
APPENDIX H2: EBPSP WQMP



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Engineering Department

Preliminary Water Quality Management Plan
(PWQMP)

For compliance with Santa Ana Regional Water Quality Control Board
Order Number R8-2010-0036 (NPDES Permit No. CAS618036)

Project Name:	Eucalyptus Business Park
Ontario Project #:	
Applicant Name:	Ontario Ranch Venture, LLC
Applicant Address:	3501 Jamboree Road, Suite 3000, Newport Beach, CA
Project Address:	S'Iy Block of Eucalyptus, Walker, Ont. Ranch, & Campus
Project Size (acres):	200.15
Project Description:	Business Park, and Open Space/Park

Submittal Date: 1/7/2026

Preliminary Water Quality Management Plan (PWQMP)

1. Introduction

The Preliminary Water Quality Management Plan (PWQMP) is a planning tool to improve integration of required water quality elements, stormwater management, water conservation, rainwater harvesting and re-use, and flood management in land use planning and the City's development process. The Preliminary WQMP will assist project applicants and planners in properly designing and laying out project sites so that water quality may be incorporated in the most effective manner and at the lowest cost for the developer.

The San Bernardino County Municipal Separate Storm Sewer System Permit (MS4 Permit) requires project-specific Water Quality Management plans (WQMP) to be prepared for all priority new development and significant redevelopment projects listed in Section 2 of this document. The MS4 Permit stipulates that the City of Ontario require priority project applicants to submit a Preliminary project-specific WQMP, as early as possible, during the environmental review or planning phase of a development project and that the Preliminary WQMP be approved prior to the issuance of land use entitlement.

2. Priority Projects (requiring a Preliminary WQMP)

Land Use entitlement shall not be issued for any of the listed projects, below, until a Preliminary WQMP has been approved by the City's Engineering Department. For construction projects not going through entitlement, a Preliminary and Final project specific WQMP shall be approved, prior to the issuance of construction permits:

Check the appropriate project category below, for this project:

**Check
below**

Project Categories

	1. All significant re-development projects. Significant re-development is defined as the addition or replacement of 5,000 or more square feet of impervious surface on an already developed site subject to discretionary approval of the Permittee. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of the facility, or emergency redevelopment activity required to protect public health and safety. Where redevelopment results in an increase of less than fifty percent of the impervious surfaces of a previously existing developed site, and the existing development was not subject to WQMP requirements, the numeric sizing criteria discussed below applies only to the addition or replacement, and not to the entire developed site. Where redevelopment results in an increase of fifty percent or more of the impervious surfaces of a previously existing developed site, the numeric sizing criteria applies to the entire development (new and existing).
✓	2. New development projects that create 10,000 square feet or more of impervious surface (collectively over the entire project site) including commercial, industrial, residential housing subdivisions (i.e., detached single family home subdivisions, multi-family attached subdivisions or townhomes, condominiums, apartments, etc.), mixed-use, and public projects. This category includes development projects on public and private land, which fall under the planning and building authority of the permitting agency.

**Check
below**

Project Categories

	3. Automotive repair shops (with SIC codes 5013, 5014, 5541, 7532- 7534, 7536-7539).
	4. Restaurants and Food Service Establishments where the land area of development is 5,000 square feet or more.
	5. Developments of 2,500 square feet of impervious surface or more adjacent to (within 200 feet) or discharging directly into environmentally sensitive areas (ESA's) such as areas designated in the Ocean Plan as areas of special biological significance or waterbodies listed on the CWA Section 303(d) list of impaired waters.
	6. Parking lots of 5,000 square feet or more exposed to storm water. Parking lot is defined as land area or facility for the temporary storage of motor vehicles.
	7. Retail Gasoline Outlets (RGOs) that are either 5,000 sq ft or more or have a projected average daily traffic of 100 or more vehicles per day.
	8. *This project is not covered under any of the categories listed above.

* If the development is not covered under any of the project categories listed in Section 2, the project is not required to design and install Site Design/LID BMPs or Treatment Control BMPs to treat the design storm event (Design Capture Volume) described in Section 4.

3. Preliminary WQMP Objectives

Through a combination of Site Design/LID BMPs (where feasible), Source Control, and/or Treatment Control BMPs, project-specific WQMPs shall address all identified pollutants and hydrologic conditions of concern from new development and significant re-development projects for the categories of projects (priority projects) listed in Section 2. Under each type of BMP, listed below, please indicate which BMPs are planned to be implemented and included in the Final WQMP for the project:

A. Site Design/LID (Low Impact Design) for Reducing Stormwater Runoff:

The MS4 Permit requires each priority development project to infiltrate, harvest and use, evapotranspire, or bio-treat the runoff from a 2-yr, 24-hour storm event (Design Capture Volume). If site conditions do not permit infiltration, harvest and use, evapotranspiration, and/or bio-treatment of the entire Design Capture Volume, at the project site, Site Design/LID techniques are required to be implemented to the Maximum Extent Practicable, at the project site, and the remainder of the DCV shall be infiltrated, harvested, bio-treated or treated by alternative measures. Project applicants shall submit a Preliminary WQMP that documents the LID/Site Design BMPs, proposed for the project. Please indicate, in the table below, which Site Design/LID BMPs will be utilized on this project to accomplish this requirement:

Site Design/LID Practice	Planned	Not Planned
Provide at least the minimum effective area required for LID BMPs, to comply with the WQMP (see Table 3-1 below).	✓	
Grade parking lot areas/drive aisles/roof drains to sheet flow runoff into landscaped swales, via curb cuts or zero-face curbs or otherwise disconnect direct drainage from MS4.		✓
Design landscaped areas as swales and grade to accept runoff from building roofs, parking lots and project roadways.		✓
Install surface retention basins or infiltration trenches to receive impervious area runoff.		✓
Install pervious pavement in parking stalls, alleys, driveways, gutters, walkways, trails or patios.		✓
Install underground stormwater retention chambers where downstream landscaped areas are limited.	✓	
Install approved Stormwater Drywells in detention areas.	✓	
Construct streets, sidewalks, and parking lot stalls to the minimum widths necessary.	✓	
Install on-site Biotreatment basins/trenches with underdrains, where soil type is poorly draining.		✓
Install "Engineered Soil" to increase uptake/soil storage capacity and/or evapotranspiration.		✓
Install Rainwater Harvesting/Use Equipment.		✓
Regional LID BMP facilities are installed, off-site, with the capacity and conveyances to accept post-development storm water runoff from this project and reserved capacity allocation credits have been assigned to the project, in a Certificate or other legally binding document, attached herein		✓

Table 3-1 Minimum Effective Area¹ Required for LID BMPs (surface + subsurface facilities) for Project WQMP to Demonstrate Infeasibility² (% of site)

Project Type	New Development	Re-Development
SF/MF Residential < 7 du/ac	10%	5%
SF/MF Residential < 7 - 18 du/ac	7%	3.5%
SF/MF Residential > 18 du/ac	5%	2.5%
Mixed Use, Commercial/Industrial w/FAR< 1.0	10%	5%
Mixed Use, Commercial/Industrial w/FAR 1.0-2.0	7%	3.5%
Mixed Use, Commercial/Industrial w/FAR> 2.0	5%	2.5%
Podium (parking under > 75% of project)	3%	1.5%
Zoning allowing development to property lines	2%	1%
Transit Oriented Development ³	5%	2.5%
Parking	5%	2.5%

¹ “Effective area” is defined as land area which 1) is suitable for a retention/infiltration BMP (based on infeasibility criteria) and 2) is located down-gradient from building roof or paved areas, so that it may receive gravity flow runoff.

