County of San Diego

Stormwater Quality Management Plan (SWQMP)

For Priority Development Projects (PDPs)

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

Priority Development Project

Project Information	
Project Name	North County Environmental Resources
Project Address	25568 Mesa Rock Road
Assessor's Parcel # (APN)	187-100-23, 31,33, 35, 37, 38
Permit # / Record ID	Permit #/Record ID

Project Applicant / Project Proponent		
Name	ADJ Holdings, LLC, A California Limited Liability Company	
Address	807 E. Mission Road, San Marcos, CA 92069	
Phone	760-744-9040	**Email:**

SWQMP Preparer		
Name	Robert Dentino	
Company (if applicable)	EXCEL Engineering	
Address	440 State Place, Escondido CA 92029	
Phone	760-745-8118	**Email:** rdentino@excelengineering.net
PE Number (if applicable)	45629	

Preparer's Certification

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

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

Signature [signature] **Date** August 29, 2019

REGISTERED PROFESSIONAL ENGINEER ROBERT B. DENTINO No. 45629 Exp. 12/31/20 CIVIL STATE OF CALIFORNIA

COUNTY ACCEPTED

SWQMP Approved By: *Approval Date:*

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

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

No.	Date	Summary of Changes
Preliminary Design / Planning / CEQA		
1	07/30/2019	Initial Submittal
2	08/25/2019	Revisions per Redlines
3	Date	Summary of Change
4	Date	Summary of Change
No.	Date	Summary of Change
Final Design		
1	Date	Initial Submittal
2	Date	Summary of Change
3	Date	Summary of Change
4	Date	Summary of Change
No.	Date	Summary of Change
Plan Changes		
1	Date	Initial Submittal
2	Date	Summary of Change
3	Date	Summary of Change
4	Date	Summary of Change
No.	Date	Summary of Change

PDP SWQMP Submittal Checklist

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

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

☒ Attachment 1: Storm Water Intake Form

☒ Attachment 2: DMA Exhibits and Construction Plan Sheets

☒ Attachment 3: Source Control BMP Worksheet

N/A ☐ Attachment 4: Previous SWQMP Submittals

☒ Attachment 5: Existing Site and Drainage Description

☒ Attachment 6: Documentation of DMAs without Structural BMPs

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

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

☒ Attachment 9: Management of Critical Coarse Sediment Yield Areas

☒ Attachment 10: Installation Verification Form

☒ Attachment 11: BMP Maintenance Agreements and Plans

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

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

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

Table 1 – Scope of SWQMP Submittal

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

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

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

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

Table 2 – Baseline BMPs for Existing and Proposed Site Features

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

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

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

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

Completion of Part B is not required because:

☐ This is a Small Residential Project, OR

☐ None of these sources or features is proposed.

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

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

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

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

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

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

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

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

BMP-Feature Combination		**Explanation**
Feature	Feature	Explanation
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	
Feature	Feature	Explanation
BMP	BMP	

Table 5: DMA Structural Compliance Strategies and Documentation

Part A – Selection and Application Structural Performance Standards

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

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

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

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

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

a. Existing impervious area (ft²)	b. Impervious area created / replaced (ft²)	c. % Impervious created / replaced [(b/a)*100]
N/A	N/A	N/A

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

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

Part B – Compliance Strategies and Required Attachments

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

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

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

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

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

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

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

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

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

☐ **PDP is Exempt from Hydromodification Management Requirements**

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

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

☒ **WMAA mapping demonstrates the following:**

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

b. All potential upstream offsite CCYSAs will be bypassed

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

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

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

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

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

a. Project does not require discretionary permits

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

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

☒ **Project demonstrates no net impact to receiving waters**

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

Table 7 –Minimum Construction Stormwater BMPs

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

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

Table 8 – Explanations and Justifications for Construction Phase BMPs

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

ATTACHMENTS

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

☒ Attachment 1: Storm Water Intake Form

☒ Attachment 2: DMA Exhibits and Construction Plan Sheets

☒ Attachment 3: Source Control BMP Worksheet

☐ Attachment 4: Previous SWQMP Submittals

☒ Attachment 5: Existing Site and Drainage Description

☒ Attachment 6: Documentation of DMAs without Structural BMPs

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

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

☒ Attachment 9: Management of Critical Coarse Sediment Yield Areas

☒ Attachment 10: Installation Verification Form

☒ Attachment 11: BMP Maintenance Agreements and Plans

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

ATTACHMENT 1

Storm Water Intake Form

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

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

Part 1. Project Information	
Project Name:	North County Environmental Resources
Record ID (Permit) No(s):	
Assessor's Parcel No(s):	187-100-23, 31, 33, 35, 37, 38
Street Address (or Intersection):	25568 Mesa Rock Road
City, State, Zip:	Escondido, CA 92029

Part 2. Applicant / Project Proponent Information	
Name:	ADJ Holdings, LLC. A California Limited Liability Company
Company:	
Street Address:	807 E. Mission Road
City, State, Zip:	San Marcos, CA 92069
Phone Number	760-744-9040
Email:	

Part 3. Required Information for All Development Projects

Ⓐ	**1. Existing (pre-development) impervious surfaces (ft²)**	**2. Created or replaced impervious surfaces (ft²)**	**3. Total disturbed area (acres or ft²)**
	0	120,900	140,811 SF

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

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

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

Part 4. Priority Classification & SWQMP Form Selection

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

Part 5. Applicant Signature

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

Applicant / Project Proponent Signature: Date: 06-13-2019

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

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

ATTACHMENT 2

DMA Exhibits and Construction Plan Sheets

2.0 General Requirements

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

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

2.1 DMA Exhibits

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

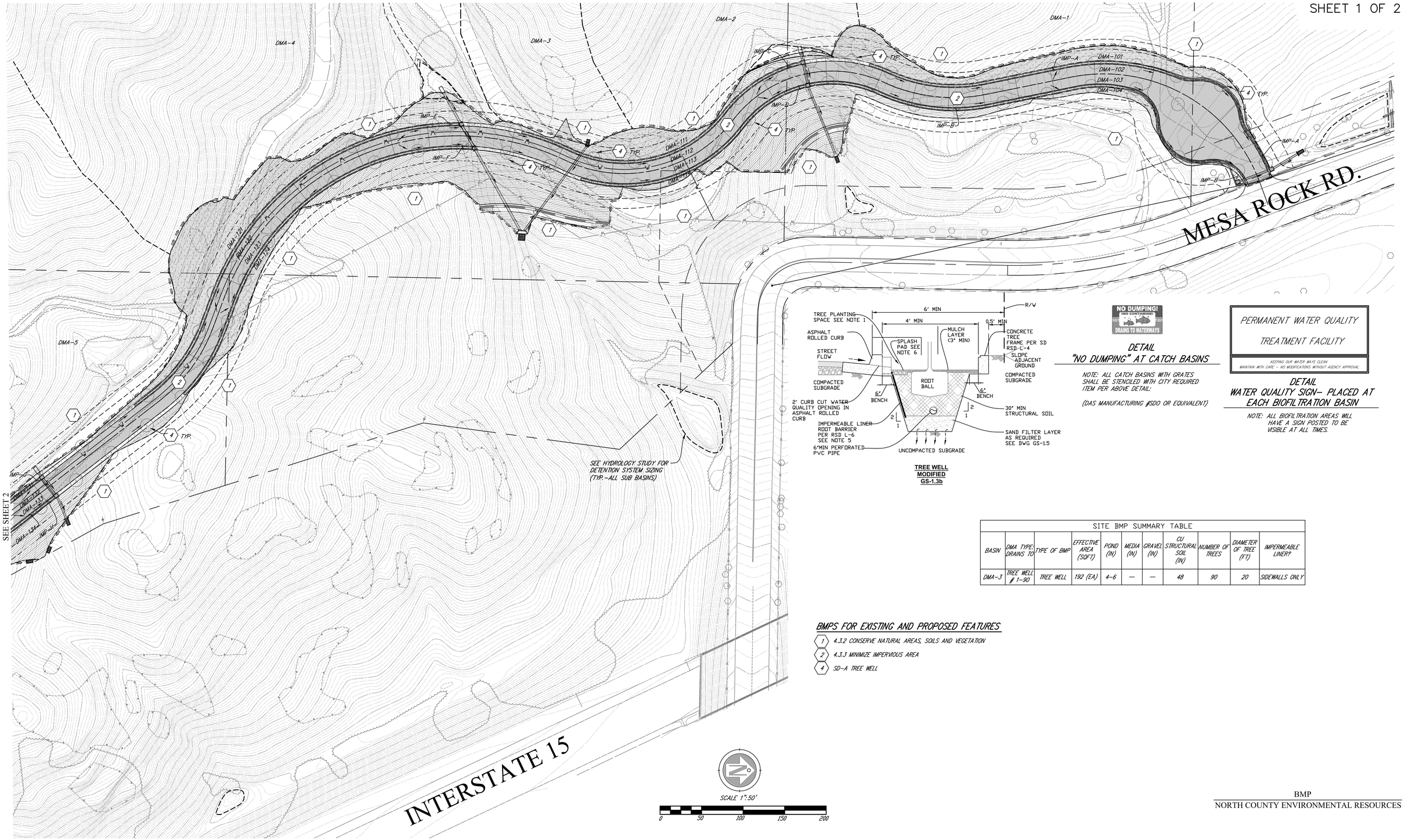
DMA Exhibit ID #:	
A. Features required for all exhibits	
1. Existing Site Features	
☒ Underlying hydrologic soil group (A, B, C, D)	☒ Topography and impervious areas
☒ Approximate depth to groundwater	☒ Existing drainage network, directions, and offsite connections
☐ Natural hydrologic features	
2.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

