

CITY OF CARLSBAD
PRIORITY DEVELOPMENT PROJECT (PDP)
STORM WATER QUALITY MANAGEMENT PLAN (SWQMP)
FOR
CITY OF CARLSBAD MAINTENANCE & OPERATIONS CENTER
PROJECT NO. CUP2018-0022
DRAWING No.: TBD
GR No.: TBD
ENGINEER OF WORK: MIKE MAGEE, PE



PREPARED FOR:

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619-233-1023

PREPARED BY:

WSP USA
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SAN DIEGO, CALIFORNIA 92121
858-500-4500

DATE:
JULY 15, 2022

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CERTIFICATION PAGE

Project Name: City of Carlsbad Maintenance & Operations Center
Project ID: CUP2018-0022

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.



PE No.: 85660
Exp.: 9/30/2022

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

MIKE MAGEE, PE

Print Name

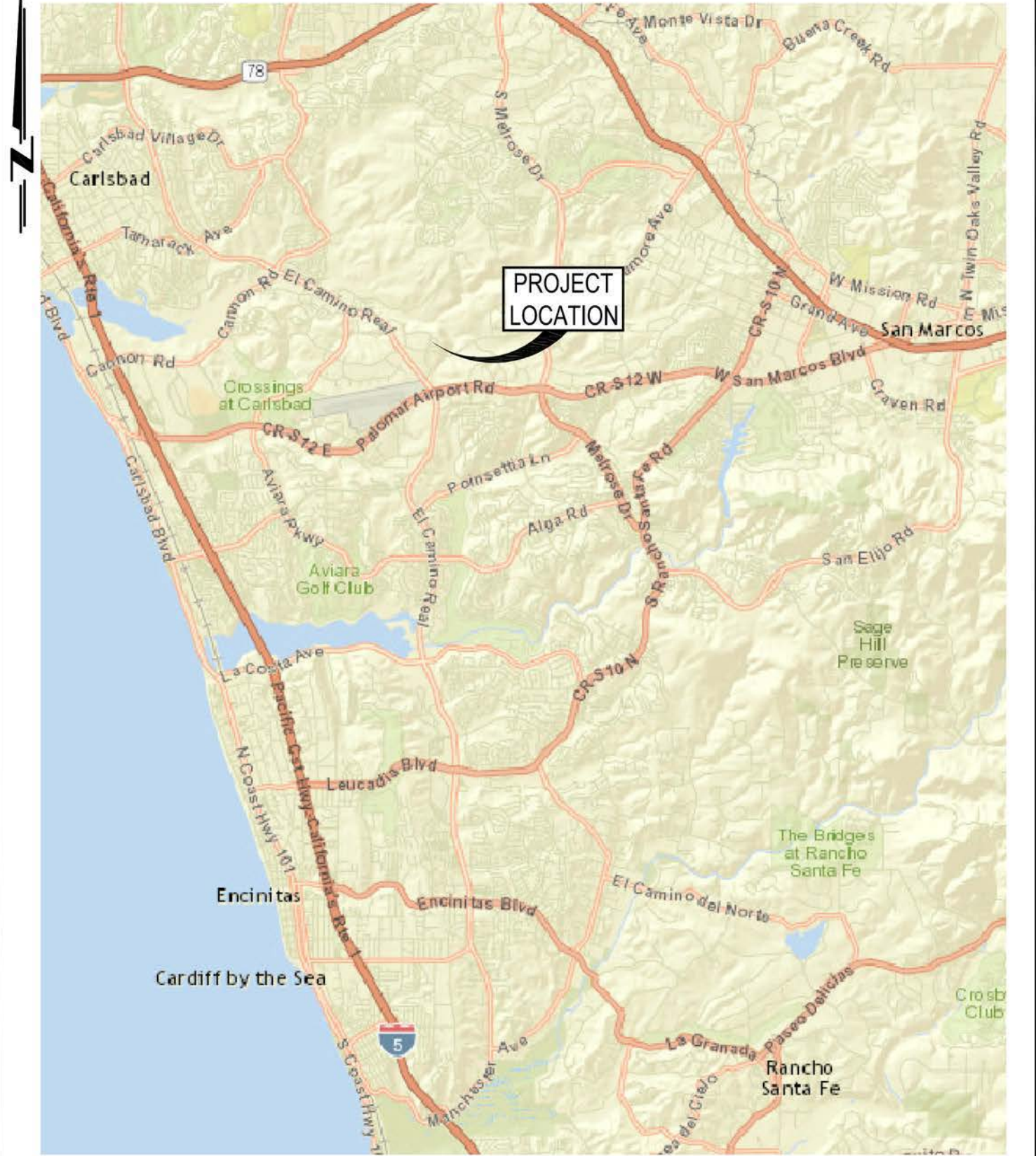
WSP USA

Company

07/15/2022

Date

PROJECT VICINITY MAP



**PROJECT
LOCATION**



BergerABAM

10525 Vista Sorrento Parkway, Suite 350
San Diego, CA 92121
(858) 500-4500 FAX: (858) 500-4501

VICINITY MAP

**CITY OF CARLSBAD MAINTENANCE & OPERATIONS
CENTER
2600 ORION WAY
CARLSBAD, CA**

MC PLOT NO: 1

DATE: JUNE, 2016 PROJECT NUMBER: A16.0054.00 FIG 1

[Insert City's Storm Water Standard Questionnaire (Form E-34) here]

**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 6**, mark the 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; OR
 b) Designed and constructed to be hydraulically disconnected from paved streets or roads; OR
 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 6**, 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 checked="" type="checkbox"/>	<input 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 street, road, highway, freeway or driveway surface collectively over the entire project site? <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 6 , 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 , complete the trash capture questions..		

* 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.

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) = 236,255 sq. ft.

Total proposed newly created or replaced impervious area (B) = 326,870 sq. ft.

Percent impervious area created or replaced (B/A)*100 = 138% %

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 6**, 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 6**, check the first box stating, "My project is a **PDP ...**" and complete applicant information.

STEP 5

TO BE COMPLETED FOR STANDARD PROJECTS

Complete the question below regarding your Standard Project (SDRWQCB Order No. 2017-0077):

YES NO

Is the Standard Project within any of the following Priority Land Use (PLU) categories?

R-23 (15-23 du/ac), R-30 (23-30 du/ac), PI (Planned Industrial), CF (Community Facilities), GC (General Commercial), L (Local Shopping Center), R (Regional Commercial), V-B (Village-Barrio), VC (Visitor Commercial), O (Office), VC/OS (Visitor Commercial/Open Space), PI/O (Planned Industrial/Office), or Public Transportation Station

If you answered "yes", the 'STANDARD PROJECT' is subject to **TRASH CAPTURE REQUIREMENTS**. **Go to step 6**, check the third box stating, "My project is a '**STANDARD PROJECT**' subject to **TRASH CAPTURE REQUIREMENTS ...**" and complete applicant information.

If you answered "no", your project is a 'STANDARD PROJECT'. Go to step 6, check the second box stating, "My project is a 'STANDARD PROJECT'..." and complete applicant information.

STEP 6

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**) per **E-35 template** 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.
- My project is a '**STANDARD PROJECT**' subject to **TRASH CAPTURE REQUIREMENTS** and must comply with **TRASH CAPTURE REQUIREMENTS** of the BMP Manual. I understand I must prepare a **TRASH CAPTURE Storm Water Quality Management Plan (SWQMP)** per **E-35A template** for submittal at time of application.

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: MIKE MAGEE, PE Applicant Title: CIVIL ENGINEER / PROJECT MANAGER

Applicant Signature:  Date: 07/15/2022

SITE INFORMATION CHECKLIST

Project Summary Information	
Project Name	ORION MAINTENANCE & OPERATIONS CENTER
Project ID	CUP2018-0022
Project Address	2600 ORION WAY CARLSBAD, CALIFORNIA 92010
Assessor's Parcel Number(s) (APN(s))	209-050-26-00
Project Watershed (Hydrologic Unit)	Carlsbad 904
Parcel Area	26.28 Acres (1,114,756 Square Feet)
Existing Impervious Area (subset of Parcel Area)	2.82 Acres (236,255 Square Feet)
Area to be disturbed by the project (Project Area)	8.24 Acres (359,010 Square Feet)
Project Proposed Impervious Area (subset of Project Area)	7.50 Acres (326,870 Square Feet)
Project Proposed Pervious Area (subset of Project Area)	0.74 Acres (32,140 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:

DEVELOPMENT OF NEW CITY OF CARLSBAD M&O CENTER, INCLUDING NEW BUILDINGS, PARKING LOTS, PARKING STRUCTURE, AND ASSOCIATED IMPROVEMENTS. THE REDEVELOPMENT PROJECT IS ADJACENT TO THE EXISTING FLEET MAINTENANCE BUILDING AND PUBLIC SAFETY CENTER.

Existing Land Cover Includes (select all that apply):

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

Description / Additional Information:

EXISTING LAND COVER INCLUDES THE EXISTING CITY OF CARLSBAD FLEET MAINTENANCE BUILDING, PUBLIC SAFETY CENTER, PARKING LOTS, AND ASSOCIATED IMPROVEMENTS. PORTIONS OF THE SITE ARE GRADED, BUT UNDEVELOPED (PERVIOUS VEGETATIVE AND NON-VEGETATED AREA).

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
- 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:

THE GROUNDWATER TABLE WAS NOT ENCOUNTERED WITHIN 20 FEET DURING THE GEOTECHNICAL INVESTIGATION BY SCST, INC. (JUNE 14, 2016). THE DEPTH TO GROUNDWATER IS UNDOCUMENTED BASED ON WATER RESOURCES CONTROL BOARD RECORDS (GEOTRACKER DATABASE).

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]:

THE EXISTING SITE TOPOGRAPHY IS RELATIVELY FLAT AND SLOPES GENTLY TO THE SOUTH. THE NORTHERN PORTION OF THE SITE IS DEVELOPED AND THE SOUTHERN PORTION IS RELATIVELY UNDEVELOPED, ALTHOUGH IT IS CURRENTLY UTILIZED AS A PARKING LOT AND MATERIAL STORAGE AREA.

GENERALLY, STORMWATER RUNOFF FROM THE SITE IS DISCHARGED TO AN ONSITE STORM SYSTEM THAT CONNECTS TO THE CITY OF CARLSBAD MUNICIPAL STORM CONVEYANCE SYSTEM ALONG ORION WAY TO THE WEST. THE EXISTING DRAINAGE PATTERN IS PRESENTED ON THE EXISTING CONDITIONS PLAN, DRAWING C-601.

Description of Proposed Site Development and Drainage Patterns

Project Description / Proposed Land Use and/or Activities:

THE PROPOSED PROJECT WILL CONSIST OF THE DESIGN AND CONSTRUCTION OF A CITY OF CARLSBAD MAINTENANCE AND OPERATIONS CENTER INCLUDING FIVE NEW BUILDINGS, A MULTI-STORY PARKING STRUCTURE, AND ASSOCIATED PARKING LOTS. THE PROJECT SITE CURRENTLY EXISTS AS DEVELOPED SPACE ADJACENT TO THE CITY OF CARLSBAD FLEET MAINTENANCE BUILDING AND PUBLIC SAFETY CENTER.

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

THE PROPOSED IMPERVIOUS FEATURES OF THE PROJECT INCLUDE FIVE NEW BUILDINGS, A MULTI-STORY PARKING STRUCTURE, AND ASSOCIATED PARKING LOTS.

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

THE PROPOSED PERVIOUS FEATURES INCLUDE IMPERVIOUS DISPERSION / LANDSCAPE AREA, PERMEABLE PAVEMENTS, BIOSWALES, AND BIOFILTRATION AREAS.

Does the project include grading and changes to site topography?

Yes

No

Description / Additional Information:

YES, EARTHWORK OPERATIONS WILL CONSIST OF SITE WIDE MASS GRADING, INCLUDING OVER EXCAVATIONS TO MITIGATE THE POTENTIAL FOR DIFFERENTIAL SETTLEMENT OF THE PROPOSED STRUCTURES.

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

Yes

No

Description / Additional Information:

YES, THE PROJECT INCLUDES CHANGES TO THE EXISTING SITE DRAINAGE PATTERN. ADDITIONALLY, THE PROJECT INCLUDES PERMANENT STORM WATER BMP FACILITIES TO TREAT STORM WATER QUALITY, VOLUME, AND RATE DISCHARGED FROM THE SITE.

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):

STORM WATER IS CONVEYED TO RECEIVING WATERS VIA THE EXISTING CITY OF CARLSBAD MUNICIPAL STORMWATER CONVEYANCE SYSTEM.

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
AGUA HEDIONDA CREEK (904.3)	NITROGEN	2019
	SELENIUM	2019
	MANGANESE	2019
	TOTAL DISSOLVED SOLIDS	2019
	PHOSPHORUS	2019
	INDICATOR BACTERIA	2019
	TOXICITY	2019
	BENTHIC COMMUNITY EFFECTS	2025
	BIFENTHRIN	2029
	CHLORPYRIFOS	2029
	CYPERMETHRIN	2029
	MALATHION	2029

Identification of Project Site Pollutants

Identify pollutants anticipated from the project site based on all proposed use(s) of the site (see Table B.6-1 below):

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

TABLE-1. Anticipated and Potential Pollutants Generated by Land Use Type

Priority Project Categories	General Pollutant Categories								
	Sediment	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Detached Residential Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P(1)	P(2)	P	X
Commercial Development >one acre	P(1)	P(1)	X	P(2)	X	P(5)	X	P(3)	P(5)
Heavy Industry	X		X	X	X	X	X		
Automotive Repair Shops			X	X(4)(5)	X		X		
Restaurants					X	X	X	X	P(1)
Hillside Development >5,000 ft2	X	X			X	X	X		X
Parking Lots	P(1)	P(1)	X		X	P(1)	X		P(1)
Retail Gasoline Outlets			X	X	X	X	X		
Streets, Highways & Freeways	X	P(1)	X	X(4)	X	P(5)	X	X	P(1)

X = anticipated
P = potential
(1) A potential pollutant if landscaping exists onsite.
(2) A potential pollutant if the project includes uncovered parking areas.
(3) A potential pollutant if land use involves food or animal waste products.
(4) Including petroleum hydrocarbons.
(5) Including solvents.

