
120.14	0.0366	0.0340	0.0182	0.0000
120.22	0.0366	0.0351	0.0183	0.0000
120.29	0.0366	0.0362	0.0185	0.0000
120.36	0.0366	0.0373	0.0190	0.0000
120.44	0.0366	0.0384	0.0196	0.0000
120.51	0.0366	0.0395	0.0202	0.0000
120.58	0.0366	0.0407	0.0209	0.0000
120.66	0.0366	0.0418	0.0215	0.0000
120.73	0.0366	0.0429	0.0222	0.0000
120.80	0.0366	0.0440	0.0228	0.0000
120.88	0.0366	0.0451	0.0234	0.0000
120.95	0.0366	0.0462	0.0240	0.0000
121.03	0.0366	0.0474	0.0246	0.0000
121.10	0.0366	0.0485	0.0252	0.0000
121.17	0.0366	0.0496	0.0257	0.0000
121.25	0.0366	0.0507	0.0263	0.0000
121.32	0.0366	0.0518	0.0268	0.0000
121.39	0.0366	0.0529	0.0273	0.0000
121.47	0.0366	0.0540	0.0279	0.0000
121.54	0.0366	0.0552	0.0284	0.0000
121.61	0.0366	0.0563	0.0289	0.0000
121.69	0.0366	0.0574	0.0293	0.0000
121.76	0.0366	0.0585	0.0298	0.0000
121.83	0.0366	0.0596	0.0303	0.0000
121.91	0.0366	0.0607	0.0308	0.0000
121.98	0.0366	0.0619	0.0312	0.0000
122.05	0.0366	0.0630	0.0317	0.0000
122.13	0.0366	0.0641	0.0321	0.0000
122.20	0.0366	0.0652	0.0326	0.0000
122.27	0.0366	0.0663	0.0330	0.0000
122.35	0.0366	0.0674	0.0334	0.0000
122.42	0.0366	0.0685	0.0338	0.0000
122.49	0.0366	0.0697	0.0343	0.0000
122.57	0.0366	0.0708	0.0347	0.0000
122.64	0.0366	0.0719	0.0351	0.0000
122.68	0.0366	0.0725	0.0355	0.0000

Surface iltration 3 Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>To Amended(cfs)</u>	<u>Wetted Surface</u>
5.1830	0.0366	0.0725	0.0000	0.1935	0.0000
5.2564	0.0377	0.0753	0.0000	0.1935	0.0000
5.3299	0.0387	0.0781	0.0000	0.2026	0.0000
5.4033	0.0398	0.0809	0.0000	0.2116	0.0000
5.4768	0.0409	0.0839	0.0000	0.2206	0.0000
5.5502	0.0420	0.0870	0.0000	0.2297	0.0000
5.6236	0.0430	0.0901	0.0000	0.2387	0.0000
5.6971	0.0441	0.0933	0.0004	0.2477	0.0000
5.7705	0.0452	0.0966	0.0081	0.2568	0.0000
5.8440	0.0463	0.0999	0.0110	0.2658	0.0000
5.9174	0.0473	0.1034	0.0132	0.2748	0.0000
5.9908	0.0484	0.1069	0.0151	0.2838	0.0000
6.0643	0.0495	0.1105	0.0168	0.2929	0.0000
6.1377	0.0506	0.1141	0.0184	0.3019	0.0000

6.2112	0.0516	0.1179	0.0699	0.3109	0.0000
6.2846	0.0527	0.1217	0.3626	0.3200	0.0000
6.3580	0.0538	0.1256	0.7764	0.3290	0.0000
6.4315	0.0549	0.1296	1.2318	0.3380	0.0000
6.5049	0.0559	0.1337	1.6510	0.3471	0.0000
6.5784	0.0570	0.1378	1.9699	0.3561	0.0000
6.6518	0.0581	0.1421	2.1696	0.3651	0.0000
6.6830	0.0585	0.1439	2.3471	0.3690	0.0000

Name : Surface iltration 3

Element Flows To:

Outlet 1	Outlet 2
Biofiltration 3	

Name : DMA 4

Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
A,Urban,Flat	.08
Pervious Total	0.08
<u>Impervious Land Use</u>	<u>acre</u>
IMPERVIOUS-FLAT	0.28
Impervious Total	0.28
Basin Total	0.36

Element Flows To:

Surface	Interflow	Groundwater
Surface iltration 4	Surface iltration 4	

Name : Biofiltration 4

Bottom Length: 35.00 ft.

Bottom Width: 10.00 ft.

Material thickness of first layer: 1.5

Material type for first layer: ESM

Material thickness of second layer: 0.333

Material type for second layer: GRAVEL

Material thickness of third layer: 3.14

Material type for third layer: GRAVEL

Underdrain used

Underdrain Diameter (feet): 0.5

Orifice Diameter (in.): 0.85

Offset (in.): 0

Flow Through Underdrain (ac-ft.): 9.16

Total Outflow (ac-ft.): 10.012

Percent Through Underdrain: 91.49

Discharge Structure

Riser Height: 1 ft.

Riser Diameter: 12 in.

Orifice 1 Diameter: 0.0625 in. Elevation: 0.25 ft.

Orifice 2 Diameter: 1 in. Elevation: 0.5 ft.

Element Flows To:

Outlet 1 Outlet 2

Biofiltration 4 Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>Infilt(cfs)</u>
113.45	0.0080	0.0000	0.0000	0.0000
113.52	0.0080	0.0002	0.0000	0.0000
113.59	0.0080	0.0003	0.0000	0.0000
113.66	0.0080	0.0005	0.0000	0.0000
113.73	0.0080	0.0007	0.0001	0.0000
113.81	0.0080	0.0009	0.0003	0.0000
113.88	0.0080	0.0010	0.0006	0.0000
113.95	0.0080	0.0012	0.0007	0.0000
114.02	0.0080	0.0014	0.0012	0.0000
114.09	0.0080	0.0015	0.0018	0.0000
114.16	0.0080	0.0017	0.0025	0.0000
114.23	0.0080	0.0019	0.0026	0.0000
114.30	0.0080	0.0021	0.0037	0.0000
114.37	0.0080	0.0022	0.0049	0.0000
114.45	0.0080	0.0024	0.0061	0.0000
114.52	0.0080	0.0026	0.0063	0.0000
114.59	0.0080	0.0027	0.0080	0.0000
114.66	0.0080	0.0029	0.0087	0.0000
114.73	0.0080	0.0031	0.0091	0.0000
114.80	0.0080	0.0033	0.0099	0.0000
114.87	0.0080	0.0034	0.0104	0.0000
114.94	0.0080	0.0036	0.0109	0.0000
115.01	0.0080	0.0038	0.0112	0.0000
115.09	0.0080	0.0041	0.0116	0.0000
115.16	0.0080	0.0043	0.0118	0.0000
115.23	0.0080	0.0045	0.0122	0.0000
115.30	0.0080	0.0048	0.0124	0.0000
115.37	0.0080	0.0050	0.0128	0.0000
115.44	0.0080	0.0053	0.0129	0.0000
115.51	0.0080	0.0055	0.0133	0.0000
115.58	0.0080	0.0057	0.0137	0.0000
115.66	0.0080	0.0060	0.0143	0.0000
115.73	0.0080	0.0062	0.0151	0.0000
115.80	0.0080	0.0064	0.0159	0.0000
115.87	0.0080	0.0067	0.0167	0.0000
115.94	0.0080	0.0069	0.0171	0.0000
116.01	0.0080	0.0072	0.0173	0.0000
116.08	0.0080	0.0074	0.0174	0.0000
116.15	0.0080	0.0076	0.0176	0.0000

116.22	0.0080	0.0079	0.0181	0.0000
116.30	0.0080	0.0081	0.0187	0.0000
116.37	0.0080	0.0083	0.0193	0.0000
116.44	0.0080	0.0086	0.0200	0.0000
116.51	0.0080	0.0088	0.0207	0.0000
116.58	0.0080	0.0091	0.0213	0.0000
116.65	0.0080	0.0093	0.0219	0.0000
116.72	0.0080	0.0095	0.0226	0.0000
116.79	0.0080	0.0098	0.0232	0.0000
116.86	0.0080	0.0100	0.0237	0.0000
116.94	0.0080	0.0102	0.0243	0.0000
117.01	0.0080	0.0105	0.0249	0.0000
117.08	0.0080	0.0107	0.0254	0.0000
117.15	0.0080	0.0110	0.0260	0.0000
117.22	0.0080	0.0112	0.0265	0.0000
117.29	0.0080	0.0114	0.0270	0.0000
117.36	0.0080	0.0117	0.0275	0.0000
117.43	0.0080	0.0119	0.0280	0.0000
117.50	0.0080	0.0121	0.0285	0.0000
117.58	0.0080	0.0124	0.0290	0.0000
117.65	0.0080	0.0126	0.0294	0.0000
117.72	0.0080	0.0129	0.0299	0.0000
117.79	0.0080	0.0131	0.0304	0.0000
117.86	0.0080	0.0133	0.0308	0.0000
117.93	0.0080	0.0136	0.0313	0.0000
118.00	0.0080	0.0138	0.0317	0.0000
118.07	0.0080	0.0140	0.0321	0.0000
118.14	0.0080	0.0143	0.0325	0.0000
118.22	0.0080	0.0145	0.0330	0.0000
118.29	0.0080	0.0147	0.0334	0.0000
118.36	0.0080	0.0150	0.0338	0.0000
118.42	0.0080	0.0152	0.0343	0.0000

Surface Infiltration 4 Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>To Amended(cfs)</u>	<u>Wetted Surface</u>
4.9730	0.0080	0.0152	0.0000	0.0424	0.0000
5.0441	0.0083	0.0158	0.0000	0.0424	0.0000
5.1153	0.0085	0.0164	0.0000	0.0444	0.0000
5.1864	0.0087	0.0170	0.0000	0.0463	0.0000
5.2575	0.0089	0.0176	0.0000	0.0482	0.0000
5.3287	0.0092	0.0183	0.0000	0.0501	0.0000
5.3998	0.0094	0.0189	0.0000	0.0520	0.0000
5.4709	0.0096	0.0196	0.0001	0.0540	0.0000
5.5421	0.0099	0.0203	0.0064	0.0559	0.0000
5.6132	0.0101	0.0210	0.0102	0.0578	0.0000
5.6843	0.0103	0.0217	0.0125	0.0597	0.0000
5.7555	0.0105	0.0225	0.0145	0.0616	0.0000
5.8266	0.0108	0.0232	0.0162	0.0636	0.0000
5.8977	0.0110	0.0240	0.0178	0.0655	0.0000
5.9688	0.0112	0.0248	0.0192	0.0674	0.0000
6.0400	0.0115	0.0256	0.2040	0.0693	0.0000
6.1111	0.0117	0.0264	0.5583	0.0712	0.0000
6.1822	0.0119	0.0273	0.9881	0.0732	0.0000
6.2534	0.0121	0.0281	1.4227	0.0751	0.0000
6.3245	0.0124	0.0290	1.7940	0.0770	0.0000
6.3956	0.0126	0.0299	2.0568	0.0789	0.0000
6.4668	0.0128	0.0308	2.2188	0.0809	0.0000

6.4730 0.0129 0.0309 2.3954 0.0810 0.0000

Name : Surface iltration 4

Element Flows To:

Outlet 1 **Outlet 2**
Biofiltration 4

Name : DMA 5

Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
A,Urban,Flat	.05
Pervious Total	0.05
<u>Impervious Land Use</u>	<u>acre</u>
IMPERVIOUS-FLAT	0.59
Impervious Total	0.59
Basin Total	0.64

Element Flows To:

Surface	Interflow	Groundwater
Surface iltration 5	Surface iltration 5	

Name : Biofiltration 5

Bottom Length: 70.40 ft.

Bottom Width: 10.00 ft.

Material thickness of first layer: 1.5

Material type for first layer: ESM

Material thickness of second layer: 0.333

Material type for second layer: GRAVEL

Material thickness of third layer: 2.51

Material type for third layer: GRAVEL

Underdrain used

Underdrain Diameter (feet): 0.83

Orifice Diameter (in.): 0.85

Offset (in.): 0

Flow Through Underdrain (ac-ft.): 17.724

Total Outflow (ac-ft.): 20.603

Percent Through Underdrain: 86.03

Discharge Structure

Riser Height: 1 ft.

Riser Diameter: 12 in.

Orifice 1 Diameter: 0.0625 in. **Elevation:** 0.25 ft.

Orifice 2 Diameter: 1 in. Elevation: 0.5 ft.

