County of San Diego
PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

AUTOZONE
PDS2017-LDGRMJ-30144

VALLEY CENTER ROAD
VALLEY CENTER, CA 92082

ASSESSOR'S PARCEL NUMBER(S):
186-270-35

ENGINEER OF WORK:

BRENT C. MOORE, RCE 59121 EXP 6/30/2019

PREPARED FOR:

BELL HOLDINGS, LLC
P.O. BOX 642
RANCHO SANTA FE, CA 92067
858-756-3589

PDP SWQMP PREPARED BY:

ALIDADE ENGINEERING
41743 ENTERPRISE CIRCLE NORTH, SUITE 209
TEMECULA, CA 92590
951-587-2020

DATE OF SWQMP:
01/29/2019

PLANS PREPARED BY:
ALIDADE ENGINEERING
41743 ENTERPRISE CIRCLE NORTH, SUITE 209
TEMECULA, CA 92590
951-587-2020

SWQMP APPROVED BY:

APPROVAL DATE:

APPROVED FOR CONSISTENCY WITH PROJECT SWQMP. APPROVAL DOES NOT CONSTITUTE COMPLIANCE WITH REGULATORY REQUIREMENTS

SWQMP APPROVED BY: PDS Land Development

APPROVAL DATE: 5/3/2019

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Table of Contents

Attachments

Acronyms

ACP	Alternative Compliance Project
APN	Assessor's Parcel Number
BMP	Best Management Practice
BMP DM	Best Management Practice Design Manual
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NRCS	Natural Resources Conservation Service
PDCI	Private Development Construction Inspection Section
PDP	Priority Development Project
PDS	Planning and Development Services
PE	Professional Engineer
RPO	Resource Protection Ordinance
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWQMP	Storm Water Quality Management Plan
WMAA	Watershed Management Area Analysis
WPO	Watershed Protection Ordinance
WQIP	Water Quality Improvement Plan

PDP SWQMP Preparer's Certification Page

Project Name: AUTOZONE
Permit Application Number: PDS2017-LDGRMJ-30144

PREPARER'S CERTIFICATION

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

I have read and understand that the County of San Diego has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the BMP Design Manual. I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by County staff is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

Brent Moore C59121 EXP 6/30/21
Engineer of Work's Signature, PE Number & Expiration Date

BRENT C. MOORE
Print Name

ALIDADE ENGINEERING
Company

1/29/19
Date

Engineer's Seal:

Template Date: March 16, 2016
LUEG:SW **PDP SWQMP**

Preparation Date: 01/29/2019]

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Submittal Record

Use this Table to keep a record of submittals of this PDP SWQMP. Each time the PDP SWQMP is re-submitted, provide the date and status of the project. In column 4 summarize the changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck comments behind this page.

Preliminary Design / Planning / CEQA

Submittal Number	Date	Summary of Changes
1		Initial Submittal
2		
3		
4		

Final Design

Submittal Number	Date	Summary of Changes
1	10/26/17	Initial Submittal
2	04/04/18	Updated Grading Permit Number, revised biofiltration basin configuration and grading, updated total proposed impervious area, updated, updated storm water pollutant worksheet calcs, Form I-8, DMA exhibits and DMA mapbook in Attachment 1, updated Hydromod Compliance report and Hydromod exhibits in Attachment 2, Updated BMP Maintenance Plan and prepared exhibits for the Draft Maintenance Agreement in Attachment 3, included updated plans in Attachment 5, included updated Drainage Study in Attachment 6 and included updated Geotechnical Letter in Attachment 7.
3	06/28/2018	Updated Step 1 with new Impervious area and WDID No.; updated Step 3.3 with revised project description, updated Land Cover acreages, and updated site drainage patterns; updated Step 3.8 with revised site drainage patterns; updated Step 4.3.8 due to revised landscape

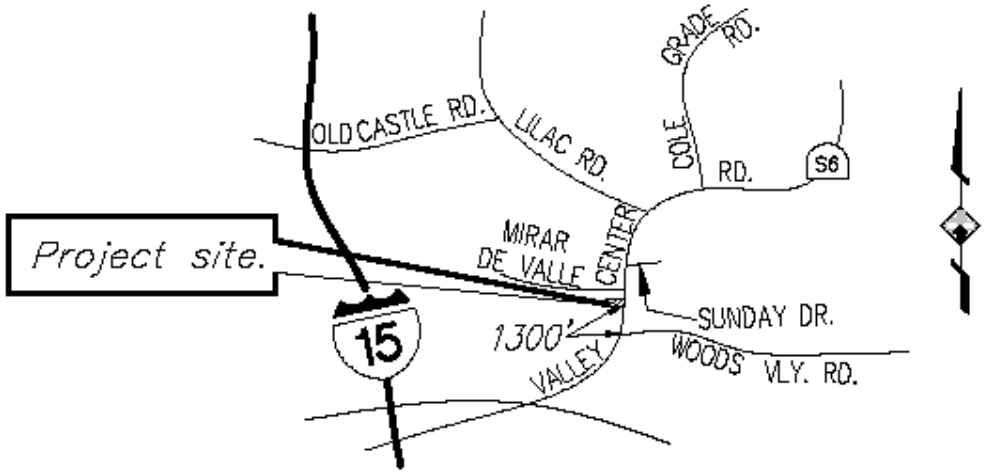
		acreage; updated County BMP worksheets due to revised site grading; updated Attachment 1D exhibit due to revised site grading; updated County of San Diego BMP Verification Form due to new form.
4	01/29/19	Updated Step 1 with revised existing and newly created impervious area and revised total disturbed area. Revised Step 3 to include Existing Development due to having a portion of the two drive access points to the site constructed with the Tractor Supply project (PDS2017-LDGRMJ-30114), updated existing land cover values accordingly and revised wording of existing site drainage patterns as a result of the completed grading and improvements on the adjacent Tractor Supply project. Updated Step 3.3 Project Description to and Change in Land Cover Types due to construction of the adjacent Tractor Supply project. Updated Step 3.4 to account for site impacts from the construction of the adjacent Tractor Supply project.

Plan Changes

Submittal Number	**Date**	**Summary of Changes**
1		Initial Submittal
2		
3		
4		

Project Vicinity Map

Project Name: AUTOZONE
Record ID: PDS2017-LDGRMJ-30144



INTERSECTION OF VALLEY CENTER ROAD AND
WOODS VALLEY ROAD 1,300 FEET TO S'LY PROPERTY LINE AT VALLEY CENTER ROAD.

VICINITY MAP

NOT TO SCALE
THOMAS BROS. 1090–E4

Step 1: Project type determination (Standard or Priority Development Project)

Is the project part of another Priority Development Project (PDP)? If so, a PDP SWQMP is required. Go to Step 2.			(☐ Yes ☒ No
The project is (select one): ☒ New Development ☐ Redevelopment[1]			
The total proposed newly created or replaced impervious area is:			27,520 ft^2
The total existing (pre-project) impervious area is:			1,600 ft^2
The total area disturbed by the project is:			42,935 ft^2
If the total area disturbed by the project is 1 acre (43,560 sq. ft.) or more OR the project is part of a larger common plan of development disturbing 1 acre or more, a Waste Discharger Identification (WDID) number must be obtained from the State Water Resources Control Board. WDID: _9 37C383935__			
Is the project in any of the following categories, (a) through (f)?[2]			
Yes ☒	No ☐	(a)	New development projects that create 10,000 square feet or more of impervious surfaces[3] (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☐	No ☒	(b)	Redevelopment projects that create and/or replace 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 surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☒	No ☐	(c)	New and redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses: (i) Restaurants. This category is defined as 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). (ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater. (iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce. (iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.

[1] Redevelopment is defined as: The creation and/or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include routine maintenance activities, such as trenching and resurfacing associated with utility work; pavement grinding; resurfacing existing roadways; new sidewalks construction; pedestrian ramps; or bike lanes on existing roads; and routine replacement of damaged pavement, such as pothole repair.

[2] Applicants should note that any development project that will create and/or replace 10,000 square feet or more of impervious surface (collectively over the entire project site) is considered a new development.

[3] For solar energy farm projects, the area of the solar panels does not count toward the total impervious area of the site.

Project type determination (continued)

Yes ☐	No ☒	(d)	New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging directly to an Environmentally Sensitive Area (ESA). "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). *Note: ESAs are areas that 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 Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees. See BMP Design Manual Section 1.4.2 for additional guidance.*
Yes ☒	No ☐	(e)	New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses: (i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539. (ii) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.
Yes ☐	No ☒	(f)	New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction. *Note: See BMP Design Manual Section 1.4.2 for additional guidance.*

Does the project meet the definition of one or more of the Priority Development Project categories (a) through (f) listed above?

☐ No – the project is not a Priority Development Project (Standard Project).

☒ Yes – the project is a Priority Development Project (PDP).

Further guidance may be found in Chapter 1 and Table 1-2 of the BMP Design Manual.

The following is for **redevelopment PDPs only**:

The area of existing (pre-project) impervious area at the project site is: ft^2 (A)
The total proposed newly created or replaced impervious area is ft^2 (B)
Percent impervious surface created or replaced (B/A)*100: %
The percent impervious surface created or replaced is (select one based on the above calculation):

☐ less than or equal to fifty percent (50%) – **only newly created or replaced impervious areas are considered a PDP and subject to stormwater requirements**

OR

☐ greater than fifty percent (50%) – **the entire project site is considered a PDP and subject to stormwater requirements**

Step 1.1: Storm Water Quality Management Plan requirements

Step	Answer	Progression
Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? To answer this item, complete Step 1 Project Type Determination Checklist on Pages 1 and 2, and see PDP exemption information below. For further guidance, see Section 1.4 of the BMP Design Manual *in its entirety*.	☐ Standard Project	Standard Project requirements apply, including Standard Project SWQMP. **Complete Standard Project SWQMP.**
	☒ PDP	Standard and PDP requirements apply, including PDP SWQMP. **Complete PDP SWQMP.**
	☐ PDP with ACP	If participating in offsite alternative compliance, **complete Step 6.3 and an ACP SWQMP.**
	☐ PDP Exemption	**Go to Step 1.2 below.**

Step 1.2: Exemption to PDP definitions

Is the project exempt from PDP definitions based on either of the following: ☐ Projects that are only new or retrofit paved sidewalks, bicycle lanes, or trails that meet the following criteria: (i) Designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas; OR (ii) Designed and constructed to be hydraulically disconnected from paved streets or roads [i.e., runoff from the new improvement does not drain directly onto paved streets or roads]; OR (iii) Designed and constructed with permeable pavements or surfaces in accordance with County of San Diego Guidance on Green Infrastructure;	If so: Standard Project requirements apply, AND any additional requirements specific to the type of project. County concurrence with the exemption is required. *Provide discussion and list any additional requirements below in this form.* **Complete Standard Project SWQMP**
☐ Projects that are only retrofitting or redeveloping existing paved alleys, streets or roads that are designed and constructed in accordance with the County of San Diego Guidance on Green Infrastructure.	**Complete Green Streets PDP Exempt SWQMP.**
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:	

Step 2: Construction Storm Water BMP Checklist

Minimum Required Standard Construction Storm Water BMPs		
If you answer "Yes" to any of the questions below, your project is subject to Table 1 on the following page (Minimum Required Standard Construction Stormwater BMPs). As noted in Table 1, please select at least the minimum number of required BMPs, or as many as are feasible for your project. If no BMP is selected, an explanation must be given in the box provided. The following questions are intended to aid in determining construction BMP requirements for your project. **Note: All selected BMPs below must be included on the BMP plan incorporated into the construction plan sets.**		
1. Will there be soil disturbing activities that will result in exposed soil areas? (This includes minor grading and trenching.) **Reference Table 1 Items A, B, D, and E** Note: Soil disturbances NOT considered significant include, but are not limited to, change in use, mechanical/electrical/plumbing activities, signs, temporary trailers, interior remodeling, and minor tenant improvement.	☒Yes	☐No
2. Will there be asphalt paving, including patching? **Reference Table 1 Items D and F**	☒Yes	☐No
3. Will there be slurries from mortar mixing, coring, or concrete saw cutting? **Reference Table 1 Items D and F**	☒Yes	☐No
4. Will there be solid wastes from concrete demolition and removal, wall construction, or form work? **Reference Table 1 Items D and F**	☒Yes	☐No
5. Will there be stockpiling (soil, compost, asphalt, concrete, solid waste) for over 24 hours? **Reference Table 1 Items D and F**	☒Yes	☐No
6. Will there be dewatering operations? **Reference Table 1 Items C and D**	☐Yes	☒No
7. Will there be temporary on-site storage of construction materials, including mortar mix, raw landscaping and soil stabilization materials, treated lumber, rebar, and plated metal fencing materials? **Reference Table 1 Items E and F**	☒Yes	☐No
8. Will trash or solid waste product be generated from this project? **Reference Table 1 Item F**	☒Yes	☐No
9. Will construction equipment be stored on site (e.g.: fuels, oils, trucks, etc.?) **Reference Table 1 Item F**	☒Yes	☐No
10. Will Portable Sanitary Services ("Porta-potty") be used on the site? **Reference Table 1 Item F**	☒Yes	☐No

Table 1. Construction Storm Water BMP Checklist

Minimum Required Best Management Practices (BMPs)	CALTRANS SW Handbook[4] Detail or County Std. Detail	✔ BMP Selected	Reference sheet No.'s where each selected BMP is shown on the plans. If no BMP is selected, an explanation must be provided.
A. Select Erosion Control Method for Disturbed Slopes (choose at least one for the appropriate season)			
Vegetation Stabilization Planting[5] (Summer)	SS-2, SS-4	☐	BMPs are shown on the Erosion Control Plan (sheet 9) of the Grading Plans (PDS2017-LDGRMJ-30144)
Hydraulic Stabilization Hydroseeding[2] (Summer)	SS-4	☒	
Bonded Fiber Matrix or Stabilized Fiber Matrix[6] (Winter)	SS-3	☒	
Physical Stabilization Erosion Control Blanket[3] (Winter)	SS-7	☐	
B. Select erosion control method for disturbed flat areas (slope < 5%) (choose at least one)			
County Standard Lot Perimeter Protection Detail	PDS 659[7], SC-2	☐	BMPS are shown on the Erosion Control Plan (sheet 9) of the Grading Plans (PDS2017-LDGRMJ-30144)
Will use erosion control measures from Item A on flat areas also	SS-3, 4, 7	☒	
County Standard Desilting Basin (must treat all site runoff)	PDS 660[8], SC-2	☐	
Mulch, straw, wood chips, soil application	SS-6, SS-8	☒	

4 State of California Department of Transportation (Caltrans). 2003. Storm Water Quality Handbooks, Construction Site Best Management Practices (BMPs) Manual. March. Available online at: http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm.

5 If Vegetation Stabilization (Planting or Hydroseeding) is proposed for erosion control it may be installed between May 1st and August 15th. Slope irrigation is in place and needs to be operable for slopes >3 feet. Vegetation must be watered and established prior to October 1st. The owner must implement a contingency physical BMP by August 15th if vegetation establishment does not occur by that date. If landscaping is proposed, erosion control measures must also be used while landscaping is being established. Established vegetation must have a subsurface mat of intertwined mature roots with a uniform vegetative coverage of 70 percent of the natural vegetative coverage or more on all disturbed areas.

6 All slopes over three feet must have established vegetative cover prior to final permit approval.

7 County of San Diego, Planning & Development Services. 2012. Standard Lot Perimeter Protection Design System. Building Division. PDS 659. Available online at http://www.sandiegocounty.gov/pds/docs/pds659.pdf.

8 County of San Diego, Planning & Development Services. 2012. County Standard Desilting Basin for Disturbed Areas of 1 Acre or Less Building Division. PDS 659. Available online at http://www.sandiegocounty.gov/pds/docs/pds660.pdf.

Table 1. Construction Storm Water BMP Checklist (continued)

Minimum Required Best Management Practices (BMPs)	CALTRANS SW Handbook Detail or County Std. Detail	✔ BMP Selected	Reference sheet No.'s where each selected BMP is shown on the plans. If no BMP is selected, an explanation must be provided.
C. If runoff or dewatering operation is concentrated, velocity must be controlled using an energy dissipater			
Energy Dissipater Outlet Protection[9]	SS-10	☒	BMPs are shown on the Erosion Control Plan (sheet 9) of the Grading Plans (PDS2017-LDGRMJ-30144)
D. Select sediment control method for all disturbed areas (choose at least one)			
Silt Fence	SC-1	☒	BMPs are shown on the Erosion Control Plan (sheet 9) of the Grading Plans (PDS2017-LDGRMJ-30144)
Fiber Rolls (Straw Wattles)	SC-5	☒	
Gravel & Sand Bags	SC-6 & 8	☐	
Dewatering Filtration	NS-2	☐	
Storm Drain Inlet Protection	SC-10	☒	
Engineered Desilting Basin (sized for 10-year flow)	SC-2	☐	
E. Select method for preventing offsite tracking of sediment (choose at least one)			
Stabilized Construction Entrance	TC-1	☒	BMPs are shown on the Erosion Control Plan (sheet 9) of the Grading Plans (PDS2017-LDGRMJ-30144)
Construction Road Stabilization	TC-2	☐	
Entrance/Exit Tire Wash	TC-3	☐	
Entrance/Exit Inspection & Cleaning Facility	TC-1	☐	
Street Sweeping and Vacuuming	SC-7	☒	
F. Select the general site management BMPs			
F.1 Materials Management			
Material Delivery & Storage	WM-1	☒	BMPs are shown on the Erosion Control Plan (sheet 9) of the Grading Plans (PDS2017-LDGRMJ-30144)
Spill Prevention and Control	WM-4	☒	
F.2 Waste Management[10]			
Waste Management Concrete Waste Management	WM-8	☒	BMPs are shown on the Erosion Control Plan (sheet 9) of the Grading Plans (PDS2017-LDGRMJ-30144)
Solid Waste Management	WM-5	☒	
Sanitary Waste Management	WM-9	☒	
Hazardous Waste Management	WM-6	☒	

Note: The Construction General Permit (Order No. 2009-0009-DWQ) also requires all projects not subject to the BMP Design Manual to comply with runoff reduction requirements through the implementation of post-construction BMPs as described in Section XIII of the order.

[9] Regional Standard Drawing D-40 – Rip Rap Energy Dissipater is also acceptable for velocity reduction.

[10] Not all projects will have every waste identified. The applicant is responsible for identifying wastes that will be onsite and applying the appropriate BMP. For example, if concrete will be used, BMP WM-8 must be selected.

Step 3: County of San Diego PDP SWQMP Site Information Checklist

Step 3.1: Description of Existing Site Condition

Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	San Luis Rey HU, Lower San Luis HA, Valley Center HSA (903.14)

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

- ☒ Existing development
- ☐ Previously graded but not built out
- ☐ Demolition completed without new construction
- ☐ Agricultural or other non-impervious use
- ☒ Vacant, undeveloped/natural

Description / Additional Information:
Existing site is vacant and undeveloped with the exception of the limited grading and improvements that were installed on site as part of the development for the Tractor Supply project located adjacent to the project site (PDS2017-LDGRMJ-30114).

Existing Land Cover Includes (select all that apply and provide each area on site):

- ☒ Vegetative Cover 0.993 Acres (43,240 Square Feet)
- ☐ Non-Vegetated Pervious Areas _____ Acres (_____ Square Feet)
- ☒ Impervious Areas 0.037 Acres (1,600 Square Feet)

Description / Additional Information:
The existing site is undeveloped with the exception of a portion of the two proposed entrances to the AutoZone project from the adjacent Tractor Supply project (PDS2017-LDGRMJ-30114). The construction for the Tractor Supply project included installation of 1,600 sf of impervious area of which 1,294 sf will remain in place. The development of the Tractor Supply site also included the addition of slope landscaping on the AutoZone site. There are also street trees located adjacent to Valley Center Road. The remainder of the site is covered with native weeds and grasses.

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) (or N/A if no infiltration is used):

- ☐ 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
☐ Other

Description / Additional Information:

Step 3.2: Description of Existing Site Drainage Patterns

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) Is runoff from offsite conveyed through the site? if yes, quantify all offsite drainage areas, design flows, and locations where offsite flows enter the project site, and summarize how such flows are conveyed through the site;
(3) Provide details regarding existing project site drainage conveyance network, including any existing storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels; and
(4) Identify all discharge locations from the existing project site along with a summary of conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations.

Describe existing site drainage patterns:

(1) Existing drainage sheet flows following natural contours.
(2) Project accepts offsite run-on from approximately 1.3 acres located south and west of the project site. The offsite run-on was calculated to be 2.51 cfs for the 100-year storm event. The offsite run-on comingles with onsite runoff within the right-of-way for Old Mirar De Valle Road and follows existing contours to an existing catch located near the northeast corner of the project site.
(3) There is an existing catch basin located near the northeast corner of the site that intercepts runoff from approximately 2.145 acres of offsite and onsite areas. The catch basin is connected to the existing public storm drain in Valley Center Road by an existing 24-inch RCP storm drain. There is a rough graded swale located adjacent to the easterly property line that was created by the road grading for the widening of Valley Center Road.
(4) As noted in (3) above, the existing catch basin intercepts runoff from approximately 2.145 acres (3.64 cfs for the 100-year storm event). The remainder of the runoff from approximately 0.001 acres (0.01 cfs for the 100-year storm event) sheets flows to the adjacent property to the south (future Tractor Supply site).

Step 3.3: Description of Proposed Site Development

Project Description / Proposed Land Use and/or Activities:
The project proposes construction of one 7,380 square foot commercial building with hardscape, parking lot and landscaping on a 0.850 acre parcel. The project includes construction of an offsite access drive which would be solely used by delivery and trash trucks and an offsite site wall to shield future residential development from the commercial development. The developed area for AutoZone including the offsite access drive and site walls will be approximately 64.3% impervious (28,814 square feet of building, site walls, hardscape and pavement including the portion of the access drives constructed with the adjacent Tractor Supply project PDS2017-LDGRMJ-30114).

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 one commercial building, hardscape constructed of PCC pavement, parking lot, private access drive and site walls.

List/describe proposed pervious features of the project (e.g., landscape areas):
The proposed pervious features of the project include parking lot landscaped islands, landscaping at the outer edges of the proposed development, tree grates within the hardscape area fronting the building and one proposed biofiltration basin.

Does the project include grading and changes to site topography?
☒Yes
☐No

Description / Additional Information:
The project includes construction of a private access drive located immediately west of the project site that includes construction of a bladed swale to intercept and direct offsite run-on away from the property. The proposed parking lot will be graded to drain to a proposed private storm drain system. The majority of the site, including the private access drive, will be designed to direct storm water runoff to a biofiltration basin located just east of the proposed building. The remainder of the project is graded to drain to either Valley Center Road or to Old Mirar De Valle Road.

Insert acreage or square feet for the different land cover types in the table below:

Change in Land Cover Type Summary			
Land Cover Type	Existing (acres or ft^2)	Proposed (acres or ft^2)	Percent Change
Vegetation	43,240 s.f.	16,026 s.f.	-63%
Pervious (non-vegetated)	0 s.f.	0 s.f.	0%
Impervious	1,600 s.f.	27,520 s.f.	63%

Step 3.4: Description of Proposed Site Drainage Patterns

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

☒Yes

☐No

If yes, provide details regarding the proposed project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels, and the method for conveying offsite flows through or around the proposed project site. Identify all discharge locations from the proposed project site along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide a summary of pre- and post-project drainage areas and design flows to each of the runoff discharge locations. Reference the drainage study for detailed calculations.

Describe proposed site drainage patterns:

The project includes construction of a private access drive located immediately west of the project site that includes construction of a bladed swale to intercept and direct offsite run-on away from the property. The runoff from the private access drive will be directed to either a proposed private curb inlet or to a proposed private Type F catch basin. A portion of the private access drive was constructed with the adjacent Tractor Supply project (PDS2017-LDGRMJ-30114). The runoff from both structures will be conveyed to the proposed biofiltration basin via a proposed private storm drain located adjacent to the north wall of the building. The runoff from the building roof will hard connect to the proposed storm drain located adjacent to the north wall of the building which will outlet into the proposed biofiltration basin. The proposed parking lot will be graded to drain to a proposed private curb inlet which connects to the private onsite storm drain that outlets into the proposed biofiltration basin. A portion of the access drive to the parking lot was constructed with the adjacent Tractor Supply project (PDS2017-LDGRMJ-30114) and the runoff from that pavement will also directed to the proposed biofiltration basin. The runoff from the proposed landscaped areas adjacent to Valley Center Road will sheet flow directly to Valley Center Road and get intercepted by the existing curb inlet located near the north east corner of the site. The remainder of the project is graded to drain to either the adjacent property to the south (future Tractor Supply site) or to Old Mirar De Valle Road where it will follow the natural contours and get intercepted by the existing catch basin located near the northeast corner of the project site.

The proposed biofiltration basin accepts runoff from a 0.852 acre contributing basin that is approximately 76.6% impervious (28,438 square feet of building, hardscape and parking lot and 8,694 square feet of landscaping including the biofiltration basin). The total unmitigated runoff draining to the proposed biofiltration basin was calculated to be 6.42 cfs for the 100-year storm event. The runoff from the biofiltration basin will drain to a proposed underground storage system with flow control orifices and weir walls to reduce the developed outflows to be equal or less than the runoff developed in the existing condition towards the public storm drain system in Valley Center Road. Due to the grades of the un-named private road providing access for Tractor Supply, AutoZone and the existing residences to the west, a portion of the AutoZone site will drain back towards the Tractor Supply site. The basins in question are 0.001acres and 0.00007 acres in size and contribute 0.009 cfs and 0.0004 cfs respectively towards the Tractor Supply site for the 100-year storm event and will have negligible impact to the Tractor Supply storm drain system. The landscaped area fronting Valley Center Road will drain directly to Valley Center Road. The basin in question is 0.083 acres in size and contributes 0.31 cfs for the 100-year storm event. (See Page 18 for continuation)

Step 3.5: Potential Pollutant Source Areas

Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply). Select "Other" if the project is a phased development and provide a description:

- ☒ 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
- ☐ Other (provide description)

Description / Additional Information:

Step 3.6: Identification and Narrative of Receiving Water and Pollutants of Concern

Describe flow path of storm water from the project site discharge location(s), through urban storm conveyance systems as applicable, to receiving creeks, rivers, and lagoons as applicable, and ultimate discharge to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable):
The public storm drain system in Valley Center Road outlets to Moosa Creek which drains to Turner Lake. Downstream of Turner Lake, Moosa Creek drains to Lower San Luis Rey River which outlets to the Pacific Ocean in Oceanside.

List any 303(d) impaired water bodies[11] within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:

303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs / WQIP Highest Priority Pollutant
Pacific Ocean (903.11)	Enterococcus, Total Coliform	
San Luis Rey River (903.11)	Chloride, Enterococcus, Fecal Coliform, Phosphorus, TDS, Total Nitrogen, Toxicity	Bacteria

Identification of Project Site Pollutants*

*Identification of project site pollutants below is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs. Note the project must also participate in an alternative compliance program (unless prior lawful approval to meet earlier PDP requirements is demonstrated).

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

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

[11] The current list of Section 303(d) impaired water bodies can be found at http://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/#impaired

Pesticides	☐	☐	☐

Step 3.7: Hydromodification Management Requirements

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

☒Yes, hydromodification management requirements for flow control and preservation of critical coarse sediment yield areas are applicable.

☐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[12] for the watershed in which the project resides.

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

[12] The Watershed Management Area Analysis (WMAA) is an optional element for inclusion in the Water Quality Improvement Plans (WQIPs) described in the 2013 MS4 Permit [Provision B.3.b.(4)]. It is available online at the Project Clean Water website: http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=248

Step 3.7.1: Critical Coarse Sediment Yield Areas*

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

Projects must satisfy critical coarse sediment yield area (CCSYA) requirements by characterizing the project as one of the scenario-types presented below and satisfying associated criteria. Projects must appropriately satisfy all requirements for identification, avoidance, and bypass, OR may alternatively elect to demonstrate no net impact.

☐ **Scenario 1**: Project is subject to and in compliance with RPO requirements *(without utilization of RPO exemptions 86.604(e)(2)(cc) or 86.604(e)(3) that result in impacts to more than 15% of the project-scale CCSYAs)*.

- ☐ Identify: Project has identified both onsite and upstream CCSYAs as areas that are coarse, ≥25% slope, and ≥50' tall. *(Optional refinement methods may be performed per guidance in Section H.1.2). AND,*
- ☐ Avoid: Project has avoided onsite CCSYAs per existing RPO steep slope encroachment criteria. AND,
- ☐ Bypass: Project has demonstrated that both onsite and upstream CCSYAs are bypassed through or around the project site with a 2 year peak storm velocity of 3 feet per second or greater. OR,
- ☐ No Net Impact: Project does not satisfy all Scenario 1 criteria above and must alternatively demonstrate no net impact to the receiving water.

☒ **Scenario 2**: Project is entirely exempt/not subject to RPO requirements without utilization of RPO exemptions 86.604(e)(2)(cc) or 86.604(e)(3).

- ☒ Identify: Project has identified upstream CCSYAs that are coarse, ≥25% slope, and ≥50' tall. *(Optional refinement methods may be performed per guidance in Section H.1.2). AND,*
- ☒ Avoid: Project is not required to avoid onsite CCSYAs as none were identified in the previous step. AND,
- ☒ Bypass: Project has demonstrated that upstream CCSYAs are bypassed through or around the project site with a 2 year peak storm velocity of 3 feet per second or greater. OR,
- ☐ No Net Impact: Project does not satisfy all Scenario 2 criteria above and must alternatively demonstrate no net impact to the receiving water. *(Skip to next row).*

☐ **Scenario 3**: Project utilizes exemption(s) via RPO Section 86.604(e)(2)(cc) or 86.604(e)(3) and impacts more than 15% of the project-scale CCSYAs.

- ☐ No Net Impact: Project is not eligible for traditional methods of identification, avoidance, and bypass. Project must demonstrate no net impact to the receiving water.

Critical Coarse Sediment Yield Areas Continued
Demonstrate No Net Impact
If the project elects to satisfy CCSYA criteria through demonstration of no net impact to the receiving water. Applicants must identify the methods utilized from the list below and provide supporting documentation in Attachment 2c of the SWQMP. Check all that are applicable. ☒ N/A, the project appropriately identifies, avoids, and bypasses CCSYAs. ☐ Project has performed additional analysis to demonstrate that impacts to CCSYAs satisfy the no net impact standard of Ep/Sp≤1.1. ☐ Project has provided alternate mapping of CCSYAs. ☐ Project has implemented additional onsite hydromodification flow control measures. ☐ Project has implemented an offsite stream rehabilitation project to offset impacts. ☐ Project has implemented other applicant-proposed mitigation measures.

Step 3.7.2: 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 point of compliance for the project is the existing 24-inch RCP stub that was extended to the site with the widening of Valley Center Road.
Has a geomorphic assessment been performed for the receiving channel(s)? ☒ No, the low flow threshold is 0.1Q2 (default low flow threshold) ☐ Yes, the result is the low flow threshold is 0.1Q2 ☐ Yes, the result is the low flow threshold is 0.3Q2 ☐ Yes, the result is the low flow threshold is 0.5Q2 *If a geomorphic assessment has been performed, provide title, date, and preparer:* *Discussion / Additional Information: (optional)*

Step 3.8: 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 local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.

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.

The offsite run-on from the south and west comingles with the remainder of the onsite runoff and flows to Old Mirar Del Valle Road where it will ultimately get intercepted by the existing catch basin located near the northeast corner of the project. The runoff from this 1.216 acre area was calculated to be 2.41 cfs for the 100-year storm event.

Step 4: Source Control BMP Checklist

Source Control BMPs			
All development projects must implement source control BMPs 4.2.1 through 4.2.6 where applicable and feasible. See Chapter 4.2 and Appendix E of the County BMP Design Manual for information to implement source control BMPs shown in this checklist. Answer each category below pursuant to the following: • "Yes" means the project will implement the source control BMP as described in Chapter 4.2 and/or Appendix E of the County BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification must be provided.			
Source Control Requirement	**Applied?**		
4.2.1 Prevention of Illicit Discharges into the MS4	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.1 not implemented:			
4.2.2 Storm Drain Stenciling or Signage	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.2 not implemented:			
4.2.3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐Yes	☐No	☒N/A
Discussion / justification if 4.2.3 not implemented: There are no outdoor material storage areas onsite.			
4.2.4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐Yes	☐No	☒N/A
Discussion / justification if 4.2.4 not implemented: There are no outdoor material storage areas onsite.			

Source Control Requirement	Applied?		
4.2.5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.5 not implemented:			
4.2.6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below):			
☒ A. On-site storm drain inlets	☒Yes	☐No	☐N/A
☐ B. Interior floor drains and elevator shaft sump pumps	☐Yes	☐No	☒N/A
☐ C. Interior parking garages	☐Yes	☐No	☒N/A
☒ D. Need for future indoor & structural pest control	☒Yes	☐No	☐N/A
☒ E. Landscape/outdoor pesticide use	☒Yes	☐No	☐N/A
☐ F. Pools, spas, ponds, fountains, and other water features	☐Yes	☐No	☒N/A
☐ G. Food service	☐Yes	☐No	☒N/A
☒ H. Refuse areas	☒Yes	☐No	☐N/A
☐ I. Industrial processes	☐Yes	☐No	☒N/A
☐ J. Outdoor storage of equipment or materials	☐Yes	☐No	☒N/A
☐ K. Vehicle and equipment cleaning	☐Yes	☐No	☒N/A
☒ L. Vehicle/equipment repair and maintenance	☒Yes	☐No	☐N/A
☐ M. Fuel dispensing areas	☐Yes	☐No	☒N/A
☐ N. Loading docks	☐Yes	☐No	☒N/A
☒ O. Fire sprinkler test water	☒Yes	☐No	☐N/A
☒ P. Miscellaneous drain or wash water	☒Yes	☐No	☐N/A
☒ Q. Plazas, sidewalks, and parking lots	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above.			

Note: Show all source control measures described above that are included in design capture volume calculations in the plan sheets of Attachment 5.

Step 5: Site Design BMP Checklist

Site Design BMPs
All development projects must implement site design BMPs SD-A through SD-H where applicable and feasible. See Chapter 4.3 and Appendix E of the County BMP Design Manual for information to implement site design BMPs shown in this checklist. Answer each category below pursuant to the following: • "Yes" means the project will implement the site design BMP as described in Chapter 4.3 and/or Appendix E of the County BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification must be provided.

Site Design Requirement	Applied?		
4.3.1 Maintain Natural Drainage Pathways and Hydrologic Features	☐Yes	☐No	☒N/A
Discussion / justification if 4.3.1 not implemented: The project site has no existing natural drainage pathways or hydrologic features.			
4.3.2 Conserve Natural Areas, Soils, and Vegetation	☐Yes	☒No	☐N/A
Discussion / justification if 4.3.2 not implemented: The AutoZone project will disturb the entire area of the project. There are existing street trees, many of which appear to be dead or dying, that will be removed and replaced with other trees. The remainder of the existing native grasses and weeds will be replaced by other native, drought tolerant landscaping. The are no environmentally sensitive areas on site			
4.3.3 Minimize Impervious Area	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.3 not implemented:			
4.3.4 Minimize Soil Compaction	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.4 not implemented:			
4.3.5 Impervious Area Dispersion	☐Yes	☒No	☐N/A
Discussion / justification if 4.3.5 not implemented: In lieu of impervious area dispersion, the runoff from the impervious areas of the project will be directed to a proposed biofiltration basin.			

Site Design Requirement	Applied?		
4.3.6 Runoff Collection	☐Yes	☒No	☐N/A
Discussion / justification if 4.3.6 not implemented: We are not proposing the use of permeable pavers due to a historically high groundwater table (10.1' below existing ground). In addition, in lieu of small collection areas, we are directing the runoff to a proposed biofiltration basin with the exception of the areas immediately fronting Valley Center Road that sheet flow directly to Valley Center Road, minor areas that drain back towards the adjacent property to the south (Tractor Supply site) and the area that sheet flows directly to Old Mirar De Valle Road.			
4.3.7 Landscaping with Native or Drought Tolerant Species	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.7 not implemented:			
4.3.8 Harvesting and Using Precipitation	☐Yes	☒No	☐N/A
Discussion / justification if 4.3.8 not implemented: 390 gallons/acre * 0.185 acres + 1,470 gallons/acre * 0.185 acres = 344 gallons = 46.0 cubic feet. Our calculated DCV for the project is 1,648 cubic feet. Therefore, as the 36 hour demand of 46.0 cubic feet is less than 0.25 of the DCV, Harvest and Use is considered to be infeasible.			