Trash Capture BMP Requirements

The project must meet the following Trash Capture BMP Requirements (see Section 4.4 of the BMP Design Manual): 1) The trash capture BMP is sized for a one-year, one-hour storm event or equivalent storm drain system, and 2) the trash capture BMP captures trash equal or greater to 5mm.

Description / Discussion of Trash Capture BMPs:

TRASH AND DEBRIS SCREENS / FILTERS SHALL BE INSTALLED AT ALL STORM DRAIN INLETS.

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 Appendix H of the manual been performed?

H.6.1 Site-Specific GLU Analysis

H.7 Downstream Systems Sensitivity to Coarse Sediment

H.7.3 Coarse Sediment Source Area Verification

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 H.2, H.3, and H.4 as applicable, and the areas are identified on the SWQMP Exhibit.

Discussion / Additional Information:

THE PROJECT SITE IS NOT LOCATED WITHIN A CRITICAL COARSE SEDIMENT YIELD AREA BASED ON REVIEW OF THE CARLSBAD WATERSHED MANAGEMENT AREA, WATER QUALITY IMPROVEMENT PLAN (WQIP) FOR THE CARLSBAD WATERSHED – HU 904.00, DATED JUNE 2016.

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 PROPOSED STRUCTURAL BMPs WILL BOTH TREAT AND REGULATE THE DISCHARGE RATE OF STORM WATER FROM EACH CORRESPONDING DRAINAGE MANAGEMENT AREA (DMA). THE SIZE OF RESPECTIVE FLOW CONTROL ORIFICES ARE IDENTIFIED ON THE BMP / HMP EXHIBITS.

THE RECEIVING CARLSBAD MUNICIPAL STORM WATER CONVEYANCE SYSTEM ULTIMATELY DISCHARGES TO THE AGUA HEDIONDA LAGOON AND PACIFIC OCEAN. THE SYSTEM IS PART OF THE APPROVED CARLSBAD DRAINAGE MASTER PLAN PREPARED BY BROWN AND CALDWELL, DATED JULY 3, 2008.

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:

N/A

Discussion / Additional Information: (optional)

N/A

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.

THE PROJECT SITE IS UNDERLAIN BY IMPERMEABLE SOILS THAT PRECLUDE INFILTRATION OF STORMWATER AS A METHOD OF WATER QUALITY TREATMENT AND FLOW CONTROL. PROPOSED TREATMENT AND FLOW CONTROL BMPs INCLUDE AN IMPERMEABLE LINEAR AND UNDERDRAIN SYSTEM TO MITIGATION ADVERSE EFFECTS OF IMPERMEABLE SOILS.

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.

N/A

[Insert City's Standard Project Requirement Checklist Form E-36 (here)]



STANDARD PROJECT REQUIREMENT CHECKLIST E-36

Development Services
Land Development Engineering
1635 Faraday Avenue
442-339-2750
www.carlsbadca.gov

Project Information

Project Name: ORION MAINTENANCE & OPERATIONS CENTER

Project ID: CUP2018-0022

DWG No. or Building Permit No.: TBD

Baseline BMPs for Existing and Proposed Site Features

Complete the **Table 1 - Site Design Requirement** to document existing and proposed site features and the BMPs to be implemented for them. All BMPs must be implemented **where applicable and feasible**. Applicability is generally assumed if a feature exists or is proposed.

BMPs must be implemented for **site design** features **where feasible**. Leaving the box for a BMP unchecked means it will not be implemented (either partially or fully) either because it is inapplicable or infeasible. Explanations must be provided in the **area below**. The table provides specific instructions on when explanations are required.

Table 1 - Site Design Requirement

A. Existing Natural Site Features (see Fact Sheet BL-1)

<p>1. Check the boxes below for each existing feature on the site.</p>	<p>1. Select the BMPs to be implemented for each identified feature. Explain why any BMP not selected is infeasible in the area below.</p>	
	<p>SD-G Conserve natural features</p>	<p>SD-H Provide buffers around waterbodies</p>
<input type="checkbox"/> Natural waterbodies	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Natural storage reservoirs & drainage corridors	<input type="checkbox"/>	--
<input type="checkbox"/> Natural areas, soils, & vegetation (incl. trees)	<input type="checkbox"/>	--

B. BMPs for Common Impervious Outdoor Site Features (see Fact Sheet BL-2)

<p>1. Check the boxes below for each proposed feature.</p>	<p>2. Select the BMPs to be implemented for each proposed feature. If neither BMP SD-B nor SD-I is selected for a feature, explain why both BMPs are infeasible in the area below.</p>		
	<p>SD-B Direct runoff to pervious areas</p>	<p>SD-I Construct surfaces from permeable materials</p>	<p>Minimize size of impervious areas</p>
<input type="checkbox"/> Streets and roads	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p><input checked="" type="checkbox"/> Check this box to confirm that all impervious areas on the site will be minimized where feasible.</p> <p>If this box is not checked, identify the surfaces that cannot be minimized in area below, and explain why it is</p>
<input type="checkbox"/> Sidewalks & walkways	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Parking areas & lots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Driveways	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Patios, decks, & courtyards	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/> Hardcourt recreation areas	<input type="checkbox"/>	<input type="checkbox"/>	

<input type="checkbox"/> Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<i>infeasible to do so.</i>
---------------------------------------	--------------------------	--------------------------	-----------------------------

C. <input checked="" type="checkbox"/> BMPs for Rooftop Areas: <i>Check this box if rooftop areas are proposed and select at least one BMP below.</i> <i>If no BMPs are selected, explain why they are infeasible in the area below.</i>	(see Fact Sheet BL-3)
--	------------------------------

<input checked="" type="checkbox"/> SD-B Direct runoff to pervious areas	<input type="checkbox"/> SD-C Install green roofs	<input type="checkbox"/> SD-E Install rain barrels
--	---	--

D. <input checked="" type="checkbox"/> BMPs for Landscaped Areas: <i>Check this box if landscaping is proposed and select the BMP below</i> <input checked="" type="checkbox"/> SD-K Sustainable Landscaping <i>If SD-K is not selected, explain why it is infeasible in the area below.</i>	(see Fact Sheet BL-4)
--	------------------------------

*Provide discussion/justification for site design BMPs that will **not** be implemented (either partially or fully):*

Baseline BMPs for Pollutant-generating Sources

All development projects must complete **Table 2 - Source Control Requirement** to identify applicable requirements for documenting pollutant-generating sources/ features and source control BMPs.

BMPs must be implemented for **source control** features *where feasible*. Leaving the box for a BMP unchecked means it will not be implemented (either partially or fully) either because it is inapplicable or infeasible. Explanations must be provided in the **area below**. The table provides specific instructions on when explanations are required.

Table 2 - Source Control Requirement

A. Management of Storm Water Discharges						
1. Identify all proposed outdoor work areas below <input type="checkbox"/> <i>Check here if none are proposed</i>	2. Which BMPs will be used to prevent materials from contacting rainfall or runoff? (See Fact Sheet BL-5) <i>Select all feasible BMPs for each work area</i>			3. Where will runoff from the work area be routed? (See Fact Sheet BL-6) <i>Select one or more option for each work area</i>		
	SC-A Overhead covering	SC-B Separation flows from adjacent areas	SC-C Wind protection	SC-D Sanitary sewer	SC-E Containment system	Other
<input checked="" type="checkbox"/> Trash & Refuse Storage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Materials & Equipment Storage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<input checked="" type="checkbox"/> Loading & Unloading	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Fueling	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Maintenance & Repair	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Vehicle & Equipment Cleaning	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B. Management of Storm Water Discharges (see Fact Sheet BL-7)

Select one option for each feature below:

• Storm drain inlets and catch basins ...	<input type="checkbox"/> are not proposed	<input checked="" type="checkbox"/> will be labeled with stenciling or signage to discourage dumping (SC-F)
• Interior work surfaces, floor drains & sumps ...	<input type="checkbox"/> are not proposed	<input checked="" type="checkbox"/> will not discharge directly or indirectly to the MS4 or receiving waters
• Drain lines (e.g. air conditioning, boiler, etc.) ...	<input type="checkbox"/> are not proposed	<input checked="" type="checkbox"/> will not discharge directly or indirectly to the MS4 or receiving waters
• Fire sprinkler test water ...	<input type="checkbox"/> are not proposed	<input checked="" type="checkbox"/> will not discharge directly or indirectly to the MS4 or receiving waters

Provide discussion/justification for source control BMPs that will **not** be implemented (either partially or fully):

Form Certification

This E-36 Form is intended to comply with applicable requirements of the city's BMP Design Manual. I certify that it has been completed to the best of my ability and accurately reflects the project being proposed and the applicable BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the review of this form by City staff is confined to a review and does not relieve me as the person in charge of overseeing the selection and design of storm water BMPs for this project, of my responsibilities for project design.

Preparer Signature: *Mike Magee*

Date: 07/15/2022

Print preparer name: MIKE MAGEE, PE

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.

BASED ON THE RESULTS OF IN-SITU BOREHOLE PERCOLATION TESTING PERFORMED BY SCST, INC. ON JUNE 3, 2016, THE UNDERLYING SOILS WERE DETERMINED TO HAVE NEGLIGIBLE TO ZERO INFILTRATION RATES FROM THE PROCHET METHOD OF ANALYSIS (NRCS SOIL TYPE D). THE RESULTS ARE REFLECTED ON THE ATTACHED I-8 FORM.

BIOFILTRATION BASINS INCLUDING IMPERMEABLE LINEAR AND UNDERDRAIN SYSTEM, AND MODULAR WETLAND VAULT UNITS HAVE BEEN PROPOSEDD AS PERMANENT STRUCTURAL STORM WATER TREATMENT AND FLOW CONTROL BMP FACILITIES IN ACCORDANCE WITH THE CITY OF CARLSBAD BMP DESIGN MANUAL AND STORM WATER STANDARDS.

[Continue on next page as necessary.]

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

Structural BMP Summary Information
[Copy this page as needed to provide information for each individual proposed structural BMP]

Structural BMP ID No. 1, 4, 5, 6, 7, 8, 9, 10

DWG TBD Sheet No. C6.2

- 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)
 - Dry Wells (INF-4)
 - Partial retention by biofiltration with partial retention (PR-1)
 - Biofiltration (BF-1)
 - Proprietary Biofiltration (BF-3)
 - 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):

THE BIOFILTRATION BMPS POSSESS A SIZED ORIFICES PROVIDING SUFFICIENT FLOW CONTROL FOR THE RESPECTIVE DMA THAT IS TREATED. ALL STRUCTURAL BIOFILTRATION BMPS DISCHARGE DIRECTLY TO THE EXISTING OFFSITE, CARLSBAD MUNICIPAL STORM WATER CONVEYANCE SYSTEM LOCATED ALONG ORION STREET. NO TREATMENT OR FLOW CONTROL OF STORM WATER IS PROPOSED IN SERIES. ADDITIONALLY, NO COMMINGLING OF UNTREATED AND TREATED STORM WATER IS ALLOWED. ALL STORM WATER DISCHARGED FROM THE PROJECT SITE HAS SATISFIED TREATMENT AND FLOW CONTROL REQUIREMENTS AT THE DMAS RESPECTIVE STRUCTURAL BIOFILTRATION BMP (POC).

THE RECEIVING CARLSBAD MUNICIPAL STORM WATER CONVEYANCE SYSTEM ULTIMATELY DISCHARGES TO THE AGUA HEDIONDA LAGOON AND PACIFIC OCEAN. THE SYSTEM IS PART OF THE APPROVED CARLSBAD DRAINAGE MASTER PLAN PREPARED BY BROWN AND CALDWELL, DATED JULY 3, 2008.

Structural BMP Summary Information
[Copy this page as needed to provide information for each individual proposed structural BMP]

Structural BMP ID No. 2, 3

DWG TBD Sheet No. C6.2

- 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)
 - Dry Wells (INF-4)
 - Partial retention by biofiltration with partial retention (PR-1)
 - Biofiltration (BF-1)
 - Proprietary Biofiltration (BF-3)
 - 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):

THE MODULAR WETLAND, PROPRIETARY BIOFILTRATION BMPS POSSESS A SIZED ORIFICES PROVIDING SUFFICIENT FLOW CONTROL FOR THE RESPECTIVE DMA THAT IS TREATED. ALL STRUCTURAL BIOFILTRATION BMPS DISCHARGE DIRECTLY TO THE EXISTING OFFSITE, CARLSBAD MUNICIPAL STORM WATER CONVEYANCE SYSTEM LOCATED ALONG ORION STREET. NO TREATMENT OR FLOW CONTROL OF STORM WATER IS PROPOSED IN SERIES. ADDITIONALLY, NO COMMINGLING OF UNTREATED AND TREATED STORM WATER IS ALLOWED. ALL STORM WATER DISCHARGED FROM THE PROJECT SITE HAS SATISFIED TREATMENT AND FLOW CONTROL REQUIREMENTS AT THE DMAS RESPECTIVE STRUCTURAL BIOFILTRATION BMP (POC).

THE RECEIVING CARLSBAD MUNICIPAL STORM WATER CONVEYANCE SYSTEM ULTIMATELY DISCHARGES TO THE AGUA HEDIONDA LAGOON AND PACIFIC OCEAN. THE SYSTEM IS PART OF THE APPROVED CARLSBAD DRAINAGE MASTER PLAN PREPARED BY BROWN AND CALDWELL, DATED JULY 3, 2008.