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

2.2 Individual Structural BMP DMA Mapbook

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

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



TREE WELL MODIFIED GS-1.3b

NO DUMPING! (NO CONTAMINE) DRAINS TO WATERWAYS

DETAIL "NO DUMPING" AT CATCH BASINS

NOTE: ALL CATCH BASINS WITH GRATES SHALL BE STENCILED WITH CITY REQUIRED ITEM PER ABOVE DETAIL:

(DAS MANUFACTURING #SDO OR EQUIVALENT)

PERMANENT WATER QUALITY TREATMENT FACILITY

KEEPING OUR WATER WAYS CLEAN
MAINTAIN WITH CARE - NO MODIFICATIONS WITHOUT AGENCY APPROVAL

DETAIL WATER QUALITY SIGN- PLACED AT EACH BIOFILTRATION BASIN

NOTE: ALL BIOFILTRATION AREAS WILL HAVE A SIGN POSTED TO BE VISIBLE AT ALL TIMES.

SITE BMP SUMMARY TABLE										
BASIN	DMA TYPE: DRAINS TO	TYPE OF BMP	EFFECTIVE AREA (SQFT)	POND (IN)	MEDIA (IN)	GRAVEL (IN)	CU STRUCTURAL SOIL (IN)	NUMBER OF TREES	DIAMETER OF TREE (FT)	IMPERMEABLE LINER?
DMA-3	TREE WELL # 1-90	TREE WELL	192 (EA)	4-6	—	—	48	90	20	SIDEWALLS ONLY

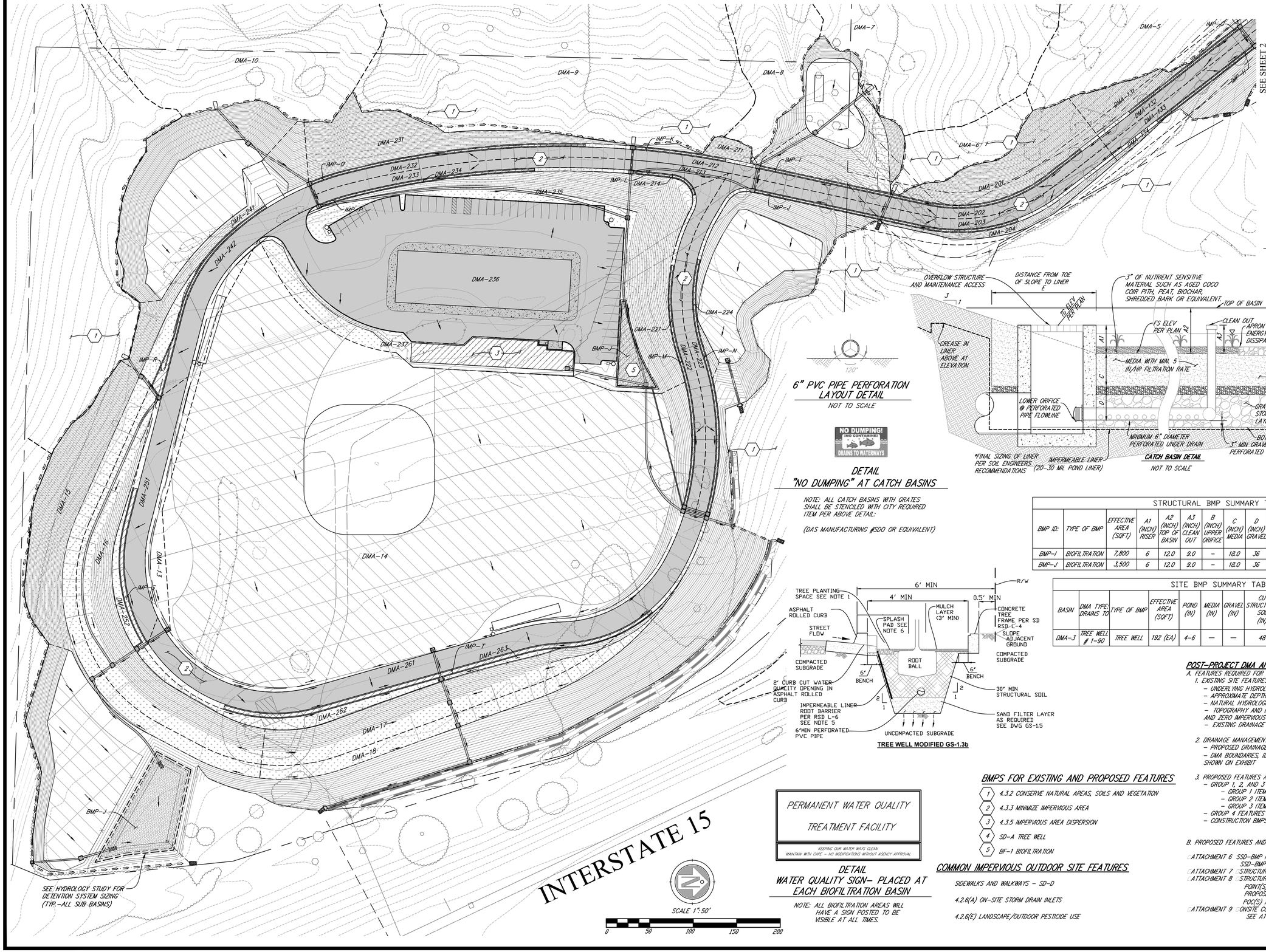
BMPS FOR EXISTING AND PROPOSED FEATURES

1. 4.3.2 CONSERVE NATURAL AREAS, SOILS AND VEGETATION
2. 4.3.3 MINIMIZE IMPERVIOUS AREA
4. SD-A TREE WELL

SCALE 1":50'

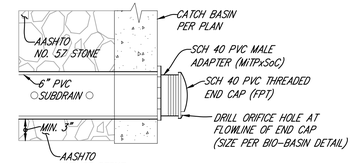
0 50 100 150 200

BMP
NORTH COUNTY ENVIRONMENTAL RESOURCES

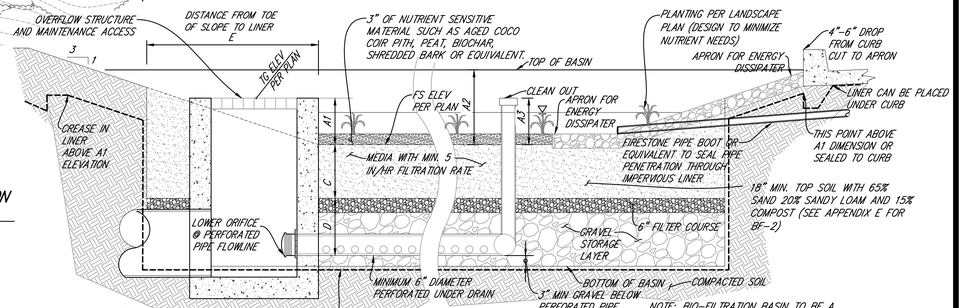


LEGEND

- BIOFILTRATION BMP (TCBMP & LID ONLY)
- NEW IMPERVIOUS SURFACE (ASPHALT, CURBS, WALLS, ROOF, CONCRETE, ETC.)
- NEW PERVIOUS LANDSCAPE



ORIFICE DETAIL
NOT TO SCALE



CATCH BASIN DETAIL
NOT TO SCALE

NOTE: BIO-FILTRATION BASIN TO BE A NUTRIENT SENSITIVE MEDIA DESIGN (BF-2) PER COUNTY OF SAN DIEGO BMP MANUAL. (SEE APPENDIX E FOR BF-2 REQUIREMENTS).