Note: Show all site design measures described above that are included in design capture volume calculations in the plan sheets of Attachment 5.

Step 6: 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 County at the completion of construction. This may include requiring the project owner or project owner's representative and engineer of record 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 County must confirm the maintenance (see Section 7 of the BMP Design Manual).

Use this section 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 (Step 6.2) for each structural BMP within the project (copy the BMP summary information sheet [Step 6.2] as many times as needed to provide summary information for each individual structural BMP).

Step 6.1: Description of structural BMP strategy

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 or separate. At the end of this discussion provide a summary of all the structural BMPs within the project including the type and number.

We coordinated with the Project Architect to layout the proposed development and at the same time allow sufficient area to construct a biofiltration basin in the best area available to collect, clean and store the runoff from the project site. The next step was to have the a Geotechnical Engineer who is familiar with the area go to the site and perform infiltration/percolation tests as outlined in Appendix C and D of the BMP Design Manual in the location we have chosen for the treatment control BMP. The Geotechnical Engineer determined that the underlying soils could accept partial infiltration based upon the site testing performed within the basin. Therefore, with that knowledge in hand, we utilized PR-1 Biofiltration with Partial Retention from Appendix E of the BMP Design Manual to design the proposed biofiltration basin. We prepared a drainage study to determine the contributing basin limits to the biofiltration basin. We then estimated the design Capture Volume (DCV) for the biofiltration basin using worksheet B.2-1. The next step was to coordinate with the project Architect to determine if the proposed landscaping would be considered Hydrozone-Low, Hydrozone-Medium or Hydrozone- High.

(Continue on following page as necessary.)

Description of structural BMP strategy continued
(Page reserved for continuation of description of general strategy for structural BMP implementation at the site)

(Continued from previous page)

The Landscape Architect instructed us that it would be appropriate to figure 50% of the proposed landscaping as Hydrozone-Low and 50% of the proposed landscaping as Hydrozone-Medium. We then calculated the anticipated average wet season demand for the site as outlined in Appendix B.3 of the BMP Design Manual. It was determined that the anticipated 36-hour demand would be less than 25% of the DCV for the project. Therefore, Harvest and Use was determined to be infeasible. We then performed the iterative sizing process for the biofiltration basin using Worksheet B.5-1 and determined that the basin would utilize the 3% criteria for basin sizing. The proposed biofiltration basin located adjacent to the proposed building will be sized for both pollutant control and flow control (when combined with the proposed underground storage facility). The next step is to prepare the continuous simulation analysis to determine how the basin and overflow box would need to be modified in order to meet the flow control requirements. Once the basin size and overflow box modifications are determined from the continuous simulation, then next step is to verify that the revised basin will still meet the sizing requirements for cleaning. The overflow box for the basin will tie to underground detention sized to meet the flow control requirements.

Step 6.2: Structural BMP Checklist

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. Biofiltration Basin 1	
Construction Plan Sheet No. Sheets 4, 5, 7, 11 and 13 (PDS2017-LDGRMJ-30144)	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☒ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☒ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ 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) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description 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)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms (See Section 1.12 of the BMP Design Manual)	Brent C. Moore Alidade Engineering 41743 Enterprise Circle North, Suite 209 Temecula, CA 92590 (951) 587-2020
Who will be the final owner of this BMP?	☐ HOA ☒ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☐ HOA ☒ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	1

Discussion (as needed): *(Continue on subsequent pages as necessary)*

Step 6.3: Offsite Alternative Compliance Participation Form

PDP INFORMATION	
Record ID:	N/A
Assessor's Parcel Number(s) [APN(s)]	N/A
What are your PDP Pollutant Control Debits? *See Attachment 1 of the PDP SWQMP	N/A
What are your PDP HMP Debits? (if applicable) *See Attachment 2 of the PDP SWQMP	N/A
ACP Information	
Record ID:	N/A
Assessor's Parcel Number(s) [APN(s)]	N/A
Project Owner/Address	N/A
What are your ACP Pollutant Control Credits? *See Attachment 1 of the ACP SWQMP	N/A
What are your ACP HMP Debits? (if applicable) *See Attachment 2 of the ACP SWQMP	N/A
Is your ACP in the same watershed as your PDP? ☐ Yes ☐ No	Will your ACP project be completed prior to the completion of the PDP? ☐ Yes ☐ No
Does your ACP account for all Deficits generated by the PDP? ☐ Yes ☐ No (PDP and/or ACP must be redesigned to account for all deficits generated by the PDP.	What is the difference between your PDP debits and ACP Credits? *(ACP Credits -Total PDP Debits = Total Earned Credits)

Step 6.2: Structural BMP Checklist

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. Underground Storage 1	
Construction Plan Sheet No. Sheets 6, 7, 8, 11 - 13 (PDS2017-LDGRMJ-30144)	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ 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) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description 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)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms (See Section 1.12 of the BMP Design Manual)	Brent C. Moore Alidade Engineering 41743 Enterprise Circle North, Suite 209 Temecula, CA 92590 (951) 587-2020
Who will be the final owner of this BMP?	☐ HOA ☒ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☐ HOA ☒ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	1

Discussion (as needed):
Due to site constraints, the proposed biofiltration basin will be sized for pollutant control and flow control when combined with the proposed underground storage. The underground system will consist of two 48-inch culverts connected to a junction box designed with internal flow control orifices and an overflow weir. One 48-inch culvert working in conjunction with multi-stage flow control orifices and an overflow weir wall will provide the additional capacity not included in the biofiltration basin to meet the hydromodification requirement and the other 48-inch culvert working in conjunction with a single flow control orifice and the overflow weir will provide the capacity to attenuate the increased runoff from the 100-year storm event. The runoff from the underground system will be conveyed via the private storm drain system to the 24-inch diameter stub which serves as the point of discharge for the project.
(Continue on subsequent pages as necessary)

Step 6.3: Offsite Alternative Compliance Participation Form

PDP INFORMATION	
Record ID:	N/A
Assessor's Parcel Number(s) [APN(s)]	N/A
What are your PDP Pollutant Control Debits? *See Attachment 1 of the PDP SWQMP	N/A
What are your PDP HMP Debits? (if applicable) *See Attachment 2 of the PDP SWQMP	N/A
ACP Information	
Record ID:	N/A
Assessor's Parcel Number(s) [APN(s)]	N/A
Project Owner/Address	N/A
What are your ACP Pollutant Control Credits? *See Attachment 1 of the ACP SWQMP	N/A
What are your ACP HMP Debits? (if applicable) *See Attachment 2 of the ACP SWQMP	N/A
Is your ACP in the same watershed as your PDP? ☐ Yes ☐ No	Will your ACP project be completed prior to the completion of the PDP? ☐ Yes ☐ No
Does your ACP account for all Deficits generated by the PDP? ☐ Yes ☐ No (PDP and/or ACP must be redesigned to account for all deficits generated by the PDP.	What is the difference between your PDP debits and ACP Credits? *(ACP Credits -Total PDP Debits = Total Earned Credits)

ATTACHMENT 1

BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 1a	Storm Water Pollutant Control Worksheet Calculations -Worksheet B.3-1 (Required) -Worksheet B.1-1 (Required) -Worksheet B.4-1 (if applicable) -Worksheet B.4-2 (if applicable) -Worksheet B.5-1 (if applicable) -Worksheet B.5-2 (if applicable) -Worksheet B.5-3 (if applicable) -Worksheet B.6-1 (if applicable) -Summary Worksheet (optional)	☒ Included
Attachment 1b	Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP Design Manual to complete Form I-8.	☒ Included ☐ Not included because the entire project will use harvest and use BMPs
Attachment 1c	DMA Exhibit (Required) See DMA Exhibit Checklist on the back of this Attachment cover sheet.	☒ Included
Attachment 1d	Individual Structural BMP DMA Mapbook (Required) -Place each map on 8.5”x11” paper. -Show at a minimum the DMA, Structural BMP, and any existing hydrologic features within the DMA.	☒ Included

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

Category	#	Description	Value	Units
Capture & Use Inputs	0	Design Capture Volume for Entire Project Site	1,651	cubic-feet
	1	Proposed Development Type	Retail	unitless
	2	Number of Residents or Employees at Proposed Development	5	#
	3	Total Planted Area within Development	16,113	sq-ft
	4	Water Use Category for Proposed Planted Areas	Moderate	unitless
Infiltration Inputs	5	Is Average Site Design Infiltration Rate ≤0.500 Inches per Hour?	Yes	yes/no
	6	Is Average Site Design Infiltration Rate ≤0.010 Inches per Hour?	No	yes/no
	7	Is Infiltration of the Full DCV Anticipated to Produce Negative Impacts?	Yes	yes/no
	8	Is Infiltration of Any Volume Anticipated to Produce Negative Impacts?	No	yes/no
Calculations	9	36-Hour Toilet Use Per Resident or Employee	1.40	cubic-feet
	10	Subtotal: Anticipated 36 Hour Toilet Use	7	cubic-feet
	11	Anticipated 1 Acre Landscape Use Over 36 Hours	196.52	cubic-feet
	12	Subtotal: Anticipated Landscape Use Over 36 Hours	73	cubic-feet
	13	Total Anticipated Use Over 36 Hours	80	cubic-feet
	14	Total Anticipated Use / Design Capture Volume	0.05	cubic-feet
	15	Are Full Capture and Use Techniques Feasible for this Project?	No	unitless
	16	Is Full Retention Feasible for this Project?	No	yes/no
	17	Is Partial Retention Feasible for this Project?	Yes	yes/no
Result	18	Feasibility Category	4	1, 2, 3, 4, 5

Worksheet B.3-1 General Notes:

A. Applicants may use this worksheet to determine the types of structural BMPs that are acceptable for implementation at their project site (as required in Section 5 of the BMPDM). User input should be provided for yellow shaded cells, values for all other cells will be automatically generated. Projects demonstrating feasibility or potential feasibility via this worksheet are encouraged to incorporate capture and use features in their project.

B. Negative impacts associated with retention may include geotechnical, groundwater, water balance, or other issues identified by a geotechnical engineer and substantiated through completion of Form I-8.

C. Feasibility Category 1: Applicant must implement capture & use, retention, and/or infiltration elements for the entire DCV.

D. Feasibility Category 2: Applicant must implement capture & use elements for the entire DCV.

E. Feasibility Category 3: Applicant must implement retention and/or infiltration elements for all DMAs with Design Infiltration Rates greater than 0.50 in/hr.

F. Feasibility Category 4: Applicant must implement standard unlined biofiltration BMPs sized at ≥3% of the effective impervious tributary area for all DMAs with Design Infiltration Rates of 0.011 to 0.50 in/hr. Applicants may be permitted to implement lined BMPs, reduced size BMPs, and/or specialized biofiltration BMPs provided additional criteria identified in "Supplemental Retention Criteria for Non-Standard Biofiltration BMPs" are satisfied.

G. Feasibility Category 5: Applicant must implement standard lined biofiltration BMPs sized at ≥3% of the effective impervious tributary area for all DMAs with Design Infiltration Rates of 0.010 in/hr or less. Applicants may also be permitted to implement reduced size and/or specialized biofiltration BMPs provided additional criteria identified in "Supplemental Retention Criteria for Non-Standard Biofiltration BMPs" are satisfied.

H. PDPs participating in an offsite alternative compliance program are not held to the feasibility categories presented herein.

Factor of Safety and Design Infiltration Rate Worksheet			**Worksheet D.5-1**		
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	1	0.25
		Predominant soil texture	0.25	3	0.75
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	2	0.5
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			2
B	Design	Level of pretreatment/ expected sediment loads	0.5	1	0.5
		Redundancy/resiliency	0.25	2	0.5
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			1.5
Combined Safety Factor, $S_{total} = S_A \times S_B$					3.00
Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias)					0.35
Design Infiltration Rate, in/hr, $K_{design} = K_{observed} / S_{total}$					0.12

Supporting Data

Briefly describe infiltration test and provide reference to test forms:

Infiltration rate value obtained from the site specific test results prepared by SCST.

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

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	0	Drainage Basin ID or Name	BA1										unitless
	1	Basin Drains to the Following BMP Type	Biofiltration										unitless
	2	85th Percentile 24-hr Storm Depth	0.75										inches
	3	Design Infiltration Rate Recommended by Geotechnical Engineer	0.120										in/hr
	4	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	28,438										sq-ft
	5	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)	0										sq-ft
	6	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)	8,694										sq-ft
	7	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)	0										sq-ft
	8	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)	0										sq-ft
	9	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)	0										sq-ft
	10	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)	0										sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	11	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	No	No	No	No	yes/no
	12	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)											sq-ft
	13	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	14	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	16	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	17	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	18	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	19	Number of Tree Wells Proposed per SD-A											#
	20	Average Mature Tree Canopy Diameter											ft
	21	Number of Rain Barrels Proposed per SD-E											#
	22	Average Rain Barrel Size											gal
Treatment Train Inputs & Calculations	23	Does BMP Overflow to Stormwater Features in Downstream Drainage?	No	No	No	No	No	No	No	No	No	No	unitless
	24	Identify Downstream Drainage Basin Providing Treatment in Series											unitless
	25	Percent of Upstream Flows Directed to Downstream Dispersion Areas											percent
	26	Upstream Impervious Surfaces Directed to Dispersion Area (Ci=0.90)	0	0	0	0	0	0	0	0	0	0	cubic-feet
	27	Upstream Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	0	0	0	0	0	0	0	0	0	0	cubic-feet
Initial Runoff Factor Calculation	28	Total Tributary Area	37,132	0	0	0	0	0	0	0	0	0	sq-ft
	29	Initial Runoff Factor for Standard Drainage Areas	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	30	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	31	Initial Weighted Runoff Factor	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	32	Initial Design Capture Volume	1,648	0	0	0	0	0	0	0	0	0	cubic-feet
Dispersion Area Adjustments	33	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	34	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	35	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	36	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	37	Runoff Factor After Dispersion Techniques	0.71	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
	38	Design Capture Volume After Dispersion Techniques	1,648	0	0	0	0	0	0	0	0	0	cubic-feet
Tree & Barrel Adjustments	39	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	40	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	41	Final Adjusted Runoff Factor	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	42	Final Effective Tributary Area	26,364	0	0	0	0	0	0	0	0	0	sq-ft
	43	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	44	Final Design Capture Volume Tributary to BMP	1,648	0	0	0	0	0	0	0	0	0	cubic-feet

Worksheet B.1-1 General Notes:

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

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

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	0	Drainage Basin ID or Name	BA1	-	-	-	-	-	-	-	-	-	sq-ft
	1	Design Infiltration Rate Recommended by Geotechnical Engineer	0.120	-	-	-	-	-	-	-	-	-	in/hr
	2	Effective Tributary Area	26,364	-	-	-	-	-	-	-	-	-	sq-ft
	3	Minimum Biofiltration Footprint Sizing Factor	0.030	-	-	-	-	-	-	-	-	-	ratio
	4	Design Capture Volume Tributary to BMP	1,648	-	-	-	-	-	-	-	-	-	cubic-feet
	5	Is Biofiltration Basin Impermeably Lined or Unlined?	Unlined										unitless
	6	Provided Biofiltration BMP Surface Area	1,037										sq-ft
	7	Provided Surface Ponding Depth	12										inches
	8	Provided Soil Media Thickness	18										inches
	9	Provided Depth of Gravel Above Underdrain Invert	10										inches
	10	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	1.25										inches
	11	Provided Depth of Gravel Below the Underdrain	3										inches
Retention Calculations	12	Volume Infiltrated Over 6 Hour Storm	62	0	0	0	0	0	0	0	0	0	cubic-feet
	13	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	14	Gravel Pore Space Available for Retention	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	15	Effective Retention Depth	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	16	Calculated Retention Storage Drawdown (Including 6 Hr Storm)	16	0	0	0	0	0	0	0	0	0	hours
	17	Volume Retained by BMP	244	0	0	0	0	0	0	0	0	0	cubic-feet
	18	Fraction of DCV Retained	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	19	Portion of Retention Performance Standard Satisfied	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	20	Fraction of DCV Retained (normalized to 36-hr drawdown)	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	21	Design Capture Volume Remaining for Biofiltration	1,252	0	0	0	0	0	0	0	0	0	cubic-feet
Biofiltration Calculations	22	Max Hydromod Flow Rate through Underdrain	0.0743	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	CFS
	23	Max Soil Filtration Rate Allowed by Underdrain Orifice	3.10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	in/hr
	24	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	25	Soil Media Filtration Rate to be used for Sizing	3.10	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	26	Depth Biofiltered Over 6 Hour Storm	18.58	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	inches
	27	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	28	Effective Depth of Biofiltration Storage	19.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	29	Drawdown Time for Surface Ponding	4	0	0	0	0	0	0	0	0	0	hours
	30	Drawdown Time for Effective Biofiltration Depth	6	0	0	0	0	0	0	0	0	0	hours
	31	Total Depth Biofiltered	38.18	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	inches
	32	Option 1 - Biofilter 1.50 DCV: Target Volume	1,878	0	0	0	0	0	0	0	0	0	cubic-feet
	33	Option 1 - Provided Biofiltration Volume	1,878	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Option 2 - Store 0.75 DCV: Target Volume	939	0	0	0	0	0	0	0	0	0	cubic-feet
	35	Option 2 - Provided Storage Volume	939	0	0	0	0	0	0	0	0	0	cubic-feet
	36	Portion of Biofiltration Performance Standard Satisfied	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
Result	37	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	-	-	-	-	-	-	-	-	-	yes/no
	38	Overall Portion of Performance Standard Satisfied	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	39	This BMP Overflows to the Following Drainage Basin	-	-	-	-	-	-	-	-	-	-	unitless
	40	**Deficit of Effectively Treated Stormwater**	0	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	cubic-feet

Worksheet B.5-1 General Notes:

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

Summary of Stormwater Pollutant Control Calculations (V1.3)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
General Info	0	Drainage Basin ID or Name	BA1	-	-	-	-	-	-	-	-	-	unitless
	1	85th Percentile Storm Depth	0.75	-	-	-	-	-	-	-	-	-	inches
	2	Design Infiltration Rate Recommended by Geotechnical Engineer	0.120	-	-	-	-	-	-	-	-	-	in/hr
	3	Total Tributary Area	37,132	-	-	-	-	-	-	-	-	-	sq-ft
	4	85th Percentile Storm Volume (Rainfall Volume)	2,321	-	-	-	-	-	-	-	-	-	cubic-feet
Initial DCV	5	Initial Weighted Runoff Factor	0.71	-	-	-	-	-	-	-	-	-	unitless
	6	Initial Design Capture Volume	1,648	-	-	-	-	-	-	-	-	-	cubic-feet
Site Design Volume Reductions	7	Dispersion Area Reductions	0	-	-	-	-	-	-	-	-	-	cubic-feet
	8	Tree Well and Rain Barrel Reductions	0	-	-	-	-	-	-	-	-	-	cubic-feet
BMP Volume Reductions	9	Effective Area Tributary to BMP	26,364	-	-	-	-	-	-	-	-	-	square feet
	10	Final Design Capture Volume Tributary to BMP	1,648	-	-	-	-	-	-	-	-	-	cubic-feet
	11	Basin Drains to the Following BMP Type	Biofiltration	-	-	-	-	-	-	-	-	-	unitless
	12	Volume Retained by BMP (normalized to 36 hour drawdown)	396	-	-	-	-	-	-	-	-	-	cubic-feet
Total Volume Reductions	13	Total Fraction of Initial DCV Retained within DMA	0.24	-	-	-	-	-	-	-	-	-	fraction
	14	Percent of Average Annual Runoff Retention Provided	31.4%	-	-	-	-	-	-	-	-	-	%
	15	Percent of Average Annual Runoff Retention Required	18.3%	-	-	-	-	-	-	-	-	-	%
Performance Standard	16	Percent of Pollution Control Standard Satisfied	100.0%	-	-	-	-	-	-	-	-	-	%
Treatment Train	17	Discharges to Secondary Treatment in Drainage Basin	-	-	-	-	-	-	-	-	-	-	unitless
	18	Impervious Surface Area Still Requiring Treatment	0	-	-	-	-	-	-	-	-	-	square feet
	19	Impervious Surfaces Directed to Downstream Dispersion Area	-	-	-	-	-	-	-	-	-	-	square feet
	20	Impervious Surfaces Not Directed to Downstream Dispersion Area	-	-	-	-	-	-	-	-	-	-	square feet
Result	21	Deficit of Effectively Treated Stormwater	0	-	-	-	-	-	-	-	-	-	cubic-feet

Summary Notes:

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

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

False

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition	Worksheet C.4-1

Part 1 - Full Infiltration Feasibility Screening Criteria

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

Note that it is not necessary to investigate each and every criterion in the worksheet if infiltration is precluded. Instead a letter of justification from a geotechnical professional familiar with the local conditions substantiating any geotechnical issues will be required.

Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☐	☑

Provide basis:

Results of falling head borehole percolation testing were 0.2 and 0.6-inches per hour. The tested material is believed to be generally representative of the material that will be encountered below the proposed BMP location. The average of the tested infiltration rates do not support allowing infiltration greater than 0.5-inches per hour

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

2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☐	☑

Provide basis:

The tested infiltration rate at the site does not support allowing infiltration greater than 0.5-inched per hour. Doing so will increase the risk of adverse settlement of the proposed structure to be located adjacent to the planned BMP. Additionally, due to the close proximity of the proposed structure to the proposed BMP location, we recommend the BMP be lined with an impermeable membrane to minimize this risk. We recommend that an impermeable barrier be installed on the north side , and the west side of the biofiltration basin. The impermeable barrier should extend to a depth of at least 1 foot below the footing depth of the east side of the proposed building.SCST does not recommend allowing infiltration greater than 0.5 incher per hour

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

Worksheet C.4-1 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☑
Provide basis: Based on our experience with other sites in the site vicinity, historic high groundwater elevations are above the base elevation of the proposed infiltration basin and, if unlined, may increase the risk of groundwater contamination. Allowing infiltration at the site may increase the risk of adverse settlement of the proposed structure to be located adjacent to the planned BMP. SCST does not recommend allowing infiltration greater than 0.5 inches per hour. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☑
Provide basis: There are no known contaminants occurring at the proposed site, but our tested infiltration rate falls below 0.5 inches per hour so SCST does not recommend allowing infiltration greater than the tested amount. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result*	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by County staff to substantiate findings.

Worksheet C.4-1 Page 3 of 4

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

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

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☑	☐

Provide basis:

There are no known contaminants occurring at the proposed site, but our tested infiltration rate falls below 0.5 inches per hour so SCST does not recommend allowing infiltration greater than the tested amount.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level**? The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☑	☐

Provide basis:

There tested infiltration rates average 0.4 inches per hour. Boring logs show poorly graded sand at the bottom of our excavation which is believed to be generally representative of the material that will be encountered below proposed BMP locations. The observed infiltration rates support allowing partial infiltration. In order to minimize potential impacts to the adjacent improvements, we recommend that an impermeable barrier be installed on the north side , and the west side of the biofiltration basin. The impermeable barrier should extend to a depth of at least 1 foot below the footing depth of the east side of the proposed building.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Worksheet C.4-1 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☑	☐
Provide basis: Partial infiltration can be allowed at the site provided the recommendations presented in the previous criteria are followed. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☑	☐
Provide basis: This Criteria Should be addressed by the Project Civil Engineer. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**		

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

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
☒ Existing topography and impervious areas
☒ Existing and proposed site drainage network and connections to drainage offsite
☒ Proposed demolition
☒ 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)
☒ Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Step 3.5)
☒ Structural BMPs (identify location, structural BMP ID#, type of BMP, and size/detail)

OLD MIRAR DE VALLE ROAD

POINT OF COMPLIANCE

VALLEY CENTER ROAD

LEGEND:

DMA1	DMA BASIN IDENTIFICATION
BA1	BIOFILTRATION AREA
	PERVIOUS AREA
	BIOFILTRATION BASIN
	IMPERVIOUS AREA
	BASIN BOUNDARY
	DRAINAGE MANAGEMENT AREA BOUNDARY (DMA)
INLET	STORM WATER STENCILING "NO DUMPING, DRAINS TO MOOSA CREEK" OR SIMILAR
UG1	UNDERGROUND STORAGE
	FLOW DIRECTION

UNDERLYING HYDROLOGIC SOIL GROUP:
SOIL GROUP 'C'

HISTORIC DEPTH TO GROUND WATER:
10.1 FEET BELOW EXISTING GROUND

CRITICAL COARSE SEDIMENT YIELD AREAS:
NONE ONSITE

OFFSITE COARSE SEDIMENT YIELD AREAS –
NONE TRIBUTARY TO THE PROJECT LIMITS

SOURCE CONTROL BMPS

SC2 STORM DRAIN STENCILING OR SIGNAGE
(STENCILS ON CONCRETE CATCH BASINS AND INLETS PROHIBITING ILLEGAL DUMPING)

SC6A ONSITE STORM DRAIN INLETS
(SHOW LOCATIONS OF INLETS AND CATCH BASINS)

SC6D NEED FOR FUTURE INDOOR & STRUCTURAL PEST CONTROL
(NO LANDSCAPING ADJACENT TO DOORS)

SC6E LANDSCAPE/OUTDOOR PESTICIDE USE
(SHOW STORM WATER TREATMENT FACILITIES)

SC6H REFUSE AREAS
(REFUSE AREA WILL BE COVERED, GRADED AND PAVED TO PREVENT RUN-ON AND PROTECTED WITH DOORS AND BIN COVERS TO PREVENT WIND DISPERSAL)

SC6L VEHICLE/EQUIPMENT REPAIR AND MAINTENANCE
(NO VEHICLE REPAIR OR MAINTENANCE WILL BE DONE OUTDOORS)

SC6Q PLAZAS, SIDEWALKS AND PARKING LOTS
(SWEPT REGULARLY TO PREVENT THE ACCUMULATION OF LITTER & DEBRIS)

SITE DESIGN BMPS

SD3 MINIMIZE IMPERVIOUS AREAS
(MINIMIZE THE USE OF IMPERVIOUS AREAS IN LANDSCAPING DESIGN)

SD4 MINIMIZE SOIL COMPACTION
(MINIMIZE SOIL COMPACTION IN LANDSCAPED AREAS)

SD7 LANDSCAPE WITH NATIVE OR DROUGHT TOLERANT SPECIES

SELF MITIGATING DMAS MUST MEET THE FOLLOWING TO BE ELIGIBLE FOR EXCLUSION:

- VEGETATION IN THE NATURAL OR LANDSCAPED AREA IS NATIVE AND/OR NON-NATIVE/NON-INVASIVE DROUGHT TOLERANT SPECIES THAT DO NOT REQUIRE REGULAR APPLICATION OF FERTILIZERS AND PESTICIDES. SEE LANDSCAPE AND IRRIGATION PLANS (PDS2017-LP-17-096) FOR PROPOSED LANDSCAPING.
- SOILS ARE UNDISTURBED NATIVE TOPSOIL, OR DISTURBED SOILS THAT HAVE BEEN AMENDED AND AERATED TO PROMOTE WATER RETENTION CHARACTERISTICS TO UNDISTURBED NATIVE TOPSOIL. CONTRACTOR SHALL AERATE THE SOIL WITHIN THE LIMITS OF GRADING IN THIS AREA UPON COMPLETION OF GRADING ACTIVITIES AND PRIOR TO INSTALLATION OF LANDSCAPING AND IRRIGATION.
- THE INCIDENTAL IMPERVIOUS AREAS ARE LESS THAN 5 PERCENT OF THE SELF-MITIGATING AREA (INFORMATION ONLY).
- THE IMPERVIOUS AREA WITHIN THE SELF-MITIGATED AREA SHOULD NOT BE HYDRAULICALLY CONNECTED TO OTHER IMPERVIOUS AREAS UNLESS IT IS A STORM DRAIN CONVEYANCE SYSTEM SUCH AS A BROW DITCH (INFORMATION ONLY).
- THE SELF-MITIGATING AREA IS HYDRAULICALLY SEPARATE FROM DMAS THAT CONTAIN PERMANENT STORM WATER POLLUTANT CONTROL BMPS (INFORMATION ONLY).

SOURCE CONTROL BMPS FOR BUILDING:
1. FIRE SPRINKLER TEST WATER
(FIRE SPRINKLER WATER DRAINS TO SEWER)
2. MISCELLANEOUS DRAIN OR WASH WATER
(CONDENSATE LINES DISCHARGE TO L/S AND/OR BIOFILTRATION BASINS)
(ROOF TOP EQUIPMENT DESIGNED WITH SECONDARY CONTAINMENT)

FLOW CONTROL STRUCTURE

16'-4" x 1,037 SF BA1 SC6E SC6A INLET

SCALE: 1" = 10'

0 5 10 20 30

GRAPHICAL SCALE

SOURCE CONTROL EXHIBIT / DRAINAGE MANAGEMENT AREA (DMA) EXHIBIT

AUTOZONE

Alidade ENGINEERING
41743 ENTERPRISE CIRCLE NORTH, SUITE 209
TEMECULA, CA 92590
PH: (951) 587-2020
FAX: (951) 587-2626

16-202DMA.dwg 01-28-19

	DMA AREA (FT^2)	POST-PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA X RUNOFF FACTOR	SOIL TYPE	IMP NAME
DMA1	27,144*	IMPERVIOUS	0.9	24,429.6	C	BA1
	1,294**	IMPERVIOUS	0.9	1,164.6		
	8,694	LANDSCAPING	0.1	869.4	IMP SIZING FACTOR	MINIMUM AREA OR VOLUME
			TOTAL	26,463.6	0.03	794

PROPOSED AREA OR VOLUME (FT^2) | IMP AREA
1,037

*INCLUDES 55 SF OF IMPERVIOUS AREA FROM TRACTOR SUPPLY SITE
**ONSITE IMPERVIOUS AREA THAT WAS CONSTRUCTED WITH THE ADJACENT TRACTOR SUPPLY PROJECT.

	DMA AREA (FT^2)	POST-PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA X RUNOFF FACTOR	SOIL TYPE	
DMA2	50	IMPERVIOUS	0.9	45.0	C	
			TOTAL	45.0	DE MINIMIS AREA	

SHEET FLOWS TO ADJACENT PROPERTY TO THE SOUTH (TRACTOR SUPPLY SITE)

	DMA AREA (FT^2)	POST-PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA X RUNOFF FACTOR	SOIL TYPE	
DMA3	3	IMPERVIOUS	0.9	2.7	C	
			TOTAL	2.7	DE MINIMIS AREA	

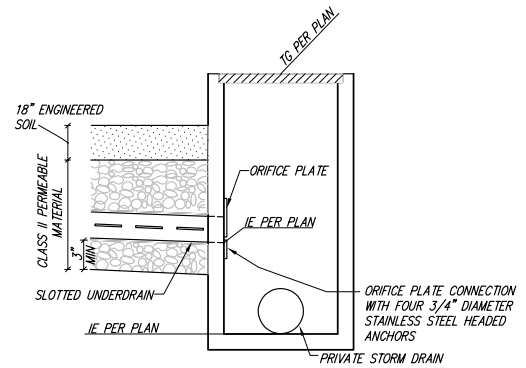
SHEET FLOWS TO ADJACENT PROPERTY TO THE SOUTH (TRACTOR SUPPLY SITE)

	DMA AREA (FT^2)	POST-PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA X RUNOFF FACTOR	SOIL TYPE	
DMA4	172	IMPERVIOUS	0.9	154.8	C	
	3,431	LANDSCAPING	0.1	343.1		
			TOTAL	497.9	SELF-MITIGATING	

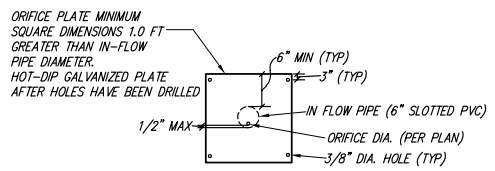
SHEET FLOWS TO VALLEY CENTER ROAD

	DMA AREA (FT^2)	POST-PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA X RUNOFF FACTOR	SOIL TYPE	
DMA5	151	IMPERVIOUS	0.9	135.9	C	
	3,901	LANDSCAPING	0.1	390.1		
			TOTAL	526.0	SELF-MITIGATING	

SHEET FLOWS TO OLD MIRAR DE VALLE ROAD

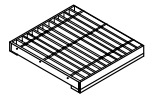


SECTION BIORETENTION CATCH BASIN
NOT TO SCALE

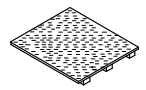


DETAIL: FLOW CONTROL ORIFICE PLATE (PVT)
NOT TO SCALE

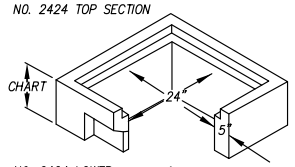
NO. 2424 STEEL TRAFFIC GRATE MAX. 1/2" SPACING WT 103# TRAF.



NO. 2424 STEEL TRAFFIC COVER WT. 114#

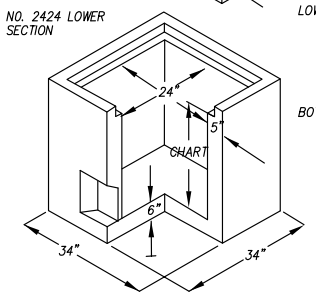


NO. 2424 TOP SECTION



TOP SECTION	HT.	LBS	AVAILABLE
2424 T6	6"	270	NO K.O.
2424 T12	12"	495	(4) 6" X 11"
2424 T18	18"	745	(4) 9" X 12"
2424 T24	24"	870	(4) 14" X 14"

NO. 2424 LOWER SECTION



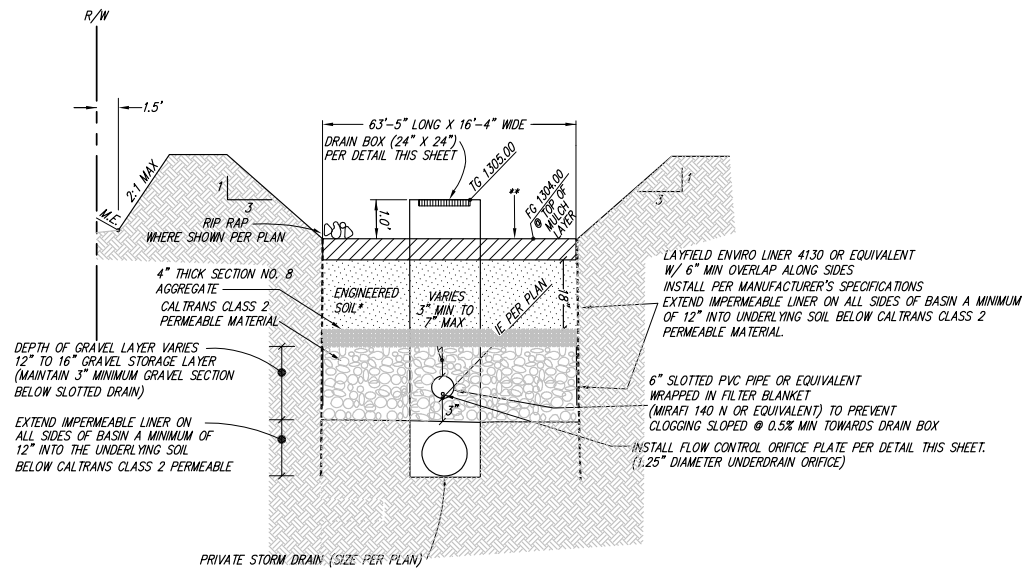
LOWER	HT.	LBS	AVAILABLE
2424 L12	12"	495	(4) 6" X 11"
2424 L18	18"	745	(4) 9" X 12"
2424 L24	24"	870	(4) 14" X 14"

BOTTOM	HT.	LBS	AVAILABLE
2424 B30	30"	1595	(4) 18" X 18"
2424 B36	36"	1905	(4) 18" X 18"

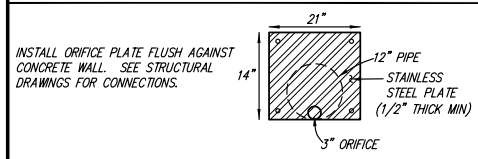
24" X 24" BROOKS BOX CATCH BASIN (PVT)
(OR EQUIVALENT)
NOT TO SCALE

*ENGINEERED SOIL: 75% - 80% SAND, 10% MAX SILT, 3% MAX CLAY AND 9% MAX COMPOST. COMPOST SHOULD COMPOSE NO MORE THAN 5% BULK WEIGHT OF THE ENGINEERED SOIL PER THE COUNTY OF SAN DIEGO LOW IMPACT DESIGN MANUAL, APPENDIX G.