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 type="checkbox"/> Included on DMA Exhibit in Attachment 1a <input checked="" type="checkbox"/> Included as Attachment 1b, separate from DMA Exhibit
Attachment 1c	<p>Form K-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs)</p> <p>Refer to Appendix B of the BMP Design Manual to complete Form K-7.</p>	<input checked="" type="checkbox"/> Included <input type="checkbox"/> Not included because the entire project will use infiltration BMPs
Attachment 1d	<p>Infiltration Feasibility Analysis (Required unless the project will use harvest and use BMPs)</p> <p>Refer to Appendix D of the BMP Design Manual.</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, E, and I of the BMP Design Manual for structural pollutant control and significant site design BMP design guidelines</p>	<input checked="" type="checkbox"/> Included
Attachment 1f	<p>Trash Capture BMP Design Calculations (Required unless the entire project will use permanent storm water quality basins)</p> <p>Refer to Appendices J of the BMP Design Manual for Trash capture BMP design guidelines</p>	<input type="checkbox"/> Included <input checked="" type="checkbox"/> Not included because the entire project will use permanent storm water quality basins (i.e. infiltration, biofiltration BMPs)

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)
- Tabular DMA Summary

SWMP NO. TBD

PARTY RESPONSIBLE FOR MAINTENANCE:
NAME CITY OF CARLSBAD

PLAN PREPARED BY:
NAME MIKE MAGEE, PE
CERTIFICATION C85660

CONTACT TBD

ADDRESS 1635 FARADAY AVENUE
CARLSBAD, CALIFORNIA, 92008

PHONE NO. 760-602-2799

SIGNATURE

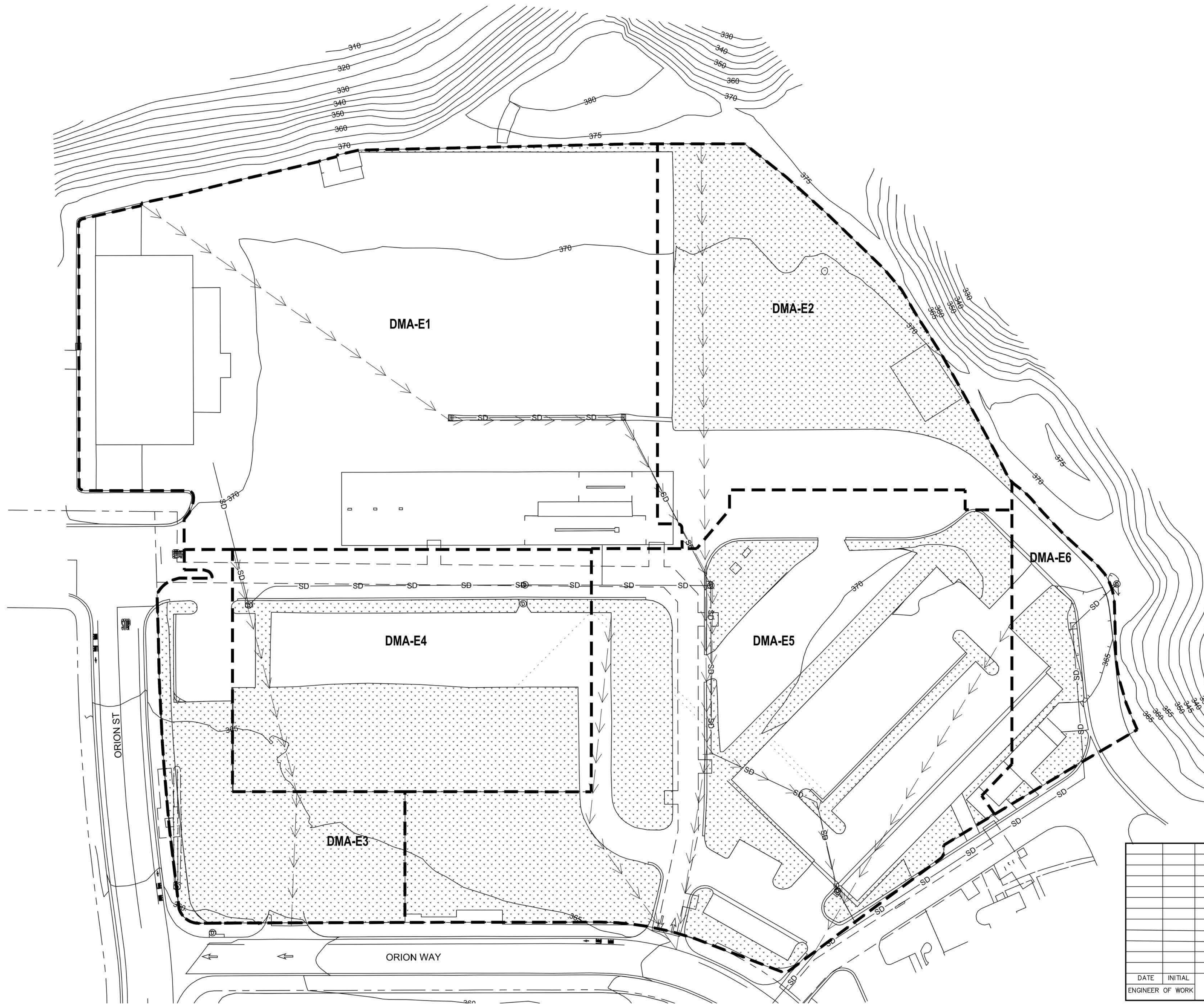
COMPANY WSP USA

ADDRESS 10525 VISTA SORRENTO PKWY
STE 350
SAN DIEGO, CALIFORNIA 92121

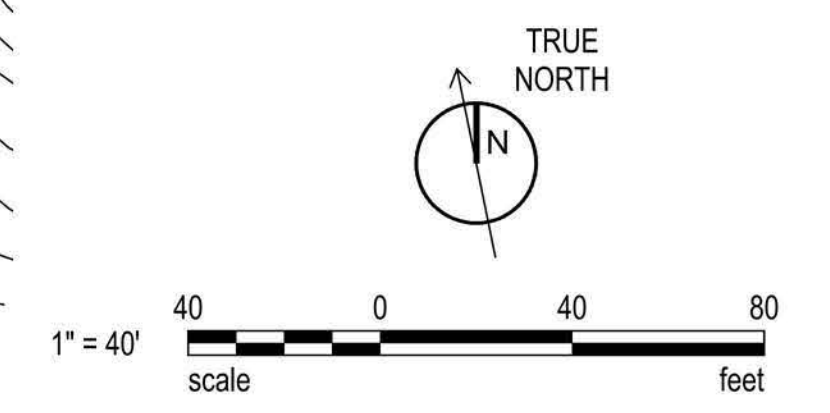
PHONE NO. 858-500-4500

Tabular Summary of DMAs												
DMA Unique Identifier	Area (SF)	Area (acres)	Pervious Area (SF)	Pervious Area (acres)	Percent Pervious (%)	HSG	Area Weighted Runoff Coefficient	Slope	Surface	Drains to Structural BMP ID(s)	Structural BMP Type	Total BMP Area (SF)
DMA-E1	117851	2.71	0	0.00	0%	TYPE D	1.00	Flat	Concrete	NONE	NONE	0
DMA-E2	48725	1.12	33984	0.78	70%	TYPE D	0.51	Flat	Concrete	NONE	NONE	0
DMA-E3	25518	0.59	23004	0.53	90%	TYPE D	0.37	Flat	Concrete	NONE	NONE	0
DMA-E4	47491	1.09	18965	0.44	40%	TYPE D	0.72	Flat	Concrete	NONE	NONE	0
DMA-E5	105021	2.41	43015	0.99	41%	TYPE D	0.71	Flat	Concrete	NONE	NONE	0
DMA-E6	14404	0.33	3787	0.09	26%	TYPE D	0.82	Flat	Concrete	NONE	NONE	0
TOTAL	359010	8.24	122755	2.82	34%	TYPE D	0.76	FLAT	PREDEVELOPMENT	-	-	0

Where: DMA = Drainage Management Area; Imp = Imperviousness; HSG = Hydrologic Soil Group; DCV = Design Capture Volume; BMP = Best Management Practice; POC = Point of Compliance; ID = Identifier; No. = Number



SYMBOL	DESCRIPTION
	DRAINAGE MANAGEMENT AREA (DMA) DELINEATION WITHIN PROJECT LIMITS
	PROJECT LIMITS OF WORK
	PUBLIC RIGHT OF WAY (ROW) LIMITS
	EASEMENT LIMITS
	PROPOSED BUILDING FOOTPRINT
	PROPOSED BIOFILTRATION BMP
	PROPOSED PROPRIETARY MODULAR WETLAND BIOFILTRATION VAULT BMP
	PROPOSED PERVIOUS LANDSCAPE AREA (SELF-RETAINING)
	PROPOSED STORM DRAIN ALIGNMENT
	DRAINAGE FLOW PATH (UNTREATED AND UNCONTROLLED FLOW RATE)
	DRAINAGE FLOW PATH (TREATED AND REGULATED FLOW RATE)



- DMA NOTES**
- THE PROJECT SITE HAS BEEN DETERMINED TO BE UNDERLAIN WITH TYPE D SOIL IN GENERAL ACCORDANCE WITH UNITED STATES DEPARTMENT OF AGRICULTURE SOIL TAXONOMY.
 - GROUNDWATER WAS NOT ENCOUNTERED IN THE SOIL BORINGS ADVANCED TO A MAXIMUM DEPTH OF 19 FEET DURING THE GEOTECHNICAL INVESTIGATION. THE DEPTH TO GROUNDWATER IS ESTIMATED TO BE BETWEEN APPROXIMATELY 20 AND 50 FEET BELOW EXISTING GROUND ELEVATION BASED ON READILY AVAILABLE DATA IN THE SITE VICINITY.
 - NO EXISTING HYDROLOGICAL FEATURES HAVE BEEN DOCUMENTED AT SITE.
 - NO CRITICAL SEDIMENT YIELD AREAS HAVE BEEN DOCUMENTED AT SITE.

DATE		INITIAL	REVISION DESCRIPTION	DATE	INITIAL	DATE	INITIAL
ENGINEER OF WORK				OTHER APPROVAL		CITY APPROVAL	

SHEET	CITY OF CARLSBAD ENGINEERING DEPARTMENT	SHEETS
DMA EXHIBIT EXISTING CONDITIONS		
RECORD COPY		PROJECT NO. CUP2018-0022
INITIAL	DATE	DRAWING NO. C6.0

SWMP NO. TBD

PARTY RESPONSIBLE FOR MAINTENANCE:
NAME CITY OF CARLSBAD

CONTACT TBD

ADDRESS 1635 FARADAY AVENUE
CARLSBAD, CALIFORNIA, 92008

PHONE NO. 760-602-2799

PLAN PREPARED BY:
NAME MIKE MAGEE, PE

CERTIFICATION C85660

COMPANY WSP

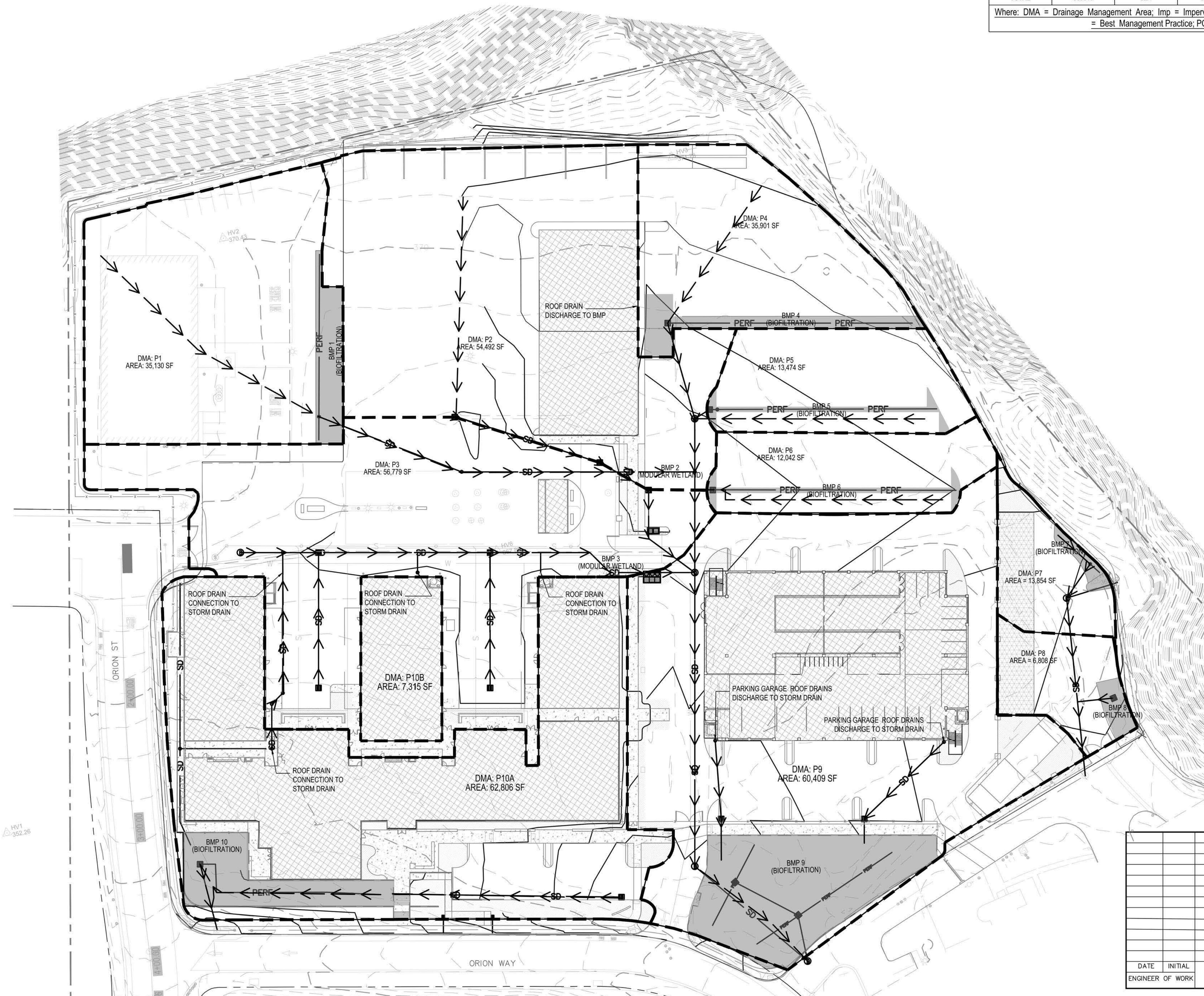
ADDRESS 10525 VISTA SORRENTO PKWY
STE 350
SAN DIEGO, CALIFORNIA 92121