Element Flows To:

Outlet 1

Outlet 2

Biofiltration 5 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
111.45	0.0162	0.0000	0.0000	0.0000
111.51	0.0162	0.0003	0.0000	0.0000
111.58	0.0162	0.0006	0.0000	0.0000
111.64	0.0162	0.0009	0.0000	0.0000
111.71	0.0162	0.0012	0.0002	0.0000
111.77	0.0162	0.0016	0.0005	0.0000
111.84	0.0162	0.0019	0.0008	0.0000
111.90	0.0162	0.0022	0.0009	0.0000
111.96	0.0162	0.0025	0.0018	0.0000
112.03	0.0162	0.0028	0.0028	0.0000
112.09	0.0162	0.0031	0.0041	0.0000
112.16	0.0162	0.0034	0.0047	0.0000
112.22	0.0162	0.0037	0.0050	0.0000
112.28	0.0162	0.0040	0.0061	0.0000
112.35	0.0162	0.0044	0.0067	0.0000
112.41	0.0162	0.0047	0.0074	0.0000
112.48	0.0162	0.0050	0.0078	0.0000
112.54	0.0162	0.0053	0.0083	0.0000
112.61	0.0162	0.0056	0.0086	0.0000
112.67	0.0162	0.0059	0.0091	0.0000
112.73	0.0162	0.0062	0.0093	0.0000
112.80	0.0162	0.0065	0.0097	0.0000
112.86	0.0162	0.0068	0.0100	0.0000
112.93	0.0162	0.0072	0.0104	0.0000
112.99	0.0162	0.0076	0.0106	0.0000
113.06	0.0162	0.0080	0.0110	0.0000
113.12	0.0162	0.0085	0.0112	0.0000
113.18	0.0162	0.0089	0.0115	0.0000
113.25	0.0162	0.0093	0.0117	0.0000
113.31	0.0162	0.0097	0.0121	0.0000
113.38	0.0162	0.0102	0.0122	0.0000
113.44	0.0162	0.0106	0.0126	0.0000
113.50	0.0162	0.0110	0.0128	0.0000
113.57	0.0162	0.0115	0.0134	0.0000
113.63	0.0162	0.0119	0.0141	0.0000
113.70	0.0162	0.0123	0.0145	0.0000
113.76	0.0162	0.0128	0.0146	0.0000
113.83	0.0162	0.0132	0.0147	0.0000
113.89	0.0162	0.0136	0.0148	0.0000
113.95	0.0162	0.0141	0.0151	0.0000
114.02	0.0162	0.0145	0.0157	0.0000
114.08	0.0162	0.0149	0.0164	0.0000
114.15	0.0162	0.0153	0.0171	0.0000
114.21	0.0162	0.0158	0.0177	0.0000
114.28	0.0162	0.0162	0.0184	0.0000
114.34	0.0162	0.0166	0.0191	0.0000

114.40	0.0162	0.0171	0.0197	0.0000
114.47	0.0162	0.0175	0.0203	0.0000
114.53	0.0162	0.0179	0.0209	0.0000
114.60	0.0162	0.0184	0.0215	0.0000
114.66	0.0162	0.0188	0.0221	0.0000
114.72	0.0162	0.0192	0.0227	0.0000
114.79	0.0162	0.0196	0.0232	0.0000
114.85	0.0162	0.0201	0.0237	0.0000
114.92	0.0162	0.0205	0.0242	0.0000
114.98	0.0162	0.0209	0.0248	0.0000
115.05	0.0162	0.0214	0.0253	0.0000
115.11	0.0162	0.0218	0.0257	0.0000
115.17	0.0162	0.0222	0.0262	0.0000
115.24	0.0162	0.0227	0.0267	0.0000
115.30	0.0162	0.0231	0.0272	0.0000
115.37	0.0162	0.0235	0.0276	0.0000
115.43	0.0162	0.0240	0.0281	0.0000
115.50	0.0162	0.0244	0.0285	0.0000
115.56	0.0162	0.0248	0.0289	0.0000
115.62	0.0162	0.0252	0.0294	0.0000
115.69	0.0162	0.0257	0.0298	0.0000
115.75	0.0162	0.0261	0.0302	0.0000
115.79	0.0162	0.0264	0.0406	0.0000

Surface iltration 5 Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>To Amended(cfs)</u>	<u>Wetted Surface</u>
4.3430	0.0162	0.0264	0.0000	0.0850	0.0000
4.4072	0.0166	0.0274	0.0000	0.0850	0.0000
4.4714	0.0170	0.0285	0.0000	0.0885	0.0000
4.5356	0.0174	0.0296	0.0000	0.0919	0.0000
4.5998	0.0178	0.0307	0.0000	0.0954	0.0000
4.6640	0.0182	0.0319	0.0000	0.0989	0.0000
4.7283	0.0187	0.0331	0.0000	0.1024	0.0000
4.7925	0.0191	0.0343	0.0000	0.1059	0.0000
4.8567	0.0195	0.0355	0.0004	0.1094	0.0000
4.9209	0.0199	0.0368	0.0074	0.1129	0.0000
4.9851	0.0203	0.0381	0.0103	0.1164	0.0000
5.0493	0.0207	0.0394	0.0124	0.1198	0.0000
5.1135	0.0211	0.0408	0.0142	0.1233	0.0000
5.1777	0.0216	0.0421	0.0158	0.1268	0.0000
5.2419	0.0220	0.0435	0.0172	0.1303	0.0000
5.3061	0.0224	0.0449	0.0186	0.1338	0.0000
5.3703	0.0228	0.0464	0.0678	0.1373	0.0000
5.4345	0.0232	0.0479	0.3135	0.1408	0.0000
5.4988	0.0236	0.0494	0.6606	0.1443	0.0000
5.5630	0.0240	0.0509	1.0551	0.1478	0.0000
5.6272	0.0245	0.0525	1.4447	0.1512	0.0000
5.6914	0.0249	0.0541	1.7798	0.1547	0.0000
5.7556	0.0253	0.0557	2.0267	0.1582	0.0000
5.8198	0.0257	0.0573	2.1859	0.1617	0.0000
5.8430	0.0259	0.0579	2.3445	0.1630	0.0000

Name : Surface iltration 5

Element Flows To:

Outlet 1

Outlet 2

Biofiltration 5

Name : DMA 6
Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
D,Urban,Flat	.07
 Pervious Total	 0.07
<u>Impervious Land Use</u>	<u>acre</u>
IMPERVIOUS-FLAT	0.74
 Impervious Total	 0.74
 Basin Total	 0.81

Element Flows To:

Surface	Interflow	Groundwater
Surface iltration 6	Surface iltration 6	

Name : Biofiltration 6
Bottom Length: 85.70 ft.
Bottom Width: 10.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 0.333
Material type for second layer: GRAVEL
Material thickness of third layer: 1.71
Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 0.5
Orifice Diameter (in.): 0.85
Offset (in.): 0
Flow Through Underdrain (ac-ft.): 19.787
Total Outflow (ac-ft.): 26.164
Percent Through Underdrain: 75.63
Discharge Structure
Riser Height: 0.92 ft.
Riser Diameter: 12 in.
Orifice 1 Diameter: 0.0625 in. Elevation: 0.25 ft.
Orifice 2 Diameter: 1 in. Elevation: 0.5 ft.

Element Flows To:

Outlet 1	Outlet 2
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Biofiltration 6 Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>Infilt(cfs)</u>
111.93	0.0197	0.0000	0.0000	0.0000
111.98	0.0197	0.0003	0.0000	0.0000
112.04	0.0197	0.0006	0.0000	0.0000
112.09	0.0197	0.0010	0.0000	0.0000
112.15	0.0197	0.0013	0.0000	0.0000
112.20	0.0197	0.0016	0.0002	0.0000
112.26	0.0197	0.0019	0.0005	0.0000
112.31	0.0197	0.0023	0.0009	0.0000
112.37	0.0197	0.0026	0.0015	0.0000
112.42	0.0197	0.0029	0.0023	0.0000
112.48	0.0197	0.0032	0.0034	0.0000
112.53	0.0197	0.0035	0.0040	0.0000
112.58	0.0197	0.0039	0.0042	0.0000
112.64	0.0197	0.0042	0.0049	0.0000
112.69	0.0197	0.0045	0.0053	0.0000
112.75	0.0197	0.0048	0.0059	0.0000
112.80	0.0197	0.0052	0.0062	0.0000
112.86	0.0197	0.0055	0.0068	0.0000
112.91	0.0197	0.0058	0.0070	0.0000
112.97	0.0197	0.0061	0.0075	0.0000
113.02	0.0197	0.0064	0.0078	0.0000
113.08	0.0197	0.0068	0.0082	0.0000
113.13	0.0197	0.0071	0.0084	0.0000
113.18	0.0197	0.0074	0.0088	0.0000
113.24	0.0197	0.0077	0.0091	0.0000
113.29	0.0197	0.0080	0.0094	0.0000
113.35	0.0197	0.0084	0.0096	0.0000
113.40	0.0197	0.0087	0.0100	0.0000
113.46	0.0197	0.0091	0.0102	0.0000
113.51	0.0197	0.0096	0.0105	0.0000
113.57	0.0197	0.0100	0.0107	0.0000
113.62	0.0197	0.0105	0.0110	0.0000
113.68	0.0197	0.0109	0.0112	0.0000
113.73	0.0197	0.0114	0.0115	0.0000
113.78	0.0197	0.0118	0.0116	0.0000
113.84	0.0197	0.0123	0.0119	0.0000
113.89	0.0197	0.0127	0.0121	0.0000
113.95	0.0197	0.0131	0.0124	0.0000
114.00	0.0197	0.0136	0.0125	0.0000
114.06	0.0197	0.0140	0.0126	0.0000
114.11	0.0197	0.0145	0.0126	0.0000
114.17	0.0197	0.0149	0.0126	0.0000
114.22	0.0197	0.0154	0.0127	0.0000
114.28	0.0197	0.0158	0.0130	0.0000
114.33	0.0197	0.0163	0.0136	0.0000
114.38	0.0197	0.0167	0.0142	0.0000
114.44	0.0197	0.0172	0.0149	0.0000
114.49	0.0197	0.0176	0.0156	0.0000
114.55	0.0197	0.0180	0.0162	0.0000
114.60	0.0197	0.0185	0.0169	0.0000
114.66	0.0197	0.0189	0.0175	0.0000
114.71	0.0197	0.0194	0.0181	0.0000
114.77	0.0197	0.0198	0.0187	0.0000

114.82	0.0197	0.0203	0.0192	0.0000
114.88	0.0197	0.0207	0.0198	0.0000
114.93	0.0197	0.0212	0.0203	0.0000
114.98	0.0197	0.0216	0.0208	0.0000
115.04	0.0197	0.0220	0.0213	0.0000
115.09	0.0197	0.0225	0.0218	0.0000
115.15	0.0197	0.0229	0.0223	0.0000
115.20	0.0197	0.0234	0.0228	0.0000
115.26	0.0197	0.0238	0.0232	0.0000
115.31	0.0197	0.0243	0.0237	0.0000
115.37	0.0197	0.0247	0.0241	0.0000
115.42	0.0197	0.0252	0.0246	0.0000
115.47	0.0197	0.0256	0.0251	0.0000

Surface iltration 6 Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>To Amended(cfs)</u>	<u>Wetted Surface</u>
3.5430	0.0197	0.0256	0.0000	0.1028	0.0000
3.5975	0.0197	0.0267	0.0000	0.1028	0.0000
3.6521	0.0197	0.0277	0.0000	0.1064	0.0000
3.7066	0.0197	0.0288	0.0000	0.1100	0.0000
3.7612	0.0197	0.0299	0.0000	0.1136	0.0000
3.8157	0.0197	0.0310	0.0000	0.1172	0.0000
3.8702	0.0197	0.0320	0.0000	0.1208	0.0000
3.9248	0.0197	0.0331	0.0000	0.1244	0.0000
3.9793	0.0197	0.0342	0.0000	0.1280	0.0000
4.0338	0.0197	0.0353	0.0001	0.1316	0.0000
4.0884	0.0197	0.0363	0.0033	0.1353	0.0000
4.1429	0.0197	0.0374	0.0086	0.1389	0.0000
4.1975	0.0197	0.0385	0.0107	0.1425	0.0000
4.2520	0.0197	0.0395	0.0125	0.1461	0.0000
4.3065	0.0197	0.0406	0.0140	0.1497	0.0000
4.3611	0.0197	0.0417	0.0154	0.1533	0.0000
4.4156	0.0197	0.0428	0.0166	0.1569	0.0000
4.4702	0.0197	0.0438	0.0242	0.1605	0.0000
4.5247	0.0197	0.0449	0.1812	0.1641	0.0000
4.5792	0.0197	0.0460	0.4366	0.1677	0.0000
4.6338	0.0197	0.0471	0.7491	0.1713	0.0000
4.6883	0.0197	0.0481	1.0871	0.1749	0.0000
4.7428	0.0197	0.0492	1.4184	0.1785	0.0000
4.7974	0.0197	0.0503	1.7123	0.1821	0.0000
4.8519	0.0197	0.0513	1.9457	0.1857	0.0000
4.9065	0.0197	0.0524	2.1112	0.1894	0.0000
4.9610	0.0197	0.0535	2.2257	0.1930	0.0000
4.9630	0.0197	0.0535	2.3681	0.1931	0.0000

Name : Surface iltration 6

Element Flows To:

Outlet 1 **Outlet 2**
 Biofiltration 6

Name : DMA 2b

Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
Pervious Total	0
<u>Impervious Land Use</u>	<u>acre</u>
IMPERVIOUS-FLAT	0.1
Impervious Total	0.1
Basin Total	0.1

Element Flows To:

Surface	Interflow	Groundwater
Surface ltration 2b	Surface ltration 2b	

Name : DMA 2c

Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
A,Urban,Flat	.09
Pervious Total	0.09
<u>Impervious Land Use</u>	<u>acre</u>
IMPERVIOUS-FLAT	0.12
Impervious Total	0.12
Basin Total	0.21

Element Flows To:

Surface	Interflow	Groundwater
Surface ltration 2c	Surface ltration 2c	

Name : Biofiltration 2b

Bottom Length: 15.50 ft.

Bottom Width: 10.00 ft.

Material thickness of first layer: 1.5

Material type for first layer: ESM

Material thickness of second layer: 0.33

Material type for second layer: GRAVEL

Material thickness of third layer: 2

Material type for third layer: GRAVEL

Underdrain used

Underdrain Diameter (feet): 0.42
Orifice Diameter (in.): 0.6
Offset (in.): 0
Flow Through Underdrain (ac-ft.): 3.322
Total Outflow (ac-ft.): 3.435
Percent Through Underdrain: 96.72

Discharge Structure

Riser Height: 1.5 ft.
Riser Diameter: 12 in.
Orifice 1 Diameter: 0.0625 in. Elevation: 1 ft.