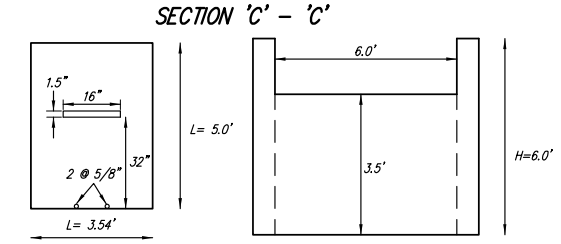
**INSTALL 3" DEPTH SECTION OF WELL-AGED, SHREDDED HARDWOOD MULCH THAT HAS BEEN STOCKPILED OR STORED FOR AT LEAST 12 MONTHS.



DETAIL: BIOFILTRATION BASIN (PVT) W/ NUTRIENT SENSITIVE MEDIA DESIGN
NOT TO SCALE

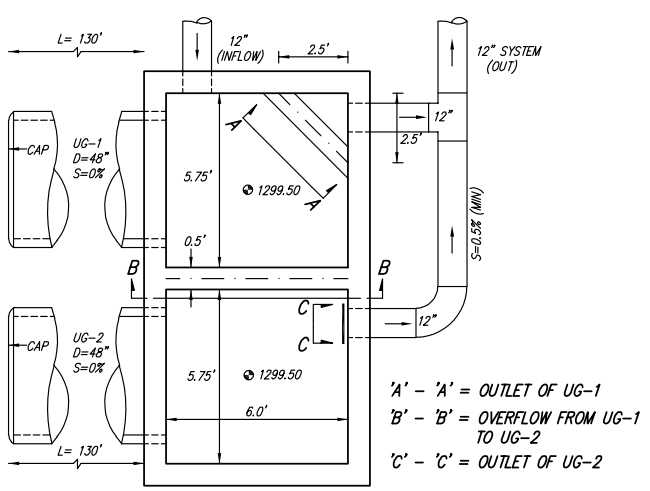


SECTION 'C' - 'C'



SECTION 'A' - 'A'

SECTION 'B' - 'B'



PLAN VIEW
6' X 12' JUNCTION STRUCTURE (PVT)
NOT TO SCALE

BIO CLEAN SCREENING FILTER WITH TROUGH SYSTEM
FOR USE IN CURB INLETS WITH WINGS

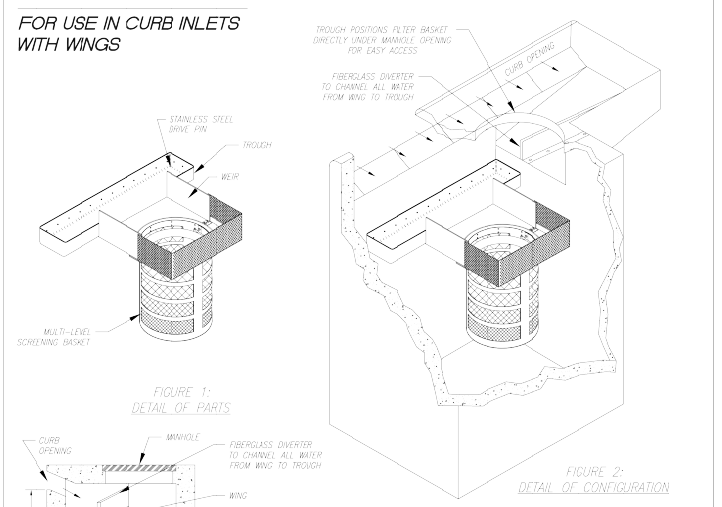


FIGURE 1: DETAIL OF PARTS
FIGURE 2: DETAIL OF CONFIGURATION
FIGURE 3: DETAIL OF MOUNTING
FIGURE 4: DETAIL OF PROFILE

NOTES:
1. TROUGH SYSTEM PROVIDES FOR ENTIRE COVERAGE OF INLET OPENING SO TO DIVERT ALL FLOW TO FILTER.
2. TROUGH SYSTEM MANUFACTURED FROM MARINE GRADE FIBERGLASS, GEL COATED FOR UV PROTECTION.
3. SYSTEM ATTACHED TO THE CATCH BASIN WITH NON-CORROSIVE HARDWARE.
4. FILTER MANUFACTURED OF 100% STAINLESS STEEL.
5. FILTER MADE OF NON-CLOGGING SCREEN WITH 4.7 MM OPENINGS AND MEETS FULL CAPTURE REQUIREMENTS.
6. FILTER CAN BE FITTED WITH HYDROCARBON ABSORBENT BOOM
7. FILTER IS LOCATED DIRECTLY UNDER THE MANHOLE FOR EASY REMOVAL AND MAINTENANCE.
8. LENGTH OF TROUGH CAN VARY FROM 2' TO 30'.
9. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE - CONTACT BIO CLEAN FOR MORE INFORMATION.
10. CONSIDERS A SAFETY FACTOR OF 2.0.
11. BYPASS IS FACILITATED VIA OVERFLOW OF THE TROUGH SYSTEM AND IS EQUAL TO THE CAPACITY OF THE CURB OPENING
12. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.
13. ADDITIONAL TREATMENT AND STORAGE CAPACITY CAN BE ACHIEVED BY UTILIZING MULTIPLE FILTER BASKETS.

DRAWING: BIO CLEAN CURB INLET FILTER DETAILS	MULTI-LEVEL SCREENING
TREATMENT FLOW RATE: 2.85 cfs	MODEL #: BC-CURB-MLS
WARRANTY: 5 YEAR MANUFACTURERS	PROJECT:
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 338 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-433-7640 FAX: 760-433-3176	REVISIONS: DATE:
DATE: 10/12/2017 SCALE: NTS	REVISIONS: DATE:
DRAFTER: M.C.P. UNITS = INCHES	REVISIONS: DATE:

Bio Clean
A Forterra Company

PAGE 3

BIO CLEAN SCREENING FILTER WITH TROUGH SYSTEM
FOR USE IN CURB INLETS

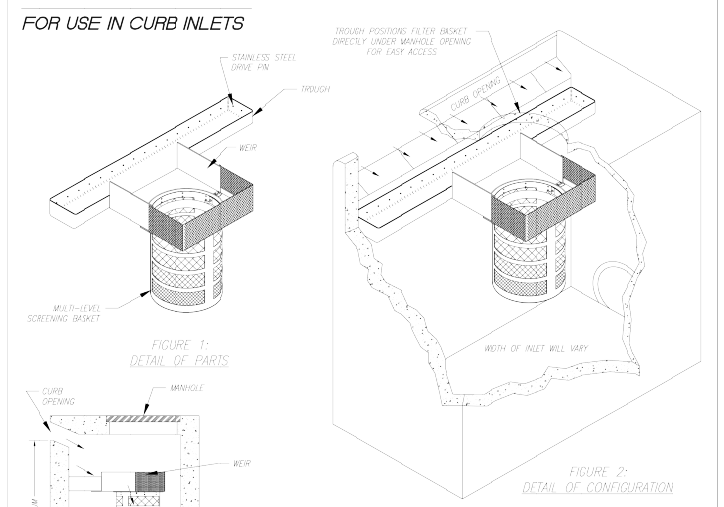


FIGURE 1: DETAIL OF PARTS
FIGURE 2: DETAIL OF CONFIGURATION
FIGURE 3: DETAIL OF MOUNTING
FIGURE 4: DETAIL OF PROFILE

NOTES:
1. TROUGH SYSTEM PROVIDES FOR ENTIRE COVERAGE OF INLET OPENING SO TO DIVERT ALL FLOW TO FILTER.
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10. CONSIDERS A SAFETY FACTOR OF 2.0.
11. BYPASS IS FACILITATED VIA OVERFLOW OF THE TROUGH SYSTEM AND IS EQUAL TO THE CAPACITY OF THE CURB OPENING
12. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.
13. ADDITIONAL TREATMENT AND STORAGE CAPACITY CAN BE ACHIEVED BY UTILIZING MULTIPLE FILTER BASKETS.

MODEL NUMBER	TREATMENT FLOW (cfs)*	SOLIDS STORAGE CAPACITY (cu ft)
BC-CURB-30	2.85	2.21
BC-CURB-24	2.85	1.77
BC-CURB-18	2.85	1.33
BC-CURB-12	2.81	0.88

*SEE PAGE 2 FOR EXPLANATION OF FLOW RATES

DRAWING: BIO CLEAN CURB INLET FILTER DETAILS	MULTI-LEVEL SCREENING
TREATMENT FLOW RATE: 2.85 cfs	MODEL #: BC-CURB-MLS
WARRANTY: 5 YEAR MANUFACTURERS	PROJECT:
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 338 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-433-7640 FAX: 760-433-3176	REVISIONS: DATE:
DATE: 10/12/2017 SCALE: NTS	REVISIONS: DATE:
DRAFTER: M.C.P. UNITS = INCHES	REVISIONS: DATE:

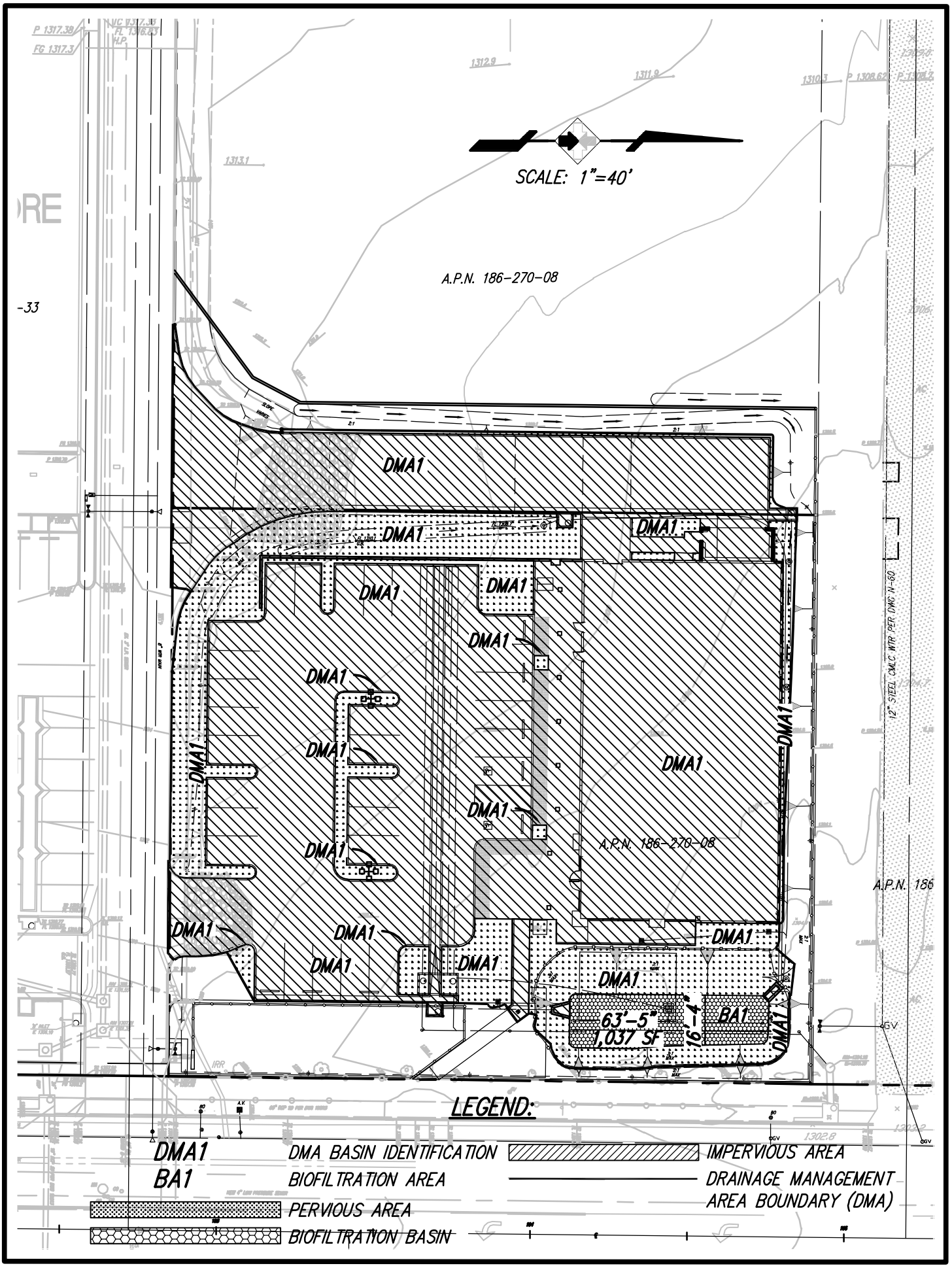
Bio Clean
A Forterra Company

PAGE 1

DRAINAGE MANAGEMENT AREA (DMA) EXHIBIT
AUTOZONE

Alidade ENGINEERING
41743 ENTERPRISE CIRCLE NORTH, SUITE 209
TEMECULA, CA 92590
PH: (951) 587-2020
FAX: (951) 587-2626

16-2022MA2.dwg 1-29-19


SCALE: 1"=40'
A.P.N. 186-270-08
DMA1
BA1
63'-5"
1,037 SF
6'-4"
A.P.N. 186-270-08
A.P.N. 186
12" STEEL CMLC WTR PER DWG N-60
LEGEND:
DMA1 DMA BASIN IDENTIFICATION
BA1 BIOFILTRATION AREA
PERVIOUS AREA
BIOFILTRATION BASIN
IMPERVIOUS AREA
DRAINAGE MANAGEMENT AREA BOUNDARY (DMA)

ATTACHMENT 2

BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

☐ Mark this box if this attachment is empty because the project is exempt from PDP hydromodification management requirements.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 2a	Flow Control Facility Design, including Structural BMP Drawdown Calculations and Overflow Design Summary (Required) See Chapter 6 and Appendix G of the BMP Design Manual	☒ Included ☐ Submitted as separate stand-alone document
Attachment 2b	Hydromodification Management Exhibit (Required)	☒ Included See Hydromodification Management Exhibit Checklist on the back of this Attachment cover sheet.
Attachment 2c	Management of Critical Coarse Sediment Yield Areas See Section 6.2 and Appendix H of the BMP Design Manual.	☐ Exhibit depicting onsite and/or upstream sources of critical coarse sediment as mapped by Regional or Jurisdictional approaches outlined in Appendix H.1 AND, ☒ Demonstration that the project effectively avoids and bypasses sources of mapped critical coarse sediment per approaches outlined in Appendix H.2 and H.3. OR, ☐ Demonstration that project does not generate a net impact on the receiving water per approaches outlined in Appendix H.4.
Attachment 2d	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	☒ Not performed ☐ Included ☐ Submitted as separate stand-alone document
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	☐ Included ☒ Not required because BMPs will drain in less than 96 hours

TECHNICAL MEMORANDUM:

SWMM Modeling for Hydromodification Compliance of:

AutoZone Valley Center, CA

Prepared For:

Alidade Engineering

March 15, 2017 (Revised April 2, 2018)

Prepared by:

Luis Parra, PhD, CPSWQ, ToR, D.WRE.
R.C.E. 66377

REC Consultants
2442 Second Avenue
San Diego, CA 92101
Telephone: (619) 232-9200

TECHNICAL MEMORANDUM

TO: Larry C Dutton
Alidade Engineering

FROM: Luis Parra, PhD, PE, CPSWQ, ToR, D.WRE.
Victor Velasco, PE.

DATE: April 2, 2018

RE: Summary of SWMM Modeling for Hydromodification Compliance for Autozone, Valley Center, CA.

INTRODUCTION

This memorandum summarizes the approach used to model the proposed residential development project site in the City of Valley Center using the Environmental Protection Agency (EPA) Storm Water Management Model 5.0 (SWMM). SWMM models were prepared for the pre and post-developed conditions at the site in order to determine if the proposed LID biofiltration facility has sufficient volume to meet Order R9-2013-001 requirements of the California Regional Water Quality Control Board San Diego Region (SDRWQCB), as explained in the Final Hydromodification Management Plan (HMP), dated March 2011, prepared for the County of San Diego by Brown and Caldwell.

SWMM MODEL DEVELOPMENT

The Autozone project comprises of a commercial development along with associated parking lots and two access roads. Two (2) SWMM models were prepared for this study: the first for the pre-development and the second for the post-developed conditions. The project site drains to one (1) Point of Compliance (POC-1), located to the NE corner of the property on Valley Center Road.

The SWMM model was used since we have found it to be more comparable to San Diego area watersheds than the alternative San Diego Hydrology Model (SDHM) and also because it is a non-proprietary model approved by the HMP document. For both SWMM models, flow duration curves were prepared to determine if the proposed HMP facilities are sufficient to meet the current HMP requirements.

The inputs required to develop SWMM models include rainfall, watershed characteristics, and BMP configurations. The Lake Wohlford gauge from the Project Clean Water website was used for this study, since it is the most representative of the project site precipitation due to elevation and proximity to the project site. Please see gauge location and project location map on Attachment 5.

Per the California Irrigation Management Information System “Reference Evaporation Zones” (CIMIS ETo Zone Map), the project site is located within the Zone 9 Evapotranspiration Area. Thus evapotranspiration values for the site were modeled using Zone 9 average monthly values from Table G.1-1 from the City of San Diego 2016 BMP Design Manual. The site was modeled with Type C hydrologic soil as this is the closest existing soil determined from the NRCS Soil Survey. However, we should point

out that for this particular project a soil type has not been identified in the NRCS soil survey, and we selected C as it is the most conservative approach in this case. In addition, infiltration tests prepared indicate that the tested values for infiltration are about 0.2 in/hr to 0.6 in/hr, which corresponds to the typical Soil Type C range (0.06 in/hr to 0.57 in/hr) according to NRCS definition, that can be found at https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba.

Soils have been assumed to be compacted in the existing condition to represent the current natural mass-grade condition of the site. In the post developed conditions the soils have been modeled as fully compacted. Other SWMM inputs for the subareas are discussed in the appendices to this document, where the selection of the parameters is explained in detail.

HMP MODELING

EXISTING CONDITIONS

The current property consists on an undeveloped but mass graded site and has one (1) point of compliance. Runoff from the project drains to POC-1 by sheet flowing in a north easterly direction. Table 1 shows a detailed summary of the areas.

TABLE 1 – SUMMARY OF EXISTING CONDITIONS

DMA	Tributary Area, A (Ac)	Slope (%)	Impervious Percentage, Ip
Existing	0.993	2.65	0.0%(1)

Note:
(1) – Per the 2013 RWQCB permit, existing condition impervious surfaces are not to be accounted for in existing conditions analysis, if the area is part of the project boundary.

DEVELOPED CONDITIONS

Runoff from the proposed project drains to a treatment train as follows: first, one (1) onsite receiving biofiltration with partial infiltration LID-1 collects the runoff. From there, low-flow runoff discharging the French-drain orifice and also the excess runoff that overflows the riser structure are collected and conveyed to an underground system for hydromodification compliance (UG-1), which is a 130 ft horizontal 48” diameter pipe. Excess runoff is overflowed to another underground pipe with the same dimensions, UG-2 (mostly used during the occurrence of very extreme events) and all runoff is then discharged in POC-1. Some small by-pass areas (DMAs 2 to 6) also discharge into POC-1, but they do not drain to the LID system due to topographic constraints. It should be noted that all by-passed areas are either pervious or impervious satisfying the de-minimis requirements of the BMP Manual.

It is assumed all storm water quality requirements for the project will be met by the biofiltration LID-1 BMP. However, detailed water quality requirements are not discussed within this technical memo. For further information in regards to storm water quality requirements for the project, please refer to the site specific Storm Water Quality Management Plan (SWQMP).

TABLE 2 – SUMMARY OF DEVELOPED CONDITIONS

DMA	BMP ---- POC	Tributary Area, A (Ac)	Impervious Percentage, Ip
DMA 1	LID-1 → UG-1 → POC-1	0.818	79.95%
LID-1	LID-1 → UG-1 → POC-1	0.025	0.00%
DMAs_2_to_4	By-pass → POC-1	0.003	37.86%
DMA_5	By-pass → POC-1	0.094	4.87%
DMA_6	By-pass → POC-1	0.053	6.59%
TOTAL	**POC-1**	**0.993**	**66.8%**

One (1) LID biofiltration basin plus one (1) Underground System (UG-1) are located within the project site and are responsible for handling hydromodification requirements for the project. The additional underground system (UG-2) only receives runoff during one hour of the continuous simulation and it is more of an extreme event emergency overflow system. It should be pointed out that in developed conditions, the biofiltration with partial infiltration basin and both underground systems will have a discharge structure with orifices, slots and/or weir as defined in Table 3.

All flows will be either by-passed or discharged from the basins via the outlet structure or infiltrate through the base of the facility to the receiving amended soil and low flow orifice. The riser structure will act as a spillway such that peak flows can be safely discharged to the receiving underground systems and from there to the storm drain system in Valley Center Road, representing POC-1.

In regards to the biofiltration basin with partial infiltration, beneath the basins' invert lays the proposed LID biofiltration portion of the drainage facility. This portion of the basin is comprised of an 18-inch layer of amended soil (a highly sandy, organic rich composite with an infiltration capacity of at least 5 inches/hr) and a layer of gravel. The basins will be unlined to allow partial infiltration, but lateral impervious liners will prevent lateral infiltration (basin is unlined at the bottom, but lined along the walls due to geotechnical safety concerns).

Additionally, an underground horizontal storage pipe (UG-1) will be located in POC-1 to help comply with the hydromodification requirements. The 4 feet diameter pipe will be 130 feet in length. At the downstream end of the pipe a riser structure with slots will control the discharge to meet hydromodification requirements and emergency weir will safely discharge excessive flows into a second underground pipe (UG-2). This second system only discharges via a 3" orifice to control the peak flow during the occurrence of an extreme storm event.

The biofiltration basin with partial infiltration (LID-1) was modeled using the biofiltration LID module within SWMM. The biofiltration module can model the amended soil layer, and a surface storage pond up to the elevation of the invert of the spillway. It should be noted that detailed outlet structure location and elevations will be shown on the construction plans based on the recommendations of this study.

BMP MODELING FOR HMP PURPOSES

Modeling of HMP BMPs

One (1) BMP biofiltration with partial infiltration basin (LD-1) and an underground 4 feet horizontal storage pipe (UG-1) are proposed for hydromodification conformance for the project site, in addition to an emergency underground pipe (UG-2) mostly used for extreme storm events. Tables 3 & 4 illustrate the dimensions required for HMP compliance according to the SWMM model that was undertaken for the project.

TABLE 3 – SUMMARY OF BIOFILTRATION / PARTIAL INFILTRATION BMP

BMP	DIMENSIONS					
	BMP Area[(1)], (ft^2)	Low Flow Orif. on gravel layer (in)	Gravel Depth (in)[(2)]	Depth to Riser Invert (ft)[(3)]	Weir Perimeter Length[(3)] (ft)	Total Surface Depth[(4)] (ft)
LID-1	1,089	1.25”	18”	1.00’	8	2.00’

(1): Area of amended soil = area of gravel layer
(2): Filter layer (3” sand + 3” pea gravel) included here. Also included 3” of gravel below invert of LID orifice.
(3): Riser is at 12” above mulch, which is 3” above amended soil. The equivalent depth of ponding (considering mulch porosity of 0.4 and change in area with elevation) is 18.80”, which is the depth to be included in model.
(4): 2 ft = 3” of mulch + 12” to reach invert of riser + 9” of free board over riser invert to discharge peak flows.

TABLE 4 – SUMMARY OF OUTLET STRUCTURE DETAILS AT UNDERGROUND SYSTEMS:

UNDERGROUND PIPE SYSTEM OUTLET STRUCTURE (See Attachment 5 for configuration)							
Outlet	Bottom Orifice		Lower Slot[(1)]			Weir	
	# of orifices and Diameter (in)	Elev. (ft)	width (in)	height (in)	Invert Elev. (in)	Width (ft)	Elev. (ft)
UG-1	2 orifices, 5/8” each	0.00[(1)]	16	1.5	32	6.00	3.50
UG-2	1 orifice, 3”[(2)]	0.00	n/a	n/a	n/a	n/a	n/a

Notes:
(1) Slot and orifices on UG-1 will be placed in a wall located at distribution box to control outlet peak to discharge pipe system. Weir will discharge to UG-2.
(2) Orifice in UG-2 to be placed in a plate upstream of discharge pipe to control UG-2 discharges

FLOW DURATION CURVE COMPARISON

The Flow Duration Curve (FDC) for the site was compared at the POC by exporting the hourly runoff time series results from SWMM to a spreadsheet.

Q_2 and Q_{10} were determined with a partial duration statistical analysis of the runoff time series in an Excel spreadsheet using the Cunnane plotting position method (which is the preferred plotting methodology in the HMP Permit). As the SWMM Model includes a statistical analysis based on the Weibull Plotting Position Method, the Weibull Method was also used within the spreadsheet to ensure that the results were similar to those obtained by the SWMM Model.

The range between 10% of Q_2 and Q_{10} was divided into 100 equal time intervals; the number of hours that each flow rate was exceeded was counted from the hourly series. Additionally, the intermediate peaks with a return period "i" were obtained (Q_i with i=3 to 9). For the purpose of the plot, the values were presented as percentage of time exceeded for each flow rate. FDC comparison at the POC is illustrated in Figure 1 in both normal and logarithmic scale.

As can be seen in Figure 1, the FDC for the proposed condition with the HMP BMPs is within 110% of the curve for the existing condition in both peak flows and durations. The additional runoff volume generated from developing the site will be released to the existing point of discharge at a flow rate below the 10% Q_2 lower threshold for POC-1. Additionally, the project will also not increase peak flow rates between the Q_2 and the Q_{10}, as shown in the peak flow table in Attachment 1.

Discussion of the Manning's coefficient (Pervious Areas) for Pre and Post-Development Conditions

Typically the Manning's coefficient is selected as n = 0.10 for pervious areas and n = 0.012 for impervious areas. However, due to the impact that n has in the continuous simulation a more accurate value of the Manning's coefficient has been chosen for pervious areas. Taken into consideration the study prepared by TRWE (Reference [6]) a value of n = 0.05 has been selected (see Table 1 of Reference [6] included in Attachment 7). An average n value between average grass plus pasture (0.04) and dense grass (0.06) has been selected per the reference cited, for light rain (<0.8 in/hr) as more than 99% of the rainfall has been measured with this intensity.

DRYING TIMES

Drying time of the LID is based on the assumed low-flow capacity of the LID orifice. For LID-1 $Q_{orifice}$ is approximately 0.042 cfs, and surface volume below riser is 1,706 cu-ft. Therefore, T_1 = 1,706/(3600·0.042) = 11.3 hrs. For the underground systems the discharge is a function of the depth; drying times are calculated in Attachment 4 with the following formula:

For UG-1 the drying time is 17.0 hr, and for UG-2 it is 2.44 hrs, in both cases smaller than 24 hours.

SUMMARY

This study has demonstrated that the proposed HMP BMP provided for the Autozone Valley Center site is sufficient to meet the current HMP criteria if the geometry of the LID and underground systems recommended within this technical memorandum, and the respective orifice and outlet structure are incorporated as specified within the proposed project site.

KEY ASSUMPTIONS

1. Type C Soil is representative of the existing condition site. This is based on the site specific infiltration tests which are representative of soil Type C.
2. The LID basin will be unlined at the bottom to provide some partial infiltration at the bottom surface.
3. The LID basin will be lined laterally to prevent lateral infiltration.
4. Two underground pipes will be added to the drainage system: the first (UG-1) to help hydromodification compliance as the biofiltration with partial infiltration is not large enough, and the second (same dimension, different outlet structure) to help with reduction of Q_{100} peak flow to pre-development levels (which is studied separately in the drainage report).

ATTACHMENTS

1. Q_2 to Q_{10} Comparison Tables
2. Flow Duration Curve Analysis
3. List of the "n" largest Peaks: Pre-Development and Post-Development Conditions
4. Area vs Elevation vs Volume vs Discharge vs draw-down time Table & Discharge vs Elevation detailed Table
5. Pre & Post Development Maps, Project Plan and Section Sketches
6. SWMM Input Data in Input Format (Existing and Proposed Models)
7. EPA SWMM Figures and Explanations
8. Soil Maps
9. Summary files from the SWMM Model

REFERENCES

[1] – *"Review and Analysis of San Diego County Hydromodification Management Plan (HMP): Assumptions, Criteria, Methods, & Modeling Tools – Prepared for the Cities of San Marcos, Oceanside & Vista",* May 2012, TRW Engineering.

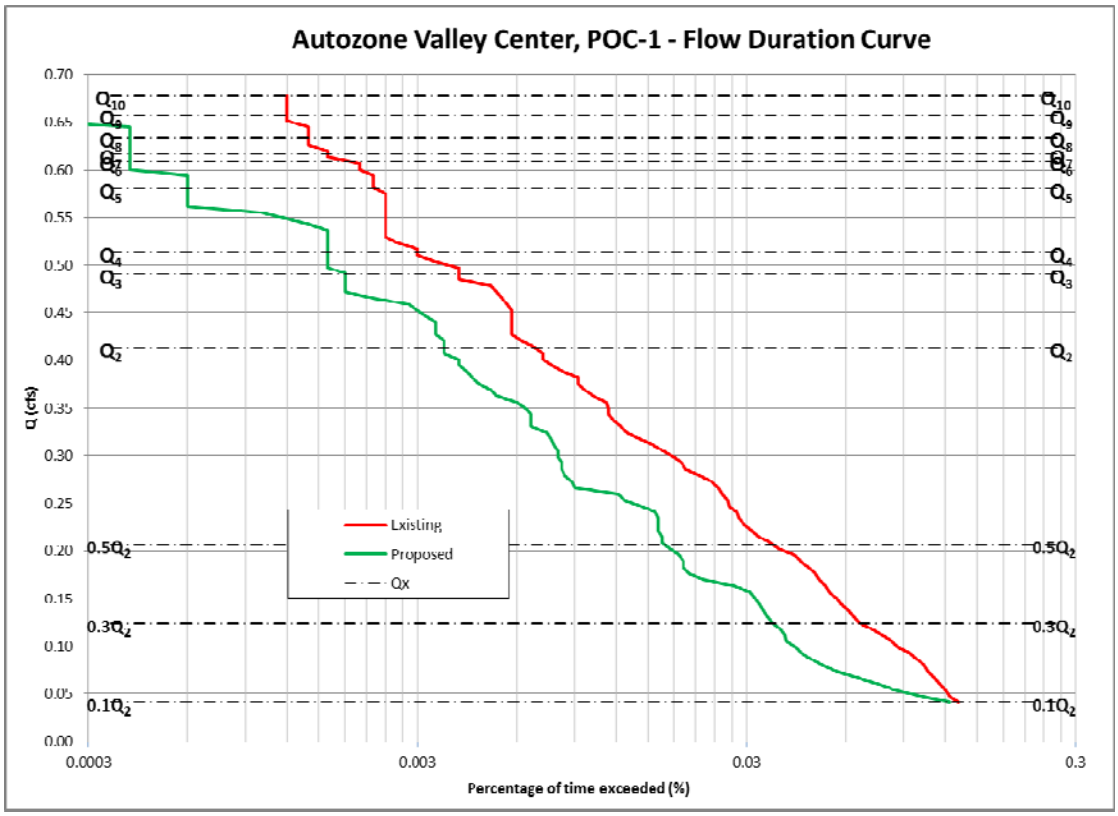
[2] – *"Final Hydromodification Management Plan (HMP) prepared for the County of San Diego",* March 2011, Brown and Caldwell.

[3] - Order R9-2013-001, California Regional Water Quality Control Board San Diego Region (SDRWQCB).

[4] – "*Handbook of Hydrology*", David R. Maidment, Editor in Chief. 1992, McGraw Hill.

[5] – "*City of San Diego BMP Design Manual*", February 2016.

[6] – *"Improving Accuracy in Continuous Hydrologic Modeling: Guidance for Selecting Pervious Overland Flow Manning's n Values in the San Diego Region"*, TRWE, 2016.



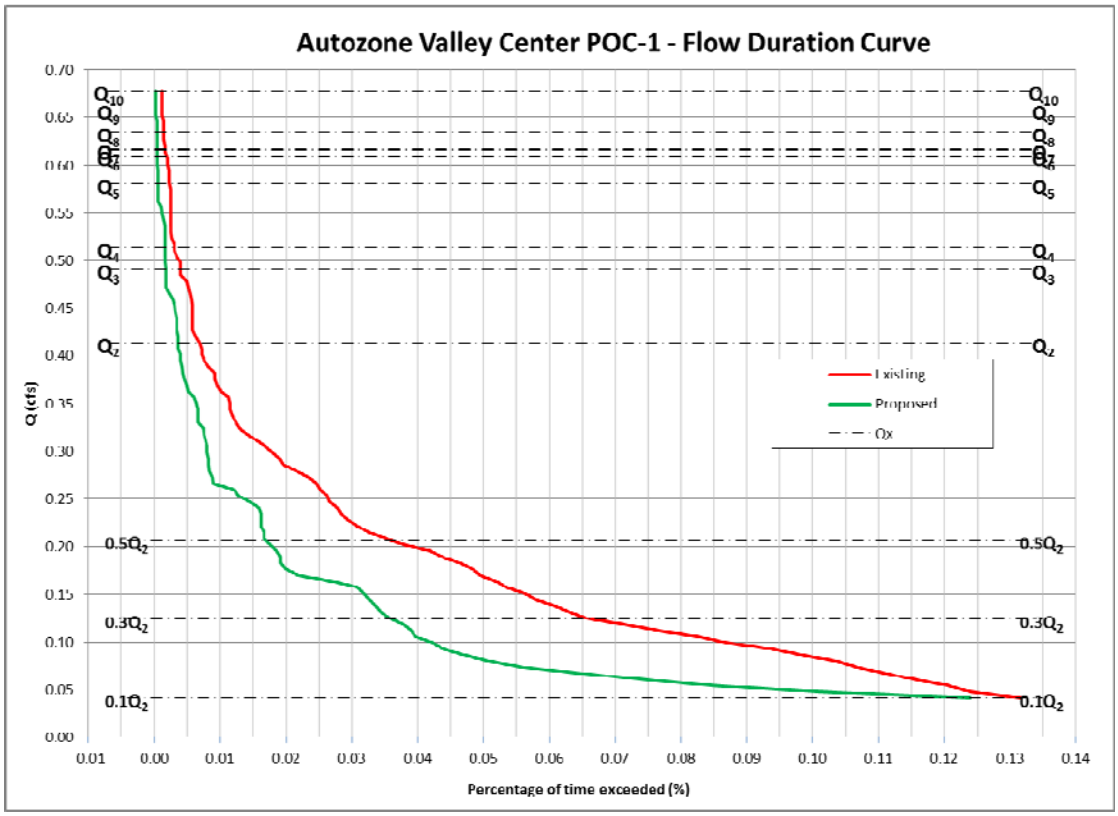


Figure 1a and 1b. Flow Duration Curve Comparison (logarithmic and normal "x" scale)

ATTACHMENT 1.