PHONE NO. 858-500-4500

Worksheet B-1: Tabular Summary of DMAs

DMA Unique Identifier	Area (SF)	Area (acres)	Pervious Area (SF)	Pervious Area (acres)	Percent Pervious (%)	HSG	Area Weighted Runoff Coefficient	DCV (cubic feet)	Treated by BMP ID(s)	BMP Pollutant Control Type	Total BMP Area (SF)	Drains to POC ID(s)
P1	35130	0.81	2542	0.06	7%	TYPE D	0.86	1475	1	Biofiltration	2542	1
P2	54492	1.25	0	0.00	0%	TYPE D	0.90	2453	2	Modular Wetland	N/A	2
P3	56779	1.30	710	0.02	1%	TYPE D	0.89	2555	3	Modular Wetland	N/A	3
P4	35901	0.82	2642	0.06	7%	TYPE D	0.86	871	4	Biofiltration	2642	4
P5	13474	0.31	972	0.02	7%	TYPE D	0.86	566	5	Biofiltration	972	5
P6	12042	0.28	1037	0.02	9%	TYPE D	0.85	494	6	Biofiltration	1037	6
P7	13854	0.32	1299	0.03	9%	TYPE D	0.84	263	7	Biofiltration	625	7
P8	6808	0.16	767	0.02	11%	TYPE D	0.83	276	8	Biofiltration	767	8
P9	60409	1.39	15671	0.36	26%	TYPE D	0.74	3177	9	Biofiltration	12023	9
P10	70121	1.61	6500	0.15	9%	TYPE D	0.84	1279	10	Biofiltration	4599	10
TOTAL	359010	8.24	32140	0.74	9%	TYPE D	0.85	13409	-	-	25207	10 POCs

Where: DMA = Drainage Management Area; Imp = Imperviousness; HSG = Hydrologic Soil Group; DCV = Design Capture Volume; BMP = Best Management Practice; POC = Point of Compliance; ID = identifier; No. = Number



LEGEND

SYMBOL	DESCRIPTION
	DRAINAGE MANAGEMENT AREA (DMA) DELINEATION WITHIN PROJECT LIMITS
	PROJECT LIMITS OF WORK
	PUBLIC RIGHT OF WAY (ROW) LIMITS
	EASEMENT LIMITS
	PROPOSED BUILDING FOOTPRINT
	PROPOSED BIOFILTRATION BMP
	PROPOSED PROPRIETARY MODULAR WETLAND BIOFILTRATION VAULT BMP
	PROPOSED PERVIOUS LANDSCAPE AREA (SELF-RETAINING)
	PROPOSED STORM DRAIN ALIGNMENT
	DRAINAGE FLOW PATH (TREATED AND REGULATED FLOW RATE)

- DMA NOTES**
1. THE PROJECT SITE HAS BEEN DETERMINED TO BE UNDERLAIN WITH TYPE D SOIL IN GENERAL ACCORDANCE WITH UNITED STATES DEPARTMENT OF AGRICULTURE SOIL TAXONOMY.
 2. GROUNDWATER WAS NOT ENCOUNTERED IN THE SOIL BORINGS ADVANCED TO A MAXIMUM DEPTH OF 19 FEET DURING THE GEOTECHNICAL INVESTIGATION. THE DEPTH TO GROUNDWATER IS ESTIMATED TO BE BETWEEN APPROXIMATELY 20 AND 50 FEET BELOW EXISTING GROUND ELEVATION BASED ON READILY AVAILABLE DATA IN THE SITE VICINITY.
 3. NO EXISTING HYDROLOGICAL FEATURES HAVE BEEN DOCUMENTED AT SITE.
 4. NO CRITICAL SEDIMENT YIELD AREAS HAVE BEEN DOCUMENTED AT SITE.
 5. DEVELOPMENT AREAS SHOULD BE CONSIDERED IMPERVIOUS UNLESS INDICATED OTHERWISE.

SHEET		CITY OF CARLSBAD ENGINEERING DEPARTMENT		SHEETS	
DMA EXHIBIT PROPOSED CONDITIONS					
RECORD COPY				PROJECT NO. CUP2018-0022	
INITIAL _____ DATE _____				DRAWING NO. C6.1	
DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
ENGINEER OF WORK		OTHER APPROVAL	CITY APPROVAL		
REVISION DESCRIPTION					

Tabular Summary of DMAs											
DMA Unique Identifier	Area (SF)	Area (acres)	Pervious Area (SF)	Pervious Area (acres)	Percent Pervious (%)	HSG	Area Weighted Runoff Coefficient	Treated by BMP ID(s)	BMP Pollutant Control Type	Total BMP Area (SF)	Drains to POC ID(s)
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DMA: E2	48725	1.12	33984	0.78	70%	TYPE D	0.51	N/A	N/A	0	N/A
DMA: E3	25518	0.59	23004	0.53	90%	TYPE D	0.37	N/A	N/A	0	N/A
DMA: E4	47491	1.09	18965	0.44	40%	TYPE D	0.72	N/A	N/A	0	N/A
DMA: E5	105021	2.41	43015	0.99	41%	TYPE D	0.71	N/A	N/A	0	N/A
DMA: E6	14404	0.33	3787	0.09	26%	TYPE D	0.82	N/A	N/A	0	N/A
TOTAL	359010	8.24	122755	2.82	34%	TYPE D	0.76	-	-	0	-

Where: DMA = Drainage Management Area; Imp = Imperviousness; HSG = Hydrologic Soil Group; DCV= Design Capture Volume;

Worksheet B-1: Tabular Summary of DMAs											
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P6	12042	0.28	1037	0.02	9%	TYPE D	0.85	494	6	Biofiltration	1037
P7	13854	0.32	1299	0.03	9%	TYPE D	0.84	263	7	Biofiltration	625
P8	6808	0.16	767	0.02	11%	TYPE D	0.83	276	8	Biofiltration	767
P9	60409	1.39	15671	0.36	26%	TYPE D	0.74	3177	9	Biofiltration	12023
P10	70121	1.61	6500	0.15	9%	TYPE D	0.84	1279	10	Biofiltration	4599
TOTAL	359010	8.24	32140	0.74	9%	TYPE D	0.85	13409	-	-	25207

Where: DMA = Drainage Management Area; Imp = Imperviousness; HSG = Hydrologic Soil Group;

Harvest and Use Feasibility Checklist		Form K-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>36-Hour moderate plant irrigation demand (planning level) = 1,470 gal Toilet and urinal demand = 300 employees * 9 gal per emp. per day * (36hr/24hr/day) = 4050 gal</p>		
<p>3. Calculate the DCV using worksheet B-2.1.</p> <p>DCV = <u>16,629</u> (cubic feet)</p>		
<p>3a. Is the 36 hour demand greater than or equal to the DCV?</p> <p><input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No ⇒</p> <p style="text-align: center;">⇓</p>	<p>3b. Is the 36 hour demand greater than 0.25DCV but less than the full DCV?</p> <p><input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No ⇒</p> <p style="text-align: center;">⇓</p>	<p>3c. Is the 36 hour demand less than 0.25DCV?</p> <p><input checked="" type="checkbox"/> Yes ⇓</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>		

Note: 36-hour demand calculations are for feasibility analysis only. Once feasibility analysis is complete the applicant may be allowed to use a different drawdown time provided they meet the 80% annual capture standard (refer to B.4.2) and 96-hour vector control drawdown requirement.

Factor of Safety and Design Infiltration Rate Worksheet			Form K-9		
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) $p = w \times v$
A	Suitability Assessment	Soil assessment methods	0.25	X	X
		Predominant soil texture	0.25		
		Site soil variability	0.25		
		Depth to groundwater / impervious layer	0.25		
		Suitability Assessment Safety Factor, $S_A = \sum p$			
B	Design	Level of pretreatment/ expected sediment loads	0.5		
		Redundancy/resiliency	0.25		
		Compaction during construction	0.25		
		Design Safety Factor, $S_B = \sum p$			
Combined Safety Factor, $S_{total} = S_A \times S_B$					
Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias)				BETWEEN 0.0 & 0.1 IN/HR	
Design Infiltration Rate, in/hr, $K_{design} = K_{observed} / S_{total}$				0.00 IN/HR (AS RECOMMENDED BY GEOTECHNICAL ENGINEER).	
Supporting Data					
<p>Briefly describe infiltration test and provide reference to test forms:</p> <p>Borehole percolation tests were performed at the project site under the observation of the geotechnical engineer to assess storm water infiltration feasibility. The test results indicate infiltration rates between 0.0 and 0.1 inch per hour at the test locations.</p>					

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 Hydromodification Management Exhibit Checklist on the back of this Attachment cover sheet.
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 checked="" type="checkbox"/> Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) Optional analyses for Critical Coarse Sediment Yield Area Determination <input type="checkbox"/> Appendix H.6.1 Verification of Geomorphic Landscape Units Onsite <input type="checkbox"/> Appendix H.7 Downstream Systems Sensitivity to Coarse Sediment
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

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

The Hydromodification Management Exhibit must identify:

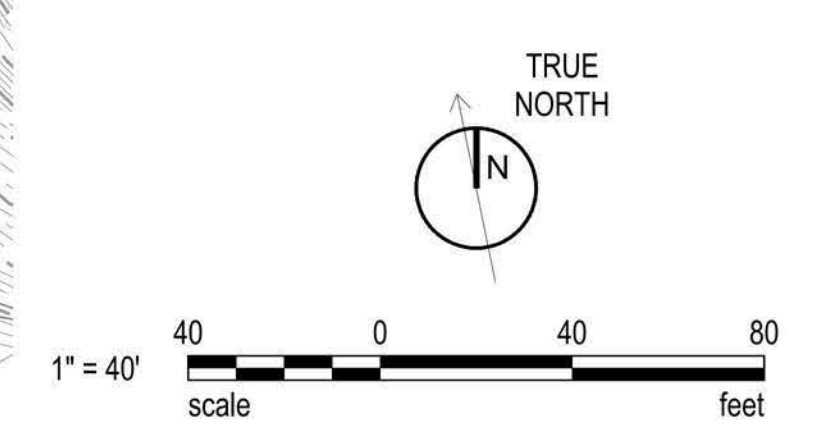
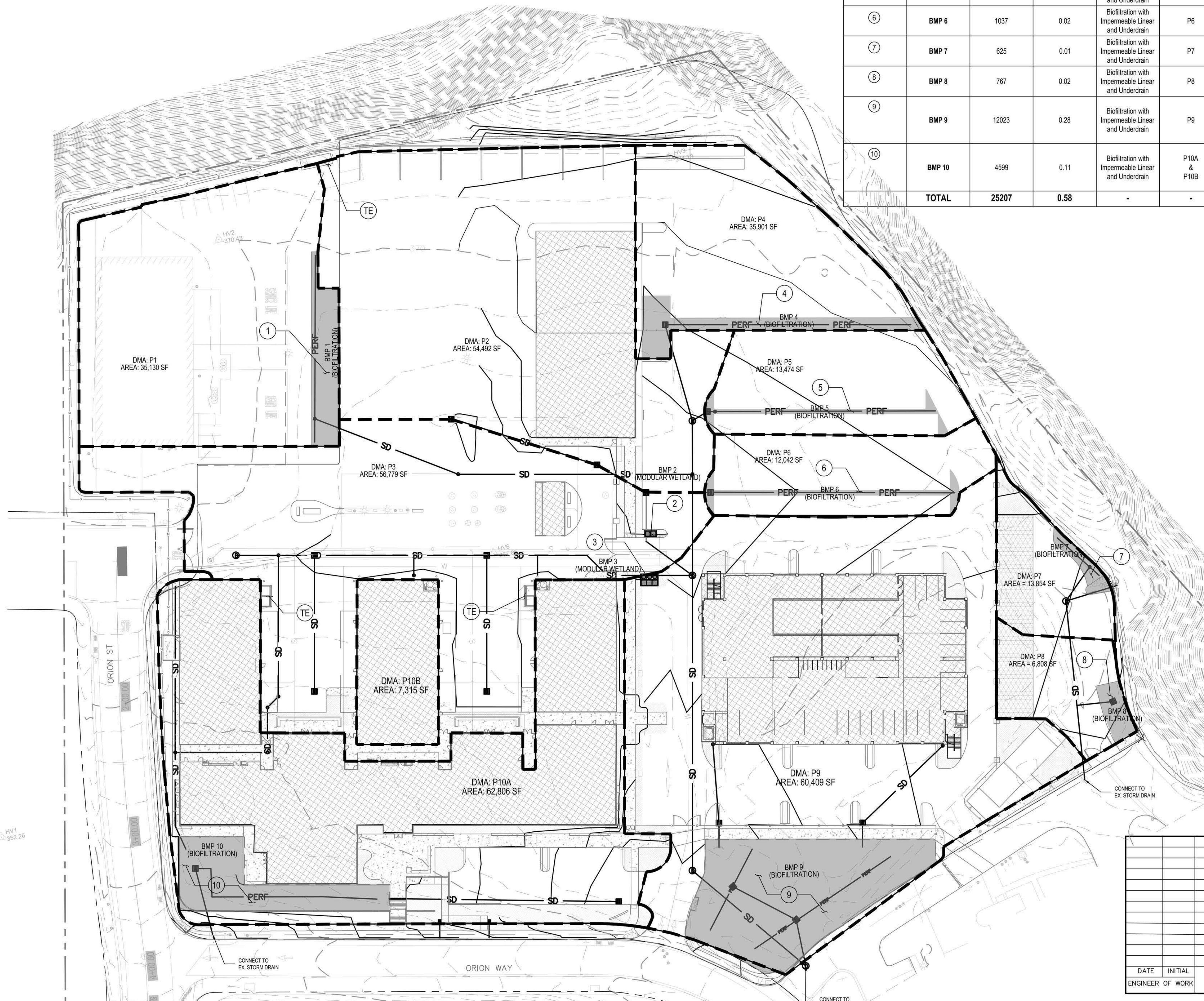
- Underlying hydrologic soil group
- Approximate depth to groundwater
- Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- Critical coarse sediment yield areas to be protected (if present)
- Existing topography
- Existing and proposed site drainage network and connections 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)

SWMP NO. TBD

PARTY RESPONSIBLE FOR MAINTENANCE:
 NAME CITY OF CARLSBAD

PLAN PREPARED BY:
 NAME MIKE MAGEE, PE
 CERTIFICATION C85660
 COMPANY WSP
 ADDRESS 10525 VISTA SORRENTO PKWY
 STE 350
 SAN DIEGO, CALIFORNIA 92121
 PHONE NO. 858-500-4500