6" PVC PIPE PERFORATION LAYOUT DETAIL
NOT TO SCALE

DETAIL "NO DUMPING" AT CATCH BASINS

NOTE: ALL CATCH BASINS WITH GRATES SHALL BE STENCILED WITH CITY REQUIRED ITEM PER ABOVE DETAIL:

(DAS MANUFACTURING #SDO OR EQUIVALENT)

STRUCTURAL BMP SUMMARY TABLE												
BMP ID:	TYPE OF BMP	EFFECTIVE AREA (SQFT)	A1 (INCH) RISER	A2 (INCH) TOP OF BASIN	A3 (INCH) CLEAN OUT	B (INCH) UPPER ORIFICE	C (INCH) MEDIA	D (INCH) GRAVEL	E FEET	BOX RISER / OVERFLOW STRUCTURE SIZE (INCHES)	ORIFICES DIAMETER UPPER (INCH)	ORIFICES DIAMETER LOWER (INCH)	IMPERMEABLE LINER?
BMP-I	BIOFILTRATION	7,800	6	12.0	9.0	–	18.0	36	1.5	36X36	–	1.875	YES
BMP-J	BIOFILTRATION	3,500	6	12.0	9.0	–	18.0	36	2.25	36X36	–	1.25	YES

TREE WELL MODIFIED GS-1.3b

SITE BMP SUMMARY TABLE										
BASIN	DMA TYPE: DRAINS TO	TYPE OF BMP	EFFECTIVE AREA (SQFT)	POND (IN)	MEDIA (IN)	GRAVEL (IN)	CU STRUCTURAL SOIL (IN)	NUMBER OF TREES	DIAMETER OF TREE (FT)	IMPERMEABLE LINER?
DMA-3	TREE WELL # 1-90	TREE WELL	192 (EA)	4-6	—	—	48	90	20	SIDEWALLS ONLY

PERMANENT WATER QUALITY TREATMENT FACILITY

KEEPING OUR WATER WAYS CLEAN
MAINTAIN WITH CARE – NO MODIFICATIONS WITHOUT AGENCY APPROVAL

DETAIL WATER QUALITY SIGN– PLACED AT EACH BIOFILTRATION BASIN

NOTE: ALL BIOFILTRATION AREAS WILL HAVE A SIGN POSTED TO BE VISIBLE AT ALL TIMES.

BMPS FOR EXISTING AND PROPOSED FEATURES

1. 4.3.2 CONSERVE NATURAL AREAS, SOILS AND VEGETATION
2. 4.3.3 MINIMIZE IMPERVIOUS AREA
3. 4.3.5 IMPERVIOUS AREA DISPERSION
4. SD-A TREE WELL
5. BF-1 BIOFILTRATION

COMMON IMPERVIOUS OUTDOOR SITE FEATURES

SIDEWALKS AND WALKWAYS – SD-D

4.2.6(A) ON-SITE STORM DRAIN INLETS

4.2.6(E) LANDSCAPE/OUTDOOR PESTICIDE USE

POST-PROJECT DMA AND TREATMENT CONTROL CALCULATIONS

A. FEATURES REQUIRED FOR ALL EXHIBITS
1. EXISTING SITE FEATURES
   - UNDERLYING HYDROLOGIC SOIL GROUP – (C) AND (D)
   - APPROXIMATE DEPTH TO GROUNDWATER – GREATER THAN 20 FEET
   - NATURAL HYDROLOGIC FEATURES – NO NATURAL HYDROLOGIC FEATURES ONSITE
   - TOPOGRAPHY AND IMPERVIOUS AREAS – SITE IS NATURAL TERRAIN WITH EXISTING DIRT ROAD AND ZERO IMPERVIOUS
   - EXISTING DRAINAGE NETWORK, DIRECTIONS, AND OFFSITE CONNECTIONS – SHOWN ON EXHIBIT

2. DRAINAGE MANAGEMENT AREA (DMA) INFORMATION
   - PROPOSED DRAINAGE NETWORK, DIRECTIONS, AND OFFSITE CONNECTIONS – SHOWN ON EXHIBIT
   - DMA BOUNDARIES, ID NUMBERS, AREAS, AND TYPE (STRUCTURAL BMP, DE MINIMIS, ETC.) – SHOWN ON EXHIBIT

3. PROPOSED FEATURES AND BMPS SPECIFIC TO INDIVIDUAL SWQMP ATTACHMENTS
   - GROUP 1, 2, AND 3 FEATURES
     - GROUP 1 ITEMS – SITE IS MASS GRADED ~ NOT APPLICABLE
     - GROUP 2 ITEMS – SEE EXHIBIT
     - GROUP 3 ITEMS – SEE EXHIBIT
   - GROUP 4 FEATURES – NOT APPLICABLE
   - CONSTRUCTION BMPS

B. PROPOSED FEATURES AND BMPS SPECIFIC TO INDIVIDUAL SWQMP ATTACHMENTS

ATTACHMENT 6 SSD-BMP IMPERVIOUS DISPERSION AREAS
SSD-BMP TREE WELLS
ATTACHMENT 7 STRUCTURAL POLLUTANT CONTROL BMPS
ATTACHMENT 8 STRUCTURAL HYDROMODIFICATION MANAGEMENT BMPS
POINT(S) OF COMPLIANCE (POC) FOR HYDROMODIFICATION MANAGEMENT
PROPOSED DRAINAGE BOUNDARY AND DRAINAGE AREA TO EACH POC
POC(S) ARE A PART OF MAIN SWQMP.
ATTACHMENT 9 ONSITE CCSYAS
SEE ATTACHMENT BMP

NORTH COUNTY ENVIRONMENTAL RESOURCES

SEE HYDROLOGY STUDY FOR DETENTION SYSTEM SIZING (TYP.–ALL SUB BASINS)

COUNTY OF SAN DIEGO PRELIMINARY GRADING PLAN
NORTH COUNTY ENVIRONMENTAL RESOURCES

OWNER / DEVELOPER

ADJ HOLDINGS, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY
807 E. MISSION ROAD
SAN MARCOS, CA 92069
760-744-9040

PARCEL ADDRESS

25568 MESA ROCK ROAD
ESCONDIDO, CA 92029

APN NO.	NET AC	GROSS AC
(1) 187-100-23	6.23	6.98
(2) 187-100-31	2.60	2.62
(3) 187-100-33	6.32	6.32
** (4) 187-100-35	5.80	7.02
** (5) 187-100-37	35.49	35.49
(6) 187-100-38	79.21	81.11
TOTAL	135.65	139.54

**ADJUSTED ACREAGE (AFTER BOUNDARY ADJUSTMENT)

(4) 187-100-35	23.24	24.46
(5) 187-100-37	18.03	18.03

SUMMARY TABLE

EXISTING:
COVERED PATIO, 634 SQFT (TO BE REMOVED)
ONE (1) SECURITY TRAILER 480 SQFT
(TO BE RELOCATED PRIOR TO GRADING)

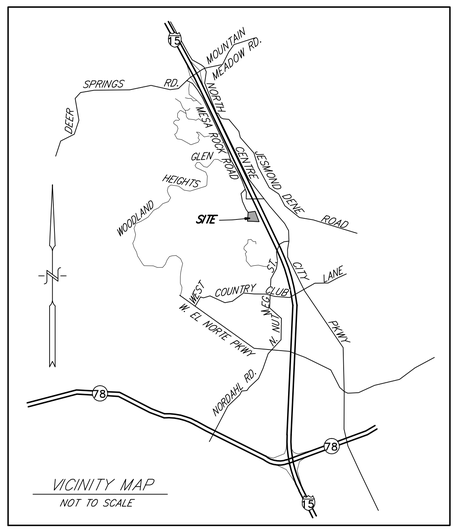
PROPOSED:
RECYCLING - SHOP, OFFICE & WASH RACK 12,000 SQFT