Q_2 to Q_{10} Comparison Table – POC 1

Return Period	Existing Condition (cfs)	Mitigated Condition (cfs)	Reduction, Exist - Mitigated (cfs)
2-year	0.413	0.241	0.172
3-year	0.491	0.350	0.140
4-year	0.513	0.389	0.125
5-year	0.581	0.409	0.171
6-year	0.609	0.443	0.167
7-year	0.616	0.457	0.159
8-year	0.634	0.468	0.166
9-year	0.658	0.486	0.171
10-year	0.678	0.539	0.139

ATTACHMENT 2

FLOW DURATION CURVE ANALYSIS

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

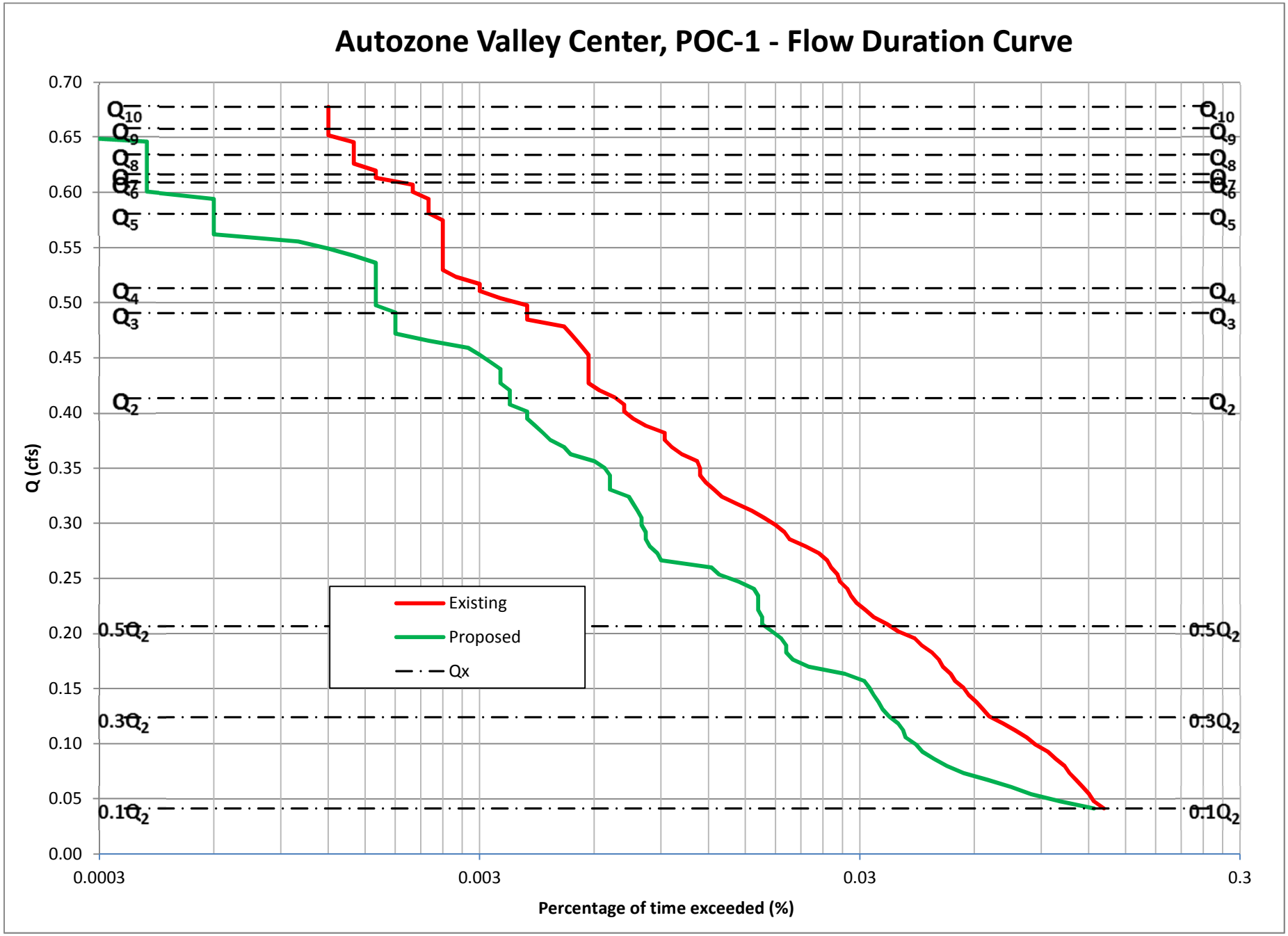
The figures on the following pages illustrate that the flow duration curve in post-development conditions, after the proposed BMP is implemented, is below the existing flow duration curve. The flow duration curve table, following the curve, shows that if the interval $0.10Q_2 - Q_{10}$ is divided in 100 sub-intervals, then a) the post development divided by pre-development durations are never larger than 110% (the permit allows up to 110%); and b) there are no more than 10 intervals in the range 101%-110% which would imply an excess over 10% of the length of the curve (the permit allows less than 10% of excesses measured as 101-110%).

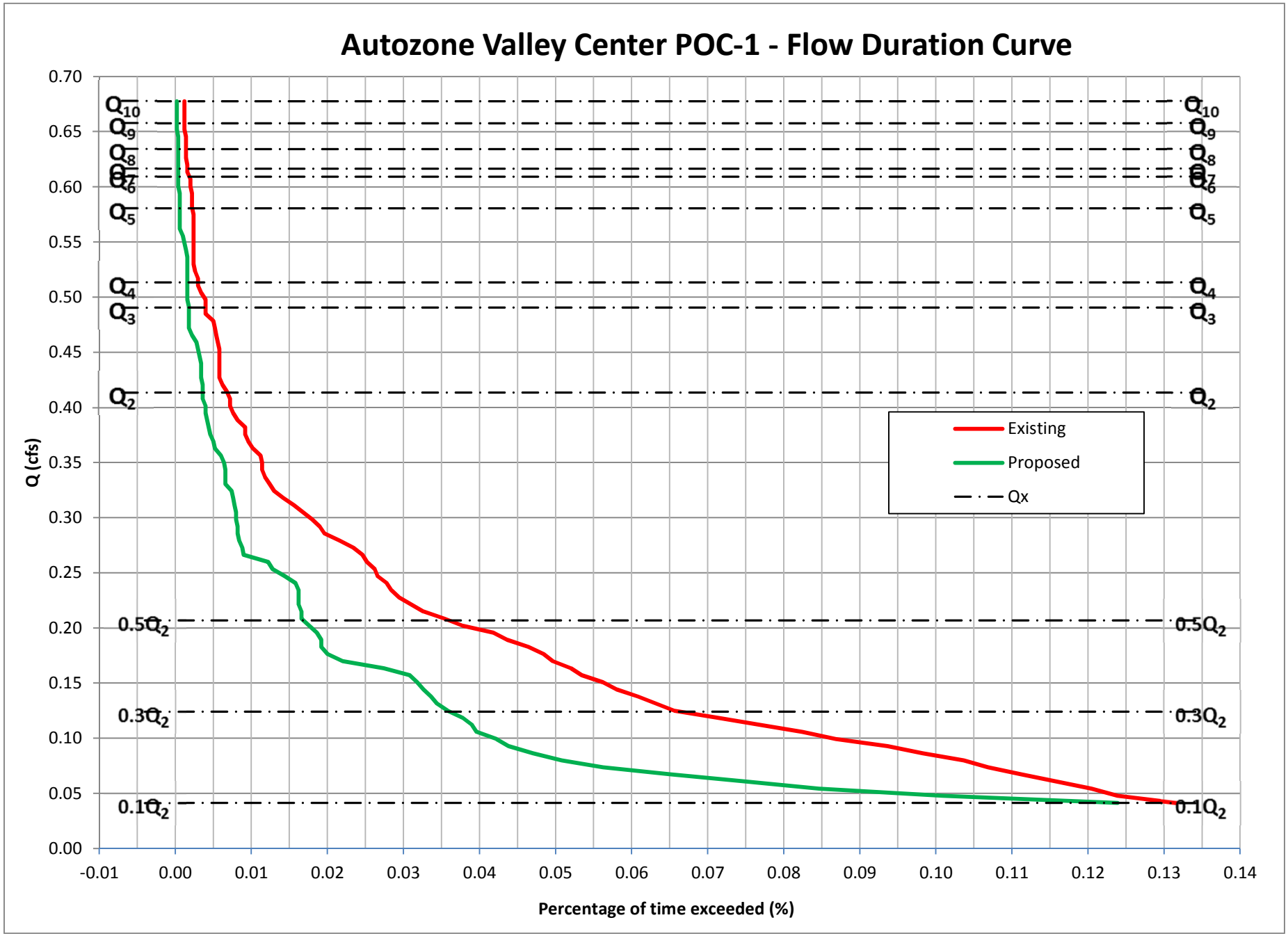
Consequently, the design passes the hydromodification test.

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

In terms of the "y" axis, the peak flow value is the variable of choice. As an additional analysis performed by REC, not only the range of analysis is clearly depicted (10% of Q_2 to Q_{10}) but also all intermediate flows are shown (Q_2, Q_3, Q_4, Q_5, Q_6, Q_7, Q_8 and Q_9) in order to demonstrate compliance at any range $Q_x - Q_{x+1}$. It must be pointed out that one of the limitations of both the SWMM and SDHM models is that the intermediate analysis is not performed (to obtain Q_i from i = 2 to 10). REC performed the analysis using the Cunnane Plotting position Method (the preferred method in the HMP permit) from the "n" largest independent peak flows obtained from the continuous time series.

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


Autozone Valley Center, POC-1 - Flow Duration Curve
Q (cfs)
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Q10
Q9
Q8
Q7
Q6
Q5
Q4
Q3
Q2
0.5Q2
0.3Q2
0.1Q2
Existing
Proposed
Qx
0.0003
0.003
0.03
0.3
Percentage of time exceeded (%)


Autozone Valley Center POC-1 - Flow Duration Curve
Q (cfs)
Percentage of time exceeded (%)
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
-0.01
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
0.11
0.12
0.13
0.14
Q10
Q9
Q8
Q7
Q6
Q5
Q4
Q3
Q2
0.5Q2
0.3Q2
0.1Q2
Existing
Proposed
Qx

Flow Duration Curve Data for Autozone Valley Center, POC-1, City of Valley Center

Q2 =	0.41	cfs	Fraction	10 %
Q10 =	0.68	cfs		
Step =	0.0064	cfs		
Count =	499679	hours		
	57.00	years		

	Existing Condition			Detention Optimized			Pass or
Interval	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	Fail?
1	0.041	658	1.32E-01	619	1.24E-01	94%	Pass
2	0.048	619	1.24E-01	504	1.01E-01	81%	Pass
3	0.054	602	1.20E-01	423	8.47E-02	70%	Pass
4	0.061	579	1.16E-01	375	7.50E-02	65%	Pass
5	0.067	556	1.11E-01	326	6.52E-02	59%	Pass
6	0.073	534	1.07E-01	281	5.62E-02	53%	Pass
7	0.080	518	1.04E-01	254	5.08E-02	49%	Pass
8	0.086	491	9.83E-02	235	4.70E-02	48%	Pass
9	0.093	468	9.37E-02	219	4.38E-02	47%	Pass
10	0.099	434	8.69E-02	211	4.22E-02	49%	Pass
11	0.106	412	8.25E-02	198	3.96E-02	48%	Pass
12	0.112	384	7.68E-02	195	3.90E-02	51%	Pass
13	0.118	357	7.14E-02	189	3.78E-02	53%	Pass
14	0.125	328	6.56E-02	179	3.58E-02	55%	Pass
15	0.131	316	6.32E-02	172	3.44E-02	54%	Pass
16	0.138	304	6.08E-02	168	3.36E-02	55%	Pass
17	0.144	290	5.80E-02	163	3.26E-02	56%	Pass
18	0.151	281	5.62E-02	159	3.18E-02	57%	Pass
19	0.157	267	5.34E-02	154	3.08E-02	58%	Pass
20	0.163	260	5.20E-02	137	2.74E-02	53%	Pass
21	0.170	248	4.96E-02	110	2.20E-02	44%	Pass
22	0.176	242	4.84E-02	100	2.00E-02	41%	Pass
23	0.183	232	4.64E-02	96	1.92E-02	41%	Pass
24	0.189	218	4.36E-02	96	1.92E-02	44%	Pass
25	0.196	209	4.18E-02	93	1.86E-02	44%	Pass
26	0.202	189	3.78E-02	88	1.76E-02	47%	Pass
27	0.208	177	3.54E-02	83	1.66E-02	47%	Pass
28	0.215	163	3.26E-02	83	1.66E-02	51%	Pass
29	0.221	155	3.10E-02	81	1.62E-02	52%	Pass
30	0.228	147	2.94E-02	81	1.62E-02	55%	Pass
31	0.234	142	2.84E-02	81	1.62E-02	57%	Pass
32	0.241	139	2.78E-02	79	1.58E-02	57%	Pass
33	0.247	133	2.66E-02	72	1.44E-02	54%	Pass
34	0.253	131	2.62E-02	64	1.28E-02	49%	Pass
35	0.260	126	2.52E-02	61	1.22E-02	48%	Pass
36	0.266	123	2.46E-02	45	9.01E-03	37%	Pass

	Existing Condition			Detention Optimized			Pass or
Interval	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	Fail?
37	0.273	117	2.34E-02	44	8.81E-03	38%	Pass
38	0.279	108	2.16E-02	42	8.41E-03	39%	Pass
39	0.286	98	1.96E-02	41	8.21E-03	42%	Pass
40	0.292	95	1.90E-02	41	8.21E-03	43%	Pass
41	0.298	90	1.80E-02	40	8.01E-03	44%	Pass
42	0.305	84	1.68E-02	40	8.01E-03	48%	Pass
43	0.311	78	1.56E-02	39	7.81E-03	50%	Pass
44	0.318	71	1.42E-02	38	7.60E-03	54%	Pass
45	0.324	65	1.30E-02	37	7.40E-03	57%	Pass
46	0.331	62	1.24E-02	33	6.60E-03	53%	Pass
47	0.337	59	1.18E-02	33	6.60E-03	56%	Pass
48	0.343	57	1.14E-02	33	6.60E-03	58%	Pass
49	0.350	57	1.14E-02	32	6.40E-03	56%	Pass
50	0.356	56	1.12E-02	30	6.00E-03	54%	Pass
51	0.363	51	1.02E-02	26	5.20E-03	51%	Pass
52	0.369	48	9.61E-03	25	5.00E-03	52%	Pass
53	0.376	46	9.21E-03	23	4.60E-03	50%	Pass
54	0.382	46	9.21E-03	22	4.40E-03	48%	Pass
55	0.388	41	8.21E-03	21	4.20E-03	51%	Pass
56	0.395	38	7.60E-03	20	4.00E-03	53%	Pass
57	0.401	36	7.20E-03	20	4.00E-03	56%	Pass
58	0.408	36	7.20E-03	18	3.60E-03	50%	Pass
59	0.414	34	6.80E-03	18	3.60E-03	53%	Pass
60	0.421	31	6.20E-03	18	3.60E-03	58%	Pass
61	0.427	29	5.80E-03	17	3.40E-03	59%	Pass
62	0.433	29	5.80E-03	17	3.40E-03	59%	Pass
63	0.440	29	5.80E-03	17	3.40E-03	59%	Pass
64	0.446	29	5.80E-03	16	3.20E-03	55%	Pass
65	0.453	29	5.80E-03	15	3.00E-03	52%	Pass
66	0.459	28	5.60E-03	14	2.80E-03	50%	Pass
67	0.466	27	5.40E-03	11	2.20E-03	41%	Pass
68	0.472	26	5.20E-03	9	1.80E-03	35%	Pass
69	0.478	25	5.00E-03	9	1.80E-03	36%	Pass
70	0.485	20	4.00E-03	9	1.80E-03	45%	Pass
71	0.491	20	4.00E-03	9	1.80E-03	45%	Pass
72	0.498	20	4.00E-03	8	1.60E-03	40%	Pass
73	0.504	17	3.40E-03	8	1.60E-03	47%	Pass
74	0.511	15	3.00E-03	8	1.60E-03	53%	Pass
75	0.517	15	3.00E-03	8	1.60E-03	53%	Pass
76	0.523	13	2.60E-03	8	1.60E-03	62%	Pass
77	0.530	12	2.40E-03	8	1.60E-03	67%	Pass
78	0.536	12	2.40E-03	8	1.60E-03	67%	Pass
79	0.543	12	2.40E-03	7	1.40E-03	58%	Pass
80	0.549	12	2.40E-03	6	1.20E-03	50%	Pass
81	0.556	12	2.40E-03	5	1.00E-03	42%	Pass

Interval	Existing Condition			Detention Optimized			Pass or Fail?
	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	
82	0.562	12	2.40E-03	3	6.00E-04	25%	Pass
83	0.568	12	2.40E-03	3	6.00E-04	25%	Pass
84	0.575	12	2.40E-03	3	6.00E-04	25%	Pass
85	0.581	11	2.20E-03	3	6.00E-04	27%	Pass
86	0.588	11	2.20E-03	3	6.00E-04	27%	Pass
87	0.594	11	2.20E-03	3	6.00E-04	27%	Pass
88	0.601	10	2.00E-03	2	4.00E-04	20%	Pass
89	0.607	10	2.00E-03	2	4.00E-04	20%	Pass
90	0.613	8	1.60E-03	2	4.00E-04	25%	Pass
91	0.620	8	1.60E-03	2	4.00E-04	25%	Pass
92	0.626	7	1.40E-03	2	4.00E-04	29%	Pass
93	0.633	7	1.40E-03	2	4.00E-04	29%	Pass
94	0.639	7	1.40E-03	2	4.00E-04	29%	Pass
95	0.646	7	1.40E-03	2	4.00E-04	29%	Pass
96	0.652	6	1.20E-03	1	2.00E-04	17%	Pass
97	0.658	6	1.20E-03	1	2.00E-04	17%	Pass
98	0.665	6	1.20E-03	1	2.00E-04	17%	Pass
99	0.671	6	1.20E-03	1	2.00E-04	17%	Pass
100	0.678	6	1.20E-03	1	2.00E-04	17%	Pass

Peak Flows calculated with Cunnane Plotting Position

Return Period (years)	Pre-dev. Q (cfs)	Post-Dev. Q (cfs)	Reduction (cfs)
10	0.678	0.539	0.139
9	0.658	0.486	0.171
8	0.634	0.468	0.166
7	0.616	0.457	0.159
6	0.609	0.443	0.167
5	0.581	0.409	0.171
4	0.513	0.389	0.125
3	0.491	0.350	0.140
2	0.413	0.241	0.172

ATTACHMENT 3

List of the "n" Largest Peaks: Pre & Post-Developed Conditions

Basic Probabilistic Equation:

R = 1/P R: Return period (years).

P: Probability of a flow to be equaled or exceeded any given year (dimensionless).

Cunnane Equation:

$$P = \frac{i-0.4}{n+0.2}$$

Weibull Equation:

$$P = \frac{i}{n+1}$$

i: Position of the peak whose probability is desired (sorted from large to small)

n: number of years analyzed.

Explanation of Variables for the Tables in this Attachment

Peak: Refers to the peak flow at the date given, taken from the continuous simulation hourly results of the n year analyzed.

Posit: If all peaks are sorted from large to small, the position of the peak in a sorting analysis is included under the variable Posit.

Date: Date of the occurrence of the peak at the outlet from the continuous simulation

Note: all peaks are not annual maxima; instead they are defined as event maxima, with a threshold to separate peaks of at least 12 hours. In other words, any peak P in a time series is defined as a value where dP/dt = 0, and the peak is the largest value in 25 hours (12 hours before, the hour of occurrence and 12 hours after the occurrence, so it is in essence a daily peak).

List of Peak events and Determination of Q2 and Q10 (Pre-Development)
Autozone Valley Center, POC-1

T (Year)	Cunnane (cfs)	Weibull (cfs)
10	**0.68**	**0.69**
9	**0.66**	**0.67**
8	**0.63**	**0.64**
7	**0.62**	**0.62**
6	**0.61**	**0.61**
5	**0.58**	**0.59**
4	**0.51**	**0.52**
3	**0.49**	**0.49**
2	**0.41**	**0.41**

Note:
Cunnane is the preferred method by the HMP permit.

Peaks (cfs)	Date	Posit	Period of Return (Years)	
			Weibull	Cunnane
0.311855	6/1/1996	57	1.02	1.01
0.312066	3/21/1979	56	1.04	1.03
0.313481	11/11/1985	55	1.05	1.05
0.318595	2/15/1992	54	1.07	1.07
0.319767	3/2/1980	53	1.09	1.09
0.323778	1/18/1952	52	1.12	1.11
0.325811	12/17/1957	51	1.14	1.13
0.327107	2/11/1959	50	1.16	1.15
0.330493	11/15/1952	49	1.18	1.18
0.332742	11/22/1965	48	1.21	1.20
0.335324	12/2/1961	47	1.23	1.23
0.336124	2/6/1969	46	1.26	1.25
0.340142	11/21/1963	45	1.29	1.28
0.342503	1/14/1993	44	1.32	1.31
0.353454	3/1/1991	43	1.35	1.34
0.357862	12/9/1982	42	1.38	1.38
0.35843	9/10/1976	41	1.41	1.41
0.358479	3/5/1995	40	1.45	1.44
0.360041	4/3/1958	39	1.49	1.48
0.364497	2/11/1962	38	1.53	1.52
0.369073	2/27/1983	37	1.57	1.56
0.382801	4/14/2003	36	1.61	1.61
0.385185	3/8/1975	35	1.66	1.65
0.388406	1/3/1977	34	1.71	1.70
0.392058	3/27/1991	33	1.76	1.75
0.394783	3/1/1983	32	1.81	1.81
0.396854	1/7/1993	31	1.87	1.87
0.407942	2/14/1980	30	1.93	1.93
0.413405	12/29/2004	29	2.00	2.00
0.415668	1/23/1969	28	2.07	2.07
0.419334	1/9/1998	27	2.15	2.15
0.421231	12/19/1984	26	2.23	2.23
0.455745	11/30/1982	25	2.32	2.33
0.459172	2/3/1998	24	2.42	2.42
0.470613	2/16/1980	23	2.52	2.53
0.48071	12/5/1966	22	2.64	2.65
0.481867	1/11/2005	21	2.76	2.78
0.481999	2/8/1993	20	2.90	2.92
0.498445	1/16/1978	19	3.05	3.08
0.499186	2/13/1992	18	3.22	3.25
0.502421	12/6/1966	17	3.41	3.45
0.509307	3/17/1982	16	3.63	3.67
0.5104	11/8/2002	15	3.87	3.92
0.52058	11/9/2002	14	4.14	4.21
0.527156	8/26/2007	13	4.46	4.54
0.577705	1/29/1980	12	4.83	4.93
0.597208	1/9/2005	11	5.27	5.40
0.608981	1/11/1980	10	5.80	5.96
0.612531	2/15/1986	9	6.44	6.65
0.622154	12/25/1983	8	7.25	7.53
0.650977	2/14/1998	7	8.29	8.67
0.681976	1/4/1995	6	9.67	10.21
0.703046	3/4/1978	5	11.60	12.43
0.716566	10/20/2004	4	14.50	15.89
0.74396	2/4/1994	3	19.33	22.00
0.878781	2/10/1963	2	29.00	35.75
1.153229	2/1/1993	1	58.00	95.33

List of Peak events and Determination of Q2 and Q10 (Post-Development)
Autozone Valley Center, POC-1

T (Year)	Cunnane (cfs)	Weibull (cfs)	Peaks (cfs)	Date	Posit	Period of Return (Years)	
10	**0.54**	**0.55**				Weibull	Cunnane
9	**0.49**	**0.51**	0.104494	2/13/1992	57	1.02	1.01
8	**0.47**	**0.47**	0.11381	3/16/1952	56	1.04	1.03
7	**0.46**	**0.46**	0.119989	3/22/1958	55	1.05	1.05
6	**0.44**	**0.44**	0.123763	12/25/1983	54	1.07	1.07
5	**0.41**	**0.41**	0.128128	2/14/1998	53	1.09	1.09
4	**0.39**	**0.39**	0.12862	11/29/1985	52	1.12	1.11
3	**0.35**	**0.35**	0.137415	2/10/1982	51	1.14	1.13
2	**0.24**	**0.24**	0.1466	2/8/1993	50	1.16	1.15
			0.14717	2/14/1980	49	1.18	1.18
			0.149534	2/4/1994	48	1.21	1.20
			0.153589	3/4/1978	47	1.23	1.23
			0.157544	11/30/1982	46	1.26	1.25
			0.157925	2/16/1980	45	1.29	1.28
			0.15997	2/24/1969	44	1.32	1.31
			0.166921	3/2/1983	43	1.35	1.34
			0.167151	1/5/2008	42	1.38	1.38
			0.168764	2/25/1969	41	1.41	1.41
			0.170055	3/17/1982	40	1.45	1.44
			0.170339	1/11/2005	39	1.49	1.48
			0.171071	1/16/1993	38	1.53	1.52
			0.171992	2/1/1996	37	1.57	1.56
			0.178411	10/20/2004	36	1.61	1.61
			0.180122	1/18/1952	35	1.66	1.65
			0.190065	12/29/2004	34	1.71	1.70
			0.192939	2/1/1993	33	1.76	1.75
			0.200613	1/27/1956	32	1.81	1.81
			0.219727	11/29/1970	31	1.87	1.87
			0.238862	5/8/1977	30	1.93	1.93
			0.24136	1/20/1962	29	2.00	2.00
			0.24615	12/3/1966	28	2.07	2.07
			0.246884	3/1/1970	27	2.15	2.15
			0.249355	1/6/1979	26	2.23	2.23
			0.255186	2/4/1958	25	2.32	2.33
			0.262179	1/15/1978	24	2.42	2.42
			0.266272	1/16/1978	23	2.52	2.53
			0.31628	2/19/1980	22	2.64	2.65
			0.327277	1/9/2005	21	2.76	2.78
			0.347211	11/22/1996	20	2.90	2.92
			0.353475	2/10/1963	19	3.05	3.08
			0.355054	12/30/1951	18	3.22	3.25
			0.35779	2/18/1980	17	3.41	3.45
			0.362573	2/20/1980	16	3.63	3.67
			0.387228	11/30/2007	15	3.87	3.92
			0.392623	11/22/1965	14	4.14	4.21
			0.402491	3/5/1995	13	4.46	4.54
			0.4064	1/11/1980	12	4.83	4.93
			0.425603	3/1/1991	11	5.27	5.40
			0.442175	1/7/1993	10	5.80	5.96
			0.450751	2/27/1983	9	6.44	6.65
			0.467119	2/15/1986	8	7.25	7.53
			0.468735	1/23/1969	7	8.29	8.67
			0.550262	11/9/2002	6	9.67	10.21
			0.558389	12/5/1966	5	11.60	12.43
			0.559982	12/6/1966	4	14.50	15.89
			0.599617	8/26/2007	3	19.33	22.00
			0.649714	1/29/1980	2	29.00	35.75
			0.714144	1/4/1995	1	58.00	95.33

Note:
Cunnane is the preferred method by the HMP permit.

ATTACHMENT 4

AREA VS ELEVATION

The area vs. elevation curves in the model are calculated in Excel and imported into the model. It should be noted that up to the first surface orifice of the biofiltration basin, the storage is allocated to the LID Module of the SWMM model. Please refer to Attachment 7 for further information. The Excel stage-storage calculations for the underground systems are provided on the following pages.

DISCHARGE VS ELEVATION

The orifice has been selected to maximize its size while still restricting flows to conform to the required 10% of the Q2 event flow as mandated in the Final Hydromodification Management Plan by Brown & Caldwell, dated March 2011. While REC acknowledges that the orifice is small, to increase the size of the outlet would impact the basin's ability to restrict flows beneath the HMP thresholds, thus preventing the BMP from conformance with HMP requirements.

In order to further reduce the risk of blockage of the orifices, regular maintenance of the riser and orifice must be performed to ensure potential blockages are minimized. A detail of the orifice and riser structure is provided in Attachment 5 of this memorandum.

Stage-discharge relationships were developed to represent the outlet structures for the underground pipe systems, and are provided on the following pages.

DISCHARGE EQUATIONS

1) Weir:

$$Q_W = C_W \cdot L \cdot H^{3/2} \quad (1)$$

2) Slot:

As an orifice: $$Q_s = B_s \cdot h_s \cdot c_g \cdot \sqrt{2g\left(H - \frac{h_s}{2}\right)} \quad (2.a)$$

As a weir: $$Q_s = C_W \cdot B_s \cdot H^{3/2} \quad (2.b)$$

For H > h_s slot works as weir until orifice equation provides a smaller discharge. The elevation such that equation (2.a) = equation (2.b) is the elevation at which the behavior changes from weir to orifice.

3) Vertical Orifices

As an orifice: $$Q_o = 0.25 \cdot \pi D^2 \cdot c_g \cdot \sqrt{2g\left(H - \frac{D}{2}\right)} \quad (3.a)$$

As a weir: Critical depth and geometric family of circular sector must be solved to determined Q as a function of H:

$$\frac{Q_O^2}{g} = \frac{A_{cr}^3}{T_{cr}}; \quad H = y_{cr} + \frac{A_{cr}}{2 \cdot T_{cr}}; \; T_{cr} = 2\sqrt{y_{cr}(D - y_{cr})}\,; \quad A_{cr} = \frac{D^2}{8}[\alpha_{cr} - sin(\alpha_{cr})]\,;$$

$$y_{cr} = \frac{D}{2}[1 - sin(0.5 \cdot \alpha_{cr})] \quad \text{(3.b.1, 3.b.2, 3.b.3, 3.b.4 and 3.b.5)}$$

There is a value of H (approximately H = 110% D) from which orifices no longer work as weirs as critical depth is not possible at the entrance of the orifice. This value of H is obtained equaling the discharge using critical equations and equations (3.b).

A mathematical model is prepared with the previous equations depending on the type o discharge.

The following are the variables used above:

Q_W, Q_s, Q_O = Discharge of weir, slot or orifice (cfs)

C_W, c_g : Coefficients of discharge of weir (typically 3.1) and orifice (0.61 to 0.62)

L, B_s, D, h_s : Length of weir, width of slot, diameter of orifice and height of slot, respectively; (ft)

H: Level of water in the pond over the invert of slot, weir or orifice (ft)

A_{cr}, T_{cr}, y_{cr}, α_{cr}: Critical variables for circular sector: area (sq-ft), top width (ft), critical depth (ft), and angle to the center, respectively.

Stage-Area for Biofiltration BMP Basin 1

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
-0.25	1089	0	Bottom of 3" layer of mulch [1]
0.00	1089	109	
0.25	1162	390	
0.50	1238	690	
0.75	1314	1009	
1.00	1393	1348	
1.25	1473	1706	**Surface Outlet** [3]
1.50	1555	2084	
1.75	1639	2484	
2.00	1724	2904	

SUB SURFACE STORAGE BASIN 1

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
-1.75	1089	490	**Amended Soil Base (0.3 voids)**
-3.25	1089	653	**Gravel Base (0.4 voids)** [4]

Gravel & Amended Soil	**TOTAL =**	1143	(ft^3)
Surface Total	**TOTAL =**	1009	(ft^3)
IMP	**TOTAL =**	**2153**	**(ft^3)**

Effective Depth[5]:	18.80 in

At Elevation 0.75 ft is the WQ Area: 1089 (ft^2) BIOFILTRATION [2]

(1): The three inches of mulch begin here, they have a porosity of 0.4 voids.
(2): The Water Quality (WQ) area corresponds to the area at the bottom of the Biofiltration. This is the area corresponding to the ammended soil and gravel.
(3): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet) which is the 2 feet by 2 feet emergency weir.
(4): The gravel depth includes the 6 inches of storage below the LID orifice.
(5): Depth to be used in the SWMM LID Controls. See Attachment 7 for more details.

Outlet structure for Discharge of Basin 1

Discharge vs Elevation Table

Lower orifice:	0.625	"	Lower slot	
Number of orif:	0		Number of slots:	0
Cg-low:	0.61		Invert:	0.00 ft
			B:	0.000 ft
Middle orifice	2.500	"	h_{slot}:	0.000 ft
Number of orif:	0.000			
Cg-middle:	0.61		Emergency weir	
invert elev:	0	ft	Invert:	0.000 ft
			W:	8.00 ft

*Note: h = head above the invert of the Emergency Weir discharge opening.