Element Flows To:

Outlet 1 Outlet 2

Biofiltration 2b Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>Infilt(cfs)</u>
122.72	0.0036	0.0000	0.0000	0.0000
122.78	0.0036	0.0001	0.0000	0.0000
122.85	0.0036	0.0001	0.0000	0.0000
122.91	0.0036	0.0002	0.0000	0.0000
122.98	0.0036	0.0003	0.0000	0.0000
123.04	0.0036	0.0003	0.0001	0.0000
123.10	0.0036	0.0004	0.0002	0.0000
123.17	0.0036	0.0005	0.0004	0.0000
123.23	0.0036	0.0005	0.0006	0.0000
123.30	0.0036	0.0006	0.0006	0.0000
123.36	0.0036	0.0007	0.0009	0.0000
123.42	0.0036	0.0008	0.0013	0.0000
123.49	0.0036	0.0008	0.0017	0.0000
123.55	0.0036	0.0009	0.0022	0.0000
123.62	0.0036	0.0010	0.0024	0.0000
123.68	0.0036	0.0010	0.0027	0.0000
123.75	0.0036	0.0011	0.0034	0.0000
123.81	0.0036	0.0012	0.0035	0.0000
123.87	0.0036	0.0012	0.0036	0.0000
123.94	0.0036	0.0013	0.0038	0.0000
124.00	0.0036	0.0014	0.0039	0.0000
124.07	0.0036	0.0014	0.0042	0.0000
124.13	0.0036	0.0015	0.0043	0.0000
124.19	0.0036	0.0016	0.0045	0.0000
124.26	0.0036	0.0017	0.0047	0.0000
124.32	0.0036	0.0018	0.0049	0.0000
124.39	0.0036	0.0019	0.0050	0.0000
124.45	0.0036	0.0020	0.0052	0.0000
124.51	0.0036	0.0020	0.0053	0.0000
124.58	0.0036	0.0021	0.0055	0.0000
124.64	0.0036	0.0022	0.0056	0.0000
124.71	0.0036	0.0023	0.0058	0.0000
124.77	0.0036	0.0024	0.0061	0.0000
124.83	0.0036	0.0025	0.0063	0.0000
124.90	0.0036	0.0026	0.0064	0.0000
124.96	0.0036	0.0027	0.0064	0.0000

125.03	0.0036	0.0028	0.0065	0.0000
125.09	0.0036	0.0029	0.0067	0.0000
125.15	0.0036	0.0030	0.0070	0.0000
125.22	0.0036	0.0031	0.0073	0.0000
125.28	0.0036	0.0032	0.0077	0.0000
125.35	0.0036	0.0033	0.0081	0.0000
125.41	0.0036	0.0034	0.0085	0.0000
125.47	0.0036	0.0035	0.0088	0.0000
125.54	0.0036	0.0036	0.0092	0.0000
125.60	0.0036	0.0037	0.0095	0.0000
125.67	0.0036	0.0037	0.0098	0.0000
125.73	0.0036	0.0038	0.0101	0.0000
125.80	0.0036	0.0039	0.0104	0.0000
125.86	0.0036	0.0040	0.0107	0.0000
125.92	0.0036	0.0041	0.0110	0.0000
125.99	0.0036	0.0042	0.0113	0.0000
126.05	0.0036	0.0043	0.0116	0.0000
126.12	0.0036	0.0044	0.0118	0.0000
126.18	0.0036	0.0045	0.0121	0.0000
126.24	0.0036	0.0046	0.0123	0.0000
126.31	0.0036	0.0047	0.0126	0.0000
126.37	0.0036	0.0048	0.0128	0.0000
126.44	0.0036	0.0049	0.0131	0.0000
126.50	0.0036	0.0050	0.0133	0.0000
126.55	0.0036	0.0051	0.0179	0.0000

Surface Itration 2b Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>To Amended(cfs)</u>	<u>Wetted Surface</u>
3.8300	0.0036	0.0051	0.0000	0.0187	0.0000
3.8941	0.0036	0.0053	0.0000	0.0187	0.0000
3.9581	0.0036	0.0055	0.0000	0.0195	0.0000
4.0222	0.0036	0.0057	0.0000	0.0202	0.0000
4.0863	0.0036	0.0060	0.0000	0.0210	0.0000
4.1503	0.0036	0.0062	0.0000	0.0218	0.0000
4.2144	0.0036	0.0064	0.0000	0.0225	0.0000
4.2785	0.0036	0.0066	0.0000	0.0233	0.0000
4.3425	0.0036	0.0069	0.0000	0.0241	0.0000
4.4066	0.0036	0.0071	0.0000	0.0248	0.0000
4.4707	0.0036	0.0073	0.0000	0.0256	0.0000
4.5347	0.0036	0.0076	0.0000	0.0264	0.0000
4.5988	0.0036	0.0078	0.0000	0.0271	0.0000
4.6629	0.0036	0.0080	0.0000	0.0279	0.0000
4.7269	0.0036	0.0082	0.0000	0.0287	0.0000
4.7910	0.0036	0.0085	0.0000	0.0294	0.0000
4.8551	0.0036	0.0087	0.0000	0.0302	0.0000
4.9191	0.0036	0.0089	0.0000	0.0310	0.0000
4.9832	0.0036	0.0092	0.0000	0.0317	0.0000
5.0473	0.0036	0.0094	0.0000	0.0325	0.0000
5.1113	0.0036	0.0096	0.0001	0.0333	0.0000
5.1754	0.0036	0.0098	0.0001	0.0340	0.0000
5.2395	0.0036	0.0101	0.0001	0.0348	0.0000
5.3035	0.0036	0.0103	0.0001	0.0356	0.0000
5.3676	0.0036	0.0105	0.0773	0.0363	0.0000
5.4316	0.0036	0.0108	0.3418	0.0371	0.0000
5.4957	0.0036	0.0110	0.6978	0.0379	0.0000
5.5598	0.0036	0.0112	1.0931	0.0386	0.0000
5.6238	0.0036	0.0114	1.4756	0.0394	0.0000

5.6879	0.0036	0.0117	1.7974	0.0402	0.0000
5.7520	0.0036	0.0119	2.0288	0.0409	0.0000
5.8160	0.0036	0.0121	2.1771	0.0417	0.0000
5.8300	0.0036	0.0122	2.3362	0.0419	0.0000

Name : Surface ltration 2b

Element Flows To:

Outlet 1 Outlet 2
 Biofiltration 2b

Name : Biofiltration 2c

Bottom Length: 17.00 ft.

Bottom Width: 10.00 ft.

Material thickness of first layer: 1.5

Material type for first layer: ESM

Material thickness of second layer: 0.33

Material type for second layer: GRAVEL

Material thickness of third layer: 3.35

Material type for third layer: GRAVEL

Underdrain used

Underdrain Diameter (feet): 0.5

Orifice Diameter (in.): 0.6

Offset (in.): 0

Flow Through Underdrain (ac-ft.): 4.429

Total Outflow (ac-ft.): 4.521

Percent Through Underdrain: 97.97

Discharge Structure

Riser Height: 2 ft.

Riser Diameter: 12 in.

Orifice 1 Diameter: 0.0625 in. **Elevation:** 1 ft.

Element Flows To:

Outlet 1 Outlet 2

Biofiltration 2c Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>Infilt(cfs)</u>
121.45	0.0039	0.0000	0.0000	0.0000
121.53	0.0039	0.0001	0.0000	0.0000
121.62	0.0039	0.0002	0.0000	0.0000
121.70	0.0039	0.0003	0.0000	0.0000
121.79	0.0039	0.0004	0.0001	0.0000
121.87	0.0039	0.0005	0.0002	0.0000
121.96	0.0039	0.0006	0.0003	0.0000
122.04	0.0039	0.0007	0.0005	0.0000
122.13	0.0039	0.0008	0.0009	0.0000
122.21	0.0039	0.0009	0.0013	0.0000
122.29	0.0039	0.0010	0.0015	0.0000
122.38	0.0039	0.0011	0.0019	0.0000
122.46	0.0039	0.0012	0.0027	0.0000

122.55	0.0039	0.0013	0.0036	0.0000
122.63	0.0039	0.0014	0.0037	0.0000
122.72	0.0039	0.0015	0.0047	0.0000
122.80	0.0039	0.0016	0.0050	0.0000
122.88	0.0039	0.0017	0.0051	0.0000
122.97	0.0039	0.0018	0.0055	0.0000
123.05	0.0039	0.0020	0.0057	0.0000
123.14	0.0039	0.0021	0.0060	0.0000
123.22	0.0039	0.0022	0.0061	0.0000
123.31	0.0039	0.0024	0.0064	0.0000
123.39	0.0039	0.0025	0.0065	0.0000
123.48	0.0039	0.0026	0.0067	0.0000
123.56	0.0039	0.0028	0.0068	0.0000
123.64	0.0039	0.0029	0.0071	0.0000
123.73	0.0039	0.0030	0.0075	0.0000
123.81	0.0039	0.0032	0.0079	0.0000
123.90	0.0039	0.0033	0.0084	0.0000
123.98	0.0039	0.0035	0.0088	0.0000
124.07	0.0039	0.0036	0.0093	0.0000
124.15	0.0039	0.0037	0.0095	0.0000
124.24	0.0039	0.0039	0.0096	0.0000
124.32	0.0039	0.0040	0.0097	0.0000
124.40	0.0039	0.0041	0.0099	0.0000
124.49	0.0039	0.0043	0.0102	0.0000
124.57	0.0039	0.0044	0.0106	0.0000
124.66	0.0039	0.0046	0.0109	0.0000
124.74	0.0039	0.0047	0.0113	0.0000
124.83	0.0039	0.0048	0.0116	0.0000
124.91	0.0039	0.0050	0.0120	0.0000
124.99	0.0039	0.0051	0.0123	0.0000
125.08	0.0039	0.0052	0.0126	0.0000
125.16	0.0039	0.0054	0.0129	0.0000
125.25	0.0039	0.0055	0.0133	0.0000
125.33	0.0039	0.0056	0.0136	0.0000
125.42	0.0039	0.0058	0.0139	0.0000
125.50	0.0039	0.0059	0.0141	0.0000
125.59	0.0039	0.0061	0.0144	0.0000
125.67	0.0039	0.0062	0.0147	0.0000
125.75	0.0039	0.0063	0.0150	0.0000
125.84	0.0039	0.0065	0.0152	0.0000
125.92	0.0039	0.0066	0.0155	0.0000
126.01	0.0039	0.0067	0.0158	0.0000
126.09	0.0039	0.0069	0.0160	0.0000
126.18	0.0039	0.0070	0.0163	0.0000
126.26	0.0039	0.0071	0.0165	0.0000
126.34	0.0039	0.0073	0.0168	0.0000
126.43	0.0039	0.0074	0.0170	0.0000
126.51	0.0039	0.0076	0.0172	0.0000
126.60	0.0039	0.0077	0.0175	0.0000
126.63	0.0039	0.0077	0.0177	0.0000

Surface Irrigation 2c Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>To Amended(cfs)</u>	<u>Wetted Surface</u>
5.1800	0.0039	0.0077	0.0000	0.0208	0.0000
5.2644	0.0040	0.0081	0.0000	0.0208	0.0000
5.3488	0.0042	0.0084	0.0000	0.0219	0.0000
5.4332	0.0043	0.0088	0.0000	0.0230	0.0000

5.5176	0.0044	0.0092	0.0000	0.0241	0.0000
5.6020	0.0046	0.0095	0.0000	0.0252	0.0000
5.6864	0.0047	0.0099	0.0000	0.0263	0.0000
5.7708	0.0048	0.0103	0.0000	0.0274	0.0000
5.8552	0.0050	0.0107	0.0000	0.0285	0.0000
5.9396	0.0051	0.0112	0.0000	0.0296	0.0000
6.0240	0.0052	0.0116	0.0000	0.0307	0.0000
6.1084	0.0054	0.0120	0.0000	0.0319	0.0000
6.1927	0.0055	0.0125	0.0000	0.0330	0.0000
6.2771	0.0056	0.0130	0.0000	0.0341	0.0000
6.3615	0.0057	0.0134	0.0000	0.0352	0.0000
6.4459	0.0059	0.0139	0.0001	0.0363	0.0000
6.5303	0.0060	0.0144	0.0001	0.0374	0.0000
6.6147	0.0061	0.0150	0.0001	0.0385	0.0000
6.6991	0.0063	0.0155	0.0001	0.0396	0.0000
6.7835	0.0064	0.0160	0.0001	0.0407	0.0000
6.8679	0.0065	0.0166	0.0001	0.0418	0.0000
6.9523	0.0067	0.0171	0.0001	0.0429	0.0000
7.0367	0.0068	0.0177	0.0001	0.0440	0.0000
7.1211	0.0069	0.0183	0.0001	0.0451	0.0000
7.2055	0.0071	0.0189	0.0433	0.0462	0.0000
7.2899	0.0072	0.0195	0.3836	0.0474	0.0000
7.3743	0.0073	0.0201	0.8724	0.0485	0.0000
7.4587	0.0075	0.0207	1.3889	0.0496	0.0000
7.5431	0.0076	0.0213	1.8196	0.0507	0.0000
7.6275	0.0077	0.0220	2.0957	0.0518	0.0000
7.6800	0.0078	0.0224	2.2971	0.0525	0.0000

Name : Surface ltration 2c

Element Flows To:

Outlet 1	Outlet 2
Biofiltration 2c	

Name : EXISTING BASIN 200

Bypass: Yes

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
D,NatVeg,Steep	6.14
A,NatVeg,Steep	.29
C,NatVeg,Steep	1.15
D,Urban,Flat	.09

Pervious Total	7.67
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<u>Impervious Land Use</u>	<u>acre</u>
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Impervious Total	0
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Basin Total	7.67
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Element Flows To:

Surface

Interflow

Groundwater

Name : Vault 1

Width : 10 ft.

Length : 35 ft.

Depth: 1 ft.

Discharge Structure

Riser Height: 1 ft.

Riser Diameter: 12 in.