² Criteria only required if the project WQMP seeks to demonstrate that the full DCV cannot be feasibly managed on-site.

³ Transit oriented development is defined as a project with development center within one half mile of a mass transit center.

Key: du/ac = dwelling units/acre, FAR = Floor Area Ratio = ratio of gross floor area of building to gross lot area, MF = Multi Family, SF = Single Family

B. Source Control BMPs – The following BMPs are designed to control stormwater pollutants and runoff water at the location where it is generated. Please indicate which of the listed BMPs are planned to be implemented for the project:

Source Control BMPs	Planned	Not Planned
Minimize non-stormwater site runoff through efficient irrigation system design and controllers.	✓	
Minimize trash and debris in storm runoff through a regular parking lot, storage yard and roadway sweeping program.	✓	
Provide proper covers/roofs and secondary containment for outside material storage & work areas.		✓
Provide solid roofs over all trash enclosures.	✓	
Site Owner(s)/Property Manager/HOA or POA will be familiar with the project WQMP and stormwater BMPs.	✓	
Owner or HOA or POA to provide Education/Training of site occupants and employees on stormwater BMPs.	✓	
Install stormwater placards/stenciled messages with a “No Dumping” message on all on-site/off-site storm drain inlets.	✓	
Provide contained equipment/vehicle wash rack areas that discharge to sanitary sewer.		✓

C. Treatment Control BMPs – The following BMPs are designed to control stormwater pollutants where it is not feasible to install on-site or off-site Site Design/LID BMPs, with the requisite capacity to treat the Design Capture Volume for identified Pollutants of Concern or where pretreatment of stormwater runoff is required, ahead of infiltration BMPs. Please indicate which of the listed BMPs are planned to be implemented for the project:

Treatment Control BMP	Planned	Not Planned
Gravity Separator devices for pretreatment of sediment, trash/litter or Oil & Grease	✓	
Proprietary Biofiltration vaults/devices	✓	
Media Cartridge Filtration Vaults		✓
Proprietary Filter Inserts for on-site storm drain inlets or retention basin/trench overflow drains	✓	

4. Volume-based calculation (approximate) for sizing on-site or off-site Stormwater Retention/Infiltration, Harvest & Re-Use or Biotreatment facilities

- 1) After calculating the “Watershed Imperviousness Ratio”, i , which is equal to the percent of impervious area in each Drainage Management Area, divided by 100, calculate the composite runoff coefficient C_{BMP} for the Drainage Area above using the following equation:

$$C_{BMP} = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$$

where: C_{BMP} = composite runoff coefficient; and,
 i = watershed imperviousness ratio.

- 3) Determine the area-averaged “6-hour Mean Storm Rainfall”, P_6 , for the Drainage Area. This is calculated by multiplying the area averaged 2-year 1-hour value (0.5”-0.6”) by the appropriate regression coefficient (1.4807). The 2-yr, 1-hr value for southern Ontario is approximately to 0.5” ($P_6 = 0.5 \times 1.4807 = 0.74$ and northern Ontario is approximately 0.6” in/hr ($P_6 = 0.6 \times 1.4807 = 0.89$).
- 4) Determine the appropriate drawdown time. Use the regression constant $a = 1.582$ for 24 hours and $a = 1.963$ for 48 hours. *Note: Regression constants are provided for both 24 hour and 48-hour drawdown times; however, 48-hour drawdown times should be used in most areas of California. Drawdown times in excess of 48 hours should be used with caution as vector breeding can be a problem after water has stood in excess of 72 hours. (Use of the 24-hour drawdown time should be limited to drainage areas with coarse soils (Class ‘A’ soils that readily drain.)*
- 5) Calculate the “Maximized Detention Volume”, P_0 , using the following equation:

$$P_0 = a \cdot C_{BMP} \cdot P_6$$

where: P_0 = Maximized Detention Volume, in inches
 $a = 1.582$ for 24 hour and $a = 1.963$ for 48-hour drawdown,
 C_{BMP} = composite runoff coefficient; and,
 P_6 = 6-hour Mean Storm Rainfall, in inches

- 6) Calculate the “Target Capture Volume”, V_0 , using the following equation:

$$V_0 = (P_0 \cdot A) / 12$$

where: V_0 = Target Capture Volume, in acre-feet
 P_0 = Maximized Detention Volume, in inches; and,
 A = BMP Drainage Area, in acres

Project Volume-based calculation (approximate) for planned on-site or off-site Stormwater Retention/Infiltration, Harvest & Re-Use or Biotreatment facilities:

Variable	Factor/Formula	DA1, DMA A	DA1 DMA B	DA2 DMA A	DA2 DMA B
Impervious surface/total surface, ratio	(i)				
C _{BMP} = runoff coefficient	$0.858i^3 - 0.78i^2 + 0.774i + 0.04$				
P ₆	**P ₆ = 2-yr, 1-hr depth*1.4807 =				
Detention Volume (acre inches)	P ₀ = a * C _{BMP} * P ₆ =				
Drawdown rate of basin/trench (a)	1.963 for 48-hr drawdown =				
Project Total Area (acre)	(A)				
Design Capture Volume in cu. ft.	V ₀ = [(P ₀ * A)/12] *43560 =				
Retention Volume provided in cubic feet.	Retention capacity of basins, trenches, underground storage or biotreatment basin				

See Table on Following Page

**For P₆ value, use site coordinates and NOAA website to determine project's average 2-yr, 1-hr rainfall depth, at: http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html .

5. Flow-Based calculation (approximate) for sizing on-site or off-site Biotreatment facilities and proprietary treatment technology BMPs:

- 1) After calculating the "Watershed Imperviousness Ratio", i, which is equal to the percent of impervious area in each Drainage Management Area divided by 100, calculate the composite runoff coefficient C_{BMP} for the Drainage Area above using the following equation:

$$C_{BMP} = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$$

where: C_{BMP} = composite runoff coefficient; and,
i = watershed imperviousness ratio.