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qslot-low (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.042	0.800	0.200	0.000	0.000	0.000	0.000	0.211	0.211
0.083	1.600	0.400	0.000	0.000	0.000	0.000	0.597	0.597
0.125	2.400	0.600	0.000	0.000	0.000	0.000	1.096	1.096
0.167	3.200	0.800	0.000	0.000	0.000	0.000	1.687	1.687
0.208	4.000	1.000	0.000	0.000	0.000	0.000	2.358	2.358
0.250	4.800	1.200	0.000	0.000	0.000	0.000	3.100	3.100
0.292	5.600	1.400	0.000	0.000	0.000	0.000	3.906	3.906
0.333	6.400	1.600	0.000	0.000	0.000	0.000	4.773	4.773
0.375	7.200	1.800	0.000	0.000	0.000	0.000	5.695	5.695
0.417	8.000	2.000	0.000	0.000	0.000	0.000	6.670	6.670
0.458	8.800	2.200	0.000	0.000	0.000	0.000	7.695	7.695
0.500	9.600	2.400	0.000	0.000	0.000	0.000	8.768	8.768
0.542	10.400	2.600	0.000	0.000	0.000	0.000	9.887	9.887
0.583	11.200	2.800	0.000	0.000	0.000	0.000	11.049	11.049
0.625	12.000	3.000	0.000	0.000	0.000	0.000	12.254	12.254
0.667	12.800	3.200	0.000	0.000	0.000	0.000	13.499	13.499
0.708	13.600	3.400	0.000	0.000	0.000	0.000	14.785	14.785
0.750	14.400	3.600	0.000	0.000	0.000	0.000	16.108	16.108

Underground Unit 1- Flood Control System

h (ft)	h (inch)	α (°)	Vol (cu-ft)	A (sq-ft)	Q (cfs)	Vol (ac-ft)	Δt (hr)
0.000	0	0	0.00	70	0.000	0	
0.083	1	33.2	10.12	172.9	0.005	0.0002	1.13
0.167	2	47.1	26.96	231.2	0.008	0.0006	0.73
0.250	3	57.9	48.01	274.1	0.010	0.0011	0.66
0.333	4	67.1	72.36	310.1	0.012	0.0017	0.63
0.417	5	75.3	99.43	339.7	0.013	0.0023	0.61
0.500	6	82.8	128.86	366.5	0.014	0.0030	0.60
0.583	7	89.8	160.34	389.0	0.016	0.0037	0.58
0.667	8	96.4	193.63	410.0	0.017	0.0044	0.57
0.750	9	102.6	228.54	427.8	0.018	0.0052	0.56
0.833	10	108.6	264.90	444.8	0.019	0.0061	0.55
0.917	11	114.4	302.56	459.0	0.020	0.0069	0.54
1.000	12	120.0	341.38	472.7	0.021	0.0078	0.54
1.083	13	125.4	381.24	484.0	0.021	0.0088	0.53
1.167	14	130.8	422.03	495.1	0.022	0.0097	0.52
1.250	15	136.0	463.66	503.9	0.023	0.0106	0.51
1.333	16	141.1	506.01	512.6	0.024	0.0116	0.50
1.417	17	146.1	549.00	519.2	0.025	0.0126	0.49
1.500	18	151.0	592.55	525.8	0.025	0.0136	0.48
1.583	19	156.0	636.56	530.4	0.026	0.0146	0.48
1.667	20	160.8	680.95	535.1	0.027	0.0156	0.47
1.750	21	165.6	725.65	537.7	0.027	0.0167	0.46
1.833	22	170.4	770.58	540.5	0.028	0.0177	0.45
1.917	23	175.2	815.66	541.4	0.029	0.0187	0.44
2.000	24	180.0	860.81	542.3	0.029	0.0198	0.43
2.083	25	184.8	905.97	541.4	0.030	0.0208	0.42
2.167	26	189.6	951.05	540.5	0.031	0.0218	0.41
2.250	27	194.4	995.97	537.7	0.031	0.0229	0.41
2.333	28	199.2	1040.67	535.1	0.032	0.0239	0.40
2.417	29	204.0	1085.07	530.4	0.032	0.0249	0.39
2.500	30	209.0	1129.08	525.8	0.033	0.0259	0.38
2.583	31	213.9	1172.62	519.2	0.033	0.0269	0.37
2.667	32	218.9	1215.62	512.6	0.034	0.0279	0.36
2.750	33	224.0	1257.97	503.9	0.133	0.0289	0.14
2.833	34	229.2	1299.59	495.1	0.298	0.0298	0.05
2.917	35	234.6	1340.39	484.0	0.388	0.0308	0.03
3.000	36	240.0	1380.25	472.7	0.460	0.0317	0.03
3.083	37	245.6	1419.07	459.0	0.522	0.0326	0.02
3.167	38	251.4	1456.73	444.8	0.576	0.0334	0.02
3.250	39	257.4	1493.09	427.8	0.626	0.0343	0.02
3.333	40	263.6	1528.00	410.0	0.672	0.0351	0.01
3.417	41	270.2	1561.29	389.0	0.715	0.0358	0.01
3.500	42	277.2	1592.77	366.5	0.755	0.0366	0.01
3.583	43	284.7	1622.19	339.7	1.240	0.0372	0.01
3.667	44	292.9	1649.27	310.1	2.095	0.0379	0.00
3.750	45	302.1	1673.62	274.1	3.189	0.0384	0.00
3.833	46	312.9	1694.67	231.2	4.477	0.0389	0.00
3.917	47	326.8	1711.51	172.9	5.932	0.0393	0.00
4.000	48	360.0	1721.63	70.0	7.537	0.0395	0.00
					TOT drying time (hr):		**16.96**

Underground Unit 2- HMP System

h (ft)	h (inch)	α (°)	Vol (cu-ft)	A (sq-ft)	Q (cfs)	Vol (ac-ft)	Δt (hr)
0.000	0	0	0.00	72	0.000	0.0000	
0.083	1	33.2	10.29	174.9	0.011	0.0002	0.51
0.167	2	47.1	27.29	233.2	0.041	0.0006	0.18
0.250	3	57.9	48.51	276.1	0.081	0.0011	0.10
0.333	4	67.1	73.02	312.1	0.110	0.0017	0.07
0.417	5	75.3	100.27	341.7	0.130	0.0023	0.06
0.500	6	82.8	129.86	368.5	0.147	0.0030	0.06
0.583	7	89.8	161.51	391.0	0.163	0.0037	0.06
0.667	8	96.4	194.97	412.0	0.177	0.0045	0.05
0.750	9	102.6	230.04	429.8	0.190	0.0053	0.05
0.833	10	108.6	266.57	446.8	0.202	0.0061	0.05
0.917	11	114.4	304.39	461.0	0.214	0.0070	0.05
1.000	12	120.0	343.38	474.7	0.225	0.0079	0.05
1.083	13	125.4	383.41	486.0	0.235	0.0088	0.05
1.167	14	130.8	424.37	497.1	0.245	0.0097	0.05
1.250	15	136.0	466.16	505.9	0.255	0.0107	0.05
1.333	16	141.1	508.68	514.6	0.264	0.0117	0.05
1.417	17	146.1	551.84	521.2	0.273	0.0127	0.04
1.500	18	151.0	595.55	527.8	0.282	0.0137	0.04
1.583	19	156.0	639.73	532.4	0.290	0.0147	0.04
1.667	20	160.8	684.29	537.1	0.298	0.0157	0.04
1.750	21	165.6	729.15	539.7	0.306	0.0167	0.04
1.833	22	170.4	774.25	542.5	0.314	0.0178	0.04
1.917	23	175.2	819.49	543.4	0.322	0.0188	0.04
2.000	24	180.0	864.81	544.3	0.329	0.0199	0.04
2.083	25	184.8	910.13	543.4	0.336	0.0209	0.04
2.167	26	189.6	955.38	542.5	0.343	0.0219	0.04
2.250	27	194.4	1000.47	539.7	0.350	0.0230	0.04
2.333	28	199.2	1045.34	537.1	0.357	0.0240	0.04
2.417	29	204.0	1089.90	532.4	0.364	0.0250	0.03
2.500	30	209.0	1134.08	527.8	0.370	0.0260	0.03
2.583	31	213.9	1177.79	521.2	0.377	0.0270	0.03
2.667	32	218.9	1220.95	514.6	0.383	0.0280	0.03
2.750	33	224.0	1263.47	505.9	0.389	0.0290	0.03
2.833	34	229.2	1305.26	497.1	0.395	0.0300	0.03
2.917	35	234.6	1346.22	486.0	0.401	0.0309	0.03
3.000	36	240.0	1386.25	474.7	0.407	0.0318	0.03
3.083	37	245.6	1425.24	461.0	0.413	0.0327	0.03
3.167	38	251.4	1463.06	446.8	0.419	0.0336	0.03
3.250	39	257.4	1499.59	429.8	0.425	0.0344	0.02
3.333	40	263.6	1534.66	412.0	0.430	0.0352	0.02
3.417	41	270.2	1568.12	391.0	0.436	0.0360	0.02
3.500	42	277.2	1599.77	368.5	0.441	0.0367	0.02
3.583	43	284.7	1629.36	341.7	0.447	0.0374	0.02
3.667	44	292.9	1656.61	312.1	0.452	0.0380	0.02
3.750	45	302.1	1681.12	276.1	0.458	0.0386	0.01
3.833	46	312.9	1702.34	233.2	0.463	0.0391	0.01
3.917	47	326.8	1719.34	174.9	0.468	0.0398	0.01
4.000	48	360.0	1729.63	72.0	0.473	0.0403	0.01
					TOT drying time (hr):		**2.44**

Divider Structure Discharge

Discharge vs Elevation Table

Lower orifice:	0.625 "	Lower slot	
Number of orif:	2	Number of slots:	1
Cg-low:	0.61	Invert:	2.67 ft
		B:	1.333 ft
Middle orifice	2.500 "	h_{slot}:	0.125 ft
Number of orif:	0.000		
Cg-middle:	0.61	Emergency weir	
invert elev:	0 ft	Invert:	3.500 ft
		W:	6.00 ft

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qslot-low (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.083	1.600	0.400	0.005	0.006	0.005	0.000	0.000	0.005
0.167	3.200	0.800	0.008	0.009	0.008	0.000	0.000	0.008
0.250	4.800	1.200	0.010	0.044	0.010	0.000	0.000	0.010
0.333	6.400	1.600	0.012	0.116	0.012	0.000	0.000	0.012
0.417	8.000	2.000	0.013	0.130	0.013	0.000	0.000	0.013
0.500	9.600	2.400	0.014	0.144	0.014	0.000	0.000	0.014
0.583	11.200	2.800	0.016	0.156	0.016	0.000	0.000	0.016
0.667	12.800	3.200	0.017	0.167	0.017	0.000	0.000	0.017
0.750	14.400	3.600	0.018	0.177	0.018	0.000	0.000	0.018
0.833	16.000	4.000	0.019	0.187	0.019	0.000	0.000	0.019
0.917	17.600	4.400	0.020	0.197	0.020	0.000	0.000	0.020
1.000	19.200	4.800	0.021	0.206	0.021	0.000	0.000	0.021
1.083	20.800	5.200	0.021	0.214	0.021	0.000	0.000	0.021
1.167	22.400	5.600	0.022	0.223	0.022	0.000	0.000	0.022
1.250	24.000	6.000	0.023	0.231	0.023	0.000	0.000	0.023
1.333	25.600	6.400	0.024	0.238	0.024	0.000	0.000	0.024
1.417	27.200	6.800	0.025	0.246	0.025	0.000	0.000	0.025
1.500	28.800	7.200	0.025	0.253	0.025	0.000	0.000	0.025
1.583	30.400	7.600	0.026	0.260	0.026	0.000	0.000	0.026
1.667	32.000	8.000	0.027	0.267	0.027	0.000	0.000	0.027
1.750	33.600	8.400	0.027	0.274	0.027	0.000	0.000	0.027
1.833	35.200	8.800	0.028	0.280	0.028	0.000	0.000	0.028
1.917	36.800	9.200	0.029	0.287	0.029	0.000	0.000	0.029
2.000	38.400	9.600	0.029	0.293	0.029	0.000	0.000	0.029
2.083	40.000	10.000	0.030	0.299	0.030	0.000	0.000	0.030
2.167	41.600	10.400	0.031	0.305	0.031	0.000	0.000	0.031
2.250	43.200	10.800	0.031	0.311	0.031	0.000	0.000	0.031
2.333	44.800	11.200	0.032	0.317	0.032	0.000	0.000	0.032
2.417	46.400	11.600	0.032	0.323	0.032	0.000	0.000	0.032
2.500	48.000	12.000	0.033	0.328	0.033	0.000	0.000	0.033
2.583	49.600	12.400	0.033	0.334	0.033	0.000	0.000	0.033
2.667	51.200	12.800	0.034	0.339	0.034	0.000	0.000	0.034
2.750	52.800	13.200	0.034	0.344	0.034	0.099	0.000	0.133
2.833	54.400	13.600	0.035	0.349	0.035	0.263	0.000	0.298
2.917	56.000	14.000	0.035	0.355	0.035	0.353	0.000	0.388
3.000	57.600	14.400	0.036	0.360	0.036	0.424	0.000	0.460
3.083	59.200	14.800	0.036	0.365	0.036	0.485	0.000	0.522
3.167	60.800	15.200	0.037	0.370	0.037	0.539	0.000	0.576
3.250	62.400	15.600	0.037	0.375	0.037	0.588	0.000	0.626
3.333	64.000	16.000	0.038	0.379	0.038	0.634	0.000	0.672
3.417	65.600	16.400	0.038	0.384	0.038	0.676	0.000	0.715
3.500	67.200	16.800	0.039	0.389	0.039	0.716	0.000	0.755
3.583	68.800	17.200	0.039	0.393	0.039	0.754	0.447	1.240
3.667	70.400	17.600	0.040	0.398	0.040	0.790	1.266	2.095
3.750	72.000	18.000	0.040	0.403	0.040	0.824	2.325	3.189
3.833	73.600	18.400	0.041	0.407	0.041	0.857	3.580	4.477
3.917	75.200	18.800	0.041	0.411	0.041	0.889	5.003	5.932
4.000	76.800	19.200	0.042	0.416	0.042	0.919	6.576	7.537

ATTACHMENT 5

Pre & Post-Developed Maps, Project Plan and Detention

Section Sketches

OLD MIRAR DE VALLE ROAD

POINT OF COMPLIANCE

RIM=1304.18
IE=1298.30

IE=1298.5

1302.8

LEGEND:

DMA1 — DMA BASIN IDENTIFICATION

→ → → FLOW DIRECTION

UNDERLYING HYDROLOGIC SOIL GROUP:
SOIL GROUP 'C'

HISTORIC DEPTH TO GROUND WATER:
10.1 FEET BELOW EXISTING GROUND

DMA1

VALLEY CENTER ROAD

SCALE: 1" = 10'

0 5 10 20 30

GRAPHICAL SCALE

EXISTING CONDITION
HYDROMODIFICATION MANAGMENT EXHIBIT
AUTOZONE

Alidade ENGINEERING
41743 ENTERPRISE CIRCLE NORTH, SUITE 209
TEMECULA, CA 92590
PH: (951) 587-2020
FAX: (951) 587-2626

16-202\HYDRO\MODEXT.dwg 03-29-18

OLD MIRAR DE VALLE ROAD

LEGEND:

DMA1	DMA BASIN IDENTIFICATION
BA1	BIOFILTRATION AREA
	PERVIOUS AREA
	BIOFILTRATION BASIN
	IMPERVIOUS AREA
	BASIN BOUNDARY
	DRAINAGE MANAGEMENT AREA BOUNDARY (DMA)
INLET	STORM WATER STENCILING "NO DUMPING, DRAINS TO MOOSA CREEK" OR SIMILAR
UG1	UNDERGROUND STORAGE
→ → →	FLOW DIRECTION

UNDERLYING HYDROLOGIC SOIL GROUP:
SOIL GROUP 'C'

HISTORIC DEPTH TO GROUND WATER:
10.1 FEET BELOW EXISTING GROUND

CRITICAL COARSE SEDIMENT YIELD AREAS:
NONE ONSITE

OFFSITE COARSE SEDIMENT YIELD AREAS –
NONE TRIBUTARY TO THE PROJECT LIMITS

POINT OF COMPLIANCE

FLOW CONTROL STRUCTURE

16'-4" 1,037 SF BA1

VALLEY CENTER ROAD

SCALE: 1" = 10'

0 5 10 20 30

GRAPHICAL SCALE

DEVELOPED CONDITION
HYDROMODIFICATION MANAGEMENT EXHIBIT
AUTOZONE

Alidade ENGINEERING
41743 ENTERPRISE CIRCLE NORTH, SUITE 209
TEMECULA, CA 92590
PH: (951) 587-2020
FAX: (951) 587-2626

16-222HYDROMOD.dwg 01-29-19

	DMA AREA (FT^2)	POST-PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA X RUNOFF FACTOR	SOIL TYPE	IMP NAME
DMA1	27,144*	IMPERVIOUS	0.9	24,429.6	C	BA1
	1,294**	IMPERVIOUS	0.9	1,164.6		
	8,694	LANDSCAPING	0.1	869.4	IMP SIZING FACTOR	MINIMUM AREA OR VOLUME	PROPOSED AREA OR VOLUME	(FT^2)
			TOTAL	26,463.6	0.03	794	1,037	IMP. AREA

*INCLUDES 55 SF OF IMPERVIOUS AREA FROM TRACTOR SUPPLY SITE
**ONSITE IMPERVIOUS AREA THAT WAS CONSTRUCTED WITH THE ADJACENT TRACTOR SUPPLY PROJECT.

	DMA AREA (FT^2)	POST-PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA X RUNOFF FACTOR	SOIL TYPE	
DMA2	50	IMPERVIOUS	0.9	45.0	C	
			TOTAL	45.0	DE MINIMIS AREA	

SHEET FLOWS TO ADJACENT PROPERTY TO THE SOUTH (TRACTOR SUPPLY SITE)

	DMA AREA (FT^2)	POST-PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA X RUNOFF FACTOR	SOIL TYPE	
DMA3	3	IMPERVIOUS	0.9	2.7	C	
			TOTAL	2.7	DE MINIMIS AREA	

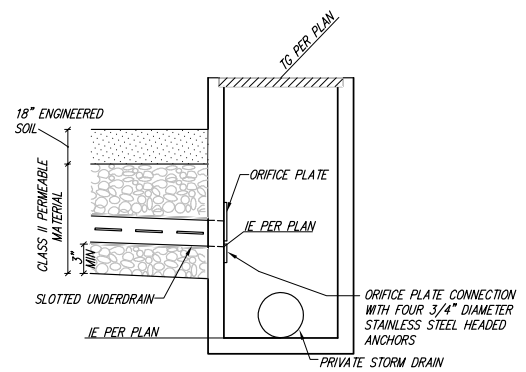
SHEET FLOWS TO ADJACENT PROPERTY TO THE SOUTH (TRACTOR SUPPLY SITE)

	DMA AREA (FT^2)	POST-PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA X RUNOFF FACTOR	SOIL TYPE	
DMA4	172	IMPERVIOUS	0.9	154.8	C	
	3,431	LANDSCAPING	0.1	343.1		
			TOTAL	497.9	SELF-MITIGATING	

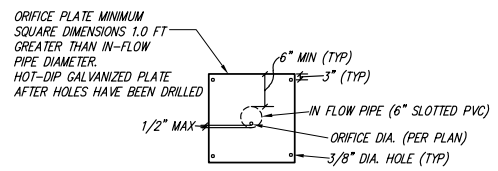
SHEET FLOWS TO VALLEY CENTER ROAD

	DMA AREA (FT^2)	POST-PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA X RUNOFF FACTOR	SOIL TYPE	
DMA5	151	IMPERVIOUS	0.9	135.9	C	
	3,901	LANDSCAPING	0.1	390.1		
			TOTAL	526.0	SELF-MITIGATING	

SHEET FLOWS TO OLD MIRAR DE VALLE ROAD

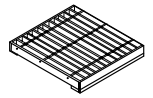


SECTION BIORETENTION CATCH BASIN
NOT TO SCALE

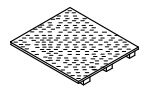


DETAIL: FLOW CONTROL ORIFICE PLATE (PVT)
NOT TO SCALE

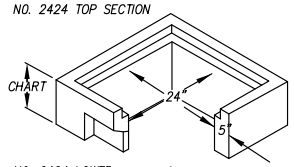
NO. 2424 STEEL TRAFFIC GRATE MAX. 1/2" SPACING WT 103# TRAF.



NO. 2424 STEEL TRAFFIC COVER WT. 114#

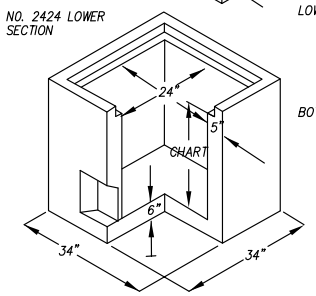


NO. 2424 TOP SECTION



TOP SECTION	HT.	LBS	AVAILABLE
2424 T6	6"	270	NO K.O.
2424 T12	12"	495	(4) 6" X 11"
2424 T18	18"	745	(4) 9" X 12"
2424 T24	24"	870	(4) 14" X 14"

NO. 2424 LOWER SECTION



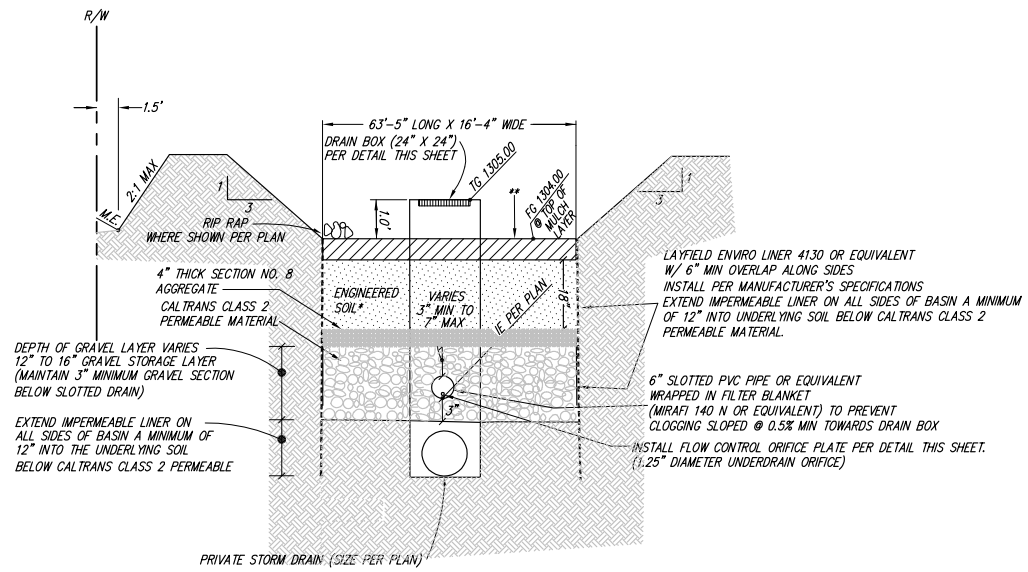
LOWER	HT.	LBS	AVAILABLE
2424 L12	12"	495	(4) 6" X 11"
2424 L18	18"	745	(4) 9" X 12"
2424 L24	24"	870	(4) 14" X 14"

BOTTOM	HT.	LBS	AVAILABLE
2424 B30	30"	1595	(4) 18" X 18"
2424 B36	36"	1905	(4) 18" X 18"

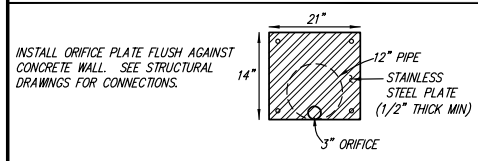
24" X 24" BROOKS BOX CATCH BASIN (PVT)
(OR EQUIVALENT)
NOT TO SCALE

*ENGINEERED SOIL: 75% - 80% SAND, 10% MAX SILT, 3% MAX CLAY AND 9% MAX COMPOST. COMPOST SHOULD COMPOSE NO MORE THAN 5% BULK WEIGHT OF THE ENGINEERED SOIL PER THE COUNTY OF SAN DIEGO LOW IMPACT DESIGN MANUAL, APPENDIX G.

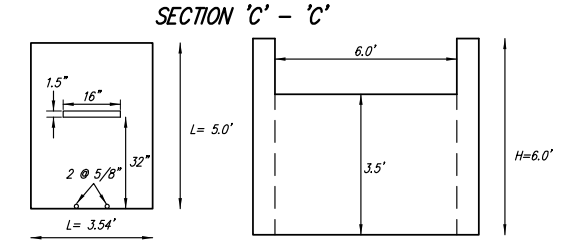
**INSTALL 3" DEPTH SECTION OF WELL-AGED, SHREDDED HARDWOOD MULCH THAT HAS BEEN STOCKPILED OR STORED FOR AT LEAST 12 MONTHS.



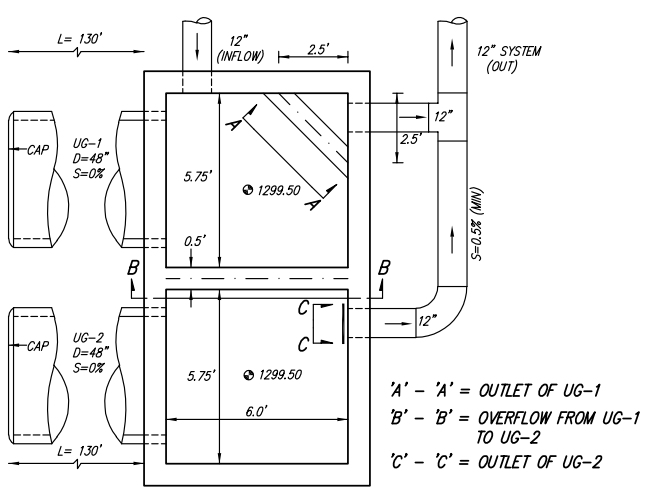
DETAIL: BIOFILTRATION BASIN (PVT) W/ NUTRIENT SENSITIVE MEDIA DESIGN
NOT TO SCALE



SECTION 'C' - 'C'



SECTION 'A' - 'A' SECTION 'B' - 'B'



PLAN VIEW
6' X 12' JUNCTION STRUCTURE (PVT)
NOT TO SCALE

BIO CLEAN SCREENING FILTER WITH TROUGH SYSTEM
FOR USE IN CURB INLETS WITH WINGS

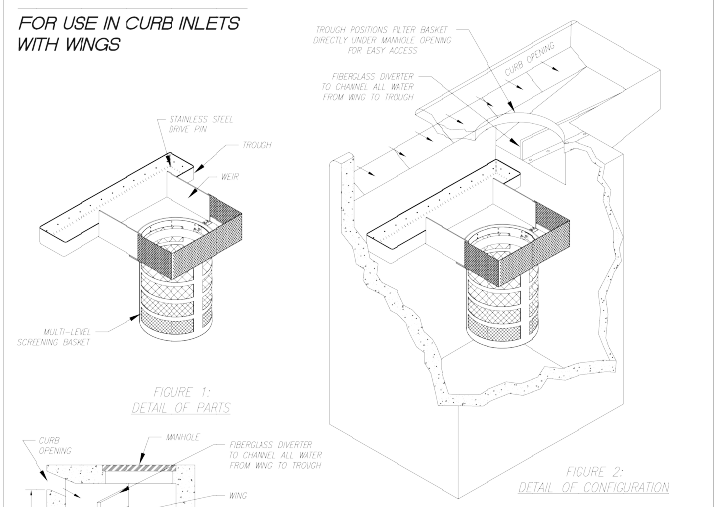


FIGURE 1: DETAIL OF PARTS
FIGURE 2: DETAIL OF CONFIGURATION
FIGURE 3: DETAIL OF MOUNTING
FIGURE 4: DETAIL OF PROFILE

NOTES:
1. TROUGH SYSTEM PROVIDES FOR ENTIRE COVERAGE OF INLET OPENING SO TO DIVERT ALL FLOW TO FILTER.
2. TROUGH SYSTEM MANUFACTURED FROM MARINE GRADE FIBERGLASS, GEL COATED FOR UV PROTECTION.
3. SYSTEM ATTACHED TO THE CATCH BASIN WITH NON-CORROSIVE HARDWARE.
4. FILTER MANUFACTURED OF 100% STAINLESS STEEL.
5. FILTER MADE OF NON-CLOGGING SCREEN WITH 4.7 MM OPENINGS AND MEETS FULL CAPTURE REQUIREMENTS.
6. FILTER CAN BE FITTED WITH HYDROCARBON ABSORBENT BOOM
7. FILTER IS LOCATED DIRECTLY UNDER THE MANHOLE FOR EASY REMOVAL AND MAINTENANCE.
8. LENGTH OF TROUGH CAN VARY FROM 2' TO 30'.
9. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE - CONTACT BIO CLEAN FOR MORE INFORMATION.
10. CONSIDERS A SAFETY FACTOR OF 2.0.
11. BYPASS IS FACILITATED VIA OVERFLOW OF THE TROUGH SYSTEM AND IS EQUAL TO THE CAPACITY OF THE CURB OPENING
12. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.
13. ADDITIONAL TREATMENT AND STORAGE CAPACITY CAN BE ACHIEVED BY UTILIZING MULTIPLE FILTER BASKETS.

DRAWING: BIO CLEAN CURB INLET FILTER DETAILS	MULTI-LEVEL SCREENING
TREATMENT FLOW RATE: 2.85 cfs	MODEL #: BC-CURB-MLS
WARRANTY: 5 YEAR MANUFACTURERS	PROJECT:
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 338 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-433-7640 FAX: 760-433-3176	REVISIONS: DATE:
DATE: 10/12/2017 SCALE: NTS	REVISIONS: DATE:
DRAFTER: M.C.P. UNITS = INCHES	REVISIONS: DATE:

Bio Clean
A Forterra Company

PAGE 3

BIO CLEAN SCREENING FILTER WITH TROUGH SYSTEM
FOR USE IN CURB INLETS

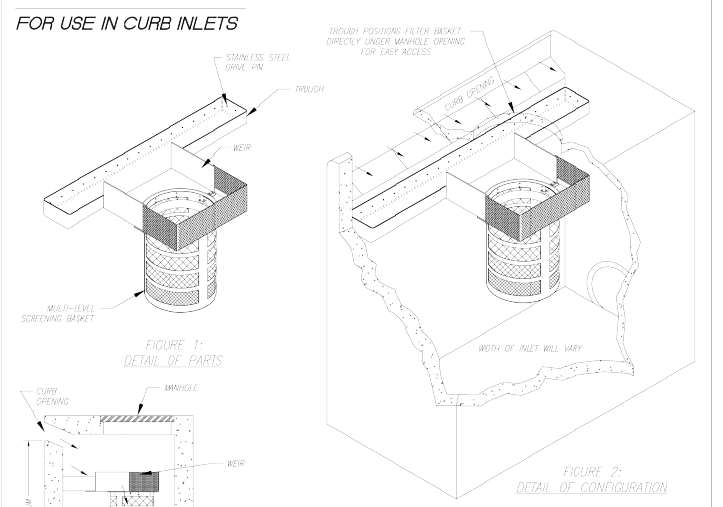


FIGURE 1: DETAIL OF PARTS
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NOTES:
1. TROUGH SYSTEM PROVIDES FOR ENTIRE COVERAGE OF INLET OPENING SO TO DIVERT ALL FLOW TO FILTER.
2. TROUGH SYSTEM MANUFACTURED FROM MARINE GRADE FIBERGLASS, GEL COATED FOR UV PROTECTION.
3. SYSTEM ATTACHED TO THE CATCH BASIN WITH NON-CORROSIVE HARDWARE.
4. FILTER MANUFACTURED OF 100% STAINLESS STEEL.
5. FILTER MADE OF NON-CLOGGING SCREEN WITH 4.7 MM OPENINGS AND MEETS FULL CAPTURE REQUIREMENTS.
6. FILTER CAN BE FITTED WITH HYDROCARBON ABSORBENT BOOM
7. FILTER IS LOCATED DIRECTLY UNDER THE MANHOLE FOR EASY REMOVAL AND MAINTENANCE.
8. LENGTH OF TROUGH CAN VARY FROM 2' TO 30'.
9. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE - CONTACT BIO CLEAN FOR MORE INFORMATION.
10. CONSIDERS A SAFETY FACTOR OF 2.0.
11. BYPASS IS FACILITATED VIA OVERFLOW OF THE TROUGH SYSTEM AND IS EQUAL TO THE CAPACITY OF THE CURB OPENING
12. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.
13. ADDITIONAL TREATMENT AND STORAGE CAPACITY CAN BE ACHIEVED BY UTILIZING MULTIPLE FILTER BASKETS.

MODEL NUMBER	TREATMENT FLOW (cfs)*	SOLIDS STORAGE CAPACITY (cu ft)
BC-CURB-30	2.85	2.21
BC-CURB-24	2.85	1.77
BC-CURB-18	2.85	1.33
BC-CURB-12	2.81	0.88

*SEE PAGE 2 FOR EXPLANATION OF FLOW RATES

DRAWING: BIO CLEAN CURB INLET FILTER DETAILS	MULTI-LEVEL SCREENING
TREATMENT FLOW RATE: 2.85 cfs	MODEL #: BC-CURB-MLS
WARRANTY: 5 YEAR MANUFACTURERS	PROJECT:
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 338 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-433-7640 FAX: 760-433-3176	REVISIONS: DATE:
DATE: 10/12/2017 SCALE: NTS	REVISIONS: DATE:
DRAFTER: M.C.P. UNITS = INCHES	REVISIONS: DATE:

Bio Clean
A Forterra Company

PAGE 1

DEVELOPED CONDITION HYDROMODIFICATION MANAGEMENT EXHIBIT
AUTOZONE

Alidade ENGINEERING
41743 ENTERPRISE CIRCLE NORTH, SUITE 209
TEMECULA, CA 92590
PH: (951) 587-2020
FAX: (951) 587-2626

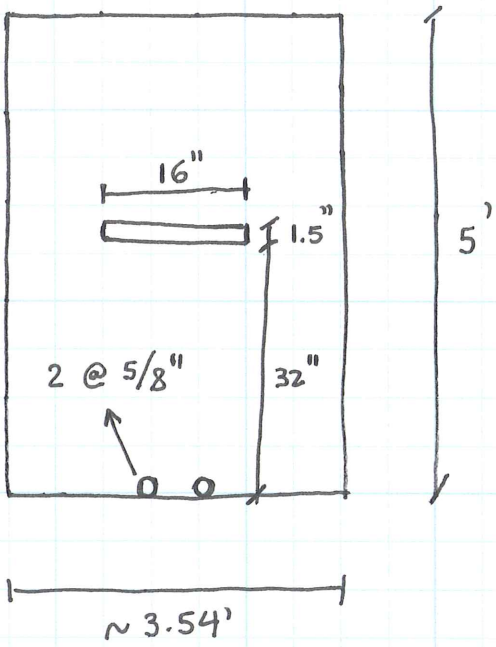
16-202HYDROMOD02.dwg 1-29-19

R·E·C Consultants, Inc.
rec-consultants.com
Civil Engineering / Land Design
Environmental Analysis
Biological Analysis
Water Resources
Land Surveying
GIS Services

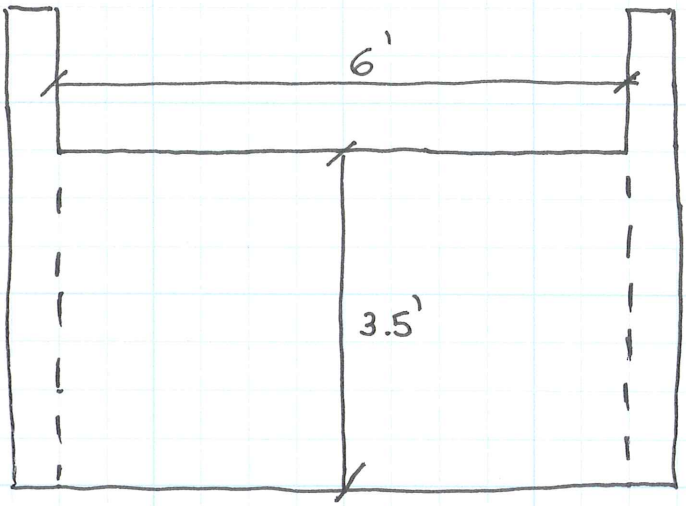
Client: Alidade
Project: Autozone Valley Center
Description:
Prepared By:
Sheet ____ of ____
Date:
Project No:
Checked By:

SECTIONS

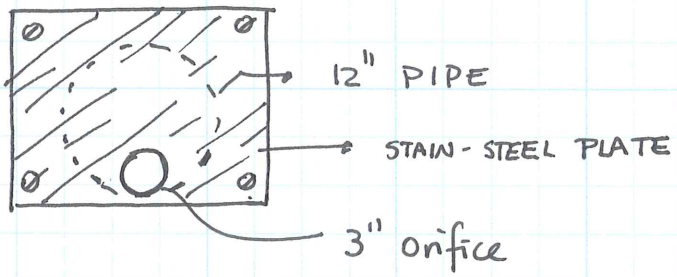
A - A



B - B



C - C



A-A: outlet of UG-1.