Element Flows To:

Outlet 1

Outlet 2

Vault Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>Infilt(cfs)</u>
0.0000	0.008	0.000	0.000	0.000
0.0111	0.008	0.000	0.000	0.000
0.0222	0.008	0.000	0.000	0.000
0.0333	0.008	0.000	0.000	0.000
0.0444	0.008	0.000	0.000	0.000
0.0556	0.008	0.000	0.000	0.000
0.0667	0.008	0.000	0.000	0.000
0.0778	0.008	0.000	0.000	0.000
0.0889	0.008	0.000	0.000	0.000
0.1000	0.008	0.000	0.000	0.000
0.1111	0.008	0.000	0.000	0.000
0.1222	0.008	0.001	0.000	0.000
0.1333	0.008	0.001	0.000	0.000
0.1444	0.008	0.001	0.000	0.000
0.1556	0.008	0.001	0.000	0.000
0.1667	0.008	0.001	0.000	0.000
0.1778	0.008	0.001	0.000	0.000
0.1889	0.008	0.001	0.000	0.000
0.2000	0.008	0.001	0.000	0.000
0.2111	0.008	0.001	0.000	0.000
0.2222	0.008	0.001	0.000	0.000
0.2333	0.008	0.001	0.000	0.000
0.2444	0.008	0.002	0.000	0.000
0.2556	0.008	0.002	0.000	0.000
0.2667	0.008	0.002	0.000	0.000
0.2778	0.008	0.002	0.000	0.000
0.2889	0.008	0.002	0.000	0.000
0.3000	0.008	0.002	0.000	0.000
0.3111	0.008	0.002	0.000	0.000
0.3222	0.008	0.002	0.000	0.000
0.3333	0.008	0.002	0.000	0.000
0.3444	0.008	0.002	0.000	0.000

0.3556	0.008	0.002	0.000	0.000
0.3667	0.008	0.002	0.000	0.000
0.3778	0.008	0.003	0.000	0.000
0.3889	0.008	0.003	0.000	0.000
0.4000	0.008	0.003	0.000	0.000
0.4111	0.008	0.003	0.000	0.000
0.4222	0.008	0.003	0.000	0.000
0.4333	0.008	0.003	0.000	0.000
0.4444	0.008	0.003	0.000	0.000
0.4556	0.008	0.003	0.000	0.000
0.4667	0.008	0.003	0.000	0.000
0.4778	0.008	0.003	0.000	0.000
0.4889	0.008	0.003	0.000	0.000
0.5000	0.008	0.004	0.000	0.000
0.5111	0.008	0.004	0.000	0.000
0.5222	0.008	0.004	0.000	0.000
0.5333	0.008	0.004	0.000	0.000
0.5444	0.008	0.004	0.000	0.000
0.5556	0.008	0.004	0.000	0.000
0.5667	0.008	0.004	0.000	0.000
0.5778	0.008	0.004	0.000	0.000
0.5889	0.008	0.004	0.000	0.000
0.6000	0.008	0.004	0.000	0.000
0.6111	0.008	0.004	0.000	0.000
0.6222	0.008	0.005	0.000	0.000
0.6333	0.008	0.005	0.000	0.000
0.6444	0.008	0.005	0.000	0.000
0.6556	0.008	0.005	0.000	0.000
0.6667	0.008	0.005	0.000	0.000
0.6778	0.008	0.005	0.000	0.000
0.6889	0.008	0.005	0.000	0.000
0.7000	0.008	0.005	0.000	0.000
0.7111	0.008	0.005	0.000	0.000
0.7222	0.008	0.005	0.000	0.000
0.7333	0.008	0.005	0.000	0.000
0.7444	0.008	0.006	0.000	0.000
0.7556	0.008	0.006	0.000	0.000
0.7667	0.008	0.006	0.000	0.000
0.7778	0.008	0.006	0.000	0.000
0.7889	0.008	0.006	0.000	0.000
0.8000	0.008	0.006	0.000	0.000
0.8111	0.008	0.006	0.000	0.000
0.8222	0.008	0.006	0.000	0.000
0.8333	0.008	0.006	0.000	0.000
0.8444	0.008	0.006	0.000	0.000
0.8556	0.008	0.006	0.000	0.000
0.8667	0.008	0.007	0.000	0.000
0.8778	0.008	0.007	0.000	0.000
0.8889	0.008	0.007	0.000	0.000
0.9000	0.008	0.007	0.000	0.000
0.9111	0.008	0.007	0.000	0.000
0.9222	0.008	0.007	0.000	0.000
0.9333	0.008	0.007	0.000	0.000
0.9444	0.008	0.007	0.000	0.000
0.9556	0.008	0.007	0.000	0.000
0.9667	0.008	0.007	0.000	0.000
0.9778	0.008	0.007	0.000	0.000

0.9889	0.008	0.007	0.000	0.000
1.0000	0.008	0.008	0.000	0.000
1.0111	0.008	0.008	0.012	0.000
1.0222	0.000	0.000	0.035	0.000

Name : Vault 2
Width : 10 ft.
Length : 12.7 ft.
Depth : 1 ft.
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.

Element Flows To:
Outlet 1 **Outlet 2**

Vault Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>Infilt(cfs)</u>
0.0000	0.002	0.000	0.000	0.000
0.0111	0.002	0.000	0.000	0.000
0.0222	0.002	0.000	0.000	0.000
0.0333	0.002	0.000	0.000	0.000
0.0444	0.002	0.000	0.000	0.000
0.0556	0.002	0.000	0.000	0.000
0.0667	0.002	0.000	0.000	0.000
0.0778	0.002	0.000	0.000	0.000
0.0889	0.002	0.000	0.000	0.000
0.1000	0.002	0.000	0.000	0.000
0.1111	0.002	0.000	0.000	0.000
0.1222	0.002	0.000	0.000	0.000
0.1333	0.002	0.000	0.000	0.000
0.1444	0.002	0.000	0.000	0.000
0.1556	0.002	0.000	0.000	0.000
0.1667	0.002	0.000	0.000	0.000
0.1778	0.002	0.000	0.000	0.000
0.1889	0.002	0.000	0.000	0.000
0.2000	0.002	0.000	0.000	0.000
0.2111	0.002	0.000	0.000	0.000
0.2222	0.002	0.000	0.000	0.000
0.2333	0.002	0.000	0.000	0.000
0.2444	0.002	0.000	0.000	0.000
0.2556	0.002	0.000	0.000	0.000
0.2667	0.002	0.000	0.000	0.000
0.2778	0.002	0.000	0.000	0.000
0.2889	0.002	0.000	0.000	0.000
0.3000	0.002	0.000	0.000	0.000
0.3111	0.002	0.000	0.000	0.000
0.3222	0.002	0.000	0.000	0.000
0.3333	0.002	0.001	0.000	0.000
0.3444	0.002	0.001	0.000	0.000
0.3556	0.002	0.001	0.000	0.000
0.3667	0.002	0.001	0.000	0.000

0.3778	0.002	0.001	0.000	0.000
0.3889	0.002	0.001	0.000	0.000
0.4000	0.002	0.001	0.000	0.000
0.4111	0.002	0.001	0.000	0.000
0.4222	0.002	0.001	0.000	0.000
0.4333	0.002	0.001	0.000	0.000
0.4444	0.002	0.001	0.000	0.000
0.4556	0.002	0.001	0.000	0.000
0.4667	0.002	0.001	0.000	0.000
0.4778	0.002	0.001	0.000	0.000
0.4889	0.002	0.001	0.000	0.000
0.5000	0.002	0.001	0.000	0.000
0.5111	0.002	0.001	0.000	0.000
0.5222	0.002	0.001	0.000	0.000
0.5333	0.002	0.001	0.000	0.000
0.5444	0.002	0.001	0.000	0.000
0.5556	0.002	0.001	0.000	0.000
0.5667	0.002	0.001	0.000	0.000
0.5778	0.002	0.001	0.000	0.000
0.5889	0.002	0.001	0.000	0.000
0.6000	0.002	0.001	0.000	0.000
0.6111	0.002	0.001	0.000	0.000
0.6222	0.002	0.001	0.000	0.000
0.6333	0.002	0.001	0.000	0.000
0.6444	0.002	0.001	0.000	0.000
0.6556	0.002	0.001	0.000	0.000
0.6667	0.002	0.001	0.000	0.000
0.6778	0.002	0.002	0.000	0.000
0.6889	0.002	0.002	0.000	0.000
0.7000	0.002	0.002	0.000	0.000
0.7111	0.002	0.002	0.000	0.000
0.7222	0.002	0.002	0.000	0.000
0.7333	0.002	0.002	0.000	0.000
0.7444	0.002	0.002	0.000	0.000
0.7556	0.002	0.002	0.000	0.000
0.7667	0.002	0.002	0.000	0.000
0.7778	0.002	0.002	0.000	0.000
0.7889	0.002	0.002	0.000	0.000
0.8000	0.002	0.002	0.000	0.000
0.8111	0.002	0.002	0.000	0.000
0.8222	0.002	0.002	0.000	0.000
0.8333	0.002	0.002	0.000	0.000
0.8444	0.002	0.002	0.000	0.000
0.8556	0.002	0.002	0.000	0.000
0.8667	0.002	0.002	0.000	0.000
0.8778	0.002	0.002	0.000	0.000
0.8889	0.002	0.002	0.000	0.000
0.9000	0.002	0.002	0.000	0.000
0.9111	0.002	0.002	0.000	0.000
0.9222	0.002	0.002	0.000	0.000
0.9333	0.002	0.002	0.000	0.000
0.9444	0.002	0.002	0.000	0.000
0.9556	0.002	0.002	0.000	0.000
0.9667	0.002	0.002	0.000	0.000
0.9778	0.002	0.002	0.000	0.000
0.9889	0.002	0.002	0.000	0.000
1.0000	0.002	0.002	0.000	0.000

1.0111	0.002	0.002	0.012	0.000
1.0222	0.000	0.000	0.035	0.000

Name : Vault 3
Width : 10 ft.
Length : 21 ft.
Depth: 1.72 ft.

Discharge Structure

Riser Height: 1 ft.
Riser Diameter: 12 in.

Element Flows To:

Outlet 1 **Outlet 2**

Vault Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>Infilt(cfs)</u>
0.0000	0.004	0.000	0.000	0.000
0.0191	0.004	0.000	0.000	0.000
0.0382	0.004	0.000	0.000	0.000
0.0573	0.004	0.000	0.000	0.000
0.0764	0.004	0.000	0.000	0.000
0.0956	0.004	0.000	0.000	0.000
0.1147	0.004	0.000	0.000	0.000
0.1338	0.004	0.000	0.000	0.000
0.1529	0.004	0.000	0.000	0.000
0.1720	0.004	0.000	0.000	0.000
0.1911	0.004	0.000	0.000	0.000
0.2102	0.004	0.001	0.000	0.000
0.2293	0.004	0.001	0.000	0.000
0.2484	0.004	0.001	0.000	0.000
0.2676	0.004	0.001	0.000	0.000
0.2867	0.004	0.001	0.000	0.000
0.3058	0.004	0.001	0.000	0.000
0.3249	0.004	0.001	0.000	0.000
0.3440	0.004	0.001	0.000	0.000
0.3631	0.004	0.001	0.000	0.000
0.3822	0.004	0.001	0.000	0.000
0.4013	0.004	0.001	0.000	0.000
0.4204	0.004	0.002	0.000	0.000
0.4396	0.004	0.002	0.000	0.000
0.4587	0.004	0.002	0.000	0.000
0.4778	0.004	0.002	0.000	0.000
0.4969	0.004	0.002	0.000	0.000
0.5160	0.004	0.002	0.000	0.000
0.5351	0.004	0.002	0.000	0.000
0.5542	0.004	0.002	0.000	0.000
0.5733	0.004	0.002	0.000	0.000
0.5924	0.004	0.002	0.000	0.000
0.6116	0.004	0.002	0.000	0.000
0.6307	0.004	0.003	0.000	0.000
0.6498	0.004	0.003	0.000	0.000
0.6689	0.004	0.003	0.000	0.000

0.6880	0.004	0.003	0.000	0.000
0.7071	0.004	0.003	0.000	0.000
0.7262	0.004	0.003	0.000	0.000
0.7453	0.004	0.003	0.000	0.000
0.7644	0.004	0.003	0.000	0.000
0.7836	0.004	0.003	0.000	0.000
0.8027	0.004	0.003	0.000	0.000
0.8218	0.004	0.004	0.000	0.000
0.8409	0.004	0.004	0.000	0.000
0.8600	0.004	0.004	0.000	0.000
0.8791	0.004	0.004	0.000	0.000
0.8982	0.004	0.004	0.000	0.000
0.9173	0.004	0.004	0.000	0.000
0.9364	0.004	0.004	0.000	0.000
0.9556	0.004	0.004	0.000	0.000
0.9747	0.004	0.004	0.000	0.000
0.9938	0.004	0.004	0.000	0.000
1.0129	0.004	0.004	0.015	0.000
1.0320	0.004	0.005	0.060	0.000
1.0511	0.004	0.005	0.122	0.000
1.0702	0.004	0.005	0.197	0.000
1.0893	0.004	0.005	0.282	0.000
1.1084	0.004	0.005	0.376	0.000
1.1276	0.004	0.005	0.477	0.000
1.1467	0.004	0.005	0.585	0.000
1.1658	0.004	0.005	0.698	0.000
1.1849	0.004	0.005	0.814	0.000
1.2040	0.004	0.005	0.932	0.000
1.2231	0.004	0.005	1.051	0.000
1.2422	0.004	0.006	1.169	0.000
1.2613	0.004	0.006	1.286	0.000
1.2804	0.004	0.006	1.399	0.000
1.2996	0.004	0.006	1.507	0.000
1.3187	0.004	0.006	1.609	0.000
1.3378	0.004	0.006	1.705	0.000
1.3569	0.004	0.006	1.792	0.000
1.3760	0.004	0.006	1.872	0.000
1.3951	0.004	0.006	1.943	0.000
1.4142	0.004	0.006	2.005	0.000
1.4333	0.004	0.006	2.060	0.000
1.4524	0.004	0.007	2.107	0.000
1.4716	0.004	0.007	2.148	0.000
1.4907	0.004	0.007	2.185	0.000
1.5098	0.004	0.007	2.248	0.000
1.5289	0.004	0.007	2.290	0.000
1.5480	0.004	0.007	2.331	0.000
1.5671	0.004	0.007	2.371	0.000
1.5862	0.004	0.007	2.411	0.000
1.6053	0.004	0.007	2.450	0.000
1.6244	0.004	0.007	2.488	0.000
1.6436	0.004	0.007	2.526	0.000
1.6627	0.004	0.008	2.563	0.000
1.6818	0.004	0.008	2.600	0.000
1.7009	0.004	0.008	2.636	0.000
1.7200	0.004	0.008	2.672	0.000
1.7391	0.004	0.008	2.707	0.000
1.7582	0.000	0.000	2.742	0.000

Name : Vault 4
Width : 10 ft.
Length : 114 ft.
Depth: 1 ft.
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.