BMP ID	Area (SF)	Area (acres)	BMP Type	Tributary DMA(s)	HYDROMOD					POLLUTANT CONTROL				
					Minimum BMP Area (sq. ft.)	Provided BMP Surface Area (sq. ft.)	Maximum HydroMod Orifice Diameter (in.)	Provided HydroMod Orifice Diameter (in.)	Drawdown Time (hours)	Total Design Capture Volume, DCV (CF) [Volume Retained + Filtered]	Volume Retained by BMP (CF)	Design Capture Volume, DCV, Requiring Biofiltration (CF)	Total Biofiltration Volume Provided, 1.5xDCV (CF)	
①	BMP 1	2542	0.06	Biofiltration with Impermeable Linear and Underdrain	P1	2115	2542	0.97	0.75	6.5	1,475	452	1,023	1,534
②	BMP 2	N/A		Modular Wetland	P2	3433	-	1.20	1.20	-	2,453	-	2,453	3,680
③	BMP 3	N/A		Modular Wetland	P3	3537	-	1.23	1.20	-	2,555	-	2,555	3,833
④	BMP 4	2642	0.06	Biofiltration with Impermeable Linear and Underdrain	P4	2161	2642	0.98	0.50	15.2	871	434	437	655
⑤	BMP 5	972	0.02	Biofiltration with Impermeable Linear and Underdrain	P5	811	972	0.60	0.50	5.6	566	173	393	589
⑥	BMP 6	1037	0.02	Biofiltration with Impermeable Linear and Underdrain	P6	716	1037	0.57	0.50	6.0	494	181	313	470
⑦	BMP 7	625	0.01	Biofiltration with Impermeable Linear and Underdrain	P7	815	625	0.61	0.50	3.6	263	107	156	234
⑧	BMP 8	767	0.02	Biofiltration with Impermeable Linear and Underdrain	P8	396	767	0.43	0.25	17.7	276	126	150	225
⑨	BMP 9	12023	0.28	Biofiltration with Impermeable Linear and Underdrain	P9	3129	12023	1.27	1.00	17.3	3,177	1,810	1,367	2,051
⑩	BMP 10	4599	0.11	Biofiltration with Impermeable Linear and Underdrain	P10A & P10B	4123	4599	1.37	1.00	6.6	1,279	706	573	860
TOTAL						21236	25207	SATISFIED	SATISFIED	SATISFIED	13409	3989	9420	14131

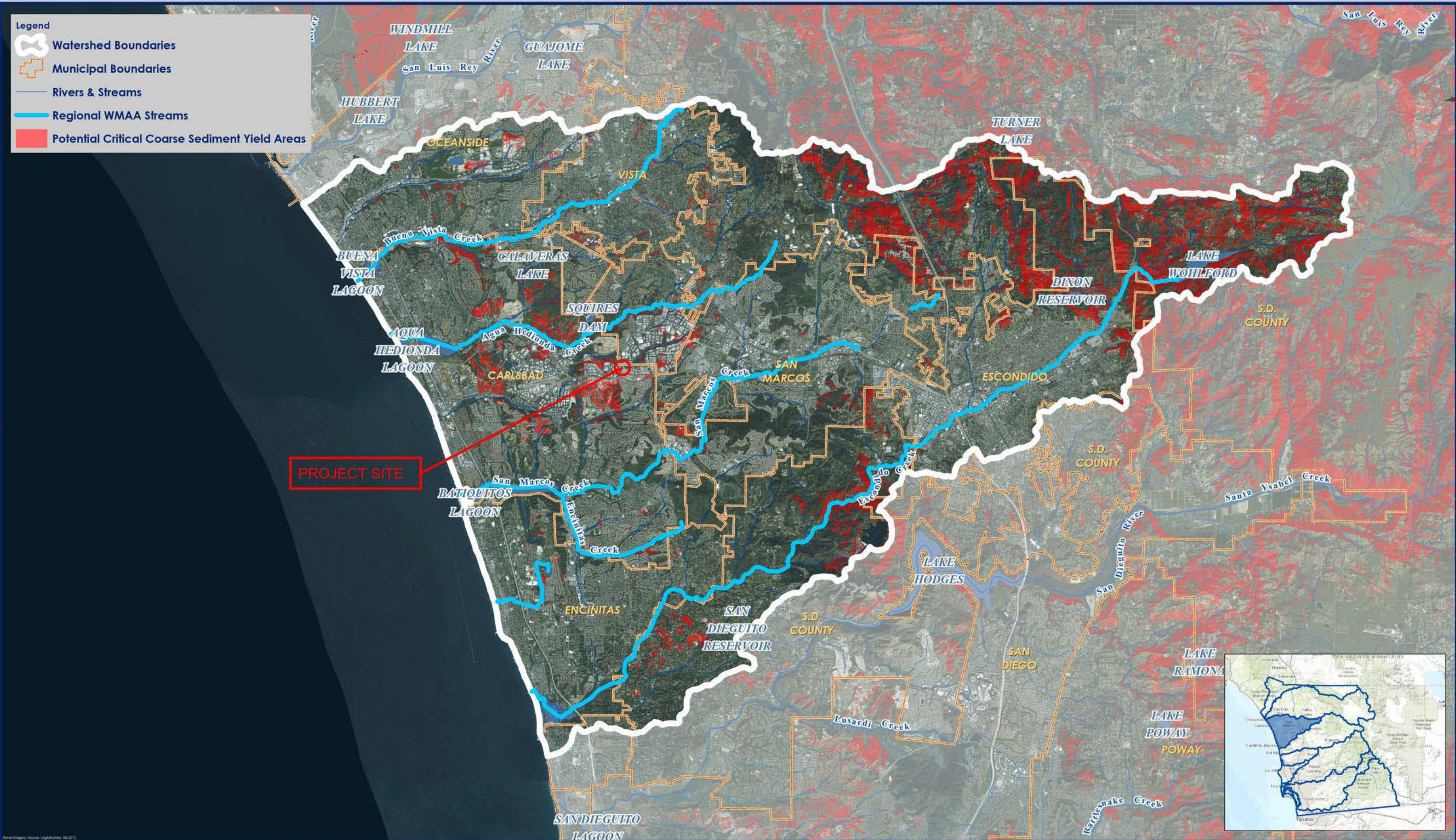


- HMP NOTES**
1. THE PROJECT SITE HAS BEEN DETERMINED TO BE UNDERLAIN WITH TYPE D SOIL IN GENERAL ACCORDANCE WITH UNITED STATES DEPARTMENT OF AGRICULTURE SOIL TAXONOMY.
 2. GROUNDWATER WAS NOT ENCOUNTERED IN THE SOIL BORINGS ADVANCED TO A MAXIMUM DEPTH OF 19 FEET DURING THE GEOTECHNICAL INVESTIGATION. THE DEPTH TO GROUNDWATER IS ESTIMATED TO BE BETWEEN APPROXIMATELY 20 AND 50 FEET BELOW EXISTING GROUND ELEVATION BASED ON READILY AVAILABLE DATA IN THE SITE VICINITY.
 3. NO EXISTING HYDROLOGICAL FEATURES HAVE BEEN DOCUMENTED AT SITE.
 4. NO CRITICAL SEDIMENT YIELD AREAS HAVE BEEN DOCUMENTED AT SITE.
 5. DEVELOPMENT AREAS SHOULD BE CONSIDERED IMPERVIOUS UNLESS INDICATED OTHERWISE.

DATE		INITIAL	REVISION DESCRIPTION	DATE	INITIAL	DATE	INITIAL
ENGINEER OF WORK				OTHER APPROVAL		CITY APPROVAL	

SHEET	CITY OF CARLSBAD ENGINEERING DEPARTMENT	SHEETS
STORM WATER HMP EXHIBIT		
RECORD COPY		PROJECT NO. CUP2018-0022
INITIAL _____ DATE _____		DRAWING NO. C6.3

- Legend**
-  Watershed Boundaries
 -  Municipal Boundaries
 -  Rivers & Streams
 -  Regional WMAA Streams
 -  Potential Critical Coarse Sediment Yield Areas



Potential Critical Coarse Sediment Yield Areas

Carlsbad Watershed - HU 904.00, 211 mi²

Exhibit Date: Sept. 8, 2014







Aerial Imagery Source: DigitalGlobe, 03/2012

BMP Sizing Spreadsheet V3.1

Project Name:	Orion Maintenance & Operations Center
Project Applicant:	WSP
Jurisdiction:	City of Carlsbad
Parcel (APN):	2090502600
Hydrologic Unit:	Agua Hedionda
Rain Gauge:	Oceanside
Total Project Area (sf):	359,010
Channel Susceptibility:	High

BMP Sizing Spreadsheet V3.1			
Project Name:	Ion Maintenance & Operations Cen	Hydrologic Unit:	Agua Hedionda
Project Applicant:	WSP	Rain Gauge:	Oceanside
Jurisdiction:	City of Carlsbad	Total Project Area:	359,010
Parcel (APN):	2090502600	Low Flow Threshold:	0.1Q2
BMP Name:	X	BMP Type:	Biofiltration
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors		Minimum BMP Size	
DMA Name	Area (sf)	Pre Project Soil Type	Pre-Project Slope	Post Project Surface Type	Area Weighted Runoff Factor (Table G.2-1) ¹	Surface Area	Surface Area (SF)		
P1	35130	D	FLAT	Concrete	0.86	0.07	2115		
P2	54492	D	FLAT	Concrete	0.90	0.07	3433		
P3	56779	D	FLAT	Concrete	0.89	0.07	3537		
P4	35901	D	FLAT	Concrete	0.86	0.07	2161		
P5	13474	D	FLAT	Concrete	0.86	0.07	811		
P6	12042	D	FLAT	Concrete	0.85	0.07	716		
P7	13854	D	FLAT	Concrete	0.84	0.07	815		
P8	6808	D	FLAT	Concrete	0.83	0.07	396		
P9	60409	D	FLAT	Concrete	0.74	0.07	3129		
P10	70121	D	FLAT	Concrete	0.84	0.07	4123		
						0	0		
						0	0		
						0	0		
						0	0		
						0	0		
						0	0		
BMP Tributary Area		359,010				Minimum BMP Size		21236	
						Proposed BMP Size*		25207	

* Assumes standard configuration

Surface Ponding Depth	3.00	in
Bioretention Soil Media Depth	18.00	in
Filter Coarse	6.00	in
Gravel Storage Layer Depth	12	in
Underdrain Offset	3.0	in

Notes:

1. Runoff factors which are used for hydromodification management flow control (Table G.2-1) are different from the runoff factors used for pollutant control BMP sizing (Table B.1-1). Table references are taken from the San Diego Region Model BMP Design Manual,

Describe the BMP's in sufficient detail in your PDP SWQMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head. Designated Staff have final review and approval authority over the project design.

This BMP Sizing Spreadsheet has been updated in conformance with the San Diego Region Model BMP Design Manual, May 2018. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V3.1			
Project Name:	on Maintenance & Operations Cer	Hydrologic Unit:	Agua Hedionda
Project Applicant:	WSP	Rain Gauge:	Oceanside
Jurisdiction:	City of Carlsbad	Total Project Area:	359,010
Parcel (APN):	2090502600	Low Flow Threshold:	0.1Q2
BMP Name	X	BMP Type:	Biofiltration

DMA Name	Rain Gauge	Pre-developed Condition		Unit Runoff Ratio (cfs/ac)	DMA Area (ac)	Orifice Flow - %Q ₂ (cfs)	Orifice Area (in ²)
		Soil Type	Slope				
P1	Oceanside	D	FLAT	0.571	0.806	0.046	0.73
P2	Oceanside	D	FLAT	0.571	1.251	0.071	1.14
P3	Oceanside	D	FLAT	0.571	1.303	0.074	1.19
P4	Oceanside	D	FLAT	0.571	0.824	0.047	0.75
P5	Oceanside	D	FLAT	0.571	0.309	0.018	0.28
P6	Oceanside	D	FLAT	0.571	0.276	0.016	0.25
P7	Oceanside	D	FLAT	0.571	0.318	0.018	0.29
P8	Oceanside	D	FLAT	0.571	0.156	0.009	0.14
P9	Oceanside	D	FLAT	0.571	1.387	0.079	1.26
P10	Oceanside	D	FLAT	0.571	1.610	0.092	1.47

3.00	0.471	7.50	3.09
Max Orifice Head (feet)	Max Tot. Allowable Orifice Flow (cfs)	Max Tot. Allowable Orifice Area (in ²)	Max Orifice Diameter (in)

0.434	0.443	7.07	3.000
Average outflow during surface drawdown (cfs)	Max Orifice Outflow (cfs)	Actual Orifice Area (in ²)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.0
----------------	-----

BMP Sizing Spreadsheet V3.1			
Project Name:	Ion Maintenance & Operations Cen	Hydrologic Unit:	Agua Hedionda
Project Applicant:	WSP	Rain Gauge:	Oceanside
Jurisdiction:	City of Carlsbad	Total Project Area:	359,010
Parcel (APN):	2090502600	Low Flow Threshold:	0.1Q2
BMP Name:	5	BMP Type:	Biofiltration
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors	Minimum BMP Size
DMA Name	Area (sf)	Pre Project Soil Type	Pre-Project Slope	Post Project Surface Type	Area Weighted Runoff Factor (Table G.2-1) ¹	Surface Area	Surface Area (SF)
						0	0
						0	0
						0	0
						0	0
P5	13474	D	FLAT	Concrete	0.86	0.07	811
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
BMP Tributary Area	13,474					Minimum BMP Size	811
						Proposed BMP Size*	972

* Assumes standard configuration

Surface Ponding Depth	3.00	in
Bioretention Soil Media Depth	18.00	in
Filter Coarse	6.00	in
Gravel Storage Layer Depth	12	in
Underdrain Offset	3.0	in

Notes:
 1. Runoff factors which are used for hydromodification management flow control (Table G.2-1) are different from the runoff factors used for pollutant control BMP sizing (Table B.1-1). Table references are taken from the San Diego Region Model BMP Design Manual,

Describe the BMP's in sufficient detail in your PDP SWQMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head. Designated Staff have final review and approval authority over the project design.