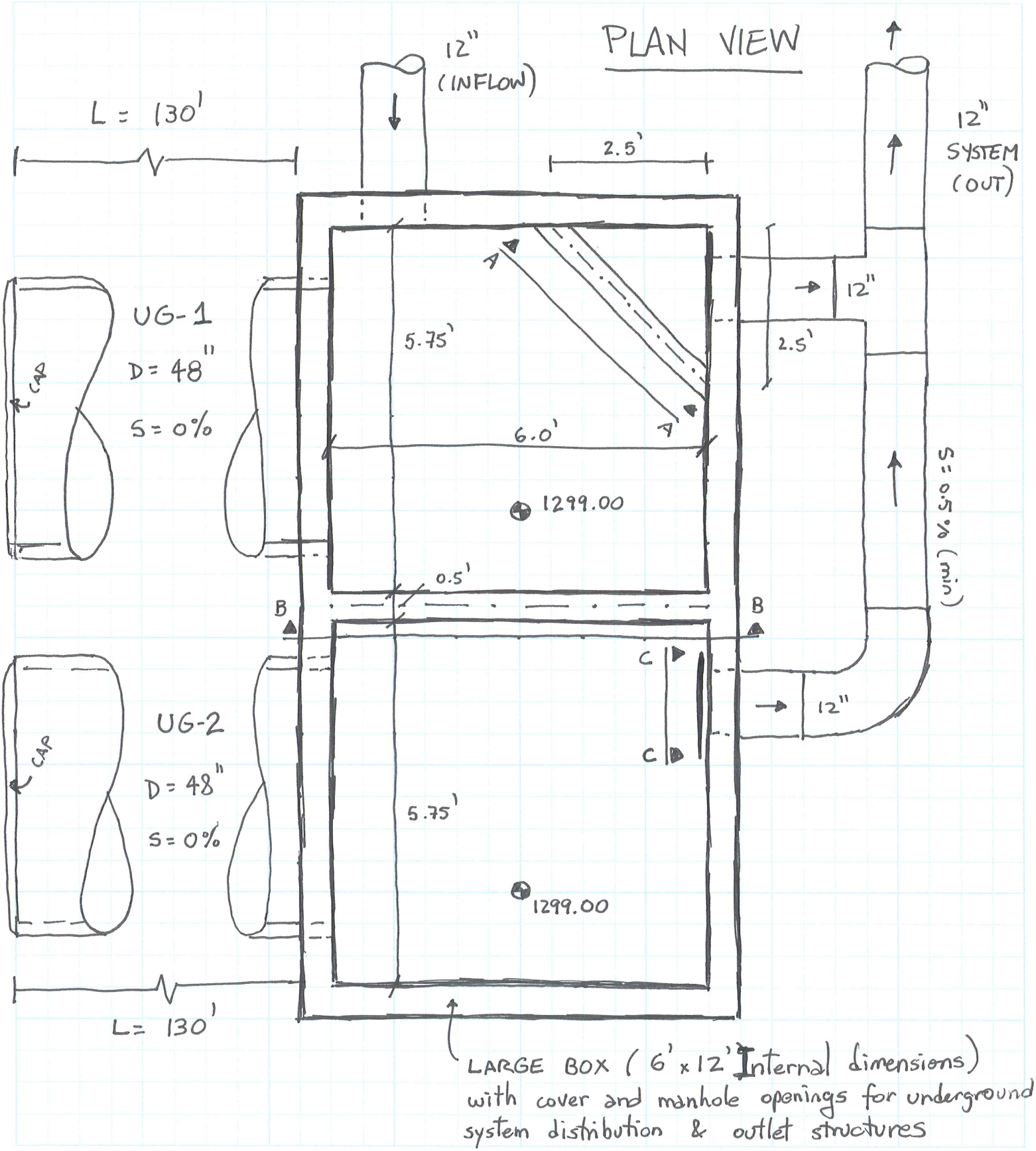
B-B: Overflow from UG-1 to UG-2

C-C: Outlet of UG-2

R·E·C Consultants, Inc.
rec-consultants.com

Civil Engineering / Land Design
Environmental Analysis
Biological Analysis
Water Resources
Land Surveying
GIS Services

Client: Alidade Sheet ____ of ____
Project: Autozone Valley Center Date: ____
Description: ____ Project No: ____
Prepared By: ____ Checked By: ____




Autozone Site
San Onofre
Sandia Creek Rd
Rainbow Camp
Oat Flats
Fallbrook
Pala 3SW
Palomar Observ
Cousen Canyon
Cole Grade Road
Birch Hill
Bonsall
Rincon Springs
La Jolla Amago
Lake Henshaw
Valley Center
Oceanside
Skyline Ranch
Loma Alta
Buena Vista
Deer Springs
Lake Wohlford
Agua Hedionda
Carlsbad
San Marcos CRS
Sutherland Res
Escondido
Harmony Grove
San Marcos
Lake Hodges
El Camino del Norte
Witch Creek FS
Encinitas
Ramona
San Elijo Lagoon
Rancho Bernardo
Barona
Mt Woodson
Solana Beach
SD Country Estates
5
15
15

ATTACHMENT 6

SWMM Input Data in Input Format (Existing & Proposed Models)

PRE_DEV POC-1

```
[TITLE]

[OPTIONS]
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
START_DATE           05/24/1951
START_TIME           00:00:00
REPORT_START_DATE    05/24/1951
REPORT_START_TIME    00:00:00
END_DATE             05/23/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
ALLOW_PONDING        NO
INERTIAL_DAMPING     PARTIAL
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
NORMAL_FLOW_LIMITED  BOTH
SKIP_STEADY_STATE    NO
FORCE_MAIN_EQUATION  H-W
LINK_OFFSETS         DEPTH
MIN_SLOPE            0

[EVAPORATION]
;;Type       Parameters
;;---------- ----------
MONTHLY      0.07   0.10   0.13   0.17   0.19   0.22   0.24   0.22   0.19   0.13   0.09   0.06
DRY_ONLY     NO

[RAINGAGES]
;;               Rain      Time   Snow   Data
;;Name           Type      Intrvl Catch  Source
;;-------------- --------- ------ ------ ----------
Lake_Wholford    INTENSITY 1:00   1.0    TIMESERIES LakeWholford

[SUBCATCHMENTS]
;;                                                 Total    Pcnt.             Pcnt.    Curb     Snow
;;Name           Raingage         Outlet           Area     Imperv   Width    Slope    Length   Pack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- --------
DMA-EXIST        Lake_Wholford    POC-1            0.993    0        197      2.65     0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA-EXIST        0.012      0.05       0.05       0.10       25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    HydCon     IMDmax
;;-------------- ---------- ---------- ----------
DMA-EXIST        6.0        0.075      0.31

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

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
LakeWholford     FILE "P:\Acad\7017 Masson\05 Park Circle\SWMM\L-Wohlf.txt"

[REPORT]
INPUT      NO
```

```
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 2835.000 3985.000 3165.000 4315.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            3000.000           4000.000

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA-EXIST        3000.000           4250.000

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Lake_Wholford    2935.941           4272.294
```

POST_DEV

```
[TITLE]

[OPTIONS]
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
START_DATE           05/24/1951
START_TIME           00:00:00
REPORT_START_DATE    05/24/1951
REPORT_START_TIME    00:00:00
END_DATE             05/23/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
ALLOW_PONDING        NO
INERTIAL_DAMPING     PARTIAL
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
NORMAL_FLOW_LIMITED  BOTH
SKIP_STEADY_STATE    NO
FORCE_MAIN_EQUATION  H-W
LINK_OFFSETS         DEPTH
MIN_SLOPE            0

[EVAPORATION]
;;Type       Parameters
;;---------- ----------
MONTHLY      0.07   0.10   0.13   0.17   0.19   0.22   0.24   0.22   0.19   0.13   0.09   0.06
DRY_ONLY     NO

[RAINGAGES]
;;               Rain      Time   Snow   Data
;;Name           Type      Intrvl Catch  Source
;;-------------- --------- ------ ------ ----------
Lake_Wholford    INTENSITY 1:00   1.0    TIMESERIES LakeWholford

[SUBCATCHMENTS]
;;                                                 Total    Pcnt.             Pcnt.    Curb     Snow
;;Name           Raingage         Outlet           Area     Imperv   Width    Slope    Length   Pack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- --------
DMA_1            Lake_Wholford    LID-1            0.817    79.95    134      1.6      0
LID-1            Lake_Wholford    UG-1             0.025    0        10       0        0
DMA_6            Lake_Wholford    POC-1            0.053    6.59     34       1.6      0
DMA_5            Lake_Wholford    POC-1            0.094    4.87     45       1.6      0
DMAs_2_to_4      Lake_Wholford    POC-1            0.003    37.86    8        1.6      0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA_1            0.012      0.05       0.05       0.10       25         OUTLET
LID-1            0.012      0.05       0.05       0.10       25         OUTLET
DMA_6            0.012      0.05       0.05       0.10       25         OUTLET
DMA_5            0.012      0.05       0.05       0.10       25         OUTLET
DMAs_2_to_4      0.012      0.05       0.05       0.10       25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    HydCon     IMDmax
;;-------------- ---------- ---------- ----------
DMA_1            6.0        0.075      0.31
LID-1            6.0        0.075      0.31
DMA_6            6.0        0.075      0.31
DMA_5            6.0        0.075      0.31
DMAs_2_to_4      6.0        0.075      0.31

[LID_CONTROLS]
```

POST_DEV

```
;;               Type/Layer Parameters
;;-------------- ---------- ----------
LID_1            BC
LID_1            SURFACE    18.80      0.05       0.0        0.0        5
LID_1            SOIL       18         0.4        0.2        0.1        5          5          1.5
LID_1            STORAGE    18         0.67       0.12       0
LID_1            DRAIN      0.4777     0.5        6          6

[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSatur  FromImprv  ToPerv     Report File
;;-------------- ---------------- ------- ---------- ---------- ---------- ---------- ---------- -----------
LID-1            LID_1            1       1089       0          0          100        0

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

[DIVIDERS]
;;               Invert     Diverted         Divider
;;Name           Elev.      Link             Type       Parameters
;;-------------- ---------- ---------------- ---------- ----------
DIV-1            0          BYPASS-1         TABULAR    DIV-1            0          0          0          0

[STORAGE]
;;               Invert   Max.     Init.    Storage    Curve                    Ponded   Evap.
;;Name           Elev.    Depth    Depth    Curve      Params                   Area     Frac.    Infiltration
Parameters
;;-------------- -------- -------- -------- ---------- -------- -------- -------- -------- -------- ----------------
------
UG-1             0        4        0        TABULAR    Under-1                  502      0
UG-2             0        4        0        TABULAR    UG-2                     570      0

[CONDUITS]
;;               Inlet            Outlet                      Manning    Inlet      Outlet     Init.      Max.
;;Name           Node             Node             Length     N          Offset     Offset     Flow       Flow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- ----------
BYPASS-1         DIV-1            UG-2             400        0.01       0          0          0          0
DIV2-POC         DIV-1            POC-1            400        0.01       0          0          0          0

[OUTLETS]
;;               Inlet            Outlet           Outflow    Outlet           Qcoeff/                   Flap
;;Name           Node             Node             Height     Type             QTable           Qexpon    Gate
;;-------------- ---------------- ---------------- ---------- ---------------- ---------------- ---------- ----
OUT_UG-1         UG-1             DIV-1            0          TABULAR/HEAD     Under-disch               NO
OUT_UG-2         UG-2             POC-1            0          TABULAR/DEPTH    Under-disch2              NO

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels
;;-------------- ------------ ---------------- ---------- ---------- ---------- ----------
BYPASS-1         DUMMY        0                0          0          0          1
DIV2-POC         DUMMY        0                0          0          0          1

[LOSSES]
;;Link           Inlet      Outlet     Average    Flap Gate
;;-------------- ---------- ---------- ---------- ----------

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
DIV-1            Diversion  0          0
DIV-1                       0.755      0.000
DIV-1                       1.240      0.447
DIV-1                       2.095      1.266
DIV-1                       3.189      2.325
DIV-1                       4.477      3.580
DIV-1                       5.932      5.003
DIV-1                       7.537      6.576

OUTLET_1         Rating     0.000      0.000
```

OUTLET_1		0.042	0.079
OUTLET_1		0.083	0.224
OUTLET_1		0.125	0.411
OUTLET_1		0.167	0.633
OUTLET_1		0.208	0.884
OUTLET_1		0.250	1.162
OUTLET_1		0.292	1.465
OUTLET_1		0.333	1.676
OUTLET_1		0.375	1.836
OUTLET_1		0.417	1.983
OUTLET_1		0.458	2.120
OUTLET_1		0.500	2.248
OUTLET_1		0.542	2.581
OUTLET_1		0.583	3.082
OUTLET_1		0.625	3.692
OUTLET_1		0.667	4.390
OUTLET_1		0.708	5.162
OUTLET_1		0.750	6.003
OUTLET_1		0.792	6.904
OUTLET_1		0.833	7.863
OUTLET_1		0.875	8.875
OUTLET_1		0.917	9.937
OUTLET_1		0.958	11.047
OUTLET_1		1.000	12.202
Under-disch	Rating	0.000	0.000
Under-disch		0.083	0.005
Under-disch		0.167	0.008
Under-disch		0.250	0.010
Under-disch		0.333	0.012
Under-disch		0.417	0.013
Under-disch		0.500	0.014
Under-disch		0.583	0.016
Under-disch		0.667	0.017
Under-disch		0.750	0.018
Under-disch		0.833	0.019
Under-disch		0.917	0.020
Under-disch		1.000	0.021
Under-disch		1.083	0.021
Under-disch		1.167	0.022
Under-disch		1.250	0.023
Under-disch		1.333	0.024
Under-disch		1.417	0.025
Under-disch		1.500	0.025
Under-disch		1.583	0.026
Under-disch		1.667	0.027
Under-disch		1.750	0.027
Under-disch		1.833	0.028
Under-disch		1.917	0.029
Under-disch		2.000	0.029
Under-disch		2.083	0.030
Under-disch		2.167	0.031
Under-disch		2.250	0.031
Under-disch		2.333	0.032
Under-disch		2.417	0.032
Under-disch		2.500	0.033
Under-disch		2.583	0.033
Under-disch		2.667	0.034
Under-disch		2.750	0.133
Under-disch		2.833	0.298
Under-disch		2.917	0.388
Under-disch		3.000	0.460
Under-disch		3.083	0.522
Under-disch		3.167	0.576
Under-disch		3.250	0.626
Under-disch		3.333	0.672
Under-disch		3.417	0.715
Under-disch		3.500	0.755
Under-disch		3.583	1.240
Under-disch		3.667	2.095
Under-disch		3.750	3.189

```
Under-disch                3.833      4.477
Under-disch                3.917      5.932
Under-disch                4.000      7.537

Under-disch2     Rating    0.000      0.000
Under-disch2               0.083      0.011
Under-disch2               0.167      0.041
Under-disch2               0.250      0.081
Under-disch2               0.333      0.110
Under-disch2               0.417      0.130
Under-disch2               0.500      0.147
Under-disch2               0.583      0.163
Under-disch2               0.667      0.177
Under-disch2               0.750      0.190
Under-disch2               0.833      0.202
Under-disch2               0.917      0.214
Under-disch2               1.000      0.225
Under-disch2               1.083      0.235
Under-disch2               1.167      0.245
Under-disch2               1.250      0.255
Under-disch2               1.333      0.264
Under-disch2               1.417      0.273
Under-disch2               1.500      0.282
Under-disch2               1.583      0.290
Under-disch2               1.667      0.298
Under-disch2               1.750      0.306
Under-disch2               1.833      0.314
Under-disch2               1.917      0.322
Under-disch2               2.000      0.329
Under-disch2               2.083      0.336
Under-disch2               2.167      0.343
Under-disch2               2.250      0.350
Under-disch2               2.333      0.357
Under-disch2               2.417      0.364
Under-disch2               2.500      0.370
Under-disch2               2.583      0.377
Under-disch2               2.667      0.383
Under-disch2               2.750      0.389
Under-disch2               2.833      0.395
Under-disch2               2.917      0.401
Under-disch2               3.000      0.407
Under-disch2               3.083      0.413
Under-disch2               3.167      0.419
Under-disch2               3.250      0.425
Under-disch2               3.333      0.430
Under-disch2               3.417      0.436
Under-disch2               3.500      0.441
Under-disch2               3.583      0.447
Under-disch2               3.667      0.452
Under-disch2               3.750      0.458
Under-disch2               3.833      0.463
Under-disch2               3.917      0.468
Under-disch2               4.000      0.473

BASIN_1          Storage   0          1174
BASIN_1                    1          1261

Under-1          Storage   0.000      70
Under-1                    0.083      172.9
Under-1                    0.167      231.2
Under-1                    0.250      274.1
Under-1                    0.333      310.1
Under-1                    0.417      339.7
Under-1                    0.500      366.5
Under-1                    0.583      389.0
Under-1                    0.667      410.0
Under-1                    0.750      427.8
Under-1                    0.833      444.8
Under-1                    0.917      459.0
Under-1                    1.000      472.7
Under-1                    1.083      484.0
```

Under-1		1.167	495.1
Under-1		1.250	503.9
Under-1		1.333	512.6
Under-1		1.417	519.2
Under-1		1.500	525.8
Under-1		1.583	530.4
Under-1		1.667	535.1
Under-1		1.750	537.7
Under-1		1.833	540.5
Under-1		1.917	541.4
Under-1		2.000	542.3
Under-1		2.083	541.4
Under-1		2.167	540.5
Under-1		2.250	537.7
Under-1		2.333	535.1
Under-1		2.417	530.4
Under-1		2.500	525.8
Under-1		2.583	519.2
Under-1		2.667	512.6
Under-1		2.750	503.9
Under-1		2.833	495.1
Under-1		2.917	484.0
Under-1		3.000	472.7
Under-1		3.083	459.0
Under-1		3.167	444.8
Under-1		3.250	427.8
Under-1		3.333	410.0
Under-1		3.417	389.0
Under-1		3.500	366.5
Under-1		3.583	339.7
Under-1		3.667	310.1
Under-1		3.750	274.1
Under-1		3.833	231.2
Under-1		3.917	172.9
Under-1		4.000	70.0
UG-2	Storage	0.000	72
UG-2		0.083	174.9
UG-2		0.167	233.2
UG-2		0.250	276.1
UG-2		0.333	312.1
UG-2		0.417	341.7
UG-2		0.500	368.5
UG-2		0.583	391.0
UG-2		0.667	412.0
UG-2		0.750	429.8
UG-2		0.833	446.8
UG-2		0.917	461.0
UG-2		1.000	474.7
UG-2		1.083	486.0
UG-2		1.167	497.1
UG-2		1.250	505.9
UG-2		1.333	514.6
UG-2		1.417	521.2
UG-2		1.500	527.8
UG-2		1.583	532.4
UG-2		1.667	537.1
UG-2		1.750	539.7
UG-2		1.833	542.5
UG-2		1.917	543.4
UG-2		2.000	544.3
UG-2		2.083	543.4
UG-2		2.167	542.5
UG-2		2.250	539.7
UG-2		2.333	537.1
UG-2		2.417	532.4
UG-2		2.500	527.8
UG-2		2.583	521.2
UG-2		2.667	514.6
UG-2		2.750	505.9
UG-2		2.833	497.1

```
UG-2                       2.917      486.0
UG-2                       3.000      474.7
UG-2                       3.083      461.0
UG-2                       3.167      446.8
UG-2                       3.250      429.8
UG-2                       3.333      412.0
UG-2                       3.417      391.0
UG-2                       3.500      368.5
UG-2                       3.583      341.7
UG-2                       3.667      312.1
UG-2                       3.750      276.1
UG-2                       3.833      233.2
UG-2                       3.917      174.9
UG-2                       4.000      72.0

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
LakeWholford     FILE "P:\Acad\7017 Masson\05 Park Circle\SWMM\L-Wohlf.txt"

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

[TAGS]

[MAP]
DIMENSIONS 2438.686 4263.194 3787.602 5072.928
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            3000.000           4300.000
DIV-1            3500.000           4300.000
UG-1             3500.000           4600.000
UG-2             3250.000           4450.000

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA_1            3500.000           5000.000
LID-1            3500.000           4800.000
DMA_6            2600.000           4650.000
DMA_5            2600.000           4300.000
DMAs_2_to_4      3000.000           4650.000

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Lake_Wholford    3067.449           4885.839
```

ATTACHMENT 7

EPA SWMM FIGURES AND EXPLANATIONS

Per the attached, the reader can see the screens associated with the EPA-SWMM Model in both pre-development and post-development conditions. Each portion, i.e., sub-catchments, outfalls, storage units, weir as a discharge, and outfalls (point of compliance), are also shown.

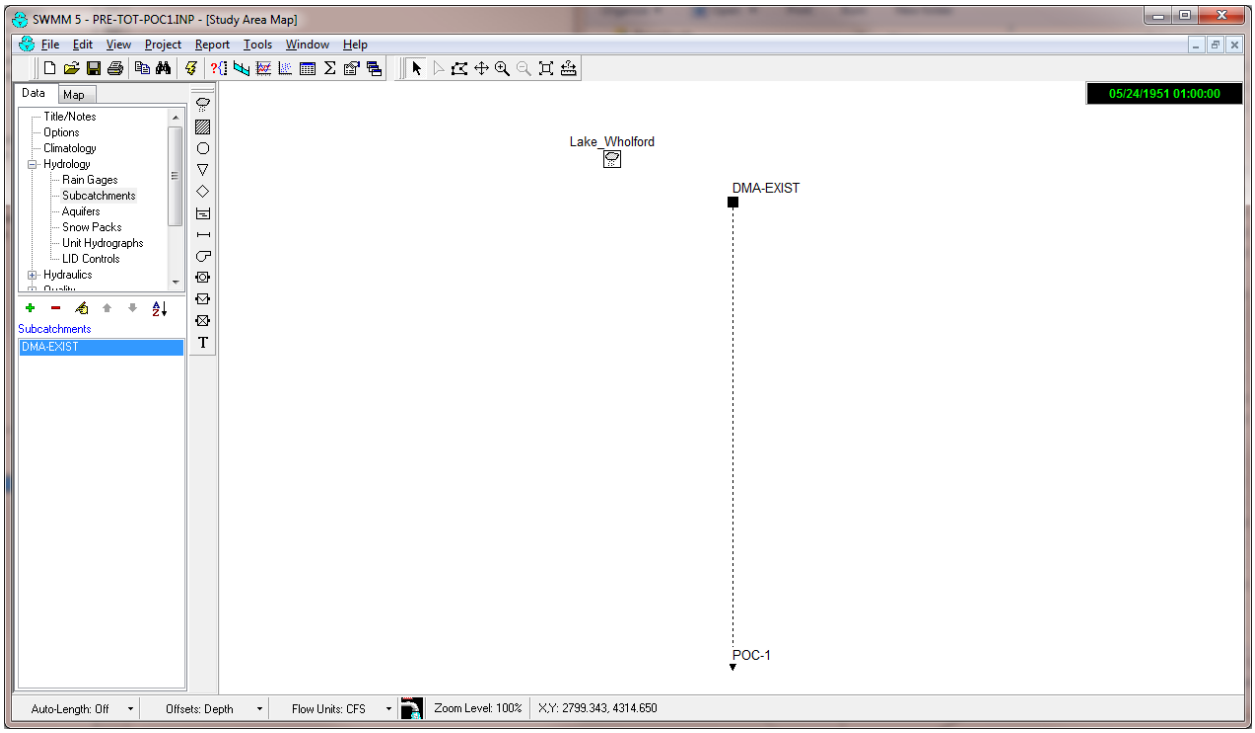
Variables for modeling are associated with typical recommended values by the EPA-SWMM model, typical values found in technical literature (such as Maidment's Handbook of Hydrology). Recommended values for the SWMM model have been attained from the interim Orange County criteria established for their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

Soil characteristics of the existing soils were determined from the NRCS Web Soil Survey Exhibit (located in Attachment 8 of this report).

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

A Technical document prepared by Tory R Walker Engineering for the Cities of San Marcos, Oceanside and Vista (Reference [1]) can also be consulted for additional information regarding typical values for SWMM parameters.

PRE-DEVELOPED CONDITION POC-1



Rain Gage Lake_Wholford

Property	Value
Name	Lake_Wholford
X-Coordinate	2935.941
Y-Coordinate	4272.294
Description	
Tag	
Rain Format	INTENSITY
Time Interval	1:00
Snow Catch Factor	1.0
Data Source	TIMESERIES
TIME SERIES:	
- Series Name	LakeWholford
DATA FILE:	
- File Name	*
- Station ID	*
- Rain Units	IN

User-assigned name of rain gage

Outfall POC-1

Property	Value
Name	POC-1
X-Coordinate	3000.000
Y-Coordinate	4000.000
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Tide Gate	NO
Type	FREE
Fixed Outfall	
Fixed Stage	0
Tidal Outfall	
Curve Name	*
Time Series Outfall	
Series Name	*

User-assigned name of outfall

Subcatchment DMA-EXIST

Property	Value
Name	DMA-EXIST
X-Coordinate	3000.000
Y-Coordinate	4250.000
Description	
Tag	
Rain Gage	Lake_Wholford
Outlet	POC-1
Area	0.993
Width	197
% Slope	2.65
% Imperv	0
N-Imperv	0.012
N-Perv	0.05
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT ...
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

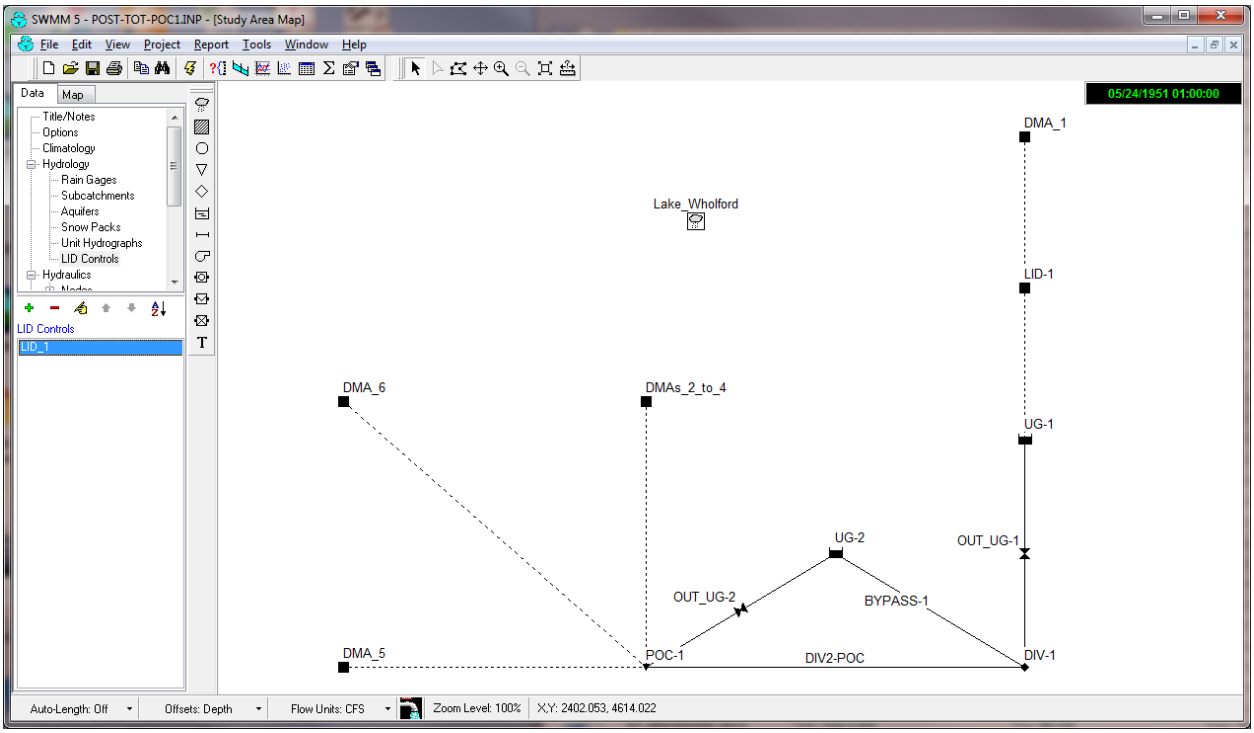
Infiltration parameters (click to edit)

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6.0
Conductivity	0.075
Initial Deficit	0.31

POST-DEVELOPED CONDITION POC-1



Rain Gage Lake_Wholford

Property	Value
Name	Lake_Wholford
X-Coordinate	3067.449
Y-Coordinate	4885.839
Description	
Tag	
Rain Format	INTENSITY
Time Interval	1:00
Snow Catch Factor	1.0
Data Source	TIMESERIES
TIME SERIES:	
- Series Name	LakeWholford
DATA FILE:	
- File Name	*
- Station ID	*
- Rain Units	IN

User-assigned name of rain gage

Outfall POC-1

Property	Value
Name	POC-1
X-Coordinate	3000.000
Y-Coordinate	4300.000
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Tide Gate	NO
Type	FREE
Fixed Outfall	
Fixed Stage	0
Tidal Outfall	
Curve Name	*
Time Series Outfall	
Series Name	*

User-assigned name of outfall

Subcatchment DMA_1

Property	Value
Name	DMA_1
X-Coordinate	3500.000
Y-Coordinate	5000.000
Description	
Tag	
Rain Gage	Lake_Wholford
Outlet	LID-1
Area	0.817
Width	134
% Slope	1.6
% Imperv	79.95
N-Imperv	0.012
N-Perv	0.05
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

User-assigned name of subcatchment

Subcatchment LID-1

Property	Value
Name	LID-1
X-Coordinate	3500.000
Y-Coordinate	4800.000
Description	
Tag	
Rain Gage	Lake_Wholford
Outlet	UG-1
Area	0.025
Width	10
% Slope	0
% Imperv	0
N-Imperv	0.012
N-Perv	0.05
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT ...
Groundwater	NO
Snow Pack	
LID Controls	1
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration parameters (click to edit)

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6.0
Conductivity	0.075
Initial Deficit	0.31

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6.0
Conductivity	0.075
Initial Deficit	0.31

Subcatchment DMAs_2_to_4

Property	Value
Name	DMAs_2_to_4
X-Coordinate	3000.000
Y-Coordinate	4650.000
Description	
Tag	
Rain Gage	Lake_Wholford
Outlet	POC-1
Area	0.003
Width	8
% Slope	1.6
% Imperv	37.86
N-Imperv	0.012
N-Perv	0.05
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT ...
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration parameters (click to edit)

Subcatchment DMA_5

Property	Value
Name	DMA_5
X-Coordinate	2600.000
Y-Coordinate	4300.000
Description	
Tag	
Rain Gage	Lake_Wholford
Outlet	POC-1
Area	0.094
Width	45
% Slope	1.6
% Imperv	4.87
N-Imperv	0.012
N-Perv	0.05
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT ...
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration parameters (click to edit)

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6.0
Conductivity	0.075
Initial Deficit	0.31

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6.0
Conductivity	0.075
Initial Deficit	0.31

Subcatchment DMA_6

Property	Value
Name	DMA_6
X-Coordinate	2600.000
Y-Coordinate	4650.000
Description	
Tag	
Rain Gage	Lake_Wholford
Outlet	POC-1
Area	0.053
Width	34
% Slope	1.6
% Imperv	6.59
N-Imperv	0.012
N-Perv	0.05
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT ...
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration parameters (click to edit)

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6.0
Conductivity	0.075
Initial Deficit	0.31

EXPLANATION OF SELECTED VARIABLES

Sub Catchment Areas:

Please refer to the attached diagrams that indicate the DMA and Bio-Filtration BMP (BMP) sub areas modeled within the project site at both the pre and post developed conditions draining to the POC.

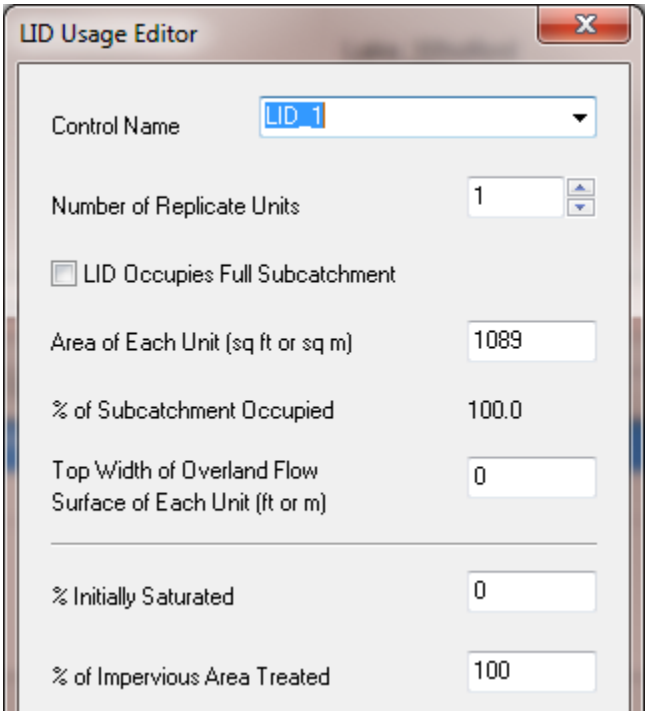
Parameters for the pre -developed models include soil Types C as determined from the site specific Natural Resources Conservation Service (NRCS) We Soil Survey (attached at the end of this appendix) and site specific infiltration results which are representative of Type C soils. Suction head, conductivity and initial deficit corresponds to average values expected for these soils types, according to sources consulted, professional experience, and approximate values obtained by the interim Orange County modeling approach.

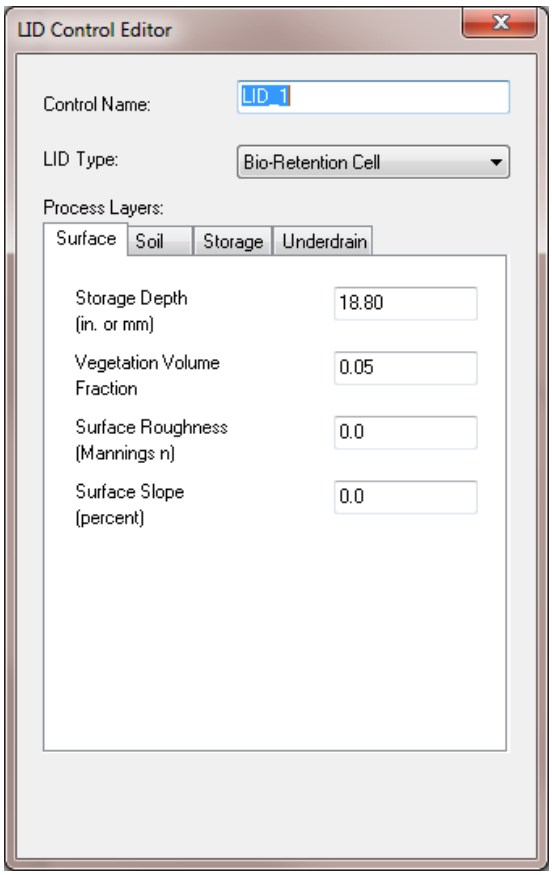
REC selected infiltration values, such that the percentage of total precipitation that becomes runoff, is realistic for the soil types and slightly smaller than measured values for Southern California watersheds.

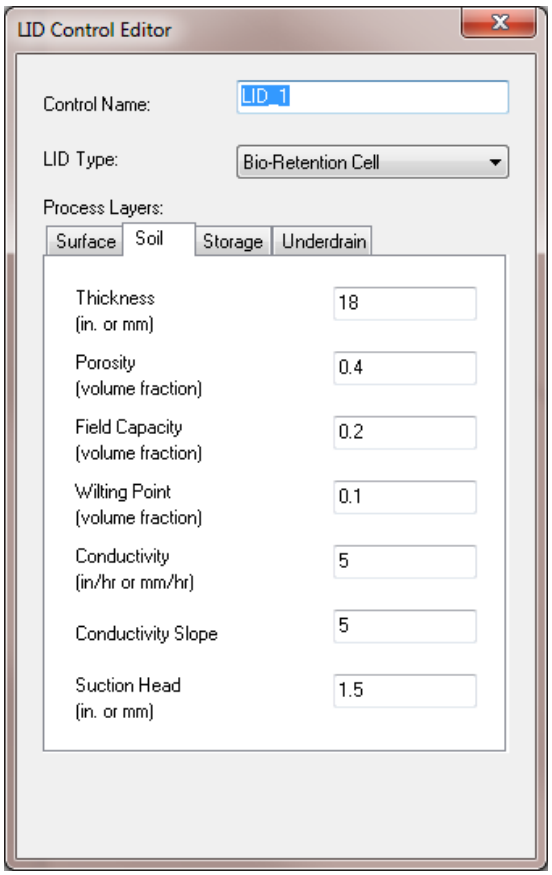
Selection of a Kinematic Approach: As the continuous model is based on hourly rainfall, and the time of concentration for the pre-development and post-development conditions is significantly smaller than 60 minutes, precise routing of the flows through the impervious surfaces, the underdrain pipe system,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

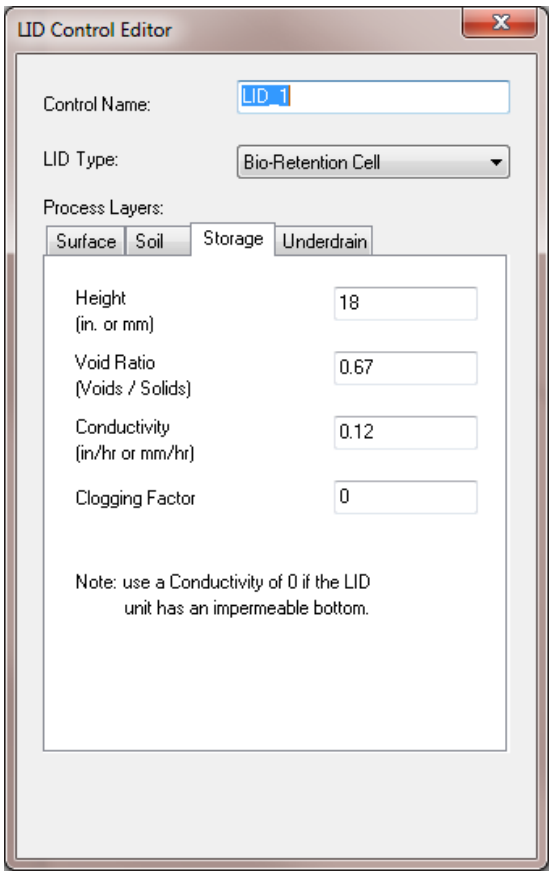
Sub-catchment BMP:

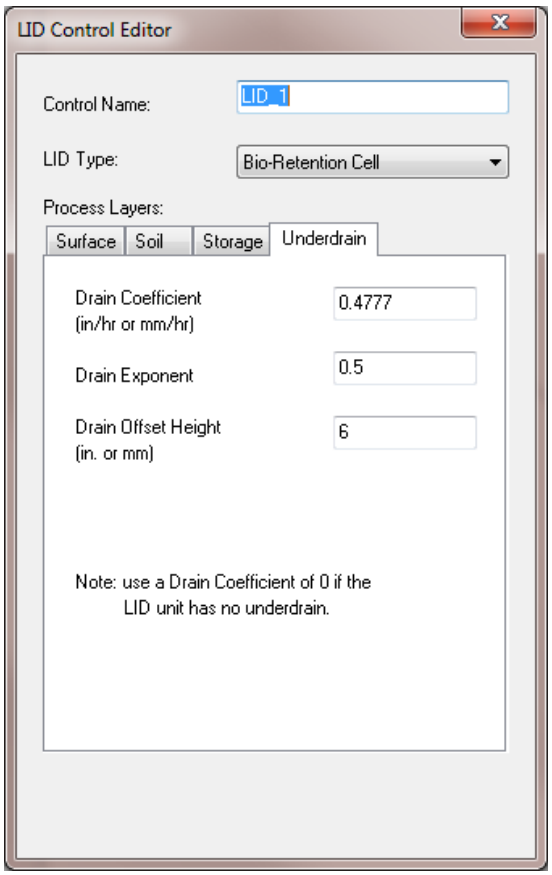
The area of bio-filtration must be equal to the area of the development tributary to the bioretention facility (area that drains into the biofiltration, equal external area plus bio-filtration itself). Five (5) decimal places were given regarding the areas of the bio-filtration to insure that the area used by the program for the LID subroutine corresponds exactly with this tributary.