Element Flows To:
Outlet 1 Outlet 2

Vault Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>Infilt(cfs)</u>
0.0000	0.026	0.000	0.000	0.000
0.0111	0.026	0.000	0.000	0.000
0.0222	0.026	0.000	0.000	0.000
0.0333	0.026	0.000	0.000	0.000
0.0444	0.026	0.001	0.000	0.000
0.0556	0.026	0.001	0.000	0.000
0.0667	0.026	0.001	0.000	0.000
0.0778	0.026	0.002	0.000	0.000
0.0889	0.026	0.002	0.000	0.000
0.1000	0.026	0.002	0.000	0.000
0.1111	0.026	0.002	0.000	0.000
0.1222	0.026	0.003	0.000	0.000
0.1333	0.026	0.003	0.000	0.000
0.1444	0.026	0.003	0.000	0.000
0.1556	0.026	0.004	0.000	0.000
0.1667	0.026	0.004	0.000	0.000
0.1778	0.026	0.004	0.000	0.000
0.1889	0.026	0.004	0.000	0.000
0.2000	0.026	0.005	0.000	0.000
0.2111	0.026	0.005	0.000	0.000
0.2222	0.026	0.005	0.000	0.000
0.2333	0.026	0.006	0.000	0.000
0.2444	0.026	0.006	0.000	0.000
0.2556	0.026	0.006	0.000	0.000
0.2667	0.026	0.007	0.000	0.000
0.2778	0.026	0.007	0.000	0.000
0.2889	0.026	0.007	0.000	0.000
0.3000	0.026	0.007	0.000	0.000
0.3111	0.026	0.008	0.000	0.000
0.3222	0.026	0.008	0.000	0.000
0.3333	0.026	0.008	0.000	0.000
0.3444	0.026	0.009	0.000	0.000
0.3556	0.026	0.009	0.000	0.000
0.3667	0.026	0.009	0.000	0.000
0.3778	0.026	0.009	0.000	0.000
0.3889	0.026	0.010	0.000	0.000
0.4000	0.026	0.010	0.000	0.000
0.4111	0.026	0.010	0.000	0.000

0.4222	0.026	0.011	0.000	0.000
0.4333	0.026	0.011	0.000	0.000
0.4444	0.026	0.011	0.000	0.000
0.4556	0.026	0.011	0.000	0.000
0.4667	0.026	0.012	0.000	0.000
0.4778	0.026	0.012	0.000	0.000
0.4889	0.026	0.012	0.000	0.000
0.5000	0.026	0.013	0.000	0.000
0.5111	0.026	0.013	0.000	0.000
0.5222	0.026	0.013	0.000	0.000
0.5333	0.026	0.014	0.000	0.000
0.5444	0.026	0.014	0.000	0.000
0.5556	0.026	0.014	0.000	0.000
0.5667	0.026	0.014	0.000	0.000
0.5778	0.026	0.015	0.000	0.000
0.5889	0.026	0.015	0.000	0.000
0.6000	0.026	0.015	0.000	0.000
0.6111	0.026	0.016	0.000	0.000
0.6222	0.026	0.016	0.000	0.000
0.6333	0.026	0.016	0.000	0.000
0.6444	0.026	0.016	0.000	0.000
0.6556	0.026	0.017	0.000	0.000
0.6667	0.026	0.017	0.000	0.000
0.6778	0.026	0.017	0.000	0.000
0.6889	0.026	0.018	0.000	0.000
0.7000	0.026	0.018	0.000	0.000
0.7111	0.026	0.018	0.000	0.000
0.7222	0.026	0.018	0.000	0.000
0.7333	0.026	0.019	0.000	0.000
0.7444	0.026	0.019	0.000	0.000
0.7556	0.026	0.019	0.000	0.000
0.7667	0.026	0.020	0.000	0.000
0.7778	0.026	0.020	0.000	0.000
0.7889	0.026	0.020	0.000	0.000
0.8000	0.026	0.020	0.000	0.000
0.8111	0.026	0.021	0.000	0.000
0.8222	0.026	0.021	0.000	0.000
0.8333	0.026	0.021	0.000	0.000
0.8444	0.026	0.022	0.000	0.000
0.8556	0.026	0.022	0.000	0.000
0.8667	0.026	0.022	0.000	0.000
0.8778	0.026	0.023	0.000	0.000
0.8889	0.026	0.023	0.000	0.000
0.9000	0.026	0.023	0.000	0.000
0.9111	0.026	0.023	0.000	0.000
0.9222	0.026	0.024	0.000	0.000
0.9333	0.026	0.024	0.000	0.000
0.9444	0.026	0.024	0.000	0.000
0.9556	0.026	0.025	0.000	0.000
0.9667	0.026	0.025	0.000	0.000
0.9778	0.026	0.025	0.000	0.000
0.9889	0.026	0.025	0.000	0.000
1.0000	0.026	0.026	0.000	0.000
1.0111	0.026	0.026	0.012	0.000
1.0222	0.000	0.000	0.035	0.000

Name : Vault 5
Width : 10 ft.
Length : 35 ft.
Depth: 1 ft.
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.

Element Flows To:
 Outlet 1 Outlet 2

Vault Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>Infilt(cfs)</u>
0.0000	0.008	0.000	0.000	0.000
0.0111	0.008	0.000	0.000	0.000
0.0222	0.008	0.000	0.000	0.000
0.0333	0.008	0.000	0.000	0.000
0.0444	0.008	0.000	0.000	0.000
0.0556	0.008	0.000	0.000	0.000
0.0667	0.008	0.000	0.000	0.000
0.0778	0.008	0.000	0.000	0.000
0.0889	0.008	0.000	0.000	0.000
0.1000	0.008	0.000	0.000	0.000
0.1111	0.008	0.000	0.000	0.000
0.1222	0.008	0.001	0.000	0.000
0.1333	0.008	0.001	0.000	0.000
0.1444	0.008	0.001	0.000	0.000
0.1556	0.008	0.001	0.000	0.000
0.1667	0.008	0.001	0.000	0.000
0.1778	0.008	0.001	0.000	0.000
0.1889	0.008	0.001	0.000	0.000
0.2000	0.008	0.001	0.000	0.000
0.2111	0.008	0.001	0.000	0.000
0.2222	0.008	0.001	0.000	0.000
0.2333	0.008	0.001	0.000	0.000
0.2444	0.008	0.002	0.000	0.000
0.2556	0.008	0.002	0.000	0.000
0.2667	0.008	0.002	0.000	0.000
0.2778	0.008	0.002	0.000	0.000
0.2889	0.008	0.002	0.000	0.000
0.3000	0.008	0.002	0.000	0.000
0.3111	0.008	0.002	0.000	0.000
0.3222	0.008	0.002	0.000	0.000
0.3333	0.008	0.002	0.000	0.000
0.3444	0.008	0.002	0.000	0.000
0.3556	0.008	0.002	0.000	0.000
0.3667	0.008	0.002	0.000	0.000
0.3778	0.008	0.003	0.000	0.000
0.3889	0.008	0.003	0.000	0.000
0.4000	0.008	0.003	0.000	0.000
0.4111	0.008	0.003	0.000	0.000
0.4222	0.008	0.003	0.000	0.000
0.4333	0.008	0.003	0.000	0.000

0.4444	0.008	0.003	0.000	0.000
0.4556	0.008	0.003	0.000	0.000
0.4667	0.008	0.003	0.000	0.000
0.4778	0.008	0.003	0.000	0.000
0.4889	0.008	0.003	0.000	0.000
0.5000	0.008	0.004	0.000	0.000
0.5111	0.008	0.004	0.000	0.000
0.5222	0.008	0.004	0.000	0.000
0.5333	0.008	0.004	0.000	0.000
0.5444	0.008	0.004	0.000	0.000
0.5556	0.008	0.004	0.000	0.000
0.5667	0.008	0.004	0.000	0.000
0.5778	0.008	0.004	0.000	0.000
0.5889	0.008	0.004	0.000	0.000
0.6000	0.008	0.004	0.000	0.000
0.6111	0.008	0.004	0.000	0.000
0.6222	0.008	0.005	0.000	0.000
0.6333	0.008	0.005	0.000	0.000
0.6444	0.008	0.005	0.000	0.000
0.6556	0.008	0.005	0.000	0.000
0.6667	0.008	0.005	0.000	0.000
0.6778	0.008	0.005	0.000	0.000
0.6889	0.008	0.005	0.000	0.000
0.7000	0.008	0.005	0.000	0.000
0.7111	0.008	0.005	0.000	0.000
0.7222	0.008	0.005	0.000	0.000
0.7333	0.008	0.005	0.000	0.000
0.7444	0.008	0.006	0.000	0.000
0.7556	0.008	0.006	0.000	0.000
0.7667	0.008	0.006	0.000	0.000
0.7778	0.008	0.006	0.000	0.000
0.7889	0.008	0.006	0.000	0.000
0.8000	0.008	0.006	0.000	0.000
0.8111	0.008	0.006	0.000	0.000
0.8222	0.008	0.006	0.000	0.000
0.8333	0.008	0.006	0.000	0.000
0.8444	0.008	0.006	0.000	0.000
0.8556	0.008	0.006	0.000	0.000
0.8667	0.008	0.007	0.000	0.000
0.8778	0.008	0.007	0.000	0.000
0.8889	0.008	0.007	0.000	0.000
0.9000	0.008	0.007	0.000	0.000
0.9111	0.008	0.007	0.000	0.000
0.9222	0.008	0.007	0.000	0.000
0.9333	0.008	0.007	0.000	0.000
0.9444	0.008	0.007	0.000	0.000
0.9556	0.008	0.007	0.000	0.000
0.9667	0.008	0.007	0.000	0.000
0.9778	0.008	0.007	0.000	0.000
0.9889	0.008	0.007	0.000	0.000
1.0000	0.008	0.008	0.000	0.000
1.0111	0.008	0.008	0.012	0.000
1.0222	0.000	0.000	0.035	0.000

Name : Vault 6
Width : 10 ft.

Length : 70.4 ft.
Depth: 1.72 ft.
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.

Element Flows To:
Outlet 1 **Outlet 2**

Vault Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>Infilt(cfs)</u>
0.0000	0.016	0.000	0.000	0.000
0.0191	0.016	0.000	0.000	0.000
0.0382	0.016	0.000	0.000	0.000
0.0573	0.016	0.000	0.000	0.000
0.0764	0.016	0.001	0.000	0.000
0.0956	0.016	0.001	0.000	0.000
0.1147	0.016	0.001	0.000	0.000
0.1338	0.016	0.002	0.000	0.000
0.1529	0.016	0.002	0.000	0.000
0.1720	0.016	0.002	0.000	0.000
0.1911	0.016	0.003	0.000	0.000
0.2102	0.016	0.003	0.000	0.000
0.2293	0.016	0.003	0.000	0.000
0.2484	0.016	0.004	0.000	0.000
0.2676	0.016	0.004	0.000	0.000
0.2867	0.016	0.004	0.000	0.000
0.3058	0.016	0.004	0.000	0.000
0.3249	0.016	0.005	0.000	0.000
0.3440	0.016	0.005	0.000	0.000
0.3631	0.016	0.005	0.000	0.000
0.3822	0.016	0.006	0.000	0.000
0.4013	0.016	0.006	0.000	0.000
0.4204	0.016	0.006	0.000	0.000
0.4396	0.016	0.007	0.000	0.000
0.4587	0.016	0.007	0.000	0.000
0.4778	0.016	0.007	0.000	0.000
0.4969	0.016	0.008	0.000	0.000
0.5160	0.016	0.008	0.000	0.000
0.5351	0.016	0.008	0.000	0.000
0.5542	0.016	0.009	0.000	0.000
0.5733	0.016	0.009	0.000	0.000
0.5924	0.016	0.009	0.000	0.000
0.6116	0.016	0.009	0.000	0.000
0.6307	0.016	0.010	0.000	0.000
0.6498	0.016	0.010	0.000	0.000
0.6689	0.016	0.010	0.000	0.000
0.6880	0.016	0.011	0.000	0.000
0.7071	0.016	0.011	0.000	0.000
0.7262	0.016	0.011	0.000	0.000
0.7453	0.016	0.012	0.000	0.000
0.7644	0.016	0.012	0.000	0.000
0.7836	0.016	0.012	0.000	0.000