SETBACK DESIGNATOR C

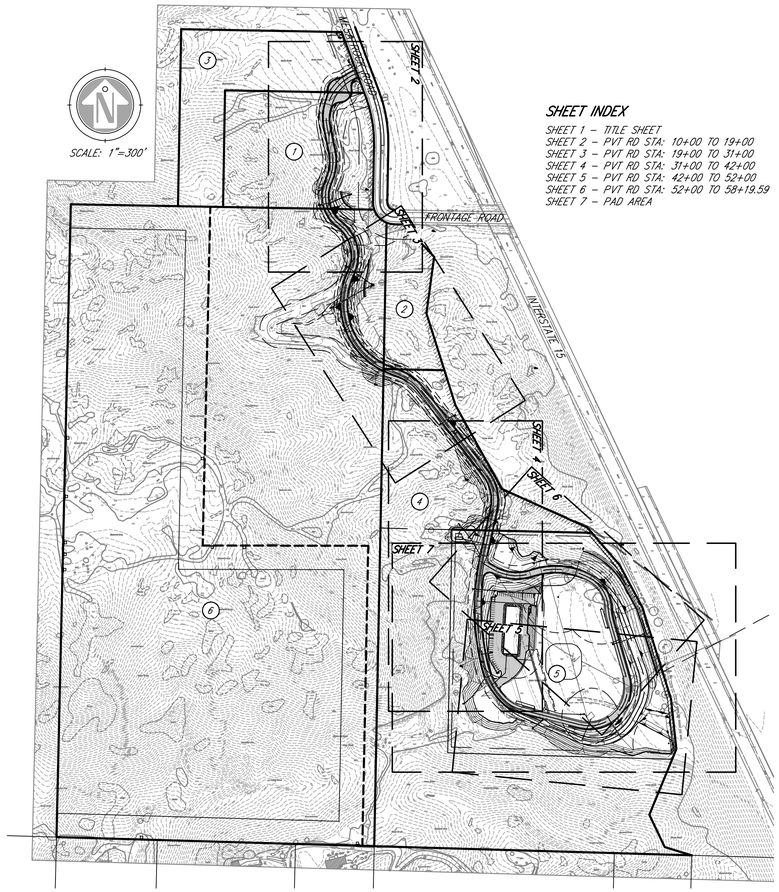
FRONT YARD SETBACK	30 FT (60 FT FROM CL)
SIDE YARD SETBACK (INTERIOR)	15 FT
REAR YARD SETBACK	25 FT

MAXIMUM NUMBER OF EMPLOYEES:
18

SEWER - VALLECITOS WATER DISTRICT
WATER - VALLECITOS WATER DISTRICT
GAS & ELECTRIC - SAN DIEGO GAS & ELECTRIC
TELEPHONE - AT&T
FIRE - DEER SPRINGS FIRE PROTECTION DISTRICT
SCHOOLS - ESCONDIDO UNION HIGH SCHOOL DISTRICT
AND ESCONDIDO UNION SCHOOL DISTRICT.



VICINITY MAP
NOT TO SCALE



SHEET INDEX

SHEET 1 - TITLE SHEET
SHEET 2 - PVT RD STA: 10+00 TO 19+00
SHEET 3 - PVT RD STA: 19+00 TO 31+00
SHEET 4 - PVT RD STA: 31+00 TO 43+00
SHEET 5 - PVT RD STA: 42+00 TO 52+00
SHEET 6 - PVT RD STA: 52+00 TO 58+19.59
SHEET 7 - PAD AREA

LEGAL DESCRIPTION

PARCEL 1: A PORTION OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 32, TOWNSHIP 11 SOUTH, RANGE 2 WEST

PARCEL 2: A PORTION OF THE WEST HALF OF THE SOUTHWEST QUARTER OF SECTION 32, TOWNSHIP 11 SOUTH, RANGE 2 WEST

PARCEL 3: A PORTION OF THE SOUTH HALF OF THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 32 TOWNSHIP 11 SOUTH, RANGE 2 WEST

PARCEL 4: A PORTION OF THE EASTERLY 687.07 FEET OF THE SOUTHERLY 489 FEET OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 32, TOWNSHIP 11 SOUTH, RANGE 2 WEST

PARCEL 5: A PORTION OF THE NORTH HALF OF THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 32, TOWNSHIP 11 SOUTH, RANGE 2 WEST

PARCEL 6: A PORTION OF THE SOUTHERLY 742.60 FEET OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER AND THE SOUTHERLY 742.60 FEET OF THE EASTERLY 875.38 FEET OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 32, TOWNSHIP 11 SOUTH, RANGE 2 WEST

SOURCE OF TOPOGRAPHY

AERIAL PHOTOGRAMMETRY BY INLAND AERIAL SURVEYS INC. DATED MAY 09, 2007.

ASSESSOR'S PARCEL NUMBER

187-100-23, 187-100-31, 187-100-33, 187-100-35, 187-100-37, 187-100-38.

OWNER CERTIFICATE

I HEREBY CERTIFY THAT I AM THE RECORD OWNER OF THE PROPERTY SHOWN ON THIS SITE PLAN AND THAT SAID SITE PLAN SHOWS MY ENTIRE CONTIGUOUS OWNERSHIP. I UNDERSTAND THAT PROPERTY IS CONSIDERED CONTIGUOUS EVEN IF IT SEPARATED BY ROADS, STREETS, UTILITY EASEMENTS OR RAILROAD RIGHTS OF WAY.

OWNER / DEVELOPER

ADJ HOLDINGS, LLC & ARIE E. DE JONG, III AND SILVA DE JONG FAMILY TRUST
807 E. MISSION ROAD
SAN MARCOS, CA 92069

ARIE E. DE JONG _____ DATE _____

EASEMENT NOTE

EASEMENTS OF RECORD NOT SHOWN HEREON SHALL BE HONORED, ABANDONED AND / OR RELOCATED TO THE SATISFACTION OF ALL INTERESTED PARTIES. PUBLIC UTILITY EASEMENTS NECESSARY TO SERVE THIS PROJECT WILL BE COORDINATED WITH THE SERVING UTILITY COMPANY.

NO.	DOC. NO.	DATE.	BENEFICIARY	DESCRIPTION
(1)	BK2593 PG135	12/26/1947	SAN DIEGO GAS & ELECTRIC	PUBLIC UTILITIES INGRESS AND EGRESS
(2)(3)	1973-044391	02/21/1973	STATE OF CALIFORNIA	RELINQUISHMENT OF ACCESS & SLOPE RIGHTS
(4)(5)	1973-0237544	08/23/1973	STATE OF CALIFORNIA	RELINQUISHMENT OF ACCESS & SLOPE RIGHTS
(6)	1974-0133272	05/22/1974	STATE OF CALIFORNIA	HIGHWAY SLOPE & DRAINAGE
(7)	1978-007076	01/06/1978	PACIFIC TELEPHONE & TELEGRAPH COMPANY	PUBLIC UTILITIES INGRESS AND EGRESS
(8A)	2008-0159874	03/26/2008		PRIVATE ROAD & UTILITIES
(8B)	2008-0218935	04/24/2008		WATER SERVICE
(13)(14)	1973-0166650	06/19/1973	STATE OF CALIFORNIA	RELINQUISHMENT OF ACCESS & SLOPE RIGHTS
(17)	2008-0159890	03/26/2008		PRIVATE ROAD & UTILITIES

EASEMENT INFORMATION SHOWN PER PRELIMINARY TITLE REPORT BY CHICAGO TITLE COMPANY DATED 6/22/2009

WORK TO BE DONE

GRADING AND DRAINAGE WORK CONSIST OF THE FOLLOWING WORK TO BE DONE ACCORDING TO THESE PLANS, THE CURRENT SAN DIEGO AREA REGIONAL STANDARD DRAWINGS, THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1997 EDITION AND PER THE SAN DIEGO COUNTY GRADING ORDINANCE.