This BMP Sizing Spreadsheet has been updated in conformance with the San Diego Region Model BMP Design Manual, May 2018. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V3.1			
Project Name:	on Maintenance & Operations Cer	Hydrologic Unit:	Agua Hedionda
Project Applicant:	WSP	Rain Gauge:	Oceanside
Jurisdiction:	City of Carlsbad	Total Project Area:	359,010
Parcel (APN):	2090502600	Low Flow Threshold:	0.1Q2
BMP Name	5	BMP Type:	Biofiltration

DMA Name	Rain Gauge	Pre-developed Condition		Unit Runoff Ratio (cfs/ac)	DMA Area (ac)	Orifice Flow - %Q ₂ (cfs)	Orifice Area (in ²)
		Soil Type	Slope				
P5	Oceanside	D	FLAT	0.571	0.309	0.018	0.28

3.00	0.018	0.28	0.60
Max Orifice Head (feet)	Max Tot. Allowable Orifice Flow (cfs)	Max Tot. Allowable Orifice Area (in ²)	Max Orifice Diameter (in)

0.012	0.012	0.20	0.500
Average outflow during surface drawdown (cfs)	Max Orifice Outflow (cfs)	Actual Orifice Area (in ²)	Selected Orifice Diameter (in)

Drawdown (Hrs)	5.6
----------------	-----

BMP Sizing Spreadsheet V3.1			
Project Name:	on Maintenance & Operations Cer	Hydrologic Unit:	Agua Hedionda
Project Applicant:	WSP	Rain Gauge:	Oceanside
Jurisdiction:	City of Carlsbad	Total Project Area:	359,010
Parcel (APN):	2090502600	Low Flow Threshold:	0.1Q2
BMP Name	6	BMP Type:	Biofiltration

DMA Name	Rain Gauge	Pre-developed Condition		Unit Runoff Ratio (cfs/ac)	DMA Area (ac)	Orifice Flow - %Q ₂ (cfs)	Orifice Area (in ²)
		Soil Type	Slope				
P6	Oceanside	D	FLAT	0.571	0.276	0.016	0.25

3.00	0.016	0.25	0.57
Max Orifice Head (feet)	Max Tot. Allowable Orifice Flow (cfs)	Max Tot. Allowable Orifice Area (in ²)	Max Orifice Diameter (in)

0.012	0.012	0.20	0.500
Average outflow during surface drawdown (cfs)	Max Orifice Outflow (cfs)	Actual Orifice Area (in ²)	Selected Orifice Diameter (in)

Drawdown (Hrs)	6.0
----------------	-----

BMP Sizing Spreadsheet V3.1

Project Name:	on Maintenance & Operations Cer	Hydrologic Unit:	Agua Hedionda
Project Applicant:	WSP	Rain Gauge:	Oceanside
Jurisdiction:	City of Carlsbad	Total Project Area:	359,010
Parcel (APN):	2090502600	Low Flow Threshold:	0.1Q2
BMP Name	7	BMP Type:	Biofiltration

DMA Name	Rain Gauge	Pre-developed Condition		Unit Runoff Ratio (cfs/ac)	DMA Area (ac)	Orifice Flow - %Q ₂ (cfs)	Orifice Area (in ²)
		Soil Type	Slope				
P7	Oceanside	D	FLAT	0.571	0.318	0.018	0.29

3.00	0.018	0.29	0.61
Max Orifice Head (feet)	Max Tot. Allowable Orifice Flow (cfs)	Max Tot. Allowable Orifice Area (in ²)	Max Orifice Diameter (in)

0.012	0.012	0.20	0.500
Average outflow during surface drawdown (cfs)	Max Orifice Outflow (cfs)	Actual Orifice Area (in ²)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.6
----------------	-----

BMP Sizing Spreadsheet V3.1			
Project Name:	on Maintenance & Operations Cer	Hydrologic Unit:	Agua Hedionda
Project Applicant:	WSP	Rain Gauge:	Oceanside
Jurisdiction:	City of Carlsbad	Total Project Area:	359,010
Parcel (APN):	2090502600	Low Flow Threshold:	0.1Q2
BMP Name	8	BMP Type:	Biofiltration

DMA Name	Rain Gauge	Pre-developed Condition		Unit Runoff Ratio (cfs/ac)	DMA Area (ac)	Orifice Flow - %Q ₂ (cfs)	Orifice Area (in ²)
		Soil Type	Slope				
P8	Oceanside	D	FLAT	0.571	0.156	0.009	0.14

3.00	0.009	0.14	0.43
Max Orifice Head (feet)	Max Tot. Allowable Orifice Flow (cfs)	Max Tot. Allowable Orifice Area (in ²)	Max Orifice Diameter (in)

0.003	0.003	0.05	0.250
Average outflow during surface drawdown (cfs)	Max Orifice Outflow (cfs)	Actual Orifice Area (in ²)	Selected Orifice Diameter (in)

Drawdown (Hrs)	17.7
----------------	------

BMP Sizing Spreadsheet V3.1			
Project Name:	on Maintenance & Operations Cer	Hydrologic Unit:	Agua Hedionda
Project Applicant:	WSP	Rain Gauge:	Oceanside
Jurisdiction:	City of Carlsbad	Total Project Area:	359,010
Parcel (APN):	2090502600	Low Flow Threshold:	0.1Q2
BMP Name	9	BMP Type:	Biofiltration

DMA Name	Rain Gauge	Pre-developed Condition		Unit Runoff Ratio (cfs/ac)	DMA Area (ac)	Orifice Flow - %Q ₂ (cfs)	Orifice Area (in ²)
		Soil Type	Slope				
P9	Oceanside	D	FLAT	0.571	1.387	0.079	1.26

3.00	0.079	1.26	1.27
Max Orifice Head (feet)	Max Tot. Allowable Orifice Flow (cfs)	Max Tot. Allowable Orifice Area (in ²)	Max Orifice Diameter (in)

0.048	0.049	0.79	1.000
Average outflow during surface drawdown (cfs)	Max Orifice Outflow (cfs)	Actual Orifice Area (in ²)	Selected Orifice Diameter (in)

Drawdown (Hrs)	17.3
----------------	------

BMP Sizing Spreadsheet V3.1			
Project Name:	on Maintenance & Operations Cer	Hydrologic Unit:	Agua Hedionda
Project Applicant:	WSP	Rain Gauge:	Oceanside
Jurisdiction:	City of Carlsbad	Total Project Area:	359,010
Parcel (APN):	2090502600	Low Flow Threshold:	0.1Q2
BMP Name	10	BMP Type:	Biofiltration

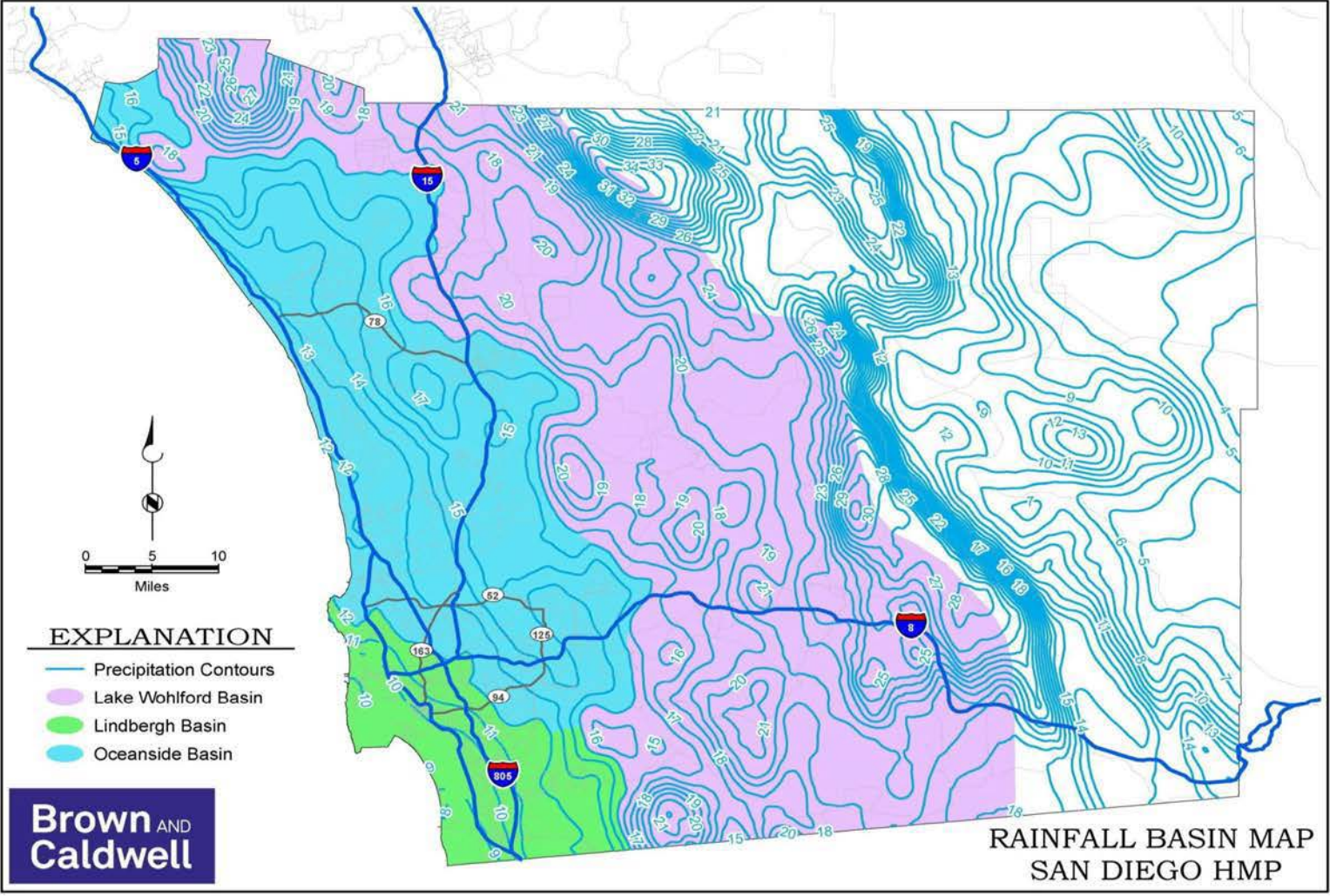
DMA Name	Rain Gauge	Pre-developed Condition		Unit Runoff Ratio (cfs/ac)	DMA Area (ac)	Orifice Flow - %Q ₂ (cfs)	Orifice Area (in ²)
		Soil Type	Slope				
P10	Oceanside	D	FLAT	0.571	1.610	0.092	1.47

3.00	0.092	1.47	1.37
Max Orifice Head (feet)	Max Tot. Allowable Orifice Flow (cfs)	Max Tot. Allowable Orifice Area (in ²)	Max Orifice Diameter (in)

0.048	0.049	0.79	1.000
Average outflow during surface drawdown (cfs)	Max Orifice Outflow (cfs)	Actual Orifice Area (in ²)	Selected Orifice Diameter (in)

Drawdown (Hrs)	6.6
----------------	-----

File Name: P:\Projects\San Diego County\139942 - HMP Implementation Assistance\GIS\HMF_GIS\Basins.mxd



- EXPLANATION**
- Precipitation Contours
 - Lake Wohlford Basin
 - Lindbergh Basin
 - Oceanside Basin



**RAINFALL BASIN MAP
SAN DIEGO HMP**

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

7.7.2 Maintenance of Non-Vegetated Infiltration BMPs

"Non-vegetated infiltration BMPs" are BMPs that store storm water runoff until it infiltrates into the ground, and do not include vegetation as a component of the BMP (refer to the "vegetated BMPs" category for infiltration BMPs that include vegetation). Non-vegetated infiltration BMPs generally include non-vegetated infiltration trenches and infiltration basins, dry wells, underground infiltration galleries, and permeable pavement with underground infiltration gallery. Applicable Fact Sheets may include INF-1 (infiltration basin) or INF-3 (permeable pavement). The non-vegetated infiltration BMP may or may not include a pre-treatment device, and may or may not include above-ground storage of runoff. The project civil engineer is responsible for determining which maintenance indicators and actions shown below are applicable based on the components of the structural BMP.

Table 7-2. Maintenance Indicators and Actions for Vegetated BMPs

Typical Maintenance Indicator(s) for Vegetated BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.
Overgrown vegetation	Mow or trim as appropriate, but not less than the design height of the vegetation per original plans when applicable (e.g. a vegetated swale may require a minimum vegetation height).
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.
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.
Standing water in vegetated swales	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, loosening or replacing top soil to allow for better infiltration, or minor re-grading for proper drainage. 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.
Standing water in bioretention, biofiltration with partial retention, or biofiltration areas, or flow-through planter boxes for longer than 96 hours following a storm event*	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains (where applicable), or repairing/replacing clogged or compacted soils.
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable.
*These BMPs typically include a surface ponding layer as part of their function which may take 96 hours to drain following a storm event.	

Table 7-3. Maintenance Indicators and Actions for Non-Vegetated Infiltration BMPs

Typical Maintenance Indicator(s) for Non-Vegetated Infiltration BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris in infiltration basin, pre-treatment device, or on permeable pavement surface	Remove and properly dispose accumulated materials.
Standing water in infiltration basin without subsurface infiltration gallery for longer than 96 hours following a storm event	Remove and replace clogged surface soils.
Standing water in subsurface infiltration gallery for longer than 96 hours following a storm event	This condition requires investigation of why infiltration is not occurring. If feasible, corrective action shall be taken to restore infiltration (e.g. flush fine sediment or remove and replace clogged soils). BMP may require retrofit if infiltration cannot be restored. If retrofit is necessary, the City Engineer shall be contacted prior to any repairs or reconstruction.
Standing water in permeable paving area	Flush fine sediment from paving and subsurface gravel. Provide routine vacuuming of permeable paving areas to prevent clogging.
Damage to permeable paving surface	Repair or replace damaged surface as appropriate.
<p>Note: When inspection or maintenance indicates sediment is accumulating in an infiltration BMP, the DMA draining to the infiltration BMP should be examined to determine the source of the sediment, and corrective measures should be made as applicable to minimize the sediment supply.</p>	

7.7.3 Maintenance of Non-Vegetated Filtration BMPs

"Non-vegetated filtration BMPs" include media filters (FT-2) and sand filters (FT-3). These BMPs function by passing runoff through the media to remove pollutants. The project civil engineer is responsible for determining which maintenance indicators and actions shown below are applicable based on the components of the structural BMP.

Table 7-4. Maintenance Indicators and Actions for Filtration BMPs

Typical Maintenance Indicator(s) for Filtration BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris	Remove and properly dispose accumulated materials.
Obstructed inlet or outlet structure	Clear obstructions.
Clogged filter media	Remove and properly dispose filter media, and replace with fresh media.
Damage to components of the filtration system	Repair or replace as applicable.
<p>Note: For proprietary media filters, refer to the manufacturer's maintenance guide.</p>	



Modular Wetlands[®] Linear

A Stormwater Biofiltration Solution

OPERATION & MAINTENANCE MANUAL



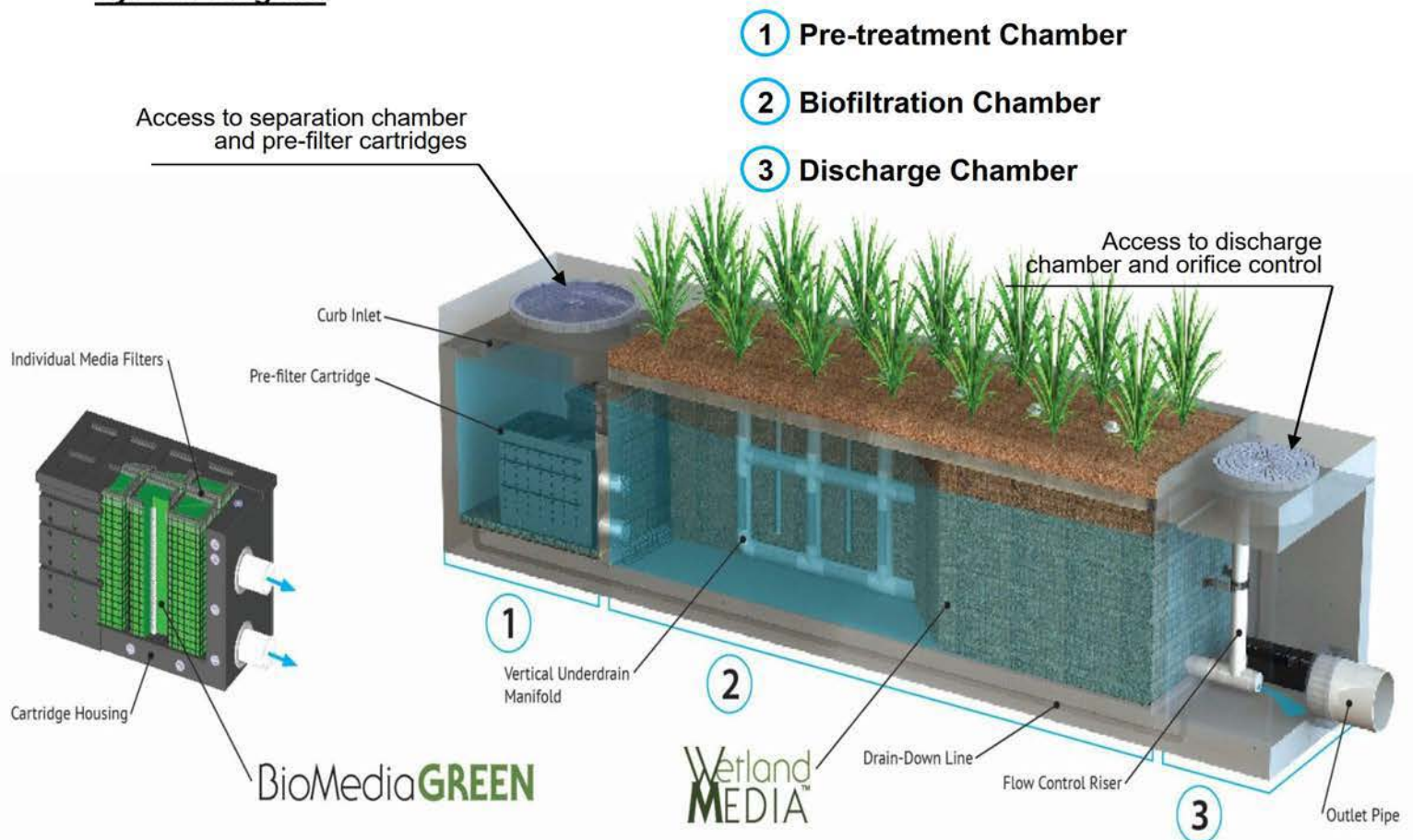


Inspection Guidelines for Modular Wetland System - Linear

Inspection Summary

- Inspect Pre-Treatment, Biofiltration and Discharge Chambers – average inspection interval is 6 to 12 months.
 - *(15 minute average inspection time).*
- NOTE: Pollutant loading varies greatly from site to site and no two sites are the same. Therefore, the first year requires inspection monthly during the wet season and every other month during the dry season in order to observe and record the amount of pollutant loading the system is receiving.

System Diagram



Inspection Overview

As with all stormwater BMPs inspection and maintenance on the MWS Linear is necessary. Stormwater regulations require that all BMPs be inspected and maintained to ensure they are operating as designed to allow for effective pollutant removal and provide protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess the site specific loading conditions. This is recommended because pollutant loading and pollutant characteristics can vary greatly from site to site. Variables such as nearby soil erosion or construction sites, winter sanding on roads, amount of daily traffic and land use can increase pollutant loading on the system. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years to ensure appropriate maintenance is provided. Without appropriate maintenance a BMP will exceed its storage capacity which can negatively affect its continued performance in removing and retaining captured pollutants.

Inspection Equipment

Following is a list of equipment to allow for simple and effective inspection of the MWS Linear:

- Modular Wetland Inspection Form
- Flashlight
- Manhole hook or appropriate tools to remove access hatches and covers
- Appropriate traffic control signage and procedures
- Measuring pole and/or tape measure.
- Protective clothing and eye protection.
- 7/16" open or closed ended wrench.
- Large permanent black marker (initial inspections only – first year)
- Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine inspections of the system.





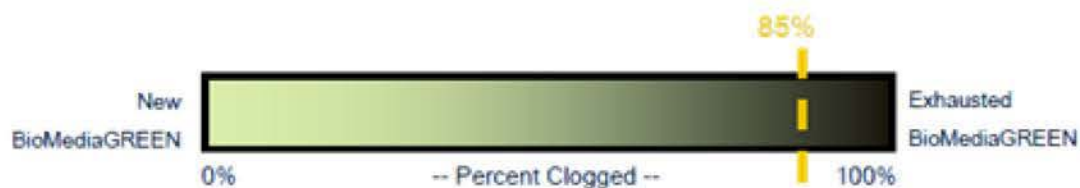
Inspection Steps

The core to any successful stormwater BMP maintenance program is routine inspections. The inspection steps required on the MWS Linear are quick and easy. As mentioned above the first year should be seen as the maintenance interval establishment phase. During the first year more frequent inspections should occur in order to gather loading data and maintenance requirements for that specific site. This information can be used to establish a base for long term inspection and maintenance interval requirements.

The MWS Linear can be inspected through visual observation without entry into the system. All necessary pre-inspection steps must be carried out before inspection occurs, especially traffic control and other safety measures to protect the inspector and near-by pedestrians from any dangers associated with an open access hatch or manhole. Once these access covers have been safely opened the inspection process can proceed:

- Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other info (see inspection form).
- Observe the inside of the system through the access hatches. If minimal light is available and vision into the unit is impaired utilize a flashlight to see inside the system and all of its chambers.
- Look for any out of the ordinary obstructions in the inflow pipe, pre-treatment chamber, biofiltration chamber, discharge chamber or outflow pipe. Write down any observations on the inspection form.
- Through observation and/or digital photographs estimate the amount of trash, debris and sediment accumulated in the pre-treatment chamber. Utilizing a tape measure or measuring stick estimate the amount of trash, debris and sediment in this chamber. Record this depth on the inspection form.

- Through visual observation inspect the condition of the pre-filter cartridges. Look for excessive build-up of sediments on the cartridges, any build-up on the top of the cartridges, or clogging of the holes. Record this information on the inspection form. The pre-filter cartridges can further be inspected by removing the cartridge tops and assessing the color of the BioMediaGREEN filter cubes (requires entry into pre-treatment chamber – see notes above regarding confined space entry). Record the color of the material. New material is a light green in color. As the media becomes clogged it will turn darker in color, eventually becoming dark brown or black. Using the below color indicator record the percentage of media exhausted.



The biofiltration chamber is generally maintenance free due to the system's advanced pre-treatment chamber. For units which have open planters with vegetation it is recommended that the vegetation be inspected. Look for any plants that are dead or showing signs of disease or other negative stressors. Record the general health of the plants on the inspection and indicate through visual observation or digital photographs if trimming of the vegetation is needed. The discharge chamber houses the orifice control structure, drain down filter and is connected to the outflow pipe. It is important to check to ensure the orifice is in proper operating conditions and free of any obstructions. It is also important to assess the condition of the drain down filter media which utilizes a block form of the BioMediaGREEN. Assess in the same manner as the cubes in the Pre-Filter Cartridge as mentioned above. Generally, the discharge chamber will be clean and free of debris. Inspect the water marks on the side walls. If possible, inspect the discharge chamber during a rain event to assess the amount of flow leaving the system while it is at 100% capacity (pre-treatment chamber water level at peak hydraulic grade lines or HGL). The water level of the flowing water should be compared to the watermark level on the side walls which is an indicator of the highest discharge rate the system achieved when initially installed. Record on the form if there is any difference in level from watermark in inches.

- NOTE: During the first few storms the water level in the outflow chamber should be observed and a 6 inch long horizontal watermark line drawn (using a large permanent marker) at the water level in the discharge chamber while the system is operating at 100% capacity. The diagram below illustrates where a line should be drawn. This line is a reference point for future inspections of the system:



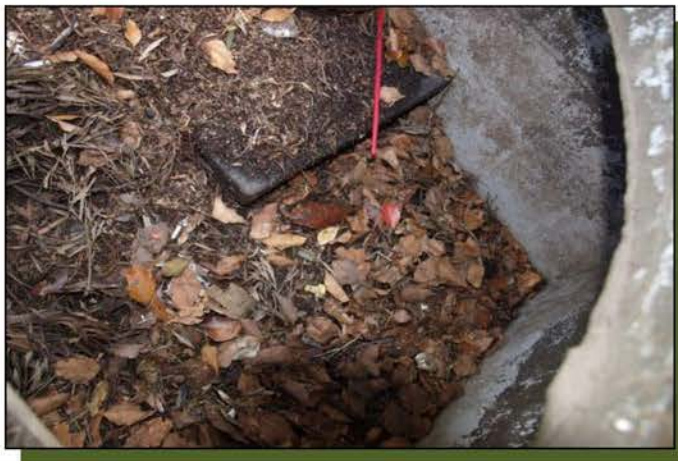
Using a permanent marker draw a 6 inch long horizontal line, as shown, at the higher water level in the MWS Linear discharge chamber.

- Water level in the discharge chamber is a function of flow rate and pipe size. Observation of water level during the first few months of operation can be used as a benchmark level for future inspections. The initial mark and all future observations shall be made when system is at 100% capacity (water level at maximum level in pre-treatment chamber). If future water levels are below this mark when system is at 100% capacity this is an indicator that maintenance to the pre-filter cartridges may be needed.
- *Finalize inspection report for analysis by the maintenance manager to determine if maintenance is required.*

Maintenance Indicators

Based upon observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components or cartridges.
- Obstructions in the system or its inlet or outlet.
- Excessive accumulation of floatables in the pre-treatment chamber in which the length and width of the chamber is fully impacted more than 18”.



Excessive accumulation of sediment in the pre-treatment chamber of more than 6 inches in depth.



- Excessive accumulation of sediment on the BioMediaGREEN media housed within the pre-filter cartridges. The following chart shows photos of the condition of the BioMediaGREEN contained within the pre-filter cartridges. When media is more than 85% clogged replacement is required.



- Excessive accumulation of sediment on the BioMediaGREEN media housed within the drain down filter. The following photos show of the condition of the BioMediaGREEN contained within the drain down filter. When media is more than 85% clogged replacement is required.



- Overgrown vegetation.



- Water level in discharge chamber during 100% operating capacity (pre-treatment chamber water level at max height) is lower than the watermark by 20%.



Inspection Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.
3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.
4. Entry into chambers may require confined space training based on state and local regulations.
5. No fertilizer shall be used in the Biofiltration Chamber.
6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may not require irrigation after initial establishment.



Maintenance Guidelines for Modular Wetland System - Linear

Maintenance Summary

- Remove Sediment from Pre-Treatment Chamber – average maintenance interval is 12 to 24 months.
 - (10 minute average service time).
- Replace Pre-Filter Cartridge Media – average maintenance interval 12 to 24 months.
 - (10-15 minute per cartridge average service time).
- Trim Vegetation – average maintenance interval is 6 to 12 months.
 - (Service time varies).

System Diagram



Maintenance Overview

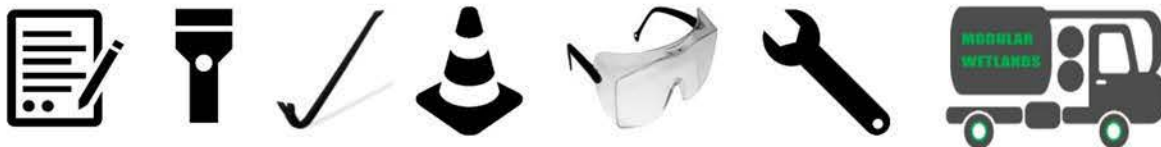
The time has come to maintain your Modular Wetland System Linear (MWS Linear). To ensure successful and efficient maintenance on the system we recommend the following. The MWS Linear can be maintained by removing the access hatches over the systems various chambers. All necessary pre-maintenance steps must be carried out before maintenance occurs, especially traffic control and other safety measures to protect the inspector and near-by pedestrians from any dangers associated with an open access hatch or manhole. Once traffic control has been set up per local and state regulations and access covers have been safely opened the maintenance process can begin. It should be noted that some maintenance activities require confined space entry. All confined space requirements must be strictly followed before entry into the system. In addition the following is recommended:

- Prepare the maintenance form by writing in the necessary information including project name, location, date & time, unit number and other info (see maintenance form).
- Set up all appropriate safety and cleaning equipment.
- Ensure traffic control is set up and properly positioned.
- Prepare a pre-checks (OSHA, safety, confined space entry) are performed.

Maintenance Equipment

Following is a list of equipment required for maintenance of the MWS Linear:

- Modular Wetland Maintenance Form
- Manhole hook or appropriate tools to access hatches and covers
- Protective clothing, flashlight and eye protection.
- 7/16" open or closed ended wrench.
- Vacuum assisted truck with pressure washer.
- Replacement BioMediaGREEN for Pre-Filter Cartridges if required (order from manufacturer).



Maintenance Steps

1. Pre-treatment Chamber (bottom of chamber)
 - A. Remove access hatch or manhole cover over pre-treatment chamber and position vacuum truck accordingly.
 - B. With a pressure washer spray down pollutants accumulated on walls and pre-filter cartridges.
 - C. Vacuum out Pre-Treatment Chamber and remove all accumulated pollutants including trash, debris and sediments. Be sure to vacuum the floor until pervious pavers are visible and clean.
 - D. If Pre-Filter Cartridges require media replacement move onto step 2. If not, replace access hatch or manhole cover.



Removal of access hatch to gain access below.



Insertion of vacuum hose into separation chamber.



Removal of trash, sediment and debris.



Fully cleaned separation chamber.

2. Pre-Filter Cartridges (attached to wall of pre-treatment chamber)

- A. After finishing step 1 enter pre-treatment chamber.
- B. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.



Pre-filter cartridges with tops on.



Inside cartridges showing media filters ready for replacement.

- C. Place the vacuum hose over each individual media filter to suck out filter media.



Vacuuming out of media filters.

- D. Once filter media has been sucked use a pressure washer to spray down inside of the cartridge and it's containing media cages. Remove cleaned media cages and place to the side. Once removed the vacuum hose can be inserted into the cartridge to vacuum out any remaining material near the bottom of the cartridge.

- E. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase. Utilize the manufacture provided refilling tray and place on top of cartridge. Fill tray with new bulk media and shake down into place. Using your hands slightly compact media into each filter cage. Once cages are full removed refilling tray and replace cartridge top ensuring bolts are properly tightened.



Refilling tray for media replacement.



Refilling tray on cartridge with bulk media.



- F. Exit pre-treatment chamber. Replace access hatch or manhole cover.

3. Biofiltration Chamber (middle vegetated chamber)

- A. In general, the biofiltration chamber is maintenance free with the exception of maintaining the vegetation. Using standard gardening tools properly trim back the vegetation to healthy levels. The MWS Linear utilizes vegetation similar to surrounding landscape areas therefore trim vegetation to match surrounding vegetation. If any plants have died replace plants with new ones:



B. Over time, sediment will accumulate in the perimeter void area and will need to be vacuumed out. The media surface may also require power washing if it becomes occluded with sediment. In addition, the wetland media will eventually need to be replaced after 10 plus years of service. A vacuum truck is recommended to fully remove all wetland media. Once old media is removed the entire chamber, media cage, and netting should be power washed. The netting may require replacement before installing new media. New wetland media should be purchased directly from the manufacture. It can be delivered either in bulk or in super sacks for easy installation.

4. Discharge Chamber (contains drain down cartridge & connected to pipe)

- A. Remove access hatch or manhole cover over discharge chamber.
- B. Enter chamber to gain access to the drain down filter. Unlock the locking mechanism and lift up drain down filter housing to remove used BioMediaGREEN filter block as shown below:



- C. Insert new BioMediaGREEN filter block and lock drain down filter housing back in place. Replace access hatch or manhole cover over discharge chamber.



Inspection Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.
3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.
4. Entry into chambers may require confined space training based on state and local regulations.
5. No fertilizer shall be used in the Biofiltration Chamber.
6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may not require irrigation after initial establishment.



Inspection Form



Modular Wetland System, Inc.

P. 760.433-7640

F. 760-433-3176

E. Info@modularwetlands.com

www.modularwetlands.com



Maintenance Report



Modular Wetland System, Inc.

P. 760.433-7640

F. 760-433-3176

E. Info@modularwetlands.com

www.modularwetlands.com

ATTACHMENT 4
City standard Single Sheet BMP (SSBMP) Exhibit

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

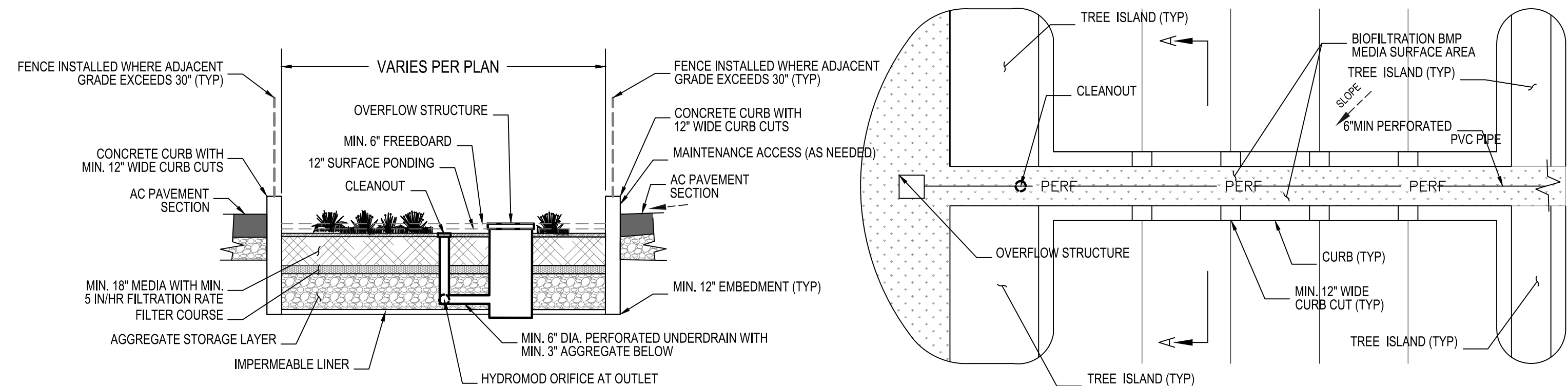
SWMP NO. TBD

PARTY RESPONSIBLE FOR MAINTENANCE:
NAME CITY OF CARLSBAD

PLAN PREPARED BY:
NAME MIKE MAGEE, PE
CERTIFICATION C85660
COMPANY WSP
ADDRESS 10525 VISTA SORRENTO PKWY
STE 350
SAN DIEGO, CALIFORNIA 92121
PHONE NO. 858-500-4500

CONTACT TBD

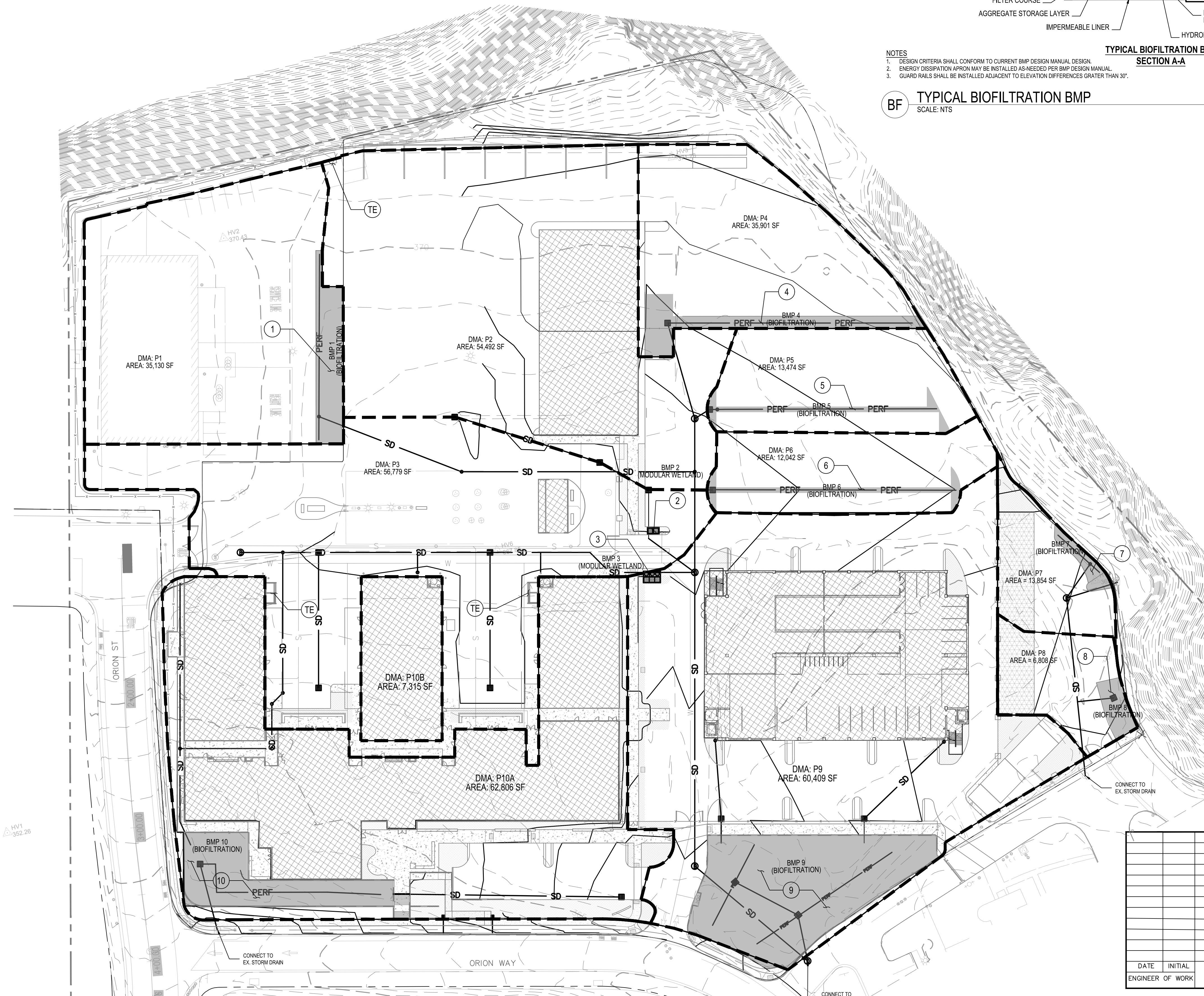
ADDRESS 1635 FARADAY AVENUE
CARLSBAD, CALIFORNIA, 92008
PHONE NO. 760-602-2799



NOTES
1. DESIGN CRITERIA SHALL CONFORM TO CURRENT BMP DESIGN MANUAL DESIGN.
2. ENERGY DISSIPATION APRON MAY BE INSTALLED AS NEEDED PER BMP DESIGN MANUAL.
3. GUARD RAILS SHALL BE INSTALLED ADJACENT TO ELEVATION DIFFERENCES GREATER THAN 30".

BF TYPICAL BIOFILTRATION BMP
SCALE: NTS

BMP TABLE								
BMP ID #	BMP TYPE	SYMBOL	CASQA NO.	QUANTITY (SF.)	DRAWING NO.	SHEET NO.(S)	INSPECTION * FREQUENCY	MAINTENANCE * FREQUENCY
HYDROMODIFICATION & TREATMENT CONTROL								
1	BIOFILTRATION AREA	[Symbol]	BF-3	2542	TBD	1	QUARTERLY	SEMI-ANNUALLY
2	MODULAR WETLAND	[Symbol]	BF-3	N/A	TBD	1	QUARTERLY	SEMI-ANNUALLY
3	MODULAR WETLAND	[Symbol]	BF-3	N/A	TBD	1	QUARTERLY	SEMI-ANNUALLY
4	BIOFILTRATION AREA	[Symbol]	BF-3	2642	TBD	1	QUARTERLY	SEMI-ANNUALLY
5	BIOFILTRATION AREA	[Symbol]	BF-3	972	TBD	1	QUARTERLY	SEMI-ANNUALLY
6	BIOFILTRATION AREA	[Symbol]	BF-3	1037	TBD	1	QUARTERLY	SEMI-ANNUALLY
7	BIOFILTRATION AREA	[Symbol]	BF-3	625	TBD	1	QUARTERLY	SEMI-ANNUALLY
8	BIOFILTRATION AREA	[Symbol]	BF-3	767	TBD	1	QUARTERLY	SEMI-ANNUALLY
9	BIOFILTRATION AREA	[Symbol]	BF-3	12023	TBD	1	QUARTERLY	SEMI-ANNUALLY
10	BIOFILTRATION AREA	[Symbol]	BF-3	4599	TBD	1	QUARTERLY	SEMI-ANNUALLY
SITE DESIGN								
	INLET FILTER	[Symbol]	TC-50	15 EA.	TBD	1	MONTHLY	QUARTERLY
TE	TRASH ENCLOSURE	[Symbol]	SD-32	3 EA.	TBD	1	WEEKLY	MONTHLY
	STENCILS	[Symbol]	SD-13	15 EA.	TBD	1	MONTHLY	QUARTERLY



- BMP NOTES**
- THESE BMPs ARE MANDATORY TO BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS OR THESE PLANS.
 - NO CHANGES TO THE PROPOSED BMPs ON THIS SHEET WITHOUT PRIOR APPROVAL FROM THE CITY ENGINEER.
 - NO SUBSTITUTIONS TO THE MATERIAL OR TYPES OR PLANTING TYPES WITHOUT PRIOR APPROVAL FROM THE CITY ENGINEER.
 - NO OCCUPANCY WILL BE GRANTED UNTIL THE CITY INSPECTION STAFF HAS INSPECTED THIS PROJECT FOR APPROPRIATE BMP CONSTRUCTION AND INSTALLATION.
 - REFER TO MAINTENANCE AGREEMENT DOCUMENTATION.
 - SEE PROJECT SWMP FOR ADDITIONAL INFORMATION.
 - THE PROJECT SITE HAS BEEN DETERMINED TO BE UNDERLAIN WITH TYPE D SOIL IN GENERAL ACCORDANCE WITH UNITED STATES DEPARTMENT OF AGRICULTURE SOIL TAXONOMY.
 - GROUNDWATER WAS NOT ENCOUNTERED IN THE SOIL BORINGS ADVANCED TO A MAXIMUM DEPTH OF 19 FEET DURING THE GEOTECHNICAL INVESTIGATION. THE DEPTH TO GROUNDWATER IS ESTIMATED TO BE BETWEEN APPROXIMATELY 20 AND 50 FEET BELOW EXISTING GROUND ELEVATION BASED ON READILY AVAILABLE DATA IN THE SITE VICINITY.
 - NO EXISTING HYDROLOGICAL FEATURES HAVE BEEN DOCUMENTED AT SITE.
 - NO CRITICAL SEDIMENT YIELD AREAS HAVE BEEN DOCUMENTED AT SITE.
 - DEVELOPMENT AREAS SHOULD BE CONSIDERED IMPERVIOUS UNLESS INDICATED OTHERWISE.

SHEET		CITY OF CARLSBAD ENGINEERING DEPARTMENT		SHEETS	
STORM WATER BMP EXHIBIT					
RECORD COPY				PROJECT NO. CUP2018-0022	
DRAWING NO. C6.2				DATE	
DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
ENGINEER OF WORK		OTHER APPROVAL		CITY APPROVAL	
REVISION DESCRIPTION					