0.8027	0.016	0.013	0.000	0.000
0.8218	0.016	0.013	0.000	0.000
0.8409	0.016	0.013	0.000	0.000
0.8600	0.016	0.013	0.000	0.000
0.8791	0.016	0.014	0.000	0.000
0.8982	0.016	0.014	0.000	0.000
0.9173	0.016	0.014	0.000	0.000
0.9364	0.016	0.015	0.000	0.000
0.9556	0.016	0.015	0.000	0.000
0.9747	0.016	0.015	0.000	0.000
0.9938	0.016	0.016	0.000	0.000
1.0129	0.016	0.016	0.015	0.000
1.0320	0.016	0.016	0.060	0.000
1.0511	0.016	0.017	0.122	0.000
1.0702	0.016	0.017	0.197	0.000
1.0893	0.016	0.017	0.282	0.000
1.1084	0.016	0.017	0.376	0.000
1.1276	0.016	0.018	0.477	0.000
1.1467	0.016	0.018	0.585	0.000
1.1658	0.016	0.018	0.698	0.000
1.1849	0.016	0.019	0.814	0.000
1.2040	0.016	0.019	0.932	0.000
1.2231	0.016	0.019	1.051	0.000
1.2422	0.016	0.020	1.169	0.000
1.2613	0.016	0.020	1.286	0.000
1.2804	0.016	0.020	1.399	0.000
1.2996	0.016	0.021	1.507	0.000
1.3187	0.016	0.021	1.609	0.000
1.3378	0.016	0.021	1.705	0.000
1.3569	0.016	0.021	1.792	0.000
1.3760	0.016	0.022	1.872	0.000
1.3951	0.016	0.022	1.943	0.000
1.4142	0.016	0.022	2.005	0.000
1.4333	0.016	0.023	2.060	0.000
1.4524	0.016	0.023	2.107	0.000
1.4716	0.016	0.023	2.148	0.000
1.4907	0.016	0.024	2.185	0.000
1.5098	0.016	0.024	2.248	0.000
1.5289	0.016	0.024	2.290	0.000
1.5480	0.016	0.025	2.331	0.000
1.5671	0.016	0.025	2.371	0.000
1.5862	0.016	0.025	2.411	0.000
1.6053	0.016	0.025	2.450	0.000
1.6244	0.016	0.026	2.488	0.000
1.6436	0.016	0.026	2.526	0.000
1.6627	0.016	0.026	2.563	0.000
1.6818	0.016	0.027	2.600	0.000
1.7009	0.016	0.027	2.636	0.000
1.7200	0.016	0.027	2.672	0.000
1.7391	0.016	0.028	2.707	0.000
1.7582	0.000	0.000	2.742	0.000

Name : Vault 7
Width : 10 ft.
Length : 85.6 ft.
Depth: 1.72 ft.

Discharge Structure

Riser Height: 1 ft.

Riser Diameter: 12 in.

Element Flows To:

Outlet 1

Outlet 2

Vault Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>Infilt(cfs)</u>
0.0000	0.019	0.000	0.000	0.000
0.0191	0.019	0.000	0.000	0.000
0.0382	0.019	0.000	0.000	0.000
0.0573	0.019	0.001	0.000	0.000
0.0764	0.019	0.001	0.000	0.000
0.0956	0.019	0.001	0.000	0.000
0.1147	0.019	0.002	0.000	0.000
0.1338	0.019	0.002	0.000	0.000
0.1529	0.019	0.003	0.000	0.000
0.1720	0.019	0.003	0.000	0.000
0.1911	0.019	0.003	0.000	0.000
0.2102	0.019	0.004	0.000	0.000
0.2293	0.019	0.004	0.000	0.000
0.2484	0.019	0.004	0.000	0.000
0.2676	0.019	0.005	0.000	0.000
0.2867	0.019	0.005	0.000	0.000
0.3058	0.019	0.006	0.000	0.000
0.3249	0.019	0.006	0.000	0.000
0.3440	0.019	0.006	0.000	0.000
0.3631	0.019	0.007	0.000	0.000
0.3822	0.019	0.007	0.000	0.000
0.4013	0.019	0.007	0.000	0.000
0.4204	0.019	0.008	0.000	0.000
0.4396	0.019	0.008	0.000	0.000
0.4587	0.019	0.009	0.000	0.000
0.4778	0.019	0.009	0.000	0.000
0.4969	0.019	0.009	0.000	0.000
0.5160	0.019	0.010	0.000	0.000
0.5351	0.019	0.010	0.000	0.000
0.5542	0.019	0.010	0.000	0.000
0.5733	0.019	0.011	0.000	0.000
0.5924	0.019	0.011	0.000	0.000
0.6116	0.019	0.012	0.000	0.000
0.6307	0.019	0.012	0.000	0.000
0.6498	0.019	0.012	0.000	0.000
0.6689	0.019	0.013	0.000	0.000
0.6880	0.019	0.013	0.000	0.000
0.7071	0.019	0.013	0.000	0.000
0.7262	0.019	0.014	0.000	0.000
0.7453	0.019	0.014	0.000	0.000
0.7644	0.019	0.015	0.000	0.000
0.7836	0.019	0.015	0.000	0.000
0.8027	0.019	0.015	0.000	0.000
0.8218	0.019	0.016	0.000	0.000

0.8409	0.019	0.016	0.000	0.000
0.8600	0.019	0.016	0.000	0.000
0.8791	0.019	0.017	0.000	0.000
0.8982	0.019	0.017	0.000	0.000
0.9173	0.019	0.018	0.000	0.000
0.9364	0.019	0.018	0.000	0.000
0.9556	0.019	0.018	0.000	0.000
0.9747	0.019	0.019	0.000	0.000
0.9938	0.019	0.019	0.000	0.000
1.0129	0.019	0.019	0.015	0.000
1.0320	0.019	0.020	0.060	0.000
1.0511	0.019	0.020	0.122	0.000
1.0702	0.019	0.021	0.197	0.000
1.0893	0.019	0.021	0.282	0.000
1.1084	0.019	0.021	0.376	0.000
1.1276	0.019	0.022	0.477	0.000
1.1467	0.019	0.022	0.585	0.000
1.1658	0.019	0.022	0.698	0.000
1.1849	0.019	0.023	0.814	0.000
1.2040	0.019	0.023	0.932	0.000
1.2231	0.019	0.024	1.051	0.000
1.2422	0.019	0.024	1.169	0.000
1.2613	0.019	0.024	1.286	0.000
1.2804	0.019	0.025	1.399	0.000
1.2996	0.019	0.025	1.507	0.000
1.3187	0.019	0.025	1.609	0.000
1.3378	0.019	0.026	1.705	0.000
1.3569	0.019	0.026	1.792	0.000
1.3760	0.019	0.027	1.872	0.000
1.3951	0.019	0.027	1.943	0.000
1.4142	0.019	0.027	2.005	0.000
1.4333	0.019	0.028	2.060	0.000
1.4524	0.019	0.028	2.107	0.000
1.4716	0.019	0.028	2.148	0.000
1.4907	0.019	0.029	2.185	0.000
1.5098	0.019	0.029	2.248	0.000
1.5289	0.019	0.030	2.290	0.000
1.5480	0.019	0.030	2.331	0.000
1.5671	0.019	0.030	2.371	0.000
1.5862	0.019	0.031	2.411	0.000
1.6053	0.019	0.031	2.450	0.000
1.6244	0.019	0.031	2.488	0.000
1.6436	0.019	0.032	2.526	0.000
1.6627	0.019	0.032	2.563	0.000
1.6818	0.019	0.033	2.600	0.000
1.7009	0.019	0.033	2.636	0.000
1.7200	0.019	0.033	2.672	0.000
1.7391	0.019	0.034	2.707	0.000
1.7582	0.000	0.000	2.742	0.000

Name : Biofiltration 2a
Bottom Length: 35.00 ft.
Bottom Width: 10.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 0.333

Material type for second layer: GRAVEL
 Material thickness of third layer: 1.71
 Material type for third layer: GRAVEL

Underdrain used

Underdrain Diameter (feet): 0.5
 Orifice Diameter (in.): 0.6
 Offset (in.): 0
 Flow Through Underdrain (ac-ft.): 8.399
 Total Outflow (ac-ft.): 9.981
 Percent Through Underdrain: 84.15

Discharge Structure

Riser Height: 1 ft.
 Riser Diameter: 12 in.
 Orifice 1 Diameter: 0.0625 in. Elevation: 0.5 ft.

Element Flows To:

Outlet 1 Outlet 2

Biofiltration 2a Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
121.95	0.0080	0.0000	0.0000	0.0000
122.01	0.0080	0.0001	0.0000	0.0000
122.06	0.0080	0.0003	0.0000	0.0000
122.12	0.0080	0.0004	0.0000	0.0000
122.17	0.0080	0.0005	0.0000	0.0000
122.23	0.0080	0.0007	0.0001	0.0000
122.28	0.0080	0.0008	0.0002	0.0000
122.34	0.0080	0.0009	0.0004	0.0000
122.39	0.0080	0.0011	0.0006	0.0000
122.45	0.0080	0.0012	0.0010	0.0000
122.50	0.0080	0.0013	0.0014	0.0000
122.56	0.0080	0.0015	0.0020	0.0000
122.62	0.0080	0.0016	0.0021	0.0000
122.67	0.0080	0.0017	0.0022	0.0000
122.73	0.0080	0.0019	0.0025	0.0000
122.78	0.0080	0.0020	0.0027	0.0000
122.84	0.0080	0.0021	0.0030	0.0000
122.89	0.0080	0.0023	0.0031	0.0000
122.95	0.0080	0.0024	0.0034	0.0000
123.00	0.0080	0.0025	0.0035	0.0000
123.06	0.0080	0.0027	0.0038	0.0000
123.11	0.0080	0.0028	0.0039	0.0000
123.17	0.0080	0.0029	0.0041	0.0000
123.22	0.0080	0.0031	0.0042	0.0000
123.28	0.0080	0.0032	0.0045	0.0000
123.34	0.0080	0.0033	0.0046	0.0000
123.39	0.0080	0.0035	0.0047	0.0000
123.45	0.0080	0.0036	0.0048	0.0000
123.50	0.0080	0.0038	0.0050	0.0000
123.56	0.0080	0.0040	0.0051	0.0000
123.61	0.0080	0.0042	0.0053	0.0000
123.67	0.0080	0.0043	0.0054	0.0000
123.72	0.0080	0.0045	0.0055	0.0000

123.78	0.0080	0.0047	0.0056	0.0000
123.83	0.0080	0.0049	0.0058	0.0000
123.89	0.0080	0.0051	0.0059	0.0000
123.95	0.0080	0.0053	0.0060	0.0000
124.00	0.0080	0.0055	0.0061	0.0000
124.06	0.0080	0.0056	0.0061	0.0000
124.11	0.0080	0.0058	0.0061	0.0000
124.17	0.0080	0.0060	0.0061	0.0000
124.22	0.0080	0.0062	0.0061	0.0000
124.28	0.0080	0.0064	0.0063	0.0000
124.33	0.0080	0.0066	0.0066	0.0000
124.39	0.0080	0.0067	0.0070	0.0000
124.44	0.0080	0.0069	0.0073	0.0000
124.50	0.0080	0.0071	0.0077	0.0000
124.55	0.0080	0.0073	0.0080	0.0000
124.61	0.0080	0.0075	0.0083	0.0000
124.67	0.0080	0.0077	0.0086	0.0000
124.72	0.0080	0.0079	0.0089	0.0000
124.78	0.0080	0.0080	0.0092	0.0000
124.83	0.0080	0.0082	0.0095	0.0000
124.89	0.0080	0.0084	0.0098	0.0000
124.94	0.0080	0.0086	0.0101	0.0000
125.00	0.0080	0.0088	0.0103	0.0000
125.05	0.0080	0.0090	0.0106	0.0000
125.11	0.0080	0.0092	0.0108	0.0000
125.16	0.0080	0.0093	0.0111	0.0000
125.22	0.0080	0.0095	0.0113	0.0000
125.28	0.0080	0.0097	0.0116	0.0000
125.33	0.0080	0.0099	0.0118	0.0000
125.39	0.0080	0.0101	0.0120	0.0000
125.44	0.0080	0.0103	0.0122	0.0000
125.49	0.0080	0.0104	0.0125	0.0000

Surface iltration 2a Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>To Amended(cfs)</u>	<u>Wetted Surface</u>
3.5430	0.0080	0.0104	0.0000	0.0420	0.0000
3.5984	0.0082	0.0109	0.0000	0.0420	0.0000
3.6538	0.0084	0.0113	0.0000	0.0435	0.0000
3.7093	0.0086	0.0118	0.0000	0.0450	0.0000
3.7647	0.0087	0.0123	0.0000	0.0465	0.0000
3.8201	0.0089	0.0128	0.0000	0.0480	0.0000
3.8755	0.0091	0.0133	0.0000	0.0495	0.0000
3.9309	0.0093	0.0138	0.0000	0.0510	0.0000
3.9863	0.0095	0.0143	0.0000	0.0525	0.0000
4.0418	0.0096	0.0148	0.0000	0.0540	0.0000
4.0972	0.0098	0.0154	0.0000	0.0555	0.0000
4.1526	0.0100	0.0159	0.0000	0.0570	0.0000
4.2080	0.0102	0.0165	0.0000	0.0585	0.0000
4.2634	0.0104	0.0171	0.0000	0.0600	0.0000
4.3188	0.0105	0.0176	0.0001	0.0615	0.0000
4.3743	0.0107	0.0182	0.0001	0.0630	0.0000
4.4297	0.0109	0.0188	0.0001	0.0645	0.0000
4.4851	0.0111	0.0194	0.0001	0.0660	0.0000
4.5405	0.0112	0.0200	0.0001	0.0674	0.0000
4.5959	0.0114	0.0207	0.1291	0.0689	0.0000
4.6514	0.0116	0.0213	0.3757	0.0704	0.0000
4.7068	0.0118	0.0220	0.6862	0.0719	0.0000