ITEM	SYMBOL
CUT (1.5:1)	
FILL (2:1)	
6" AC PAVING	
6" CURB & GUTTER	
24" CATCH BASIN	OR
6" PVC STORM DRAIN	
12" PVC STORM DRAIN	
RIP-RAP ENERGY DISSIPATOR	
SAND FILTER	
BIO-RETENTION SWALE	
BROW DITCH	
6' TALL SOLID FENCE	
HEADWALL	

LEGEND

	ASPHALT PAVEMENT
990	EXISTING MAJOR CONTOUR
990	PROPOSED MAJOR CONTOUR
	STREET LIGHT
	1.5:1 CUT SLOPE
	2:1 FILL SLOPE
995.50	SPOT ELEVATION
X%	DIRECTION OF DRAINAGE
	PROPERTY LINE
	GRADING LIMIT
FS	FINISHED SURFACE
	EXISTING SEWER MANHOLE
HP	HIGH POINT
LP	LOW POINT
FL	FLOW LINE
FF	FINISH FLOOR
(990.00)	EXISTING SPOT ELEVATION
GAS	EXISTING GAS MAIN
S	EXISTING SEWER LINE
W	EXISTING WATER LINE
W	PROPOSED WATER LINE

IMPORTANT NOTICE
Section 4216/4217 of the Government Code requires a Dig Alert Identification Number be issued before a "Permit to Excavate" will be valid. For your Dig Alert I.D. Number Call Underground Service Alert
TOLL FREE 1-800-422-4133
Two working days before you dig.

OWNER'S / PERMITTEE'S

NAME: ADJ HOLDINGS, LLC & ARIE E. DE JONG, III AND SILVA DE JONG FAMILY TRUST
ADDRESS: 807 E. MISSION ROAD SAN MARCOS, CA 92069
TELEPHONE NO: (760) 744-9040
SHORT LEGAL DESCIPTION:
PARCEL 1: A PORTION OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 32, TOWNSHIP 11 SOUTH, RANGE 2 WEST; PARCEL 2: A PORTION OF THE WEST HALF OF THE SOUTHWEST QUARTER OF SECTION 32, TOWNSHIP 11 SOUTH, RANGE 2 WEST; PARCEL 3: A PORTION OF THE SOUTH HALF OF THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 32 TOWNSHIP 11 SOUTH, RANGE 2 WEST; PARCEL 4: A PORTION OF THE EASTERLY 687.07 FEET OF THE SOUTHERLY 489 FEET OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 32, TOWNSHIP 11 SOUTH, RANGE 2 WEST; PARCEL 5: A PORTION OF THE NORTH HALF OF THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 32, TOWNSHIP 11 SOUTH, RANGE 2 WEST; PARCEL 6: A PORTION OF THE SOUTHERLY 742.60 FEET OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER AND THE SOUTHERLY 742.60 FEET OF THE EASTERLY 875.38 FEET OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 32, TOWNSHIP 11 SOUTH, RANGE 2 WEST
A.P.N. NO: 187-100-23,31,33,35,37&38
SITE ADDRESS: 25590-B MESA ROCK ROAD, UNINCORPORATED ESCONDIDO, CA 92026

NOTICE: THE SUBJECT PROPERTY MAY CONTAIN WETLANDS, A LAKE, A STREAM, AND/OR WATERS OF THE U.S. AND/OR STATE WHICH MAY BE SUBJECT TO REGULATION BY STATE AND/OR FEDERAL AGENCIES, INCLUDING, BUT NOT LIMITED TO, THE REGIONAL WATER QUALITY CONTROL BOARD, U.S. ARMY CORPS OF ENGINEERS AND THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE. IT IS THE APPLICANT'S RESPONSIBILITY TO CONSULT WITH EACH AGENCY TO DETERMINE IF A PERMIT, AGREEMENT OR OTHER APPROVAL IS REQUIRED AND TO OBTAIN ALL NECESSARY PERMITS, AGREEMENTS OR APPROVALS BEFORE COMMENCING ANY ACTIVITY WHICH COULD IMPACT THE WETLANDS, LAKE, STREAM, AND/OR WATERS OF THE U.S. ON THE SUBJECT PROPERTY. THE AGENCY CONTACT INFORMATION IS PROVIDED BELOW.

U.S. ARMY CORPS OF ENGINEERS: 915 WILSHIRE BLVD., SUITE 1101, LOS ANGELES, CA 90017; (213) 452-3333; HTTP://WWW.USACE.ARMY.MIL/
REGIONAL WATER QUALITY CONTROL BOARD: 2375 NORTHSIDE DRIVE, SUITE 100, SAN DIEGO, CA 92108; RB9_DREDGEFILL@WATERBOARDS.CA.GOV ; HTTP://WWW.WATERBOARDS.CA.GOV/SANDIEGO/
CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE: 3883 RUFFIN RD., SAN DIEGO, CA 92123; (858) 636-3160; ASKR5@WILDLIFE.CA.GOV HTTP://WWW.DFG.CA.GOV/

PRELIMINARY GRADING PLAN NOTE:
THIS PLAN IS PROVIDED TO ALLOW FOR FULL AND ADEQUATE DISCRETIONARY REVIEW OF A PROPOSED DEVELOPMENT PROJECT. THE PROPERTY OWNER ACKNOWLEDGES THAT ACCEPTANCE OR APPROVAL OF THIS PLAN DOES NOT CONSTITUTE AN APPROVAL TO PERFORM ANY GRADING SHOWN HEREON, AND AGREES TO OBTAIN A VALID GRADING PERMIT BEFORE COMMENCING SUCH ACTIVITY.

CEQA FINDING:
IT IS HEREBY FOUND THAT THE PROJECT PROPOSED BY THE APPLICATION HAS PREPARED PLANS AND DOCUMENTATION DEMONSTRATING COMPLIANCE WITH THE PROVISIONS OF THE COUNTY OF SAN DIEGO WATERSHED PROTECTION, STORM WATER MANAGEMENT, AND DISCHARGE CONTROL ORDINANCE.

NOTICE:
"THE ISSUANCE OF THIS PERMIT/APPROVAL BY THE COUNTY OF SAN DIEGO DOES NOT AUTHORIZE THE APPLICANT FOR SAID PERMIT/APPROVAL TO VIOLATE ANY FEDERAL, STATE, OR COUNTY LAWS, ORDINANCES, REGULATIONS, OR POLICIES INCLUDING, BUT NOT LIMITED TO, THE FEDERAL ENDANGERED SPECIES ACT AND ANY AMENDMENTS THERETO."

FEMA FLOOD ZONE:
ZONE X - AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN.

ENGINEER OF WORK

EXCEL ENGINEERING
440 STATE PLACE
ESCONDIDO, CA 92029
PHONE (760) 745-8118
FAX (760) 745-1890

ROBERT D. DENTINO RCE 45629

EXCEL ENGINEERING
LAND PLANNING • ENGINEERING • SURVEYING
440 STATE PLACE, ESCONDIDO, CA 92029
PH (760)745-8118 FX (760)745-1890

REGISTERED PROFESSIONAL ENGINEER
ROBERT D. DENTINO
No. 45629
Exp.12-31-14
CIVIL
STATE OF CALIFORNIA

GRADING STATMENT

CUT = 95,710 CY
FILL = 182,430 CY
IMPORT= 72,360 CY

NOTES:
1. EARTHWORK QUANTITIES SHOWN ON THIS PLAN WERE CALCULATED USING PRISMOIDAL METHODS, FOR PURPOSES OF DETERMINING BOND AMOUNTS. A 15% BUILDING FACTOR WAS APPLIED TO THE CUT VOLUME. NO SHRINK FACTORS WERE CALCULATED, FILL AREAS, IMPORT MATERIAL, ETC. CONTRACTORS ARE RESPONSIBLE FOR DETERMINING BID QUANTITIES.

2. GRADING OF CUT SLOPES AT A MAXIMUM SLOPE OF 1.5:1 AND AT A MAXIMUM HEIGHT OF UP TO 55 FEET (WITH NO TERRACES) HAS BEEN APPROVED BY THE PROJECT GEOTECHNICAL ENGINEER, WEST COAST GEOTECHNICAL CONSULTANTS INC., IN A MAY 7TH, 2013, "ADDENDUM NO. 2 TO OUR REPORT OF GEOTECHNICAL INVESTIGATION DATED NOVEMBER 1, 2012: STABILITY OF CUT SLOPES".

PERMITS

REZONE PERMIT NO. N/A
SPECIAL USE PERMIT NO. N/A
TENTATIVE MAP NO. N/A

BENCH MARK

DESCRIPTION: 2" IP WITH 2.5" BRASS DISC STAMPED "EGCS 1992 1021" IN PAVEMENT
LOCATION: 0.15MI S. OF INT. WHITING WOODS DR. & MESA ROCK RD.
RECORD FROM: MAP NO. 14236
ELEVATION: 1045.829 DATUM: USGS

PRIVATE CONTRACT

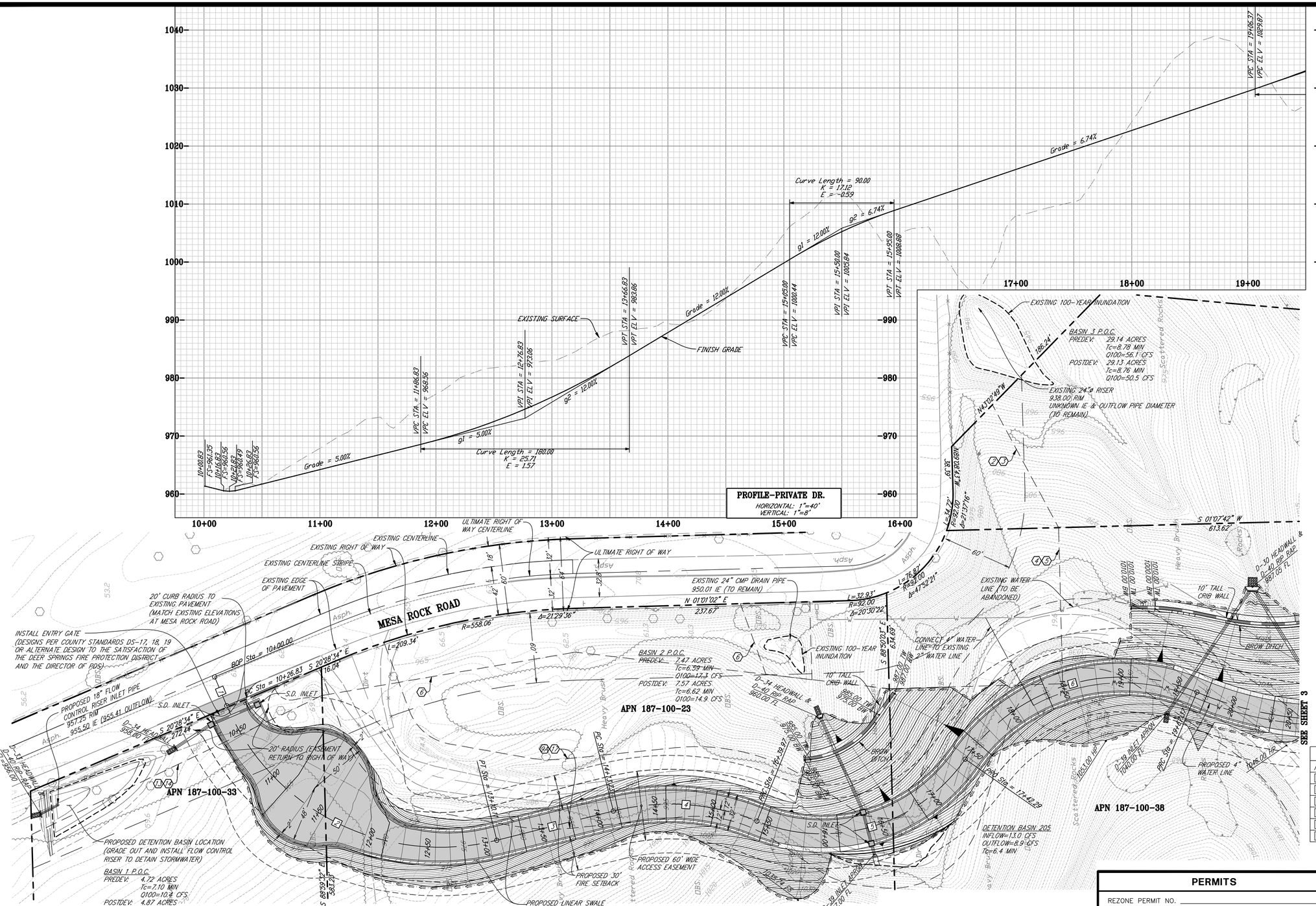
SHEET 1 | COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS | 7 SHEETS

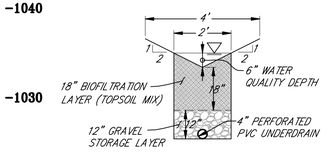
PRELIMINARY GRADING PLAN FOR:
NORTH COUNTY ENVIRONMENTAL RESOURCES
APN: 187-100-23,31,33,35,37&38
CALIFORNIA COORDINATE INDEX 362-1731

APPROVED
DIRECTOR OF PUBLIC WORKS
BY:

ENGINEER OF WORK:
ROBERT D. DENTINO
RCE 45629

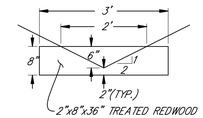
GRADING PERMIT NO:





TYPICAL SECTION
LINEAR SWALE CONFIGURED
BIORETENTION SYSTEM

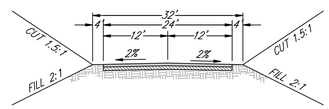
NOT TO SCALE



DETAIL
CHECK DAM @ LINEAR SWALE CONFIGURED
BIORETENTION SYSTEM "STEP"

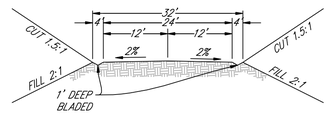
NOT TO SCALE

"STEP" NOTE:
INSTALL CHECK DAMS TO CREATE "STEPS" IN BIORETENTION SYSTEM, AT INTERVALS REQUIRED TO CREATE 6" WATER QUALITY DEPTH (I.E. ONE CHECK DAM EVERY 50' ON A 1% SLOPE AND EVERY 4.17' ON A 12% SLOPE).



TYPICAL SECTION
PRIVATE ROAD

NOT TO SCALE



TYPICAL SECTION
BENCH GRADING

NOT TO SCALE

SEE SHEET 3

CENTERLINE DATA				
NO	DELTA/BRG	RADIUS	LENGTH	REMARK
1	N89°40'59"E	--	26.83'	" "
2	Δ= 81°09'15"	200.00'	283.28'	" "
3	N11°28'16"W	--	103.61'	" "
4	Δ= 36°09'57"	200.00'	126.24'	" "
5	Δ= 77°16'49"	150.00'	202.32'	" "
6	Δ= 78°09'40"	165.00'	225.09'	" "

EXCEL ENGINEERING
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440 STATE PLACE, ESCONDIDO, CA 92029
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REGISTERED PROFESSIONAL ENGINEER
ROBERT D. DENTINO
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CIVIL
STATE OF CALIFORNIA

PERMITS

REZONE PERMIT NO. _____
SPECIAL USE PERMIT NO. _____
TENTATIVE MAP NO. _____

BENCH MARK

DESCRIPTION: 2" IP WITH 2.5" BRASS DISC STAMPED "EGCS 1992 1021" IN PAVEMENT
LOCATION: 0.15MI S. OF INT. WHITING WOODS DR. & MESA ROCK RD.
RECORD FROM: MAP NO. 14236
ELEVATION: 1045.829 DATUM: USGS

PRIVATE CONTRACT

SHEET 2 | COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS | 7 SHEETS

PRELIMINARY GRADING PLAN FOR: STA 10+00 TO 19+00

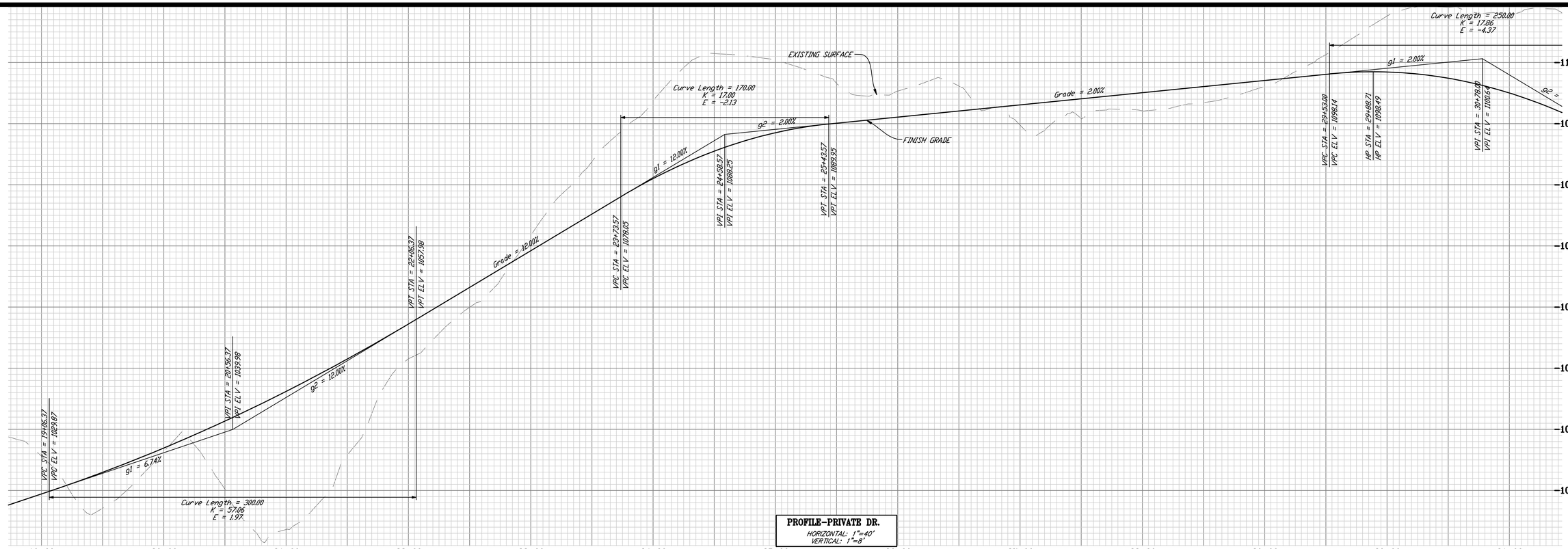
NORTH COUNTY ENVIRONMENTAL RESOURCES

APN: 187-100-23,31,33,35,37&38
CALIFORNIA COORDINATE INDEX 362-1731

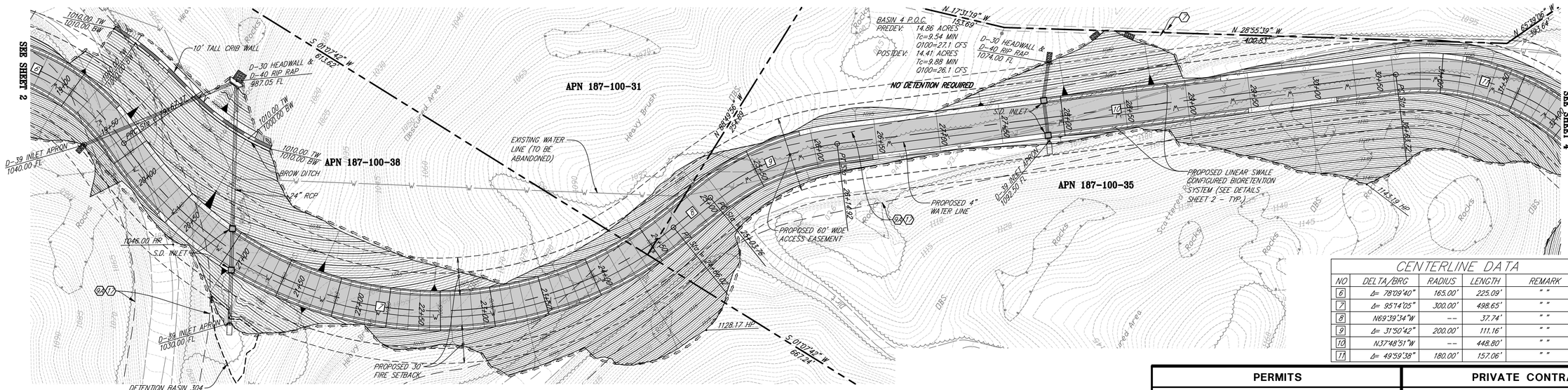
APPROVED
DIRECTOR OF PUBLIC WORKS
BY:

ENGINEER OF WORK
ROBERT D. DENTINO
R.C.E. 45629

GRADING PERMIT NO:



PROFILE-PRIVATE DR.
HORIZONTAL: 1"=40'
VERTICAL: 1"=8'



CENTERLINE DATA				
NO	DELTA/BRG	RADIUS	LENGTH	REMARK
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7	Δ= 95°14'05"	300.00'	498.65'	" "
8	N69°39'34"W	--	37.74'	" "
9	Δ= 31°50'42"	200.00'	111.16'	" "
10	N37°48'51"W	--	448.80'	" "
11	Δ= 49°59'38"	180.00'	157.06'	" "

SCALE: 1"=40'
0 40 80 120 160

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ROBERT D. DENTINO
No. 45629
Exp.12-31-14
CIVIL
STATE OF CALIFORNIA

PERMITS

REZONE PERMIT NO. _____
SPECIAL USE PERMIT NO. _____
TENTATIVE MAP NO. _____

BENCH MARK

DESCRIPTION: 2" IP WITH 2.5" BRASS DISC STAMPED "EGCS 1992 1021" IN PAVEMENT
LOCATION: 0.15MI S. OF INT. WHITING WOODS DR. & MESA ROCK RD.
RECORD FROM: MAP NO. 14236
ELEVATION: 1045.829 DATUM: USGS

PRIVATE CONTRACT

SHEET 3 | COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS | 7 SHEETS

PRELIMINARY GRADING PLAN FOR: STA 19+00 TO 31+00

NORTH COUNTY ENVIRONMENTAL RESOURCES

APN: 187-100-23,31,33,35,37&38
CALIFORNIA COORDINATE INDEX 362-1731

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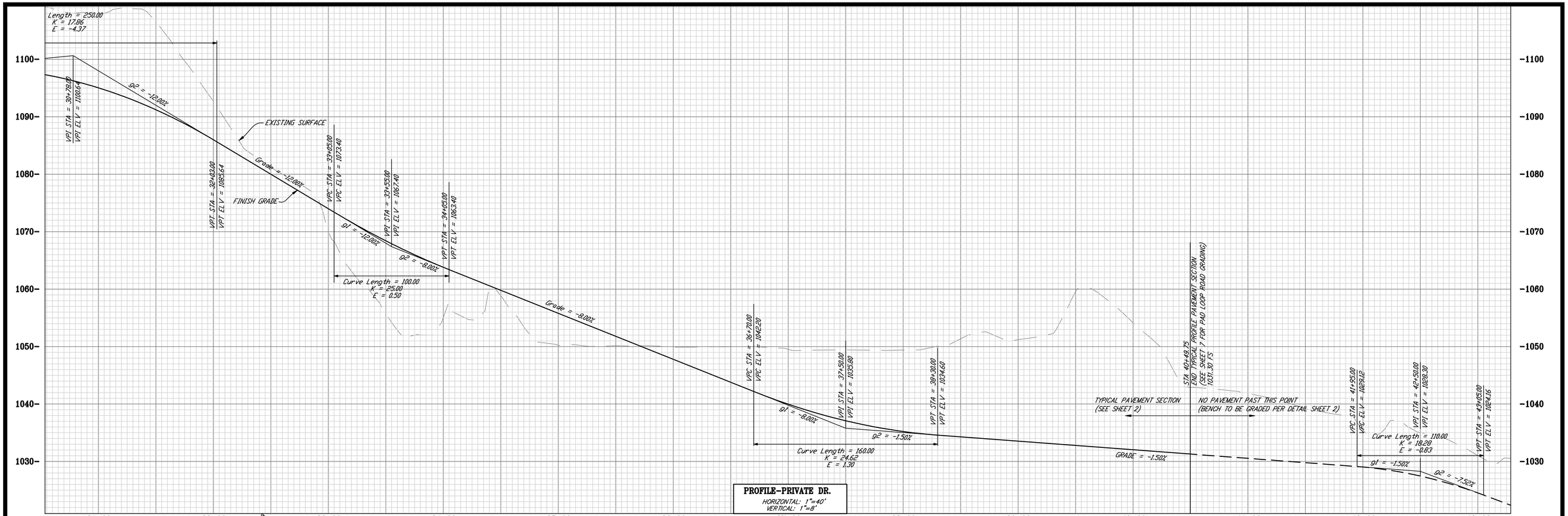
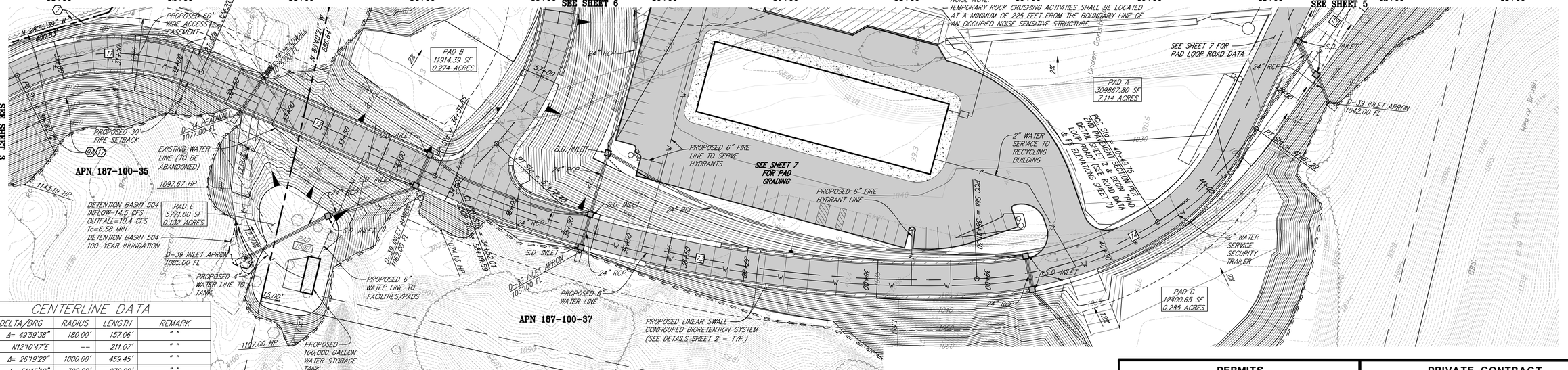
ROBERT D. DENTINO
R.C.E. 45629

GRADING PERMIT NO:





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12	N12°10'47"E	--	211.07'	" "
13	Δ= 26°19'29"	1000.00'	459.45'	" "
14	Δ= 51°45'18"	300.00'	270.99'	" "
15	N65°54'01"W	--	241.44'	" "

SCALE: 1"=40'

0 40 80 120 160

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PERMITS

REZONE PERMIT NO. _____
SPECIAL USE PERMIT NO. _____
TENTATIVE MAP NO. _____

BENCH MARK

DESCRIPTION: 2" IP WITH 2.5" BRASS DISC STAMPED "EGCS 1992 1021" IN PAVEMENT
LOCATION: 0.15MI S. OF INT. WHITING WOODS DR. & MESA ROCK RD.
RECORD FROM: MAP NO. 14236
ELEVATION: 1045.829 DATUM: USGS

PRIVATE CONTRACT

SHEET 4 | COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS | 7 SHEETS

PRELIMINARY GRADING PLAN FOR: STA 31+00 TO 42+00

NORTH COUNTY ENVIRONMENTAL RESOURCES

APN: 187-100-23,31,33,35,37&38
CALIFORNIA COORDINATE INDEX 362-1731

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BY:

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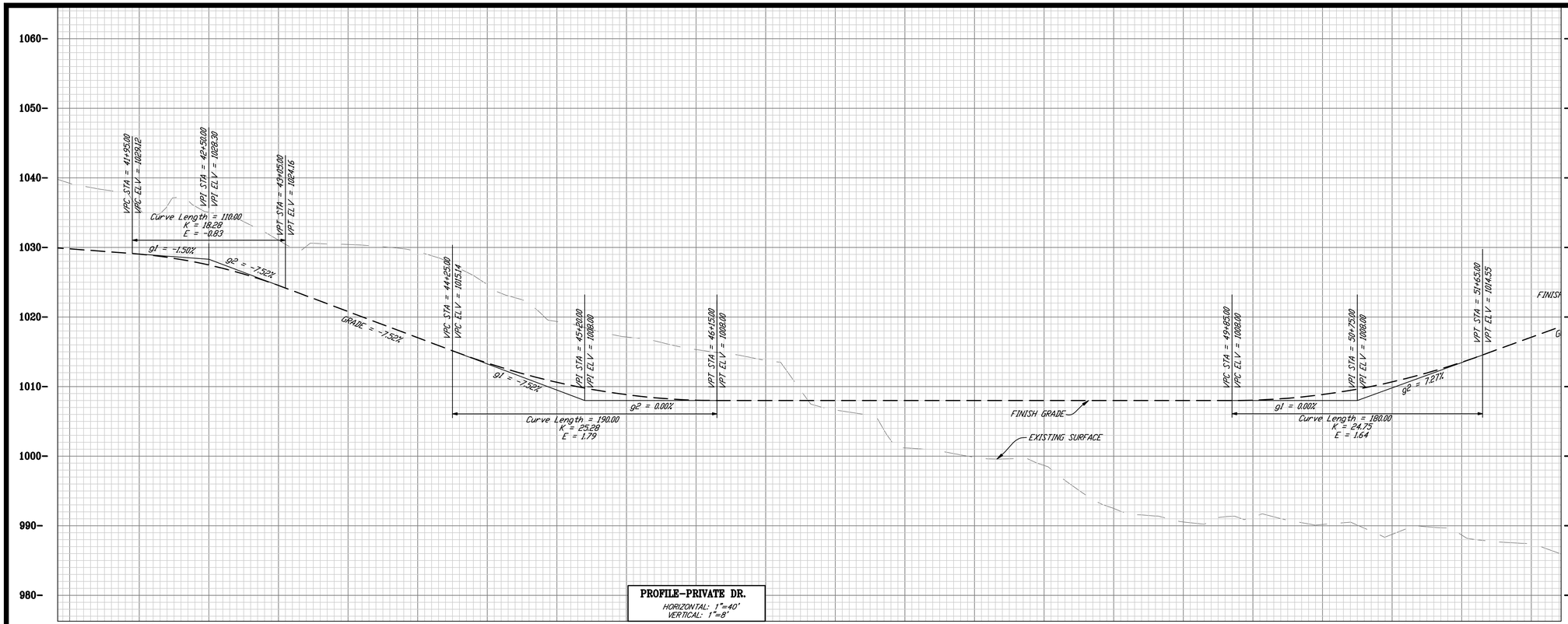
ROBERT D. DENTINO
R.C.E. 45629

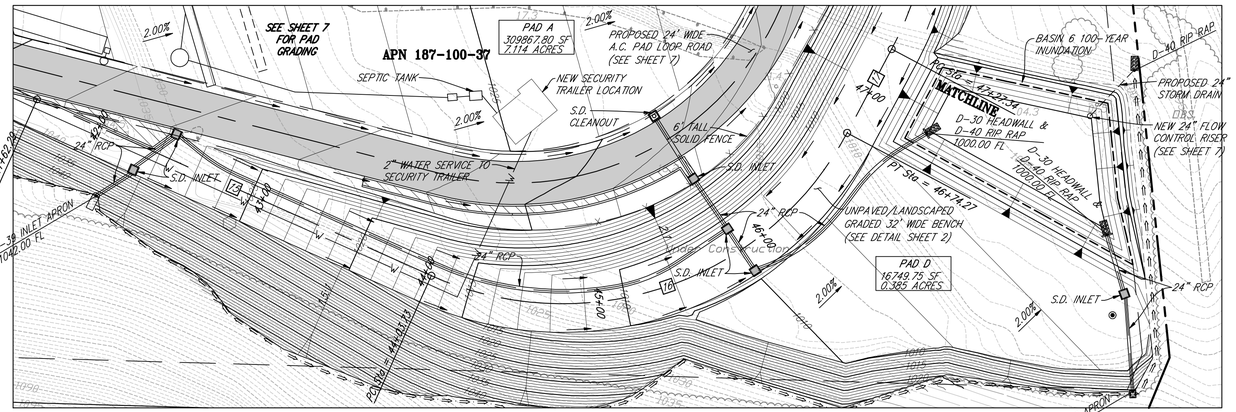
GRADING PERMIT NO:



PROFILE–PRIVATE DR.
HORIZONTAL: 1"=40'
VERTICAL: 1"=8'

CENTERLINE DATA				
NO	DELTA/BRG	RADIUS	LENGTH	REMARK
15	N65°54'01"W	--	241.44'	" "
16	Δ= 86°07'01"	180.00'	270.54'	" "
17	N27°58'58"E	--	53.07'	" "
18	Δ= 47°55'30"	200.00'	167.29'	" "
19	N19°56'31"W	--	235.96'	" "
20	Δ= 89°02'33"	300.00'	466.23'	" "

SEE SHEET 4