Variable	Factor/Formula	DA15, DMA A	DA16, DMA A	DA17, DMA A	DA18, DMA A	DA31, DMA A	DA32, DMA A
Impervious surface/total surface, ratio	(i)	0.9	0.9	0.2	0.2	0.9	0.9
C_{BMP} = runoff coefficient	$0.858i^3 - 0.78i^2 + 0.774i + 0.04$	0.73	0.73	0.17	0.17	0.73	0.73
P_6	$**P_6 = 2\text{-yr, 1-hr depth} * 1.4807 =$	0.86	0.86	0.86	0.86	0.86	0.86
Detention Volume (acre inches)	$P_0 = a * CBMP * P_6 =$	1.23	1.23	0.29	0.29	1.23	1.23
Drawdown rate of basin/trench (a)	1.963 for 48-hr drawdown =	1.96	1.96	1.96	1.96	1.96	1.96
Project Total Area (sf)		999842	1435809	357955	251733	1319154	1123646
Project Total Area (acre)	(A)	22.95	32.96	8.22	5.78	30.28	25.80
Design Capture Volume in cu. Ft.	$V_0 = [(P_0 * A)/12] * 43560 =$	102402	147052	8557	6018	135105	115081
Retention Volume provided in cubic feet.	Retention capacity of basins, trenches, underground storage or biotreatment basin	106107	152550	8871	6996	140233	121475

Variable	Factor/Formula	DA33, DMA A	DA34, DMA A	DA 43, DMA A	DA 44, DMA A	DA45, DMA A	DA46, DMA A
Impervious surface/total surface, ratio	(i)	0.2	0.2	0.9	0.9	0.2	0.2
C_{BMP} = runoff coefficient	$0.858i^3 - 0.78i^2 + 0.774i + 0.04$	0.17	0.17	0.73	0.73	0.17	0.17
P_6	$**P_6 = 2\text{-yr, 1-hr depth} * 1.4807 =$	0.86	0.86	0.86	0.86	0.86	0.86
Detention Volume (acre inches)	$P_0 = a * CBMP * P_6 =$	0.29	0.29	1.23	1.23	0.29	0.29
Drawdown rate of basin/trench (a)	1.963 for 48-hr drawdown =	1.96	1.96	1.96	1.96	1.96	1.96
Project Total Area (sf)		253619	360484	525751	601716	178186	172531
Project Total Area (acre)	(A)	5.82	8.28	12.07	13.81	4.09	3.96
Design Capture Volume in cu. Ft.	$V_0 = [(P_0 * A)/12] * 43560 =$	6063	8618	53846	61626	4260	4125
Retention Volume provided in cubic feet.	Retention capacity of basins, trenches, underground storage or biotreatment basin	6996	9771	56161	65201	4671	4671

Assumptions and supporting data for volume-based calculations:

Per NOAA data, the 2-yr, 1-hr precipitation depth at the site is 0.579" (highest value found). See Appendix for this NOAA precipitation depth chart.

Infiltration rates within the development are TBD. Per the NRCS Web Soil Survey, soils at the site are shown to be Hydrologic Soil Group (HSG) A, B, and C depending on the area (See Appendix B for HSG delineation). Soil groups A and B are typically favorable to infiltration (higher infiltration rate), and Soil group C is typically less favorable to infiltration (slower infiltration rate). For DA15, DA16, DA31, DA32, DA43, & DA44, Underground systems are to be used. For DA17, DA18, DA33, DA34, DA45, & DA46, infiltration basins are being used. In the event shallow infiltration is not feasible, drywells (intiltration) and/or modular wetlands units (biofiltration) will be utilized in combination with the volume sized underground systems.

- 2) Determine BMP design rainfall intensity, **I_{BMP}**, using the project site geo-coordinates and the NOAA website to determine project's average 2-yr, 1-hr rainfall intensity, at: http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html .Multiply this value by 0.2787 (regression coefficient for Ontario) and a minimum safety factor of 2.
- 4) Calculate the target BMP flowrate, **Q**, using the following formula (for each DMA <50 acres*):

$$Q = C_{BMP} \cdot I_{BMP} \cdot A$$

Where: **Q** = flow in cfs (Cubic feet per second)
I_{BMP} = BMP design rainfall intensity, in/hr
A = Drainage Area in acres

*For DMAs >50 acres, with **C_{BMP}** <0.5, the project applicant shall use the unit hydrograph method specified in the San Bernardino County Hydrology Manual, using the design storm pattern with rainfall return frequency such that the peak 1-hr rainfall intensity equals the 85th percentile 1-hr rainfall, multiplied by 2.

Project Flow-based calculation (approximate) for planned on-site or off-site flow-based Biotreatment facilities or Stormwater Treatment BMPs:

Variable	Factor/Formula	DA1 DMA A	DA1 DMA B	DA2 DMA A	DA2 DMA B
Impervious surface/ total surface, ratio	(i)				
C_{BMP} = composite runoff coefficient	$0.858i^3 + 0.78i^2 + 0.774i + 0.04$				
I_{BMP}	I_{BMP} = 2-yr, 1-hr storm intensity*0.2787*safety factor				
Drainage area (ac)	A = DMA sq ft/43,560				
Target BMP flowrate	Q = C_{BMP} * I_{BMP} * A				

See Table on Following Page

6. Hydrologic Conditions of Concern (HCOC) and use of the on-line San Bernardino County HCOC Map for determining necessary mitigation steps necessary if there are HCOCs downstream of a project:

Project applicants may access the on-line HCOC Map at: <http://permitrack.sbcounty.gov/WAP/>. The map will indicate any hydrology concerns with downstream waterways that are hydraulically connected to the project and will indicate if there are any approved regional projects downstream that could be utilized for off-site mitigation of HCOCs. Please indicate here if the project will or will not be able to retain/infiltrate, harvest and use or biotreat and detain the DCV, on-site, as calculated in Section 4 and if there are HCOCs identified downstream of the project:

Variable	Factor/Formula	DA1, DMA A	DA2, DMA A	DA3, DMA A	DA4, DMA A	DA5, DMA A	DA6, DMA A	DA7, DMA A	DA8, DMA A	DA9, DMA A	DA10, DMA A	DA11, DMA A	DA12, DMA A	DA13, DMA A	DA14, DMA A	DA19, DMA A	DA20, DMA A	DA21, DMA A	DA22, DMA A	DA23, DMA A
Impervious surface/total surface, ratio	(i)	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
C _{BMP} = runoff coefficient	$0.858i^3-0.78i^2+0.774i+0.04$	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
I _{BMP} = BMP design rainfall intensity, in/hr	I _{BMP} = 2-yr, 1-hr storm intensity*0.2787*safety factor	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Drainage Area (sf)	DMA sq ft	17445	49663	10315	10315	27728	27727	20182	20387	17946	17742	5726	84121	48599	64533	5727	84010	9603	9466	17130
Drainage Area (acre)	A = DMA sq ft/43,560	0.40	1.14	0.24	0.24	0.64	0.64	0.46	0.47	0.41	0.41	0.13	1.93	1.12	1.48	0.13	1.93	0.22	0.22	0.39
Target BMP flowrate	$Q = C_{BMP} * I_{BMP} * A$	0.094	0.269	0.056	0.056	0.150	0.150	0.109	0.110	0.097	0.096	0.031	0.455	0.263	0.349	0.031	0.455	0.052	0.051	0.093

Variable	Factor/Formula	DA24, DMA A	DA25, DMA A	DA26, DMA A	DA27, DMA A	DA28, DMA A	DA29, DMA A	DA30, DMA A	DA35, DMA A	DA36, DMA A	DA37, DMA A	DA38, DMA A	DA39, DMA A	DA40, DMA A	DA41, DMA A	DA42, DMA A	DA47, DMA A	DA48, DMA A	DA49, DMA A	DA50, DMA A
Impervious surface/total surface, ratio	(i)	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
C _{BMP} = runoff coefficient	$0.858i^3-0.78i^2+0.774i+0.04$	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
I _{BMP} = BMP design rainfall intensity, in/hr	I _{BMP} = 2-yr, 1-hr storm intensity*0.2787*safety factor	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Drainage Area (sf)	DMA sq ft	17072	49684	49880	16312	93816	68313	40500	17156	17150	16577	16572	20719	59982	24612	38224	15863	4965	14978	7287
Drainage Area (acre)	A = DMA sq ft/43,560	0.39	1.14	1.15	0.37	2.15	1.57	0.93	0.39	0.39	0.38	0.38	0.48	1.38	0.57	0.88	0.36	0.11	0.34	0.17
Target BMP flowrate	$Q = C_{BMP} * I_{BMP} * A$	0.092	0.269	0.270	0.088	0.508	0.370	0.219	0.093	0.093	0.090	0.090	0.112	0.325	0.133	0.207	0.086	0.027	0.081	0.039

	Modular Wetland System Models and Sizing																			
Drainage Area		DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8	DA9	DA10	DA11	DA12	DA13	DA14	DA19	DA20	DA21	DA22	DA23
Model		MWS-L-4-08	MWS-L-8-12	MWS-L-4-06	MWS-L-4-06	MWS-L-4-15	MWS-L-4-15	MWS-L-4-08	MWS-L-4-08	MWS-L-4-08	MWS-L-4-08	MWS-L-4-04	MWS-L-8-16	MWS-L-4-21	MWS-L-8-16	MWS-L-4-04	MWS-L-8-16	MWS-L-4-04	MWS-L-4-04	MWS-L-4-08
Width, ft		4	8	4	4	4	4	4	4	4	4	4	8	8	8	4	8	4	4	4
Length, ft		8	12	6	6	15	15	8	8	8	8	4	16	21	16	4	16	4	4	8
Treatment Q, cfs		0.115	0.346	0.073	0.073	0.175	0.175	0.115	0.115	0.115	0.115	0.052	0.462	0.268	0.462	0.052	0.462	0.052	0.052	0.115

	Modular Wetland System Models and Sizing																			
Drainage Area		DA24	DA25	DA26	DA27	DA28	DA29	DA30	DA35	DA36	DA37	DA38	DA39	DA40	DA41	DA42	DA47	DA48	DA49	DA50
Model		MWS-L-4-08	MWS-L-8-12	MWS-L-8-12	MWS-L-4-08	MWS-L-8-20	MWS-L-8-16	MWS-L-4-19	MWS-L-4-08	MWS-L-4-08	MWS-L-4-08	MWS-L-4-08	MWS-L-4-08	MWS-L-8-12	MWS-L-4-13	MWS-L-4-19	MWS-L-4-08	MWS-L-4-04	MWS-L-4-08	MWS-L-4-04
Width, ft		4	8	8	4	8	8	4	4	4	4	4	4	8	4	4	4	4	4	4
Length, ft		8	12	12	8	20	16	19	8	8	8	8	8	12	13	19	8	4	8	4
Treatment Q, cfs		0.115	0.346	0.346	0.115	0.570	0.462	0.238	0.115	0.115	0.115	0.115	0.115	0.346	0.144	0.238	0.115	0.052	0.115	0.052

Assumptions and supporting data for flow-based calculations:

Per NOAA data, the 2-yr, 1-hr precipitation depth at the site is 0.579" (highest value found). See Appendix for this NOAA precipitation depth chart.

DA1 through DA14, DA19 through DA30, DA35 through DA42, & DA47 through DA50 represent the drainage areas for the development's proposed streets. Modular Wetland Systems (MWS) will be used for biotreatment of the street runoff. All MWS will be placed within the project site and will connect to the nearby catch basin using a DVERT diversion system.

Retain or Harvest/Use the DCV on site?	Yes	✓	No	
Biotreat the DCV but not infiltrate the runoff?	Yes	✓	No	
HCOCs identified downstream of site?	Yes	✓	No	

If the entire DCV will not be retained on site, the DCV is biotreated but not infiltrated or additional detention capacity is needed to address identified HCOCs, downstream of the site, please list here, what additional mitigation measures will be utilized (on-site or off-site) to address HCOCs (see Section 4.2.1-4.2.3 of the SB County WQMP Technical Guidance):

HCOCs will be addressed onsite for DMAs tributary to Campus Avenue or Bon View.
All other areas are exempt from HCOCs.

7. Site Plan and Conceptual Grading/Drainage Plan requirements for submission with the Preliminary WQMP:

Provide a Site Plan and Conceptual Grading/Drainage Plan along with this Preliminary WQMP, which conceptually shows the proposed locations of buildings, homes, parking lots, parks, new paved roadways, landscaped areas, drainage patterns and drainage sub-areas, methods of conveyance, proposed retention/infiltration, harvest & use or biotreatment facilities that are planned for installation. Where it is determined to be infeasible to capture and detain design storm runoff volumes, on-site, please include other design features, as described in Section 3, above. Include numbered or lettered notes on the Site Plan with a legend detailing other BMPs, as described in Section 3.

8. BMP Maintenance and Funding Mechanism & Description:

A POA will be developed for the maintenance of "shared" BMPs.

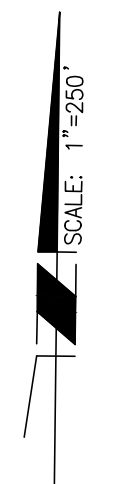
9. Acknowledgment:

- ☒ As the property owner or developer, I understand that this project is required to install and implement permanent LID Storm Water Best Management Practices pursuant to the requirements of the San Bernardino County MS4 Permit and to document those BMPs in the submittal of a Water Quality Management Plan, which is binding on any current or successive owners of this property.
- ☐ As the property owner or developer, I understand that this project is not required by the San Bernardino County MS4 Permit to install and implement permanent LID Storm Water Best Management Practices and will not be required to submit a Water Quality Management Plan.

Signature of Owner or Developer

Date

APPENDIX A: PWQMP BMP SITE PLAN



APPENDIX B: NOAA PRECIPITATION AND INTENSITY

[Home](#)[Site Map](#)[Organization](#)

Search

☒ NWS☐ All NOAA[Go](#)

General Information

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Precipitation Frequency

[Data Server](#)[GIS Grids](#)[Maps](#)[Time Series](#)[Temporals](#)[Documents](#)

Probable Maximum

[Precipitation](#)[Documents](#)

Miscellaneous

[Publications](#)[Storm Analysis](#)[Record Precipitation](#)

Contact Us

[Inquiries](#)

NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: CA

Data description

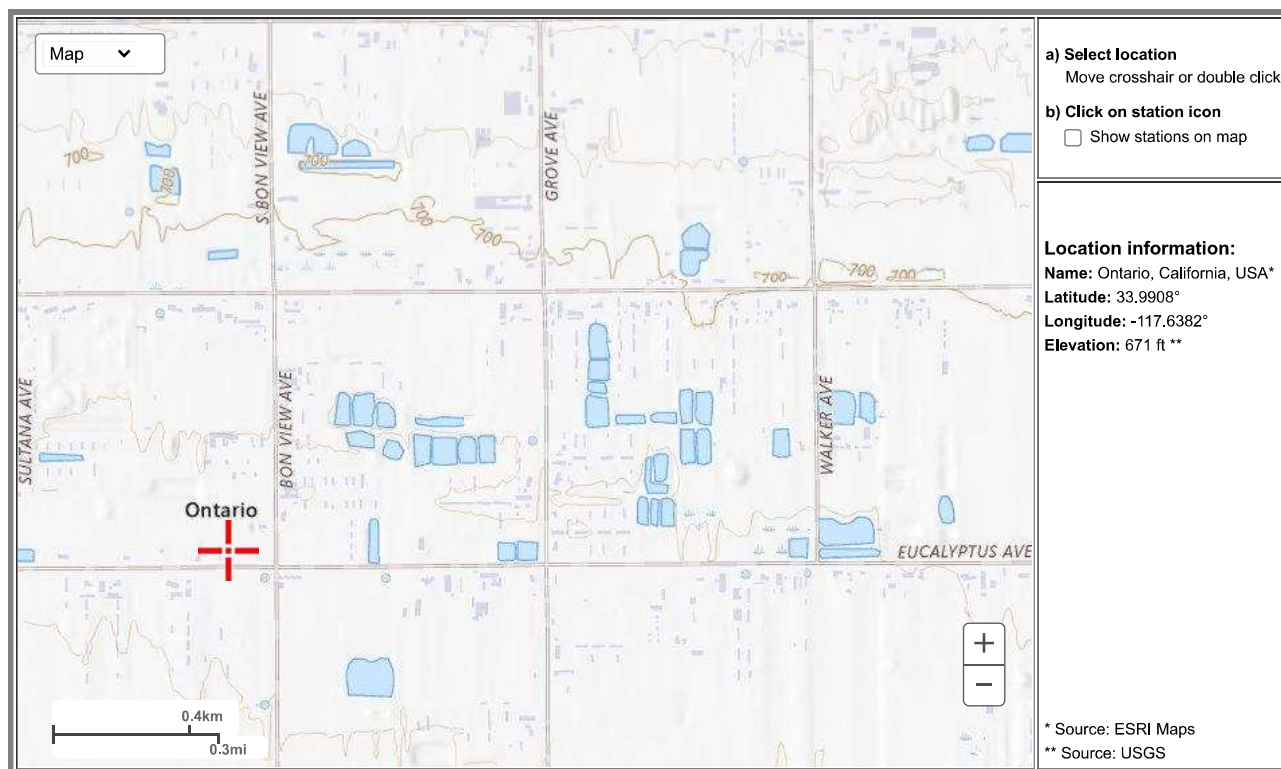
Data type: Precipitation depth Units: English Time series type: Partial duration

Select location

1) Manually:

a) By location (decimal degrees, use "-" for S and W): Latitude: Longitude: [Submit](#)b) By station (list of CA stations): Select stationc) By address Eucalyptus Ave & Grove Ave, Ontario, X [Q](#)

2) Use map:



POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION

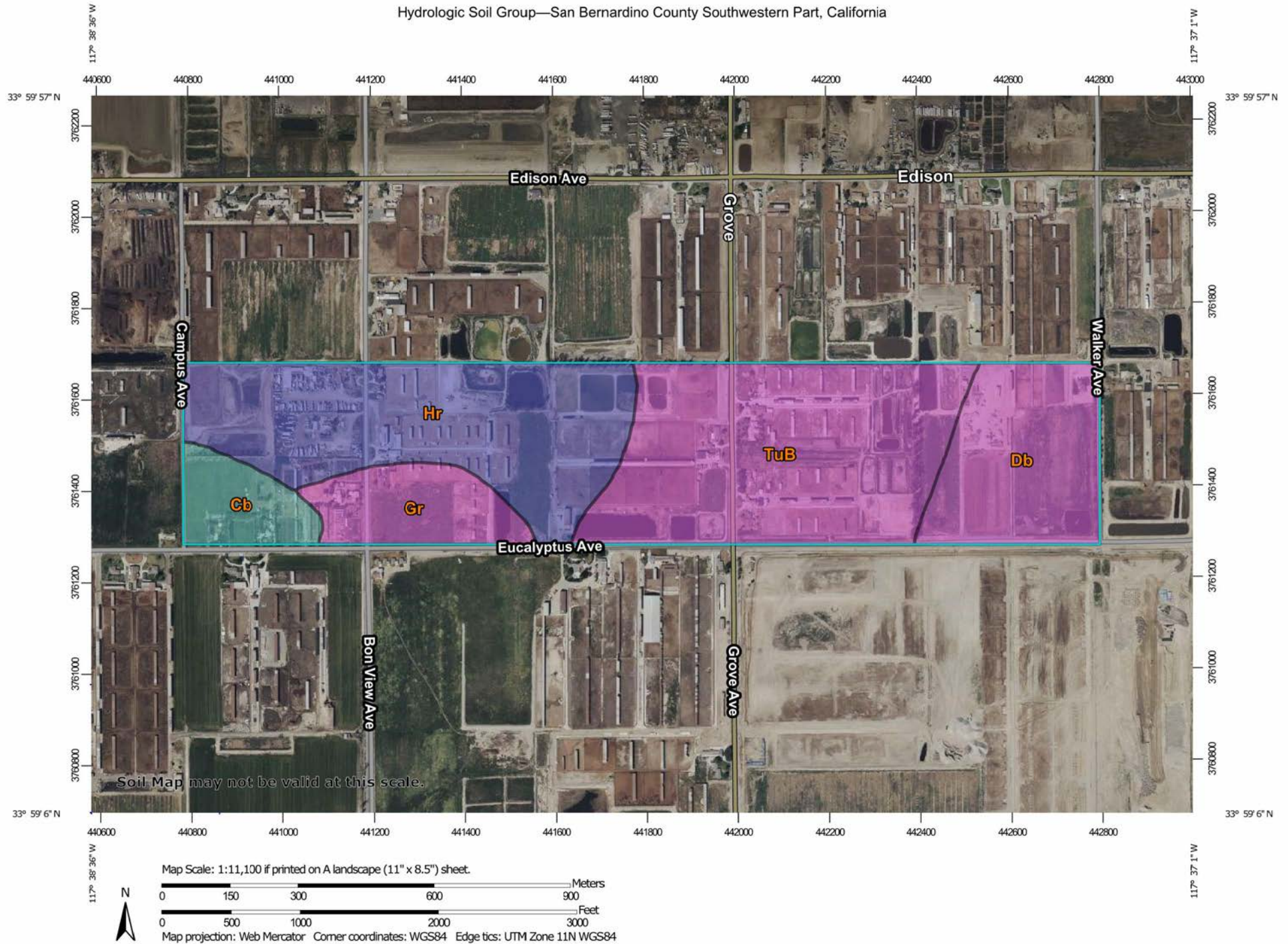
NOAA Atlas 14, Volume 6, Version 2

[PF tabular](#)[PF graphical](#)[Supplementary information](#)[Print page](#)

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.115 (0.096-0.139)	0.152 (0.126-0.183)	0.199 (0.165-0.241)	0.237 (0.196-0.291)	0.289 (0.230-0.367)	0.330 (0.257-0.427)	0.370 (0.281-0.493)	0.413 (0.304-0.565)	0.470 (0.332-0.672)	0.515 (0.351-0.763)
10-min	0.165 (0.138-0.200)	0.217 (0.181-0.263)	0.285 (0.237-0.346)	0.340 (0.280-0.417)	0.415 (0.330-0.526)	0.472 (0.368-0.613)	0.531 (0.403-0.706)	0.591 (0.436-0.810)	0.674 (0.476-0.964)	0.738 (0.502-1.09)
15-min	0.200 (0.167-0.242)	0.263 (0.219-0.318)	0.345 (0.287-0.418)	0.411 (0.339-0.504)	0.502 (0.399-0.636)	0.571 (0.445-0.741)	0.642 (0.487-0.854)	0.715 (0.527-0.980)	0.815 (0.575-1.17)	0.892 (0.608-1.32)
30-min	0.297 (0.248-0.359)	0.391 (0.326-0.473)	0.513 (0.426-0.622)	0.612 (0.504-0.749)	0.746 (0.594-0.947)	0.850 (0.662-1.10)	0.955 (0.725-1.27)	1.06 (0.784-1.46)	1.21 (0.856-1.73)	1.33 (0.904-1.97)
60-min	0.440 (0.368-0.533)	0.579 (0.483-0.701)	0.760 (0.632-0.922)	0.906 (0.748-1.11)	1.11 (0.881-1.40)	1.26 (0.981-1.63)	1.42 (1.08-1.88)	1.58 (1.16-2.16)	1.80 (1.27-2.57)	1.97 (1.34-2.92)
2-hr	0.658 (0.549-0.795)	0.864 (0.721-1.05)	1.13 (0.937-1.37)	1.34 (1.10-1.64)	1.61 (1.28-2.04)	1.82 (1.42-2.36)	2.02 (1.54-2.69)	2.23 (1.64-3.06)	2.50 (1.77-3.58)	2.71 (1.85-4.02)
3-hr	0.827 (0.691-1.00)	1.08 (0.905-1.31)	1.41 (1.17-1.71)	1.67 (1.38-2.04)	2.01 (1.60-2.54)	2.26 (1.76-2.93)	2.50 (1.90-3.33)	2.76 (2.03-3.77)	3.08 (2.18-4.41)	3.33 (2.27-4.94)

APPENDIX C: NCRS HYDROLOGIC SOIL GROUPS

Hydrologic Soil Group—San Bernardino County Southwestern Part, California



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/15/2025
Page 1 of 4

12-17

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Bernardino County Southwestern Part, California
 Survey Area Data: Version 17, Sep 8, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 14, 2022—Jun 12, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

H2-18

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Cb	Chino silt loam	C	12.2	6.1%
Db	Delhi fine sand	A	33.4	16.8%
Gr	Grangeville fine sandy loam, warm MAAT, MLRA 19	A	17.6	8.9%
Hr	Hilmar loamy fine sand	B	63.6	32.1%
TuB	Tujunga loamy sand, 0 to 5 percent slopes	A	71.6	36.1%
Totals for Area of Interest			198.4	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

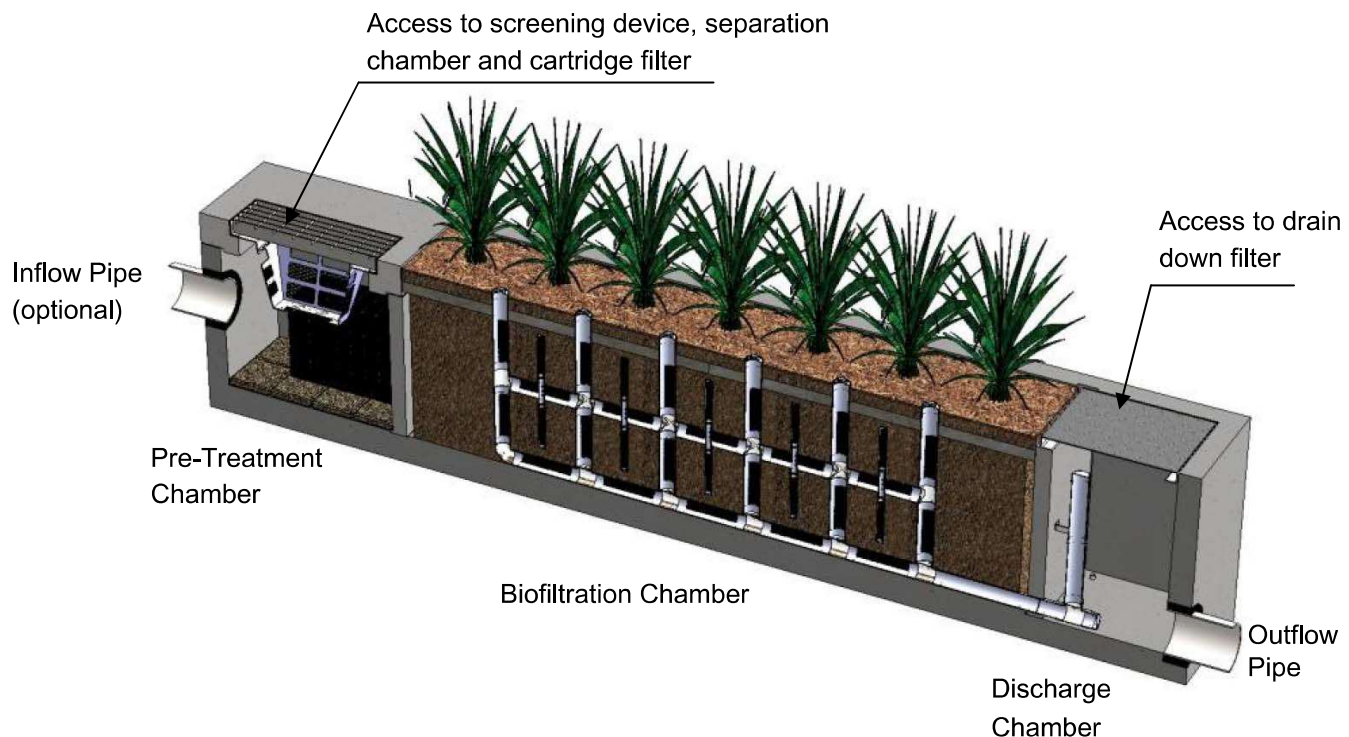
APPENDIX D: MODULAR WETLAND SYSTEM OPERATIONS AND MAINTENANCE

Maintenance Guidelines for Modular Wetland System - Linear

Maintenance Summary

- Remove Trash from Screening Device – average maintenance interval is 6 to 12 months.
 - *(5 minute average service time).*
- Remove Sediment from Separation Chamber – average maintenance interval is 12 to 24 months.
 - *(10 minute average service time).*
- Replace Cartridge Filter Media – average maintenance interval 12 to 24 months.
 - *(10-15 minute per cartridge average service time).*
- Replace Drain Down Filter Media – average maintenance interval is 12 to 24 months.
 - *(5 minute average service time).*
- Trim Vegetation – average maintenance interval is 6 to 12 months.
 - *(Service time varies).*

System Diagram



Maintenance Procedures

Screening Device

1. Remove grate or manhole cover to gain access to the screening device in the Pre-Treatment Chamber. Vault type units do not have screening device. Maintenance can be performed without entry.
2. Remove all pollutants collected by the screening device. Removal can be done manually or with the use of a vacuum truck. The hose of the vacuum truck will not damage the screening device.
3. Screening device can easily be removed from the Pre-Treatment Chamber to gain access to separation chamber and media filters below. Replace grate or manhole cover when completed.

Separation Chamber

1. Perform maintenance procedures of screening device listed above before maintaining the separation chamber.
2. With a pressure washer spray down pollutants accumulated on walls and cartridge filters.
3. Vacuum out Separation Chamber and remove all accumulated pollutants. Replace screening device, grate or manhole cover when completed.

Cartridge Filters

1. Perform maintenance procedures on screening device and separation chamber before maintaining cartridge filters.
2. Enter separation chamber.
3. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.
4. Remove each of 4 to 8 media cages holding the media in place.
5. Spray down the cartridge filter to remove any accumulated pollutants.
6. Vacuum out old media and accumulated pollutants.
7. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase.
8. Replace the lid and tighten down bolts. Replace screening device, grate or manhole cover when completed.

Drain Down Filter

1. Remove hatch or manhole cover over discharge chamber and enter chamber.
2. Unlock and lift drain down filter housing and remove old media block. Replace with new media block. Lower drain down filter housing and lock into place.
3. Exit chamber and replace hatch or manhole cover.



Maintenance 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 require irrigation.

Maintenance Procedure Illustration

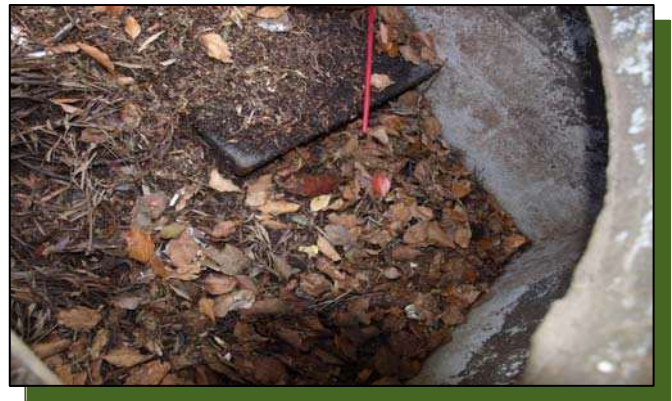
Screening Device

The screening device is located directly under the manhole or grate over the Pre-Treatment Chamber. It's mounted directly underneath for easy access and cleaning. Device can be cleaned by hand or with a vacuum truck.



Separation Chamber

The separation chamber is located directly beneath the screening device. It can be quickly cleaned using a vacuum truck or by hand. A pressure washer is useful to assist in the cleaning process.



Cartridge Filters

The cartridge filters are located in the Pre-Treatment chamber connected to the wall adjacent to the biofiltration chamber. The cartridges have removable tops to access the individual media filters. Once the cartridge is open media can be easily removed and replaced by hand or a vacuum truck.



Drain Down Filter

The drain down filter is located in the Discharge Chamber. The drain filter unlocks from the wall mount and hinges up. Remove filter block and replace with new block.



Trim Vegetation

Vegetation should be maintained in the same manner as surrounding vegetation and trimmed as needed. No fertilizer shall be used on the plants. Irrigation per the recommendation of the manufacturer and or landscape architect. Different types of vegetation requires different amounts of irrigation.





Inspection Form



Modular Wetland System, Inc.

P. 760.433-7640

F. 760-433-3176

E. Info@modularwetlands.com

www.modularwetlands.com



Inspection Report Modular Wetlands System



Project Name _____

Project Address _____ (city) (Zip Code)

Owner / Management Company _____

Contact _____

Phone () -

Inspector Name _____

Date ____ / ____ / ____ Time ____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____

Additional Notes _____

For Office Use Only

(Reviewed By)

(Date)
Office personnel to complete section to the left.

Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): _____ Size (22', 14' or etc.): _____

Structural Integrity:	Yes	No	Comments
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?			
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?			
Working Condition:			
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?			
Is there standing water in inappropriate areas after a dry period?			
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?			
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes, specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.			Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:
Any signs of improper functioning in the discharge chamber? Note issues in comments section.			
Other Inspection Items:			
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?			
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.			
Is there a septic or foul odor coming from inside the system?			

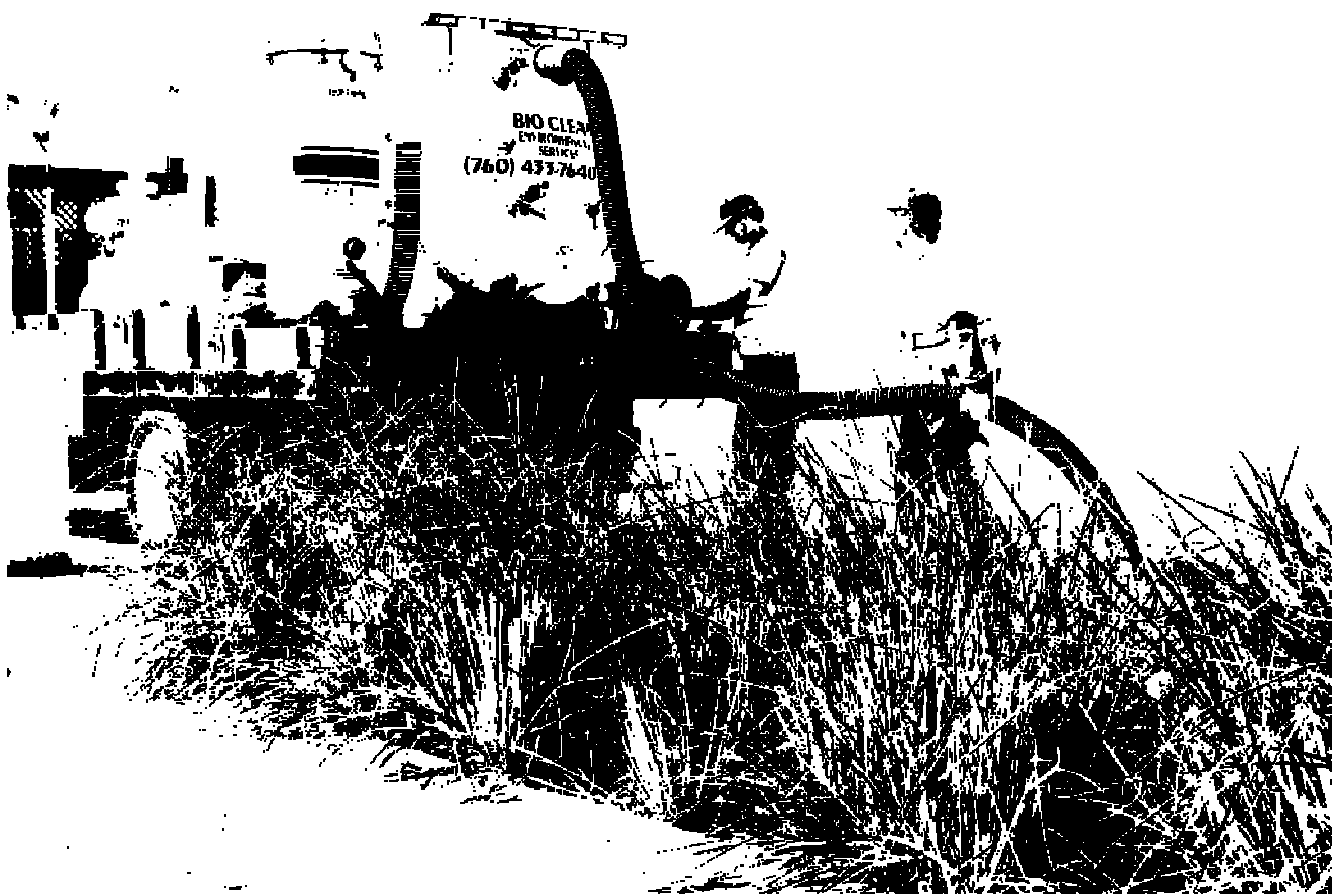
Waste:	Yes	No
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes: _____

Maintenance Report



Modular Wetland System, Inc.

P. 760.433-7640

F. 760-433-3176

E. Info@modularwetlands.com

www.modularwetlands.com



Cleaning and Maintenance Report Modular Wetlands System



Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____

Phone () -

Inspector Name _____

Date ____ / ____ / ____ Time ____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint

☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____

Additional Notes _____

For Office Use Only

(Reviewed By)

(Date)
Office personnel to complete section to the left.

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat:	MWS Catch Basins						
	Long:							
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:

APPENDIX E: CMP DETENTION AND INFILTRATION MAINTENANCE GUIDE

Contech® CMP Detention Inspection and Maintenance Guide

Underground stormwater detention and infiltration systems must be inspected and maintained at regular intervals for purposes of performance and longevity.

Inspection

Inspection is the key to effective maintenance of CMP detention systems and is easily performed. Contech recommends ongoing, annual inspections. Sites with high trash load or small outlet control orifices may need more frequent inspections. The rate at which the system collects pollutants will depend more on-site specific activities rather than the size or configuration of the system.

Inspections should be performed more often in equipment washdown areas, in climates where sanding and/or salting operations take place, and in other various instances in which one would expect higher accumulations of sediment or abrasive/corrosive conditions. A record of each inspection is to be maintained for the life of the system.

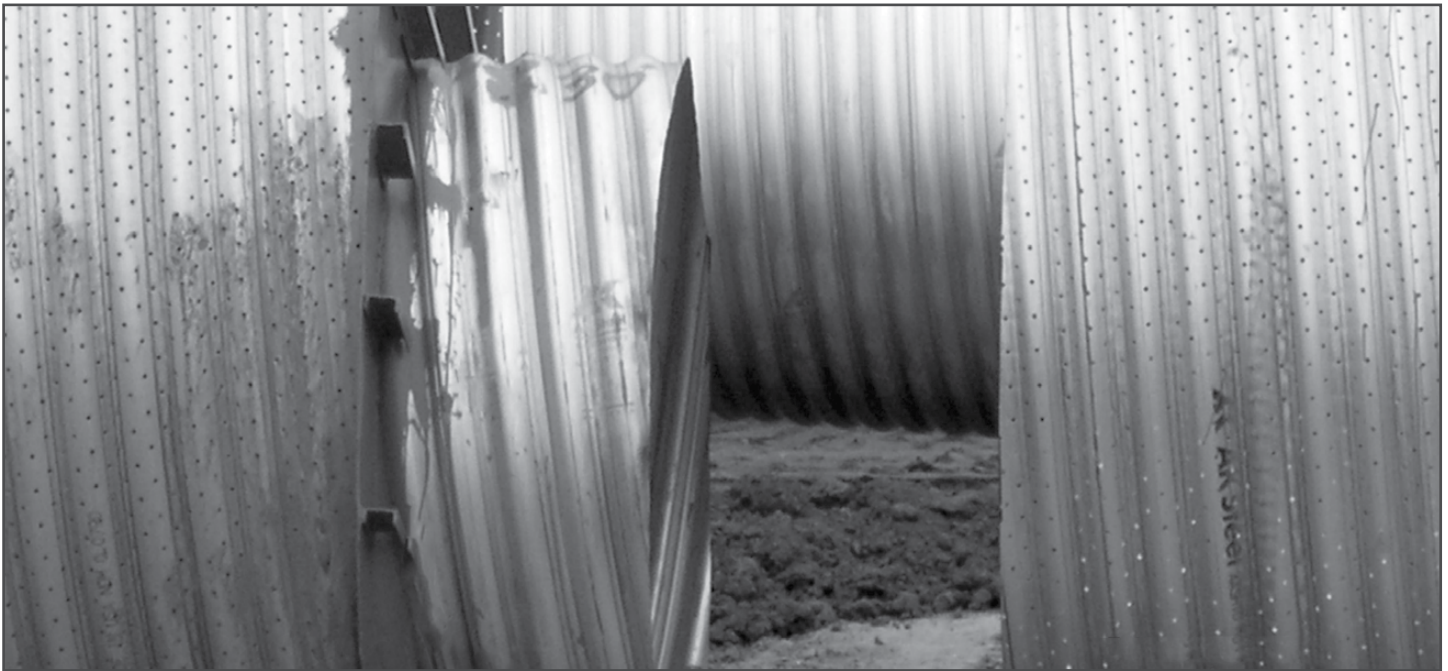
Maintenance

CMP detention systems should be cleaned when an inspection reveals accumulated sediment or trash is clogging the discharge orifice. Accumulated sediment and trash can typically be evacuated through the manhole over the outlet orifice. If maintenance is not performed as recommended, sediment and trash may accumulate in front of the outlet orifice. Manhole covers should be securely seated following cleaning activities. Contech suggests that all systems be designed with an access/inspection manhole situated at or near the inlet and the outlet orifice. Should it be necessary to get inside the system to perform maintenance activities, all appropriate precautions regarding confined space entry and OSHA regulations should be followed.

Annual inspections are best practice for all underground systems. During this inspection if evidence of salting/de-icing agents is observed within the system, it is best practice for the system to be rinsed, including above the spring line soon after the spring thaw as part of the maintenance program for the system.

Maintaining an underground detention or infiltration system is easiest when there is no flow entering the system. For this reason, it is a good idea to schedule the cleanout during dry weather.

The foregoing inspection and maintenance efforts help ensure underground pipe systems used for stormwater storage continue to function as intended by identifying recommended regular inspection and maintenance practices. Inspection and maintenance related to the structural integrity of the pipe or the soundness of pipe joint connections is beyond the scope of this guide.



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CMP DETENTION SYSTEMS

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