LID Control Editor
Control Name:
LID_1
LID Type:
Bio-Retention Cell
Process Layers:
Surface
Soil
Storage
Underdrain
Storage Depth
(in. or mm)
18.80
Vegetation Volume
Fraction
0.05
Surface Roughness
(Mannings n)
0.0
Surface Slope
(percent)
0.0


LID Control Editor
Control Name:
LID_1
LID Type:
Bio-Retention Cell
Process Layers:
Surface
Soil
Storage
Underdrain
Thickness
(in. or mm)
18
Porosity
(volume fraction)
0.4
Field Capacity
(volume fraction)
0.2
Wilting Point
(volume fraction)
0.1
Conductivity
(in/hr or mm/hr)
5
Conductivity Slope
5
Suction Head
(in. or mm)
1.5


LID Control Editor
Control Name:
LID_1
LID Type:
Bio-Retention Cell
Process Layers:
Surface
Soil
Storage
Underdrain
Height
(in. or mm)
18
Void Ratio
(Voids / Solids)
0.67
Conductivity
(in/hr or mm/hr)
0.12
Clogging Factor
0
Note: use a Conductivity of 0 if the LID
unit has an impermeable bottom.


LID Control Editor
Control Name:
LID_1
LID Type:
Bio-Retention Cell
Process Layers:
Surface
Soil
Storage
Underdrain
Drain Coefficient
(in/hr or mm/hr)
0.4777
Drain Exponent
0.5
Drain Offset Height
(in. or mm)
6
Note: use a Drain Coefficient of 0 if the
LID unit has no underdrain.

LID Control Editor: Explanation of Significant Variables

Storage Depth:

The storage depth variable within the SWMM model is representative of the storage volume provided beneath the surface riser outlet and the engineered soil and mulch components of the bioretention facility.

In those cases where the surface storage has a variable area that is also different to the area of the gravel and amended soil, the SWMM model needs to be calibrated as the LID module will use the storage depth multiplied by the BMP area as the amount of volume stored at the surface.

Let A_{BMP} be the area of the BMP (area of amended soil and area of gravel). The proper value of the storage depth S_D to be included in the LID module can be calculated by using geometric properties of the surface volume. Let A_0 be the surface area at the bottom of the surface pond, and let A_i be the surface area at the elevation of the invert of the first row of orifices (or at the invert of the riser if not surface orifices are included). Finally, let h_i be the difference in elevation between A_0 and A_i. By volumetric definition:

$$A_{BMP} \cdot S_D = \frac{(A_0 + A_i)}{2} h_i \qquad (1)$$

Equation (1) allows the determination of S_D to be included as Storage Depth in the LID module.

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

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

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

Conductivity: The conductivity value was set as 0.12 to account for the infiltration value into the underlying soil per the geotechnical report.

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

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

$$q = C(H - H_D)^n \quad (2)$$

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

The general orifice equation can be expressed as:

$$Q = \frac{\pi}{4} c_g \frac{D^2}{144} \sqrt{2g \frac{(H - H_D)}{12}} \quad (3)$$

where Q is the peak flow in cfs, D is the diameter in inches, c_g is the typical discharge coefficient for orifices (0.61-0.63 for thin walls and around 0.75-0.8 for thick walls), g is the acceleration of gravity in ft/s^2, and H and H_D are defined above and are also used in inches in Equation (3).

It is clear that:

$$q \left(\frac{in}{hr}\right) X \frac{A_{BMP}}{12 \, X \, 3600} = Q \, (cfs) \quad (4)$$

Cut-Off Flow: Q (cfs) and q (in/hr) are also the cutoff flow. For numerical reasons to insure the LID is full, the model uses cut-off = 1.01 Q.

Storage and Discharge Curves

Storage Unit UG-1

Property	Value
Name	UG-1
X-Coordinate	3500.000
Y-Coordinate	4600.000
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Max. Depth	4
Initial Depth	0
Ponded Area	502
Evap. Factor	0
Infiltration	NO
Storage Curve	TABULAR
Functional Curve	
Coefficient	1000
Exponent	0
Constant	0
Tabular Curve	
Curve Name	Under-1

User-assigned name of storage unit

Outlet OUT_UG-1

Property	Value
Name	OUT_UG-1
Inlet Node	UG-1
Outlet Node	DIV-1
Description	
Tag	
Inlet Offset	0
Flap Gate	NO
Rating Curve	TABULAR/HEAD
Functional Curve	
Coefficient	10.0
Exponent	0.5
Tabular Curve	
Curve Name	Under-disch

User-assigned name of outlet

Storage Curve Editor

Curve Name: Under-1

Description:

	Depth (ft)	Area (ft2)
1	0.000	70
2	0.083	172.9
3	0.167	231.2
4	0.250	274.1
5	0.333	310.1
6	0.417	339.7
7	0.500	366.5
8	0.583	389.0
9	0.667	410.0

Rating Curve Editor

Curve Name: Under-disch

Description:

	Head (ft)	Outflow (CFS)
1	0.000	0.000
2	0.083	0.005
3	0.167	0.008
4	0.250	0.010
5	0.333	0.012
6	0.417	0.013
7	0.500	0.014
8	0.583	0.016
9	0.667	0.017

Storage Unit UG-2

Property	Value
Name	UG-2
X-Coordinate	3250.000
Y-Coordinate	4450.000
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Max. Depth	4
Initial Depth	0
Ponded Area	570
Evap. Factor	0
Infiltration	NO ...
Storage Curve	TABULAR
Functional Curve	
Coefficient	1000
Exponent	0
Constant	0
Tabular Curve	
Curve Name	UG-2

Click to specify infiltration through the bottom of the storage unit

Outlet OUT_UG-2

Property	Value
Name	OUT_UG-2
Inlet Node	UG-2
Outlet Node	POC-1
Description	
Tag	
Inlet Offset	0
Flap Gate	NO
Rating Curve	TABULAR/DEPTH
Functional Curve	
Coefficient	10.0
Exponent	0.5
Tabular Curve	
Curve Name	Under-disch2

Name of rating curve that relates outflow to either depth or head (after specifing a curve, you can

Storage Curve Editor

Curve Name: UG-2

Description:

	Depth (ft)	Area (ft2)
1	0.000	72
2	0.083	174.9
3	0.167	233.2
4	0.250	276.1
5	0.333	312.1
6	0.417	341.7
7	0.500	368.5
8	0.583	391.0
9	0.667	412.0

Rating Curve Editor

Curve Name: Under-disch2

Description:

	Head (ft)	Outflow (CFS)
1	0.000	0.000
2	0.083	0.011
3	0.167	0.041
4	0.250	0.081
5	0.333	0.110
6	0.417	0.130
7	0.500	0.147
8	0.583	0.163
9	0.667	0.177

Divider DIV-1

Property	Value
Name	DIV-1
X-Coordinate	3500.000
Y-Coordinate	4300.000
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Max. Depth	0
Initial Depth	0
Surcharge Depth	0
Ponded Area	0
Diverted Link	BYPASS-1
Type	TABULAR
Cutoff Divider	
Cutoff Flow	0
Tabular Divider	
Curve Name	DIV-1
Weir Divider	
Min. Flow	0
Max. Depth	0
Coefficient	0

Name of link which receives the diverted flow

Diversion Curve Editor

Curve Name

DIV-1

Description

	Inflow (CFS)	Outflow (CFS)
1	0	0
2	0.755	0.000
3	1.240	0.447
4	2.095	1.266
5	3.189	2.325
6	4.477	3.580
7	5.932	5.003
8	7.537	6.576
9		

Overland Flow Manning's Coefficient per TRWE (Reference [6])

appeal of a de facto value, we anticipate that jurisdictions will not be inclined to approve land surfaces other than short prairie grass. Therefore, in order to provide SWMM users with a wider range of land surfaces suitable for local application and to provide Copermittees with confidence in the design parameters, we recommend using the values published by Yen and Chow in Table 3-5 of the EPA SWMM Reference Manual Volume I – Hydrology.

SWMM-Endorsed Values Will Improve Model Quality

In January 2016, the EPA released the SWMM Reference Manual Volume I – Hydrology (SWMM Hydrology Reference Manual). The SWMM Hydrology Reference Manual complements the SWMM 5 User's Manual and SWMM 5 Applications Manual by providing an in-depth description of the program's hydrologic components (EPA 2016). Table 3-5 of the SWMM Hydrology Reference Manual expounds upon SWMM 5 User's Manual Table A.6 by providing Manning's *n* values for additional overland flow surfaces[3]. The values are provided in Table 1:

Table 1: Manning's *n* Values for Overland Flow (EPA, 2016; Yen 2001; Yen and Chow, 1983).

Overland Surface	Light Rain (< 0.8 in/hr)	Moderate Rain (0.8-1.2 in/hr)	Heavy Rain (> 1.2 in/hr)
Smooth asphalt pavement	0.010	0.012	0.015
Smooth impervious surface	0.011	0.013	0.015
Tar and sand pavement	0.012	0.014	0.016
Concrete pavement	0.014	0.017	0.020
Rough impervious surface	0.015	0.019	0.023
Smooth bare packed soil	0.017	0.021	0.025
Moderate bare packed soil	0.025	0.030	0.035
Rough bare packed soil	0.032	0.038	0.045
Gravel soil	0.025	0.032	0.045
Mowed poor grass	0.030	0.038	0.045
Average grass, closely clipped sod	0.040	0.050	0.060
Pasture	0.040	0.055	0.070
Timberland	0.060	0.090	0.120
Dense grass	0.060	0.090	0.120
Shrubs and bushes	0.080	0.120	0.180
Land Use			
Business	0.014	0.022	0.035
Semibusiness	0.022	0.035	0.050
Industrial	0.020	0.035	0.050
Dense residential	0.025	0.040	0.060
Suburban residential	0.030	0.055	0.080
Parks and lawns	0.040	0.075	0.120

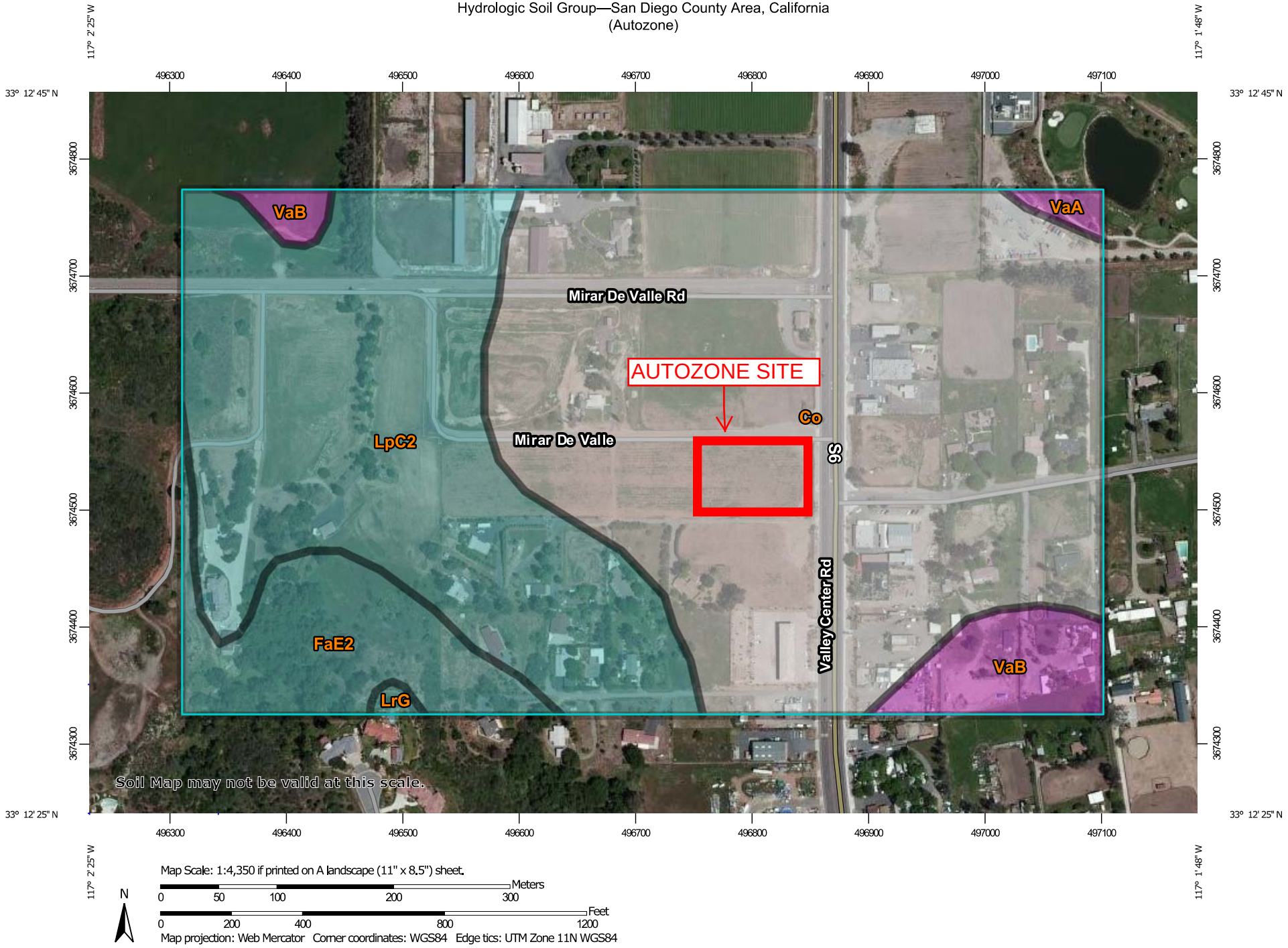
For purposes of local hydromodification management BMP design, these Manning's *n* values are an improvement upon the values presented by Engman (1986) in SWMM 5 User's Manual Table A.6. Values from SWMM 5 User's Manual Table A.6, while completely suitable for the intended application to certain agricultural land covers, comes with the disclaimer that the provided Manning's *n* values are valid for shallow-depth overland flow that match the conditions in the experimental plots (Engman,

[3] Further discussion is provided on page 6 under "Discussion of Differences Between Manning's *n* Values"

ATTACHMENT 8

Soils Maps

Hydrologic Soil Group—San Diego County Area, California
(Autozone)



Map Scale: 1:4,350 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

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 Diego County Area, California
Survey Area Data: Version 10, Sep 12, 2016

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

Date(s) aerial images were photographed: Data not available.

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.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — San Diego County Area, California (CA638)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
Co	Clayey alluvial land		47.8	54.2%
FaE2	Fallbrook sandy loam, 15 to 30 percent slopes, eroded	C	7.4	8.4%
LpC2	Las Posas fine sandy loam, 5 to 9 percent slopes, erode d	C	28.0	31.8%
LrG	Las Posas stony fine sandy loam, 30 to 65 percent slope s	C	0.2	0.3%
VaA	Visalia sandy loam, 0 to 2 percent slopes	A	0.5	0.6%
VaB	Visalia sandy loam, 2 to 5 percent slopes	A	4.2	4.7%
Totals for Area of Interest			**88.1**	**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

ATTACHMENT 9

Summary Files from the SWMM Model

PRE_DEV POC-1

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)
--------------------------------------------------------------


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

***************
Analysis Options
***************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Starting Date ............ MAY-24-1951 00:00:00
Ending Date .............. MAY-23-2008 23:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00


*************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
*************************     ---------       -------
Total Precipitation ......        80.838       976.900
Evaporation Loss .........         1.442        17.426
Infiltration Loss ........        71.990       869.970
Surface Runoff ...........         8.169        98.722
Final Surface Storage ....         0.000         0.000
Continuity Error (%) .....        -0.944


*************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         8.169         2.662
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         8.169         2.662
Internal Outflow .........         0.000         0.000
Storage Losses ...........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


**************************
Subcatchment Runoff Summary
**************************

-----------------------------------------------------------------------------------------------------------
                         Total      Total      Total      Total      Total       Total     Peak  Runoff
                        Precip      Runon       Evap      Infil     Runoff      Runoff   Runoff   Coeff
Subcatchment               in         in         in         in         in    10^6 gal      CFS
-----------------------------------------------------------------------------------------------------------
DMA-EXIST              976.90       0.00      17.43     869.97      98.72        2.66     1.15   0.101


Analysis begun on:  Fri Mar 30 12:20:50 2018
Analysis ended on:  Fri Mar 30 12:21:07 2018
Total elapsed time: 00:00:17
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)
--------------------------------------------------------------


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

***************
Analysis Options
***************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ MAY-24-1951 00:00:00
Ending Date .............. MAY-23-2008 23:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00
Routing Time Step ........ 60.00 sec


WARNING 04: minimum elevation drop used for Conduit BYPASS-1

WARNING 04: minimum elevation drop used for Conduit DIV2-POC

*************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
*************************     ---------       -------
Total Precipitation ......        80.757       976.900
Evaporation Loss .........        10.464       126.584
Infiltration Loss ........        31.363       379.390
Surface Runoff ...........        39.577       478.750
Final Surface Storage ....         0.000         0.000
Continuity Error (%) .....        -0.801


*************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......        39.575        12.896
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........        39.571        12.895
Internal Outflow .........         0.000         0.000
Storage Losses ...........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.011


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


************************
Routing Time Step Summary
************************
Minimum Time Step           :    60.00 sec
Average Time Step           :    60.00 sec
Maximum Time Step           :    60.00 sec
Percent in Steady State     :     0.00
```

Average Iterations per Step : 1.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
DMA_1	976.90	0.00	115.66	173.55	698.24	15.49	1.06	0.715
LID-1	976.90	22818.55	1126.87	4502.60	18098.91	12.29	0.98	0.761
DMA_6	976.90	0.00	19.90	808.93	153.96	0.22	0.06	0.158
DMA_5	976.90	0.00	17.90	824.69	139.36	0.36	0.11	0.143
DMAs_2_to_4	976.90	0.00	57.14	536.18	395.89	0.03	0.00	0.405

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow in	Evap Loss in	Infil Loss in	Surface Outflow in	Drain Outflow in	Init. Storage in	Final Storage in	Pcnt. Error
LID-1	LID_1	23795.45	1126.91	4502.76	1999.14	16100.43	0.00	0.00	0.28

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min
POC-1	OUTFALL	0.00	0.00	0.00	0 00:00
DIV-1	DIVIDER	0.00	0.00	0.00	0 00:00
UG-1	STORAGE	0.05	3.40	3.40	4280 07:21
UG-2	STORAGE	0.00	0.00	0.00	0 00:00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal
POC-1	OUTFALL	0.18	0.72	4280 07:20	0.610	12.894
DIV-1	DIVIDER	0.00	0.71	4280 07:21	0.000	12.284
UG-1	STORAGE	0.98	0.98	15229 17:15	12.286	12.286
UG-2	STORAGE	0.00	0.00	0 00:00	0.000	0.000

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
DIV-1	DIVIDER	499679.02	0.000	0.000

UG-1	STORAGE	499679.02	3.404	0.596
UG-2	STORAGE	499679.02	0.000	4.000

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	E&I Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
UG-1	0.018	1	0	1.558	90	4280 07:20	0.71
UG-2	0.000	0	0	0.000	0	0 00:00	0.00

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow CFS	Max. Flow CFS	Total Volume 10^6 gal
POC-1	4.32	0.02	0.72	12.894
System	4.32	0.02	0.72	12.894

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
BYPASS-1	DUMMY	0.00	0 00:00			
DIV2-POC	DUMMY	0.71	4280 07:21			
OUT_UG-1	DUMMY	0.71	4280 07:21			
OUT_UG-2	DUMMY	0.00	0 00:00			

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
BYPASS-1	0.01	0.01	0.01	499679.02	0.01
DIV2-POC	0.01	0.01	0.01	499679.02	0.01

Analysis begun on: Fri Mar 30 12:24:20 2018
Analysis ended on: Fri Mar 30 12:24:53 2018
Total elapsed time: 00:00:33

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
☒ 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)

OLD MIRAR DE VALLE ROAD

POINT OF COMPLIANCE

RIM=1304.18
IE=1298.30

IE=1298.5

1302.8

LEGEND:

DMA1 — DMA BASIN IDENTIFICATION

→ → → FLOW DIRECTION

UNDERLYING HYDROLOGIC SOIL GROUP:
SOIL GROUP 'C'

HISTORIC DEPTH TO GROUND WATER:
10.1 FEET BELOW EXISTING GROUND

DMA1

VALLEY CENTER ROAD

SCALE: 1" = 10'

0 5 10 20 30

GRAPHICAL SCALE

EXISTING CONDITION
HYDROMODIFICATION MANAGMENT EXHIBIT
AUTOZONE

Alidade ENGINEERING
41743 ENTERPRISE CIRCLE NORTH, SUITE 209
TEMECULA, CA 92590
PH: (951) 587-2020
FAX: (951) 587-2626

16-202\HYDRO\MODEXT.dwg 03-29-18

OLD MIRAR DE VALLE ROAD

LEGEND:

DMA1	DMA BASIN IDENTIFICATION
BA1	BIOFILTRATION AREA
	PERVIOUS AREA
	BIOFILTRATION BASIN
	IMPERVIOUS AREA
	BASIN BOUNDARY
	DRAINAGE MANAGEMENT AREA BOUNDARY (DMA)
INLET	STORM WATER STENCILING "NO DUMPING, DRAINS TO MOOSA CREEK" OR SIMILAR
UG1	UNDERGROUND STORAGE
→ → →	FLOW DIRECTION

UNDERLYING HYDROLOGIC SOIL GROUP:
SOIL GROUP 'C'

HISTORIC DEPTH TO GROUND WATER:
10.1 FEET BELOW EXISTING GROUND

CRITICAL COARSE SEDIMENT YIELD AREAS:
NONE ONSITE

OFFSITE COARSE SEDIMENT YIELD AREAS –
NONE TRIBUTARY TO THE PROJECT LIMITS

POINT OF COMPLIANCE

FLOW CONTROL STRUCTURE

16'-4" 1,037 SF BA1

VALLEY CENTER ROAD

SCALE: 1" = 10'

0 5 10 20 30

GRAPHICAL SCALE

DEVELOPED CONDITION
HYDROMODIFICATION MANAGEMENT EXHIBIT
AUTOZONE

Alidade ENGINEERING
41743 ENTERPRISE CIRCLE NORTH, SUITE 209
TEMECULA, CA 92590
PH: (951) 587-2020
FAX: (951) 587-2626

16-222HYDROMOD.dwg 01-29-19

	DMA AREA (FT^2)	POST-PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA X RUNOFF FACTOR	SOIL TYPE	IMP NAME
DMA1	27,144*	IMPERVIOUS	0.9	24,429.6	C	BA1
	1,294**	IMPERVIOUS	0.9	1,164.6		
	8,694	LANDSCAPING	0.1	869.4	IMP SIZING FACTOR	MINIMUM AREA OR VOLUME	PROPOSED AREA OR VOLUME	(FT^2)
			TOTAL	26,463.6	0.03	794	1,037	IMP. AREA

*INCLUDES 55 SF OF IMPERVIOUS AREA FROM TRACTOR SUPPLY SITE
**ONSITE IMPERVIOUS AREA THAT WAS CONSTRUCTED WITH THE ADJACENT TRACTOR SUPPLY PROJECT.

	DMA AREA (FT^2)	POST-PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA X RUNOFF FACTOR	SOIL TYPE	
DMA2	50	IMPERVIOUS	0.9	45.0	C	
			TOTAL	45.0	DE MINIMIS AREA	

SHEET FLOWS TO ADJACENT PROPERTY TO THE SOUTH (TRACTOR SUPPLY SITE)

	DMA AREA (FT^2)	POST-PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA X RUNOFF FACTOR	SOIL TYPE	
DMA3	3	IMPERVIOUS	0.9	2.7	C	
			TOTAL	2.7	DE MINIMIS AREA	

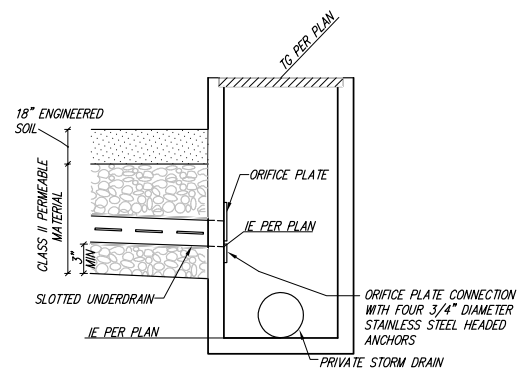
SHEET FLOWS TO ADJACENT PROPERTY TO THE SOUTH (TRACTOR SUPPLY SITE)

	DMA AREA (FT^2)	POST-PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA X RUNOFF FACTOR	SOIL TYPE	
DMA4	172	IMPERVIOUS	0.9	154.8	C	
	3,431	LANDSCAPING	0.1	343.1		
			TOTAL	497.9	SELF-MITIGATING	

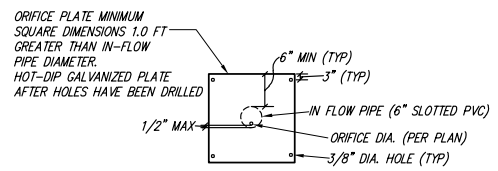
SHEET FLOWS TO VALLEY CENTER ROAD

	DMA AREA (FT^2)	POST-PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA X RUNOFF FACTOR	SOIL TYPE	
DMA5	151	IMPERVIOUS	0.9	135.9	C	
	3,901	LANDSCAPING	0.1	390.1		
			TOTAL	526.0	SELF-MITIGATING	

SHEET FLOWS TO OLD MIRAR DE VALLE ROAD

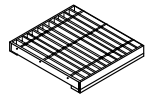


SECTION BIORETENTION CATCH BASIN
NOT TO SCALE

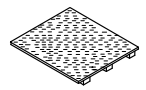


DETAIL: FLOW CONTROL ORIFICE PLATE (PVT)
NOT TO SCALE

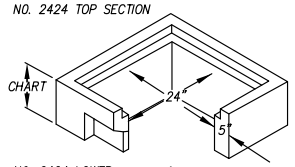
NO. 2424 STEEL TRAFFIC GRATE MAX. 1/2" SPACING WT 103# TRAF.



NO. 2424 STEEL TRAFFIC COVER WT. 114#

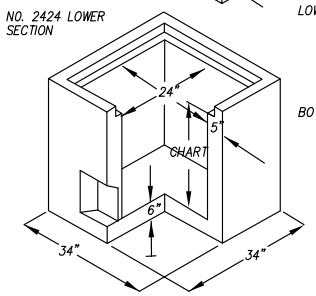


NO. 2424 TOP SECTION



TOP SECTION	HT.	LBS	AVAILABLE
2424 T6	6"	270	NO K.O.
2424 T12	12"	495	(4) 6" X 11"
2424 T18	18"	745	(4) 9" X 12"
2424 T24	24"	870	(4) 14" X 14"

NO. 2424 LOWER SECTION



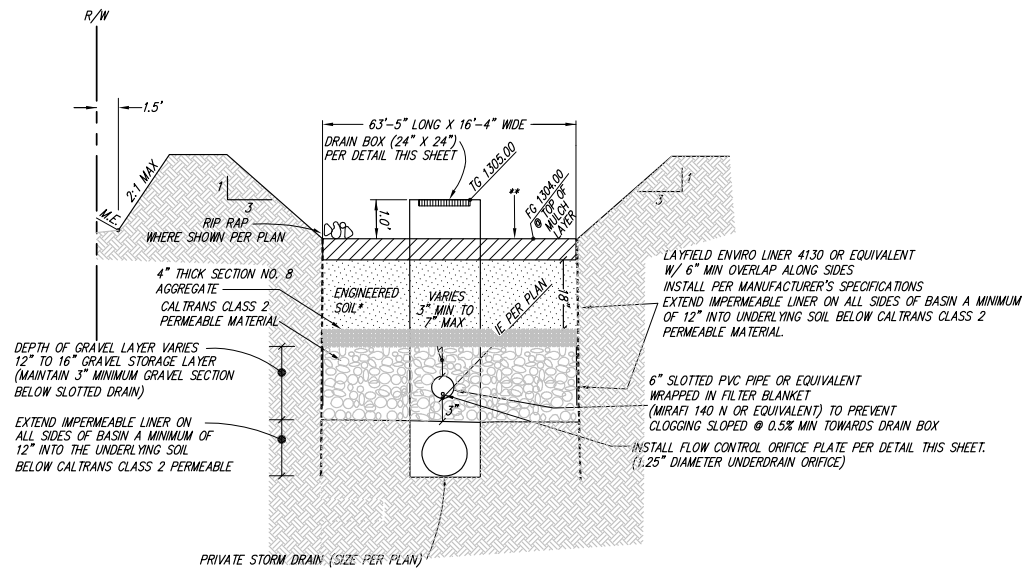
LOWER	HT.	LBS	AVAILABLE
2424 L12	12"	495	(4) 6" X 11"
2424 L18	18"	745	(4) 9" X 12"
2424 L24	24"	870	(4) 14" X 14"

BOTTOM	HT.	LBS	AVAILABLE
2424 B30	30"	1595	(4) 18" X 18"
2424 B36	36"	1905	(4) 18" X 18"

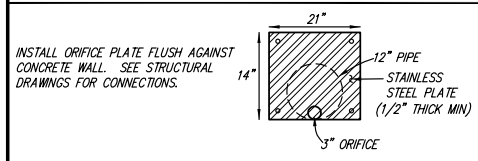
24" X 24" BROOKS BOX CATCH BASIN (PVT)
(OR EQUIVALENT)
NOT TO SCALE

*ENGINEERED SOIL: 75% - 80% SAND, 10% MAX SILT, 3% MAX CLAY AND 9% MAX COMPOST. COMPOST SHOULD COMPOSE NO MORE THAN 5% BULK WEIGHT OF THE ENGINEERED SOIL PER THE COUNTY OF SAN DIEGO LOW IMPACT DESIGN MANUAL, APPENDIX G.

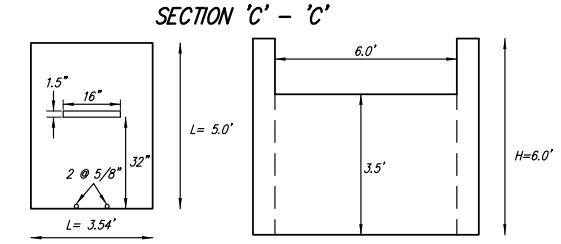
**INSTALL 3" DEPTH SECTION OF WELL-AGED, SHREDDED HARDWOOD MULCH THAT HAS BEEN STOCKPILED OR STORED FOR AT LEAST 12 MONTHS.



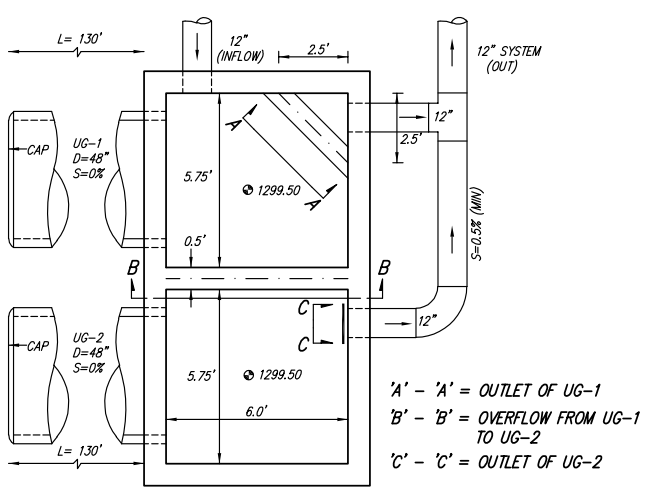
DETAIL: BIOFILTRATION BASIN (PVT) W/ NUTRIENT SENSITIVE MEDIA DESIGN
NOT TO SCALE



SECTION 'C' - 'C'



SECTION 'A' - 'A' SECTION 'B' - 'B'



PLAN VIEW
6' X 12' JUNCTION STRUCTURE (PVT)
NOT TO SCALE

BIO CLEAN SCREENING FILTER WITH TROUGH SYSTEM
FOR USE IN CURB INLETS WITH WINGS

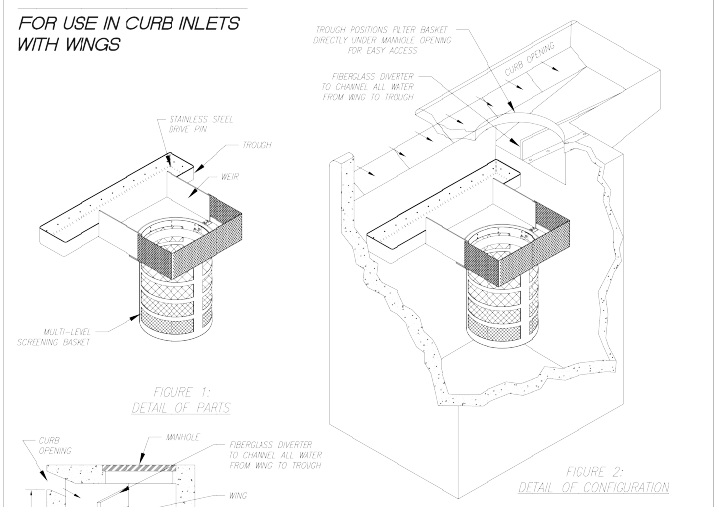


FIGURE 1: DETAIL OF PARTS
FIGURE 2: DETAIL OF CONFIGURATION
FIGURE 3: DETAIL OF MOUNTING
FIGURE 4: DETAIL OF PROFILE

NOTES:
1. TROUGH SYSTEM PROVIDES FOR ENTIRE COVERAGE OF INLET OPENING SO TO DIVERT ALL FLOW TO FILTER.
2. TROUGH SYSTEM MANUFACTURED FROM MARINE GRADE FIBERGLASS, GEL COATED FOR UV PROTECTION.
3. SYSTEM ATTACHED TO THE CATCH BASIN WITH NON-CORROSIVE HARDWARE.
4. FILTER MANUFACTURED OF 100% STAINLESS STEEL.
5. FILTER MADE OF NON-CLOGGING SCREEN WITH 4.7 MM OPENINGS AND MEETS FULL CAPTURE REQUIREMENTS.
6. FILTER CAN BE FITTED WITH HYDROCARBON ABSORBENT BOOM
7. FILTER IS LOCATED DIRECTLY UNDER THE MANHOLE FOR EASY REMOVAL AND MAINTENANCE.
8. LENGTH OF TROUGH CAN VARY FROM 2' TO 30'.
9. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE - CONTACT BIO CLEAN FOR MORE INFORMATION.
10. CONSIDERS A SAFETY FACTOR OF 2.0.
11. BYPASS IS FACILITATED VIA OVERFLOW OF THE TROUGH SYSTEM AND IS EQUAL TO THE CAPACITY OF THE CURB OPENING
12. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.
13. ADDITIONAL TREATMENT AND STORAGE CAPACITY CAN BE ACHIEVED BY UTILIZING MULTIPLE FILTER BASKETS.

DRAWING: BIO CLEAN CURB INLET FILTER DETAILS	MULTI-LEVEL SCREENING
TREATMENT FLOW RATE: 2.85 cfs	MODEL #: BC-CURB-MLS
WARRANTY: 5 YEAR MANUFACTURERS	PROJECT:
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 338 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-433-7640 FAX: 760-433-3176	REVISIONS: DATE:
DATE: 10/12/2017 SCALE: NTS	REVISIONS: DATE:
DRAFTER: M.C.P. UNITS = INCHES	REVISIONS: DATE:

Bio Clean
A Forterra Company

PAGE 3

BIO CLEAN SCREENING FILTER WITH TROUGH SYSTEM
FOR USE IN CURB INLETS

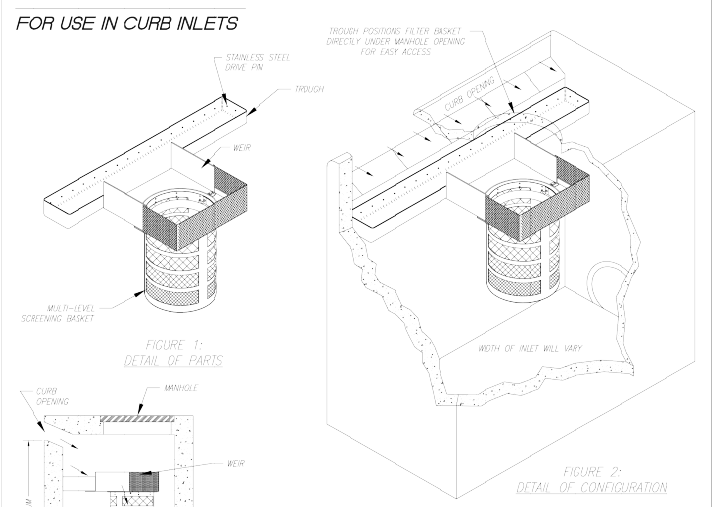


FIGURE 1: DETAIL OF PARTS
FIGURE 2: DETAIL OF CONFIGURATION
FIGURE 3: DETAIL OF MOUNTING
FIGURE 4: DETAIL OF PROFILE

NOTES:
1. TROUGH SYSTEM PROVIDES FOR ENTIRE COVERAGE OF INLET OPENING SO TO DIVERT ALL FLOW TO FILTER.
2. TROUGH SYSTEM MANUFACTURED FROM MARINE GRADE FIBERGLASS, GEL COATED FOR UV PROTECTION.
3. SYSTEM ATTACHED TO THE CATCH BASIN WITH NON-CORROSIVE HARDWARE.
4. FILTER MANUFACTURED OF 100% STAINLESS STEEL.
5. FILTER MADE OF NON-CLOGGING SCREEN WITH 4.7 MM OPENINGS AND MEETS FULL CAPTURE REQUIREMENTS.
6. FILTER CAN BE FITTED WITH HYDROCARBON ABSORBENT BOOM
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12. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.
13. ADDITIONAL TREATMENT AND STORAGE CAPACITY CAN BE ACHIEVED BY UTILIZING MULTIPLE FILTER BASKETS.

MODEL NUMBER	TREATMENT FLOW (cfs)*	SOLIDS STORAGE CAPACITY (cu ft)
BC-CURB-30	2.85	2.21
BC-CURB-24	2.85	1.77
BC-CURB-18	2.85	1.33
BC-CURB-12	2.81	0.88

*SEE PAGE 2 FOR EXPLANATION OF FLOW RATES

DRAWING: BIO CLEAN CURB INLET FILTER DETAILS	MULTI-LEVEL SCREENING
TREATMENT FLOW RATE: 2.85 cfs	MODEL #: BC-CURB-MLS
WARRANTY: 5 YEAR MANUFACTURERS	PROJECT:
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 338 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-433-7640 FAX: 760-433-3176	REVISIONS: DATE:
DATE: 10/12/2017 SCALE: NTS	REVISIONS: DATE:
DRAFTER: M.C.P. UNITS = INCHES	REVISIONS: DATE:

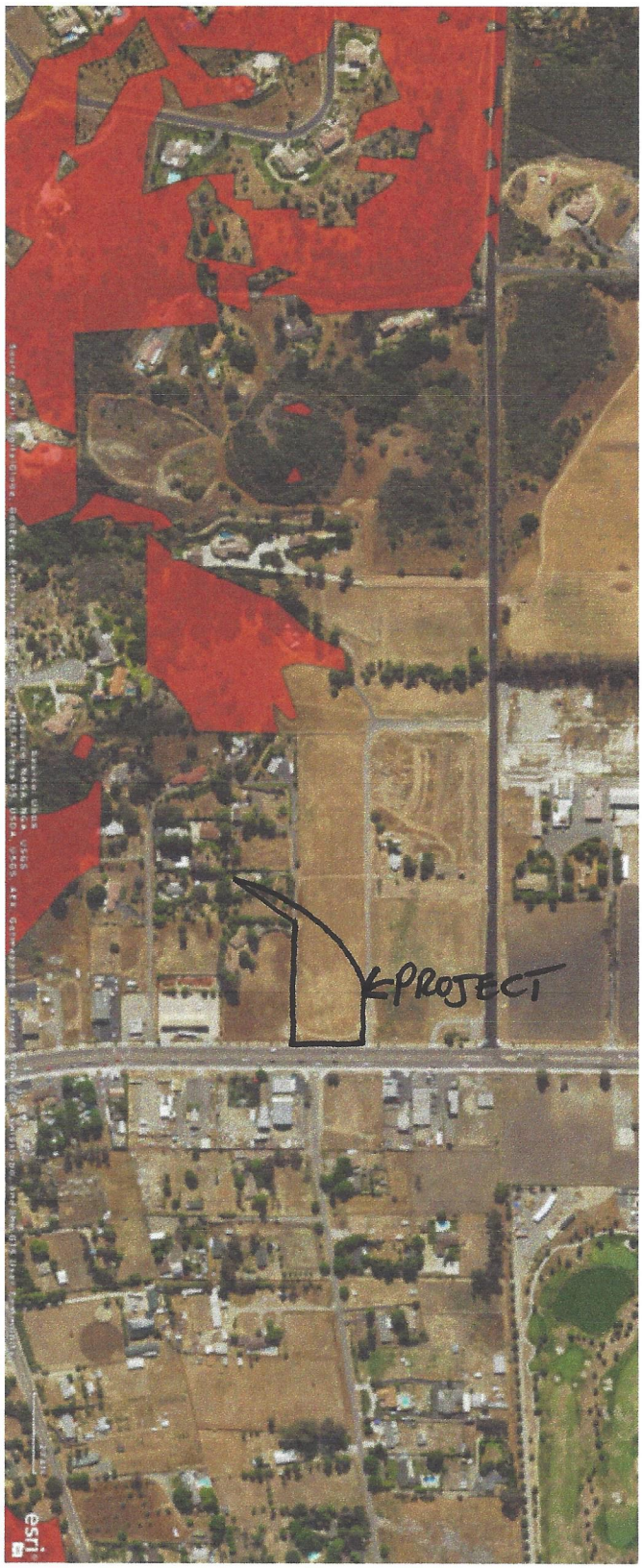
Bio Clean
A Forterra Company

PAGE 1

DEVELOPED CONDITION HYDROMODIFICATION MANAGEMENT EXHIBIT
AUTOZONE

Alidade ENGINEERING
41743 ENTERPRISE CIRCLE NORTH, SUITE 209
TEMECULA, CA 92590
PH: (951) 587-2020
FAX: (951) 587-2626

16-202HYDROMOD02.dwg 1-29-19



Autozone Valley Center

ATTACHMENT 2C

ATTACHMENT 3

Structural BMP Maintenance Information

This is the cover sheet for Attachment 3.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Plan (Required)	☒ Included See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet.
Attachment 3b	Draft Stormwater Maintenance Notification / Agreement (when applicable)	☒ Included ☐ Not Applicable

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

Attachment 3a must identify:

- ☒ Specific maintenance indicators and actions for proposed structural BMP(s). This must 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 specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- ☒ Recommended equipment to perform maintenance
- ☒ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management

Attachment 3b: For all Structural BMPs, Attachment 3b must include a draft maintenance agreement in the County's standard format depending on the Category (PDP applicant to contact County staff to obtain the current maintenance agreement forms). Refer to Section 7.3 in the BMP Design Manual for a description of the different categories.

INTRODUCTION

The Storm Water Operation & Maintenance Plan (O & M) is required under the County of San Diego's BMP Design Manual (Manual). The purpose of this O & M Plan is to describe the designated responsible party to manage the storm water BMPs, employee's training program and duties, operating schedule, maintenance frequency, routine service schedule and specific maintenance activities as called for in the approved Storm Water Quality Management Plan (SWQMP) for the Autozone project in the Township of Valley Center. The O & M Plan is subject to revisions as needed by the County Engineer.

A. DESIGNATED RESPONSIBLE PARTY

Bell Holdings, LLC
P.O. Box 642
Ranch Santa Fe, CA 92067
Mr. Steve Flynn
(858) 756-3589

B. SUMMARY OF SWQMP

To address water quality for the project, Bell Holdings, LLC shall implement Site Design BMPs, Source Control BMPs and Treatment Control BMPs until such time as the parcel is sold or quit claimed to another individual or entity. After the sale is finalized, the new owner(s) shall implement the Site Design BMPs, Source Control BMPs and Treatment Control BMPs.

(1) Site Design/LID BMPs

The proposed Autozone project minimizes the amount of impervious area as outlined in Site Design Concept 4.3.3 (SD-3) in the Manual by constructing only the minimum required parking areas and by providing the minimum amount of landscaping required by the County. The proposed development minimizes soil compaction on site by providing plenty of pedestrian access paths that should keep pedestrians out of landscaped areas thereby protecting soils in those areas in conjunction with Site Design Concept 4.3.4 (SD-4) in the Manual. Finally, the project includes landscaping with native or drought tolerant species as highlighted in Site Design Concept 4.3.7 (SD-7) of the Manual.

(2) Source Control BMPs

The Autozone project intends to effectively eliminate discharges of non-stormwater into the County's storm drain system as discussed in Source Control Concept 4.2.1 (SC-1) of the Manual. This will be accomplished by use of efficient irrigation systems which will be incorporated into the landscape design for the project. Rain shutoff devises will be employed to prevent irrigation after precipitation. The irrigation system will be designed to meet each landscape area's specific water requirements. Finally, flow reducers or shutoff valves triggered by a pressure drop will be used to control water loss in the event of broken sprinkler heads or lines. In addition, landscaping will be designed to minimize irrigation and runoff, to promote surface infiltration where appropriate and to minimize the use of fertilizers and pesticides that can contribute to storm water pollution.

The Autozone project will identify the storm drain system using stenciling or signage as outlined in Source Control Concept 4.2.2 (SC-2) of the Manual. All concrete catch basins will be stamped or stenciled with prohibitive language (e.g., "No Dumping – I Live in the San Luis Rey River" or "No Dumping – I Live in the Pacific Ocean" or similar and/or graphical icons to discourage illegal dumping satisfactory to the County Engineer. If required, the stamping shall be in Spanish as well.

The Autozone project includes a trash storage area that will be constructed per County of San Diego standards and will be protected from rainfall, run-on, runoff and wind dispersal as outlined in Source Control Concept 4.2.5 (SC-5) of the Manual.

Bell Holdings, LLC will employ additional BMPs based upon potential sources of runoff as called for in Source Control Concept 4.2.6 (SC-6) of the Manual. For example, Bell Holdings, LLC will employ Integrated Pest Management (IPM) principles to eliminate and/or reduce the need for pesticide use in the project design by incorporating pest-resistant plants and/or native plants. Bell Holdings, LLC will distribute IPM educational material to all future owners, lessees and operators. The IPM materials will address the following topics: (1) Keeping pests out of buildings and landscaping using banners, screens and caulking; (2) Physical pest elimination techniques, such as weeding, trapping, washing, or pruning out pests; (3) Relying on natural enemies to eat pests; and (4) Proper use of pesticides as a last line of defense. In addition, the design of the proposed building will include facilities in the interior of the building to fire sprinkler test water and direct it to the onsite sewer system.

All hazardous materials with the potential to contaminate urban runoff shall be placed in an enclosure such as, but not limited to, a cabinet, shed or similar structure that prevents contact with rain, runoff or spillage to the storm water conveyance system. In addition, the hazardous materials enclosure shall be protected by secondary containment structure such as berms, dikes, curbs or temporary spill containment systems and have a roof or awning to minimize direct precipitation within the secondary containment area.

An additional Source Control BMP to be used on-site is good housekeeping. Good housekeeping practices that shall be utilized on site include keeping outdoor areas in a neat and orderly condition, picking up garbage left within the pavement and landscape areas. The site shall be visually inspected on a weekly basis to remove all "foreign" items including, but not limited to, landscape debris and common trash. Routine maintenance procedures for good housekeeping include removing all freshly trimmed landscape items and natural deposited items such as annual leaves and dispose off-site per governing codes. Finally, the paved areas shall be swept as necessary using dry methods (manual sweeping, street sweepers, etc.) to remove dust and sediment buildup.

(3) Treatment Control BMPs

As a priority development project, the design of the proposed Autozone project includes treatment control BMPs to remove the pollutants of concern from the storm water runoff generated on-site for the 85th percentile storm. For this project, Bell Holdings, LLC has decided to utilize a biofiltration basin to facilitate pollutant control of the priority pollutants of concern and underground conduits connected to a flow control structure to meet both the hydromodification requirements and to mitigate the increased flows during the 100-year storm event to existing conditions.

(a) Biofiltration Basins

Biofiltration employs a simplistic, site integrated, terrestrial-based design that provides opportunity for runoff infiltration, filtration, storage and for water uptake by vegetation. Biofiltration facilities capture rainwater runoff to be filtered through a prepared soil medium. Once the soil pore space capacity of the medium is exceeded, storm water begins to pool at the surface of the planting soil. The process uses the chemical, biological and physical properties of plants, microbes soils for removal of pollutants from the storm water runoff. Some of the processes that may take place in a biofiltration facility include: sedimentation, adsorption, filtration, volatilization, ion exchange, decomposition, phytoremediation, bioremediation and storage capacity.

Biofiltration basins have a *high* removal efficiency for coarse sediment and trash and pollutants that tend to associate with fine particles during treatment. In addition, biofiltration basins have a *medium* removal efficiency for pollutants that tend to be dissolved after treatment.

The proposed biofiltration basin includes cleanouts/observation ports at the upstream ends of all of the slotted drains as required by the Manual. The rim of the cleanouts will be located 12-inches above the finished grade of the mulched basin and will act as an indicator of the amount of sediment buildup within the basins themselves. The biofiltration basin can be accessed from both the onsite parking lot and from Old Mirar De Valle Road.

The proposed curb inlets will be fitted with BioClean Curb Inlet Filters to act as pre-treatment devices to clean the storm water runoff from the parking lot and from a portion of the private access drive of trash and debris prior to directing the storm water runoff to the biofiltration basin for treatment.

(a) Underground Storm Water Storage System

The project will include dual 48-inch diameter conduits connected to a cast-in-place concrete flow control / cleanout structure. The system will be located beneath the parking lot. The flow control / cleanout structure will be designed with two access ports, two weir walls and multiple flow control orifices. The interior of the structure will be 6-feet in height to allow for easy access for repairs to and/or cleaning of the underground storm water storage system.

C. EMPLOYEE TRAINING PROGRAM

Inspection of the implementation of the SWQMP must be done by trained personnel. In addition, training of employees, contractors and sub-contractors can be an important BMP. To accomplish this, Bell Holdings, LLC shall hold a training seminar for designated owner representatives, lessees, operators, contractors and sub-contractors. The seminar shall cover the following topics at a minimum:

- Background of "pointless Pollution" video on non-point source pollution
- Information on potential fines, citizen lawsuits
- Review of the SWQMP section by section
- Common problem areas in implementation
- Review of monitoring checklists
- Construction details of protective measures

The goal of the storm water management training program is to inform employees, lessees, operators, contractors, and subcontractors of their levels of responsibility for components and goals of the SWQMP. This training program is a preventative maintenance technique, because when properly informed, employees, lessees, operators, contractors, and subcontractors have increased awareness and are more capable of preventing spills, responding safely and effectively to accidents, and recognizing situations that could lead to storm water contamination.

Storm water management training should be provided by Bell Holdings, LLC on an "As Needed" basis. Attendance records should be kept for each training session. Inspection logs and checklists should be distributed to all personnel who will be performing the monitoring and reporting.

D. INSPECTION PROGRAM FOR BMPs

As long as Bell Holdings, LLC owns the parcel, the contact person in charge of the inspection program is Mr. Steve Flynn and he can be reached at (858) 756-3589.

(1) SOURCE CONTROL BMPS

Storm Water Conveyance Stamping and Signage

The private storm drain system shall be inspected and inspection visits shall be completely documented:

- Once a month at a minimum or as directed by the local governing official.

Trash Storage Area

The trash storage area shall be inspected and inspection visits shall be completely documented:

- Routine inspection on a weekly basis to verify all trash is stored in the provided bins.
- The provided bins shall be inspected annually prior to October 1st for any damaged or worn parts and all necessary repairs shall be completed prior to October 15th of each year.

Integrated Pest Management

The project site shall be inspected and inspection visits shall be completely documented:

- Once a month at a minimum or as directed by the local governing official.

Efficient Irrigation System

The landscaped areas shall be inspected and inspection visits shall be completely documented:

- Once a month at a minimum or as directed by the local governing official. All improperly operating apparatus shall be replaced within two working days. Broken sprinkler heads and/or lines shall be repaired or replaced within two working days.

(2) TREATMENT CONTROL BMPS

Biofiltration Basins

The biofiltration basins shall be inspected and inspection visits shall be completely documented:

- Once a month at a minimum.
- After every large storm (after every storm monitored or those storms with more than 0.50 inch of precipitation.)
- On a weekly basis during extended periods of wet weather.

The inspection tasks required for the bioretention basins are as follows:

- The height of the vegetation should be measured once during the wet season and once during the dry season (depending on growth).
- Assess adequate vegetative cover. Assess quantity needed in May each year, late wet season and late dry season.
- Inspect for debris accumulation during routine trash inspection on a weekly basis or as directed by the County of San Diego.

- Inspect for accumulated sediment on a monthly basis during the wet season and prior to and following the wet season (October 1 through April 30).
- Inspect for burrows on an annual basis and after vegetation trimming.
- General maintenance inspection semi-annually late wet season and late dry season to identify signs of significant erosion.

The following inspection tasks are required for the BioClean Curb Inlet Filter that should be done on an ongoing basis including just before annual storm seasons and following rain events are as follows:

- Check for accumulated garbage and debris within the curb inlet filter.
- Look for any out of the ordinary obstructions in the curb inlet, trough, weir, filter basket and outlet pipe.
- Observe the condition and color of the hydrocarbon boom (if installed).

Underground Storm Water Storage System

The underground storm water storage system shall be inspected and inspection visits shall be completely documented:

- Prior to the onset of the rainy season and just after the rainy season. The rainy season begins on October 1 and ends on April 30.

The inspection tasks required for the underground storm water storage system are as follows:

- Manholes: Remove cover. Use a flashlight to detect sediment deposits. If present, measure sediment depth with a stadia rod accounting for depth of sump (if present). Inspect pipes connecting to the flow control / cleanout structure. Record results on a maintenance log. Replace cover. Repeat procedure for all manholes.
- If sediment accumulation reaches 6-inch in height within the system, then maintenance is required on the system.

The following inspection tasks are required for the flow control weir walls and orifices of the flow control / cleanout structure that should be done on an ongoing basis just before annual storm seasons and following rain events are as follows:

- Check for accumulated garbage, sediment and debris adjacent to the flow control weir walls and orifices.

E. MAINTENANCE PROGRAM FOR BMPs

The operation and maintenance requirements for each type of BMP are as follows:

(1) SOURCE CONTROL BMPS

Storm Water Conveyance Stamping and Signage

The stamping or stenciling shall be maintained to remain legible. If 25% of a stencil has worn off, all stencils shall be repainted.

Trash Storage Areas

- Lined bins or dumpsters shall be free from leaking of liquid waste.
- Signs on all dumpsters informing users that hazardous materials are not to be disposed of therein shall be legible and clearly visible.
- No trash shall be allowed to collect outside the provided trash bins. If trash accumulates and overflows the provided bins, the schedule for trash pickup shall be increased to account for the amount of trash accumulated.
- The trash enclosure floors shall be washed monthly to ensure no buildup of surface contaminants.
- Hazardous Waste

Suspected hazardous wastes will be analyzed to determine disposal options. Hazardous wastes generated onsite will be handled and disposed of according to applicable local, state, and federal regulations. A solid or liquid waste is considered a hazardous waste if it exceeds the criteria listed in the CCR, Title 22, Article 11.

Integrated Pest Management

Integrated Pest Management (IPM) is an ecosystem-based pollution prevention strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as:

- Biological control
- Habitat Manipulation
- Modification of cultural practices
- Use of resistant plant varieties

Pesticides are used only after monitoring indicates they are needed according to established guidelines. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non-target organisms, and the environment.

The operational and maintenance needs of an integrated pest management shall be:

- Plant pest-resistant or well-adapted plant varieties such as native plants to eliminate and/or reduce the need for pesticide use in the project design.

- Discourage pests by modifying the site and landscape design.

Preventive Maintenance

Pollution prevention is the primary "first line of defense" because pollutants that are never used do not have to be controlled or treated. Educational materials shall be distributed to future site residents/tenants with the following topics:

- Keeping pests out of building and landscaping using barriers, screens and caulking.
- Physical pest elimination techniques such as weeding, squashing, trapping, washing, or pruning out pests.
- Relying on natural predators to eat the pests
- Proper use of pesticide as a last line of defense.

Efficient Irrigation System

The operational and maintenance needs of an irrigation system are:

- Preventive maintenance and visual inspection of all sprinkler heads and lines.
- Periodic testing of all irrigation stations to verify if each landscape area is getting the correct amount of water.
- Periodic testing of all flow reducers and/or shutoff valves to verify in good working order.

Aesthetic and Functional Maintenance
Both forms of maintenance will be combined into an overall Stormwater Management System Maintenance.

Aesthetic Maintenance

The following activities will be included in the aesthetic maintenance program:

- Broken sprinkler heads and/or lines will be repaired or replaced in a timely manner.

Functional Maintenance

Functional maintenance has two components:

Preventive maintenance
Corrective maintenance

Preventive Maintenance

Preventive maintenance activities to be instituted for an irrigation system include:

- Preventive maintenance and visual inspection of all sprinkler heads and lines.
- Periodic testing of all irrigation stations to verify if each landscape area is getting the correct amount of water.
- Periodic testing of all flow reducers and/or shutoff valves to verify in good working order.

Corrective Maintenance

Corrective maintenance is required on an emergency or non-routine basis to correct problems and to restore the intended operation and safe function of an irrigation system. Corrective maintenance activities include:

- Broken sprinkler heads and/or lines will be repaired or replaced in a timely manner.
- General Facility Maintenance. In addition to the above elements of corrective maintenance, general corrective maintenance will address the overall irrigation system and its associated components. If corrective maintenance is being done to one component, other components will be inspected to see if maintenance is needed.

Good Housekeeping

The operational and maintenance needs associated with good housekeeping are:

- Keep outdoor areas in a neat and orderly condition.
- Pick up garbage left within the pavement and landscape areas.
- Periodic sweeping of the paved areas.
- Removal of all freshly trimmed landscape items and natural deposited items such as annual leaves and disposal off-site per governing codes.
- Apply all fertilizer, herbicide or pesticide in the amount and application as provided by the manufacturer.

Aesthetic and Functional Maintenance

Both forms of maintenance will be combined into an overall Stormwater Management System Maintenance.

Aesthetic Maintenance

The following activities will be included in the aesthetic maintenance program:

- Keep outdoor areas in a neat and orderly condition.
- Pick up garbage left within the pavement and landscape areas.
- Periodic sweeping of the paved areas.
- Removal of all freshly trimmed landscape items and natural deposited items such as annual leaves and disposal off-site per governing codes.
- Weed Control. Weeds will be removed through mechanical means. Herbicide will not be used because these chemicals may impact the water quality monitoring.

Functional Maintenance

Functional maintenance has two components:

Preventive maintenance
Corrective maintenance

Preventive Maintenance

Preventive maintenance activities to be instituted with good housekeeping are:

- Apply all fertilizer, herbicide or pesticide in the amount and application as provided by the manufacturer.

Corrective Maintenance

Corrective maintenance is required on an emergency or non-routine basis. Corrective maintenance activities include:

- General Facility Maintenance. General corrective maintenance will address the overall facility and its associated components. If corrective maintenance is being done to one component, other components will be inspected to see if maintenance is needed.

Hazardous Waste

Suspected hazardous wastes will be analyzed to determine disposal options. Hazardous wastes generated onsite will be handled and disposed of according to applicable local, state, and federal regulations. A solid or liquid waste is considered a hazardous waste if it exceeds the criteria listed in the CCR, Title 22, Article 11.

(2) STRUCTURAL BMPS

Biofiltration Basin

The maintenance indicators of a biofiltration basin are:

1. Accumulation of sediment, litter or debris.
2. Poor vegetation establishment.
3. Erosion due to concentrated irrigation flow.
4. Erosion due to concentrated storm water runoff flow.
5. Standing water in biofiltration basin for longer than 96 hours following a storm event.
6. Obstructed inlet or outlet structures.
7. Damage to structural components such as inlet and outlet structures.

The maintenance actions associated with the maintenance indicators noted above are as follows:

1. Remove and properly dispose of accumulated materials, without damage to vegetation. As engineered soil section is intended to be installed and maintained with minimal compaction, the removal of accumulated material will need to be done by hand and with shovels.
2. Re-seed, re-plant or re-establish vegetation per original plans.
3. Repair/re-seed/re-plant eroded areas and adjust the irrigation system.
4. 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.
5. Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains, or repairing/replacing clogged or compacted soils. The surface blockage problem may be corrected by removing the mulch layer and raking the surface. The mulch layer should then be replaced with new mulch installed 3-inch thick continuous throughout the entire area repaired.
6. Clear obstructions.
7. Repair or replace as applicable.

The maintenance actions for the BioClean Curb Inlet Filters are as follows:

1. Remove trash and debris buildup within the curb inlets either manually, with a vacuum device or with a vactor truck. A pressure wash is recommended and will assist in spraying of any debris stuck on the side or bottom of the filter basket.
2. Power wash off the trough, weir, debris screen and filter basket sides and bottom.
3. Remove the hydrocarbon boom (if installed) and assess the color and condition of the boom. Replace as necessary by ordering directly from the manufacturer.
4. Replace any damaged parts by ordering directly from the manufacturer.

Hazardous Waste

Suspected hazardous wastes will be analyzed to determine disposal options. Hazardous wastes generated onsite will be handled and disposed of according to applicable local, state, and federal regulations. A solid or liquid waste is considered a hazardous waste if it exceeds the criteria listed in the CCR, Title 22, Article 11.

Underground Storm Water Storage System

The maintenance actions for the underground storm water storage system are as follows:

1. Remove trash, sediment and debris buildup within the flow control structure and dual 48-inch diameter conduits either manually, with a vacuum device or with a vactor truck.
2. Verify that the weir walls and low flow orifice(s) are clear of all impediments and able to function as originally designed.

Hazardous Waste

Suspected hazardous wastes will be analyzed to determine disposal options. Hazardous wastes generated onsite will be handled and disposed of according to applicable local, state, and federal regulations. A solid or liquid waste is considered a hazardous waste if it exceeds the criteria listed in the CCR, Title 22, Article 11.

F. RECORD KEEPING

The project records for monitoring and reporting in accordance with the SWQMP will be maintained on-site and shall be retained for a minimum of 5 years. Monitoring, preparation of inspection reports and record keeping shall be the responsibility of Bell Holdings, LLC until such time that the parcel get sold or quit claimed to another person or entity. Bell Holdings, LLC may decide to hire out the maintenance and inspections of the SWQMP, however, the filing and reports of the monitoring and inspection shall remain the responsibility of Bell Holdings, LLC.

RECORDING REQUESTED BY:

WHEN RECORDED MAIL TO:
Bell Holdings, LLC
P.O. Box 642
Rancho Santa Fe, CA 92067

(property owner)

SPACE ABOVE THIS LINE FOR RECORDER'S USE

MAINTENANCE NOTIFICATION AGREEMENT FOR CATEGORY 1 STORMWATER TREATMENT CONTROL BMP's

THIS AGREEMENT is made on the _____ day of February, 20 19.
Bell Holdings, LLC, the Owner(s) of the hereinafter described real property:
Address Valley Center Road & Old Mirar De Valle Post Office Valley Center Zip Code 92082
Assessor Parcel No.(s) 186-270-35

List, identify, locate (plan/drawing number) and describe the TC BMP(s)

Biofiltration Basin No. 1 (PDS2017-LDGRMJ-30144 Sheets 4, 5, 7, 11 & 13); Underground Storage No. 1 (PDS2017-LDGRMJ-30144 Sheets 6, 7, 8 & 11 thru 13)

Owner(s) of the above property acknowledge the existence of the stormwater Treatment Control Best Management Practice (TC BMP) structure(s) on the said property. Perpetual maintenance of the TC BMP(s) is the requirement of the State NPDES Permit, Order No. R9-2007-0001, Section D.1.d.(6) and the County of San Diego Watershed Protection Ordinance (WPO) Ordinance No. 10096 Section 67.812 through Section 67.814, and County Standard Urban Stormwater Mitigation Plan (SUSMP) Chapter 5. In consideration of the requirement to construct and maintain TC BMP(s), as conditioned by Discretionary Permit, Grading Permit, and/or Building Permit (as may be applicable), I/we hereby covenant and agree that:

1. I/We are the owner(s) of the existing (or to be constructed concurrently) premises located on the above described property.
2. I/We shall take the responsibility for the perpetual maintenance of the TC BMP(s) as listed above in accordance with the maintenance plan and in compliance with County's self inspection reporting and verification for as long as I/we have ownership of said property(ies).
3. I/We shall cooperate with and allow the County staff to come onto said property(ies) and perform inspection duties as prescribed by local and state regulators.
4. I/We shall inform future buyer(s) or successors of said property(ies) of the existence and perpetual maintenance requirement responsibilities for TC BMP(s) as listed above and to ensure that such responsibility shall transfer to the future owner(s).
5. I/We will abide by all of the requirements and standards of Section 67.812 through Section 67.814 of the WPO (or renumbering thereof) as it exists on the date of this Agreement, and which hereby is incorporated herein by reference.

This Agreement shall run with the land. If the subject property is conveyed to any other person, firm, or corporation, the instrument that conveys title or any interest in or to said property, or any portion thereof, shall contain a provision transferring maintenance responsibility for TC BMP(s) to the successive owner according to the terms of this Agreement. Any violation of this Agreement is grounds for the County to impose penalties upon the property owner as prescribed in County Code of Regulatory Ordinances, Title 1, Division 8, Chapter 1 Administrative Citations §§18.101-18.116.

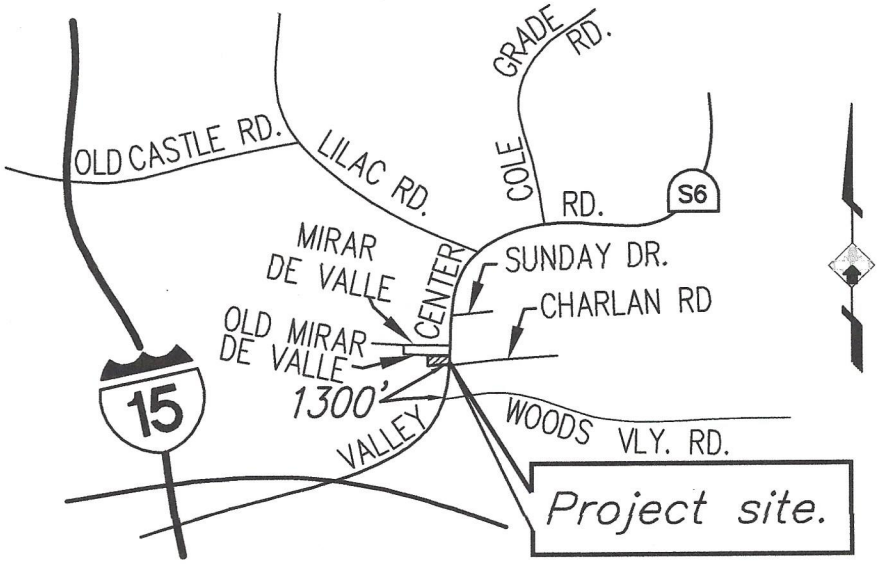
_____ _____
Owner(s) Signature(s)

Steve Flynn, President _____
Print Owner(s) Name(s) and Title

STATE OF CALIFORNIA)
COUNTY OF _____)

On _____ before me, _____Notary Public,
personally appeared _____ who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s) or the entity upon behalf of which the person(s) acted, executed the instrument.
I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.
WITNESS my hand and official seal.

Signature _____



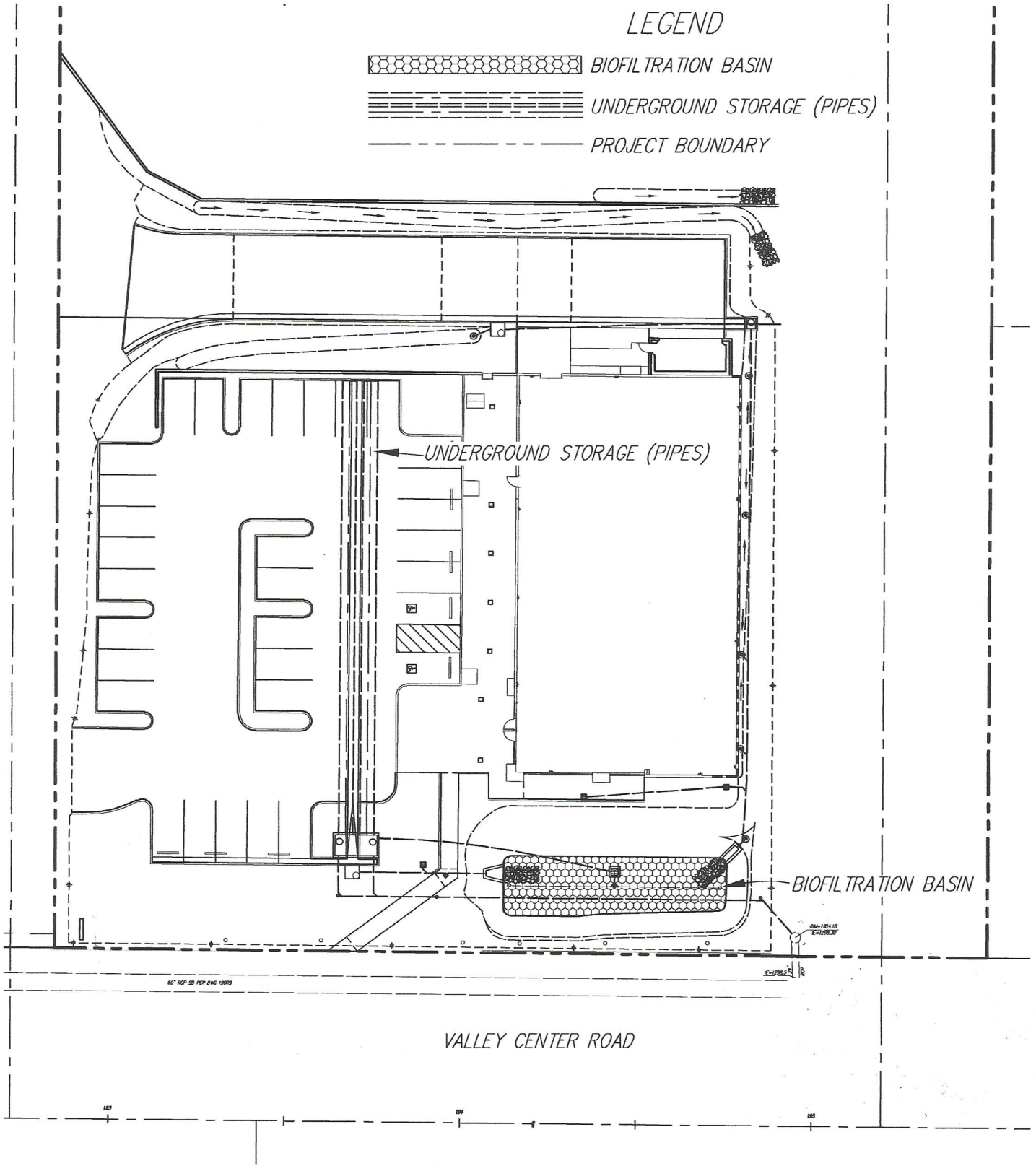
INTERSECTION OF VALLEY CENTER ROAD AND WOODS VALLEY ROAD
1,300 FEET TO S'LY PROPERTY LINE AT VALLEY CENTER ROAD.

VICINITY MAP

NOT TO SCALE

THOMAS BROS. 1090–E4

EXHIBIT 'A'
AUTOZONE STORE 6173
STORM WATER MAINTENANCE EXHIBIT



SCALE: 1"=40'

SITE MAP – EXHIBIT 'B'
AUTOZONE STORE 6173
STORM WATER MAINTENANCE EXHIBIT