4.7622	0.0120	0.0226	1.0272	0.0734	0.0000
4.8176	0.0121	0.0233	1.3651	0.0749	0.0000
4.8730	0.0123	0.0240	1.6672	0.0764	0.0000
4.9284	0.0125	0.0246	1.9085	0.0779	0.0000
4.9839	0.0127	0.0253	2.0795	0.0794	0.0000
5.0393	0.0128	0.0261	2.1964	0.0809	0.0000
5.0430	0.0129	0.0261	2.3395	0.0810	0.0000

Name : Surface iltration 2a

Element Flows To:

Outlet 1 Outlet 2
 Biofiltration 2a

ANALYSIS RESULTS

POC #1 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Predeveloped Landuse Totals for POC #2

Total Pervious Area:10.24
 Total Impervious Area:0.76

Mitigated Landuse Totals for POC #2

Total Pervious Area:8.14
 Total Impervious Area:3.01

Flow Frequency Return Periods for Predeveloped. POC #2

<u>Return Period</u>	<u>Flow(cfs)</u>
2 year	2.895503
5 year	4.697031
10 year	6.561797
25 year	8.448235

Flow Frequency Return Periods for Mitigated. POC #2

<u>Return Period</u>	<u>Flow(cfs)</u>
2 year	2.769176
5 year	4.694356
10 year	6.47231
25 year	9.121759

POC #2
 The Facility PASSED

The Facility **PASSED.**

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.2896	806	847	105	Pass
0.3529	674	685	101	Pass
0.4163	570	587	102	Pass
0.4796	494	508	102	Pass
0.5430	435	427	98	Pass
0.6063	369	360	97	Pass
0.6697	298	318	106	Pass
0.7330	262	283	108	Pass
0.7964	246	250	101	Pass
0.8598	226	233	103	Pass
0.9231	207	221	106	Pass
0.9865	192	206	107	Pass
1.0498	186	195	104	Pass
1.1132	175	180	102	Pass
1.1765	162	165	101	Pass
1.2399	152	150	98	Pass
1.3032	145	135	93	Pass
1.3666	137	122	89	Pass
1.4300	125	117	93	Pass
1.4933	116	108	93	Pass
1.5567	104	101	97	Pass
1.6200	97	97	100	Pass
1.6834	93	92	98	Pass
1.7467	90	87	96	Pass
1.8101	87	80	91	Pass
1.8735	84	73	86	Pass
1.9368	80	68	85	Pass
2.0002	76	64	84	Pass
2.0635	68	60	88	Pass
2.1269	64	58	90	Pass
2.1902	61	55	90	Pass
2.2536	58	50	86	Pass
2.3169	57	46	80	Pass
2.3803	52	44	84	Pass
2.4437	50	43	86	Pass
2.5070	47	42	89	Pass
2.5704	42	40	95	Pass
2.6337	40	36	90	Pass
2.6971	38	35	92	Pass
2.7604	37	35	94	Pass
2.8238	35	31	88	Pass
2.8871	34	31	91	Pass
2.9505	31	31	100	Pass
3.0139	29	28	96	Pass
3.0772	28	27	96	Pass
3.1406	26	23	88	Pass
3.2039	25	23	92	Pass
3.2673	24	22	91	Pass
3.3306	22	22	100	Pass
3.3940	22	20	90	Pass
3.4574	19	20	105	Pass
3.5207	18	19	105	Pass
3.5841	17	17	100	Pass
3.6474	17	16	94	Pass
3.7108	17	16	94	Pass
3.7741	16	16	100	Pass

3.8375	16	15	93	Pass
3.9008	16	15	93	Pass
3.9642	15	15	100	Pass
4.0276	15	15	100	Pass
4.0909	15	15	100	Pass
4.1543	15	15	100	Pass
4.2176	15	14	93	Pass
4.2810	15	12	80	Pass
4.3443	14	10	71	Pass
4.4077	14	10	71	Pass
4.4710	14	10	71	Pass
4.5344	13	10	76	Pass
4.5978	12	10	83	Pass
4.6611	10	9	90	Pass
4.7245	8	8	100	Pass
4.7878	8	8	100	Pass
4.8512	8	8	100	Pass
4.9145	8	8	100	Pass
4.9779	8	7	87	Pass
5.0413	8	6	75	Pass
5.1046	8	6	75	Pass
5.1680	8	6	75	Pass
5.2313	8	6	75	Pass
5.2947	8	6	75	Pass
5.3580	8	6	75	Pass
5.4214	7	6	85	Pass
5.4847	7	6	85	Pass
5.5481	7	6	85	Pass
5.6115	7	6	85	Pass
5.6748	6	6	100	Pass
5.7382	6	6	100	Pass
5.8015	6	5	83	Pass
5.8649	6	5	83	Pass
5.9282	6	5	83	Pass
5.9916	6	5	83	Pass
6.0549	6	5	83	Pass
6.1183	6	5	83	Pass
6.1817	6	5	83	Pass
6.2450	6	5	83	Pass
6.3084	6	5	83	Pass
6.3717	6	5	83	Pass
6.4351	5	4	80	Pass
6.4984	5	4	80	Pass
6.5618	4	4	100	Pass

Drawdown Time Results

POC #3 was not reported because POC must exist in both scenarios and both scenarios must have been run. POC #4 was not reported because POC must exist in both scenarios and both scenarios must have been run. POC #5 was not reported because POC must exist in both scenarios and both scenarios must have been run. **PerlnD and Implnd Changes**

No changes have been made.

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**SDHM 3.1
PROJECT REPORT**

Project Name: POC C
Site Name: West Oaks
Site Address: West Oaks Way
City : Carlsbad
Report Date: 4/8/2019
Gage : OCEANSID
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version Date: 2018/07/12

Low Flow Threshold for POC 3 : 10 Percent of the 2 Year

High Flow Threshold for POC 3: 10 year

PREDEVELOPED LAND USE

Name : Existing Basin 300
Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
D,NatVeg,Steep	13.67
A,Urban,Flat	1.34
D,Urban,Flat	.5

Pervious Total 15.51

<u>Impervious Land Use</u>	<u>acre</u>
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Impervious Total 0

Basin Total 15.51

Element Flows To:

Surface	Interflow	Groundwater
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MITIGATED LAND USE

Name : Existing Basin 300
Bypass: Yes

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
D,NatVeg,Steep	13.61
D,Urban,Flat	.07
A,Urban,Flat	.01
 Pervious Total	 13.69
 <u>Impervious Land Use</u>	 <u>acre</u>
Impervious Total	0
 Basin Total	 13.69

Element Flows To:		
Surface	Interflow	Groundwater

Name : DMA 1
 Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
D,Urban,Flat	.18
 Pervious Total	 0.18
 <u>Impervious Land Use</u>	 <u>acre</u>
IMPERVIOUS-FLAT	0.59
 Impervious Total	 0.59
 Basin Total	 0.77

Element Flows To:		
Surface	Interflow	Groundwater
Surface iltration 1	Surface iltration 1	

Name : Biofiltration 1
 Bottom Length: 75.40 ft.
 Bottom Width: 10.00 ft.
 Material thickness of first layer: 1.5
 Material type for first layer: ESM
 Material thickness of second layer: 0.333
 Material type for second layer: GRAVEL
 Material thickness of third layer: 0

Material type for third layer: GRAVEL
Underdrain used
 Underdrain Diameter (feet): 1
 Orifice Diameter (in.): 6
 Offset (in.): 0
 Flow Through Underdrain (ac-ft.): 16.489
 Total Outflow (ac-ft.): 22.159
 Percent Through Underdrain: 74.41
Discharge Structure
 Riser Height: 0.5 ft.
 Riser Diameter: 12 in.

Element Flows To:
 Outlet 1 Outlet 2

Biofiltration 1 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
124.50	0.0173	0.0000	0.0000	0.0000
124.53	0.0173	0.0002	0.0000	0.0000
124.56	0.0173	0.0003	0.0000	0.0000
124.59	0.0173	0.0005	0.0000	0.0000
124.62	0.0173	0.0006	0.0000	0.0000
124.66	0.0173	0.0008	0.0000	0.0000
124.69	0.0173	0.0010	0.0000	0.0000
124.72	0.0173	0.0011	0.0000	0.0000
124.75	0.0173	0.0013	0.0000	0.0000
124.78	0.0173	0.0015	0.0000	0.0000
124.81	0.0173	0.0016	0.0000	0.0000
124.84	0.0173	0.0018	0.0000	0.0000
124.87	0.0173	0.0019	0.0000	0.0000
124.90	0.0173	0.0021	0.0000	0.0000
124.94	0.0173	0.0023	0.0000	0.0000
124.97	0.0173	0.0024	0.0000	0.0000
125.00	0.0173	0.0026	0.0000	0.0000
125.03	0.0173	0.0027	0.0000	0.0000
125.06	0.0173	0.0029	0.0000	0.0000
125.09	0.0173	0.0031	0.0000	0.0000
125.12	0.0173	0.0032	0.0000	0.0000
125.15	0.0173	0.0034	0.0000	0.0000
125.18	0.0173	0.0036	0.0000	0.0000
125.22	0.0173	0.0037	0.0000	0.0000
125.25	0.0173	0.0039	0.0000	0.0000
125.28	0.0173	0.0040	0.0000	0.0000
125.31	0.0173	0.0042	0.0000	0.0000
125.34	0.0173	0.0044	0.0000	0.0000
125.37	0.0173	0.0045	0.0000	0.0000
125.40	0.0173	0.0047	0.0000	0.0000
125.43	0.0173	0.0048	0.0000	0.0000
125.47	0.0173	0.0050	0.0000	0.0000
125.50	0.0173	0.0052	0.0000	0.0000
125.53	0.0173	0.0053	0.0000	0.0000
125.56	0.0173	0.0055	0.0000	0.0000
125.59	0.0173	0.0057	0.0000	0.0000

125.62	0.0173	0.0058	0.0000	0.0000
125.65	0.0173	0.0060	0.0000	0.0000
125.68	0.0173	0.0061	0.0000	0.0000
125.71	0.0173	0.0063	0.0000	0.0000
125.75	0.0173	0.0065	0.0000	0.0000
125.78	0.0173	0.0066	0.0000	0.0000
125.81	0.0173	0.0068	0.0000	0.0000
125.84	0.0173	0.0070	0.0000	0.0000
125.87	0.0173	0.0071	0.0000	0.0000
125.90	0.0173	0.0073	0.0000	0.0000
125.93	0.0173	0.0074	0.0000	0.0000
125.96	0.0173	0.0076	0.0000	0.0000
125.99	0.0173	0.0078	0.0000	0.0000
126.03	0.0173	0.0080	0.0000	0.0000
126.06	0.0173	0.0082	0.0000	0.0000
126.09	0.0173	0.0084	0.0000	0.0000
126.12	0.0173	0.0087	0.0000	0.0000
126.15	0.0173	0.0089	0.0000	0.0000
126.18	0.0173	0.0091	0.0000	0.0000
126.21	0.0173	0.0093	0.0000	0.0000
126.24	0.0173	0.0095	0.0000	0.0000
126.27	0.0173	0.0098	0.0000	0.0000
126.31	0.0173	0.0100	0.0000	0.0000
126.33	0.0173	0.0102	0.0000	0.0000

Surface iltration 1 Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>To Amended(cfs)</u>	<u>Wetted Surface</u>
1.8330	0.0173	0.0102	0.0000	0.0891	0.0000
1.8641	0.0175	0.0107	0.0000	0.0891	0.0000
1.8953	0.0177	0.0113	0.0000	0.0909	0.0000
1.9264	0.0180	0.0118	0.0000	0.0927	0.0000
1.9575	0.0182	0.0124	0.0000	0.0945	0.0000
1.9887	0.0184	0.0130	0.0001	0.0963	0.0000
2.0198	0.0186	0.0135	0.0002	0.0981	0.0000
2.0509	0.0188	0.0141	0.0004	0.0999	0.0000
2.0821	0.0190	0.0147	0.0005	0.1018	0.0000
2.1132	0.0192	0.0153	0.0008	0.1036	0.0000
2.1443	0.0195	0.0159	0.0011	0.1054	0.0000
2.1755	0.0197	0.0165	0.0014	0.1072	0.0000
2.2066	0.0199	0.0171	0.0018	0.1090	0.0000
2.2377	0.0201	0.0178	0.0023	0.1108	0.0000
2.2688	0.0203	0.0184	0.0028	0.1126	0.0000
2.3000	0.0205	0.0190	0.0034	0.1144	0.0000
2.3311	0.0208	0.0197	0.0041	0.1162	0.0000
2.3622	0.0210	0.0203	0.0048	0.1181	0.0000
2.3934	0.0212	0.0210	0.0057	0.1199	0.0000
2.4245	0.0214	0.0216	0.0066	0.1217	0.0000
2.4556	0.0216	0.0223	0.0076	0.1235	0.0000
2.4868	0.0218	0.0230	0.0087	0.1253	0.0000
2.5179	0.0221	0.0237	0.0098	0.1271	0.0000
2.5490	0.0223	0.0244	0.0111	0.1289	0.0000
2.5802	0.0225	0.0251	0.0124	0.1307	0.0000
2.6113	0.0227	0.0258	0.0139	0.1325	0.0000
2.6424	0.0229	0.0265	0.0154	0.1344	0.0000
2.6736	0.0231	0.0272	0.0171	0.1362	0.0000
2.7047	0.0233	0.0279	0.0188	0.1380	0.0000
2.7358	0.0236	0.0286	0.0207	0.1398	0.0000

2.7670	0.0238	0.0294	0.0226	0.1416	0.0000
2.7981	0.0240	0.0301	0.0247	0.1434	0.0000
2.8292	0.0242	0.0309	0.0269	0.1452	0.0000
2.8330	0.0242	0.0310	0.0291	0.1454	0.0000

Name : Surfaceiltration 1

Element Flows To:

Outlet 1	Outlet 2
Biofiltration 1	

Name : DMA 11 - Self Mitigating

Bypass: Yes

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
D,Urban,Flat	.09
Pervious Total	0.09
<u>Impervious Land Use</u>	<u>acre</u>
Impervious Total	0
Basin Total	0.09

Element Flows To:

Surface	Interflow	Groundwater
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Name : DMA 12 - Self Mitigating

Bypass: Yes

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
D,Urban,Flat	.16
Pervious Total	0.16
<u>Impervious Land Use</u>	<u>acre</u>
Impervious Total	0
Basin Total	0.16

Element Flows To:

Surface

Interflow

Groundwater

ANALYSIS RESULTS

POC #1 was not reported because POC must exist in both scenarios and both scenarios must have been run. POC #2 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Predeveloped Landuse Totals for POC #3

Total Pervious Area:15.51

Total Impervious Area:0

Mitigated Landuse Totals for POC #3

Total Pervious Area:14.12

Total Impervious Area:0.59

Flow Frequency Return Periods for Predeveloped. POC #3

<u>Return Period</u>	<u>Flow(cfs)</u>
2 year	4.238067
5 year	6.9256
10 year	9.385681
25 year	12.133464

Flow Frequency Return Periods for Mitigated. POC #3

<u>Return Period</u>	<u>Flow(cfs)</u>
2 year	4.137524
5 year	6.857351
10 year	9.086473
25 year	11.750872

POC #3

The Facility PASSED

The Facility **PASSED.**

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.4238	680	705	103	Pass
0.5143	600	616	102	Pass
0.6049	526	552	104	Pass
0.6954	470	485	103	Pass
0.7859	414	438	105	Pass
0.8764	361	370	102	Pass
0.9670	295	304	103	Pass
1.0575	255	268	105	Pass

1.1480	236	249	105	Pass
1.2385	222	227	102	Pass
1.3290	210	209	99	Pass
1.4196	197	196	99	Pass
1.5101	183	185	101	Pass
1.6006	175	177	101	Pass
1.6911	169	170	100	Pass
1.7817	156	160	102	Pass
1.8722	147	152	103	Pass
1.9627	139	144	103	Pass
2.0532	127	132	103	Pass
2.1438	118	115	97	Pass
2.2343	108	105	97	Pass
2.3248	98	97	98	Pass
2.4153	93	95	102	Pass
2.5059	89	90	101	Pass
2.5964	86	87	101	Pass
2.6869	82	83	101	Pass
2.7774	81	80	98	Pass
2.8680	75	76	101	Pass
2.9585	72	72	100	Pass
3.0490	65	62	95	Pass
3.1395	61	61	100	Pass
3.2301	58	59	101	Pass
3.3206	56	55	98	Pass
3.4111	55	52	94	Pass
3.5016	48	48	100	Pass
3.5921	48	44	91	Pass
3.6827	45	42	93	Pass
3.7732	41	41	100	Pass
3.8637	40	39	97	Pass
3.9542	38	36	94	Pass
4.0448	37	36	97	Pass
4.1353	34	35	102	Pass
4.2258	34	30	88	Pass
4.3163	30	29	96	Pass
4.4069	29	28	96	Pass
4.4974	26	24	92	Pass
4.5879	24	23	95	Pass
4.6784	23	22	95	Pass
4.7690	23	20	86	Pass
4.8595	21	19	90	Pass
4.9500	21	18	85	Pass
5.0405	18	17	94	Pass
5.1311	17	17	100	Pass
5.2216	17	17	100	Pass
5.3121	17	17	100	Pass
5.4026	17	17	100	Pass
5.4931	17	17	100	Pass
5.5837	17	16	94	Pass
5.6742	16	16	100	Pass
5.7647	16	16	100	Pass
5.8552	16	16	100	Pass
5.9458	16	16	100	Pass
6.0363	15	14	93	Pass
6.1268	15	14	93	Pass
6.2173	15	14	93	Pass

6.3079	14	14	100	Pass
6.3984	14	10	71	Pass
6.4889	14	10	71	Pass
6.5794	12	10	83	Pass
6.6700	12	9	75	Pass
6.7605	10	9	90	Pass
6.8510	9	9	100	Pass
6.9415	9	8	88	Pass
7.0321	8	8	100	Pass
7.1226	8	8	100	Pass
7.2131	8	8	100	Pass
7.3036	8	8	100	Pass
7.3942	8	8	100	Pass
7.4847	8	8	100	Pass
7.5752	8	7	87	Pass
7.6657	8	7	87	Pass
7.7562	7	7	100	Pass
7.8468	7	7	100	Pass
7.9373	7	6	85	Pass
8.0278	7	6	85	Pass
8.1183	7	6	85	Pass
8.2089	6	6	100	Pass
8.2994	6	6	100	Pass
8.3899	6	6	100	Pass
8.4804	6	6	100	Pass
8.5710	6	6	100	Pass
8.6615	6	6	100	Pass
8.7520	6	6	100	Pass
8.8425	6	6	100	Pass
8.9331	6	6	100	Pass
9.0236	6	6	100	Pass
9.1141	6	4	66	Pass
9.2046	6	3	50	Pass
9.2952	6	3	50	Pass
9.3857	4	3	75	Pass

Drawdown Time Results

POC #4 was not reported because POC must exist in both scenarios and both scenarios must have been run. **Perlnd and Implnd Changes**
 No changes have been made.

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ATTACHMENT 3
Structural BMP Maintenance Information

Use this checklist to ensure the required information has been included in the Structural BMP Maintenance Information Attachment:

Preliminary Design Planning CEQA level submittal:

Attachment 3 must identify:

- Typical maintenance indicators and actions for proposed structural BMP(s) based on Section 7.7 of the BMP Design Manual

Final Design level submittal:

Attachment 3 must identify:

- Specific maintenance indicators and actions for proposed structural BMP(s). This shall be based on Section 7.7 of the BMP Design Manual and enhanced to reflect actual proposed components of the structural BMP(s)
- 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)
- Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- Maintenance thresholds for BMPs subject to siltation or heavy trash(e.g., silt level posts or other markings shall be included in all BMP components that will trap and store sediment, trash, and/or debris, so that the inspector may determine how full the BMP is, and the maintenance personnel may determine where the bottom of the BMP is . If required, posts or other markings shall be indicated and described on structural BMP plans.)
- 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

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	Typical 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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Inspect annually. • Maintain when needed.

Threshold/Indicator	Maintenance Action	Typical Maintenance Frequency
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • Inspect monthly. • Maintain when needed.
Overgrown vegetation	Mow or trim as appropriate.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • Inspect monthly. • Maintain when needed.

Threshold/Indicator	Maintenance Action	Typical 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 [City Engineer] shall be contacted prior to any additional repairs or reconstruction.	<ul style="list-style-type: none"> • 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 [City Engineer] shall be contacted prior to any additional repairs or reconstruction.
<p>Standing water in BMP for longer than 24 hours following a storm event</p> <p>Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health</p>	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.	<ul style="list-style-type: none"> • 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	Typical Maintenance Frequency
<p>Presence of mosquitos/larvae</p> <p>For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology</p>	<p>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.</p> <p>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 [City Engineer] 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.</p>	<ul style="list-style-type: none"> • 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.
<p>Underdrain clogged</p>	<p>Clear blockage.</p>	<p>Inspect if standing water is observed for longer than 24-96 hours following a storm event.</p> <p>Maintain when needed.</p>

“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).

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	Typical Maintenance Frequency
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • Inspect monthly. • Maintain when needed.
Overgrown vegetation	Mow or trim as appropriate.	<ul style="list-style-type: none"> • Inspect monthly. • Maintain when needed.
<p>Standing water in vegetated pervious area for longer than 24 hours following a storm event</p> <p>Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health</p>	Disperse any areas of standing water to nearby landscaping (i.e., spread it out to another portion of the pervious area so it drains into the soil). Make appropriate corrective measures such as adjusting irrigation system, or repairing/replacing clogged or compacted soils.	<ul style="list-style-type: none"> • 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	Typical Maintenance Frequency
<p>Presence of mosquitos/larvae</p> <p>For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology</p>	<p>Disperse any areas of standing water to nearby landscaping (i.e., spread it out to another portion of the pervious area so it drains into the soil). Loosen or replace soils to restore drainage (and prevent standing water)</p>	<ul style="list-style-type: none"> • 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
<p>Entrance / opening to the vegetated pervious area is blocked such that storm water from impervious area will not drain into the pervious area (e.g., a curb cut opening is blocked by debris or a roof drain outlet has been directly connected to the storm drain system)</p>	<p>Make repairs as appropriate to restore drainage into the vegetated pervious area.</p>	<ul style="list-style-type: none"> • Inspect monthly. • Maintain when needed.

Maintenance of a Rainstore3 Stormwater Storage Chamber

“How do I clean or maintain a Rainstore3 system?”

Invisible Structures, Inc. recommends that stormwater be pretreated prior to discharging into the chambers to avoid foreign matter accumulation inside the chamber. This can be accomplished by a variety of techniques or products. Some examples are:

Short Term Storage (Detention Basin)

“Zero” maintenance – the Preferred Method:

Use a natural, or “Bio-Filter”, inlet device – essentially a porous pavement or swale, to pre-filter trash and sediment laden runoff before capture and conveyance into a Rainstore3 chamber. Use of a simple 10-12” deep sand, or sand/gravel, filter pavement or swale will provide adequate vertical flow capacity (20 to 35+ inches per hour) and residence time to capture coarse debris and trash at the surface, with sediment and hydrocarbons (and even most traffic generated metals) kept in voids of the section for treatment action by bacteria and oxidation.

Water passing through the filter section can pass directly into the top of a Rainstore3 chamber, or be collected and transported over larger distances via Draincore2.

Only super fine sediments will pass through this section and be conveyed into the chamber. With relatively short storage times (24 to 48 hours) most of these sediments shall remain suspended, or be easily re-suspended by the next rain event for removal. Long term accumulations to a depth affecting exfiltration rates can be measured in decades, not years.

Trash pickup from the surface requires that Zero be in quotes. Also be aware that grass surface porous pavements (Grasspave2) offer greater biological activity, but at a higher surface maintenance cost – mowing, fertilization and irrigation. Gravel surface porous pavements (Gravelpave2) still provide biological activity at a level lower than with grass, but with lower maintenance required.

Short Term Storage (Detention Basin)

Low, but periodic maintenance:

Use a structural form of catch basin with a deep sump prior to use of a hooded elbow inlet into the chamber. Whether standard catch basins or sophisticated cyclonic flow devices are used, the objective is to remove any coarse debris and sediment (sand and larger) from entering the Rainstore3 chamber. Periodic maintenance will be required to remove trash and sediment that accumulates in the device. Frequency shall depend upon the physical nature of sediments carried and allowed into the “screening” device.

Fine sediments may still be transported into the chamber via the inlet pipe and will likely be dispersed rather evenly over the entire chamber bottom surface area, where they will then settle to the bottom – depending upon the duration of time water is left in the chamber and the size of the particle. Particles smaller than the AOS of the porous fabric liner will pass through the liner and continue migration until stopped by underlying soils. Particles larger than the AOS shall remain inside the chamber, and can be periodically re-suspended by injecting high-pressure water into a Maintenance Port, with removal of the sediment laden water via sump pump from the same, or other, port.

Eventually, especially if maintenance is too infrequent, the bottom of the chamber may develop a thick sediment layer sufficient to obstruct exfiltration through the bottom of the chamber. The sides of the chamber shall continue to function, but time for total water evacuation will increase.

This approach is most closely related to more traditional design responses, but is not the best solution long term for the client. Standard catch basins are lowest initial cost, but much higher in maintenance cost. Commercial cyclonic devices may have lower maintenance cost, but offer higher levels of cleaning efficiency at much higher initial investment cost.

Long Term Storage (Water Harvest Basin)

“Zero” maintenance – the Preferred Method:

Use a natural, or “Bio-Filter”, inlet device – essentially a porous pavement or swale, to pre-filter trash and sediment laden runoff before capture and conveyance into a Rainstore3 chamber. Use of a simple 10-12” deep sand, or sand/gravel, filter pavement or swale will provide adequate vertical flow capacity (20 to 35+ inches per hour) and residence time to capture coarse debris and trash at the surface, with sediment and hydrocarbons (and even most traffic generated metals) kept in voids of the section for treatment action by bacteria and oxidation.

Water passing through the filter section can pass directly into the top of a Rainstore3 chamber, or be collected and transported over larger distances via Draincore2.

Only super fine sediments will pass through this section and be conveyed into the chamber. With relatively short storage times (24 to 48 hours) most of these sediments shall be easily re-suspended by the next rain event for removal. This level of sediment can be safely captured and transported via pumps for water reuse in irrigation or gray water applications, or further filtered by an automatic sand filter device with “back-flush” capabilities.

A Note About Sump Pumps

Many of our clients have designed elaborate pump stations to remove water from Rainstore3 chambers (usually for water harvest applications). We would like to make you aware that several pump manufacturers now make standard small diameter profile sump pumps that could be useful and cost effective alternatives to subsurface pump stations that are usually placed adjacent to the chamber. With top surface evacuation pumps, all liner penetrations are kept to the top edges of the chamber and minimize potential leak points on harvest applications.

Some of the pumps are less than 3.5” diameter, which could fit inside any of the ring columns of the Rainstore3 structure itself. Most of the others are less than 7.5” diameter, and will fit inside an 8” pipe placed in a Maintenance Port configuration – removal of one “corner” column of rings. Provided that electricity and outlet pipes can be easily accommodated within the 12” minimum cover over the chamber, these sump pumps may provide a ready, easy and economical alternative to more expensive pump stations.

ATTACHMENT 4
City standard Single Sheet BMP (SSBMP) Exhibit

[Use the City's standard Single Sheet BMP Plan.]

See DMA Exhibit in Attachment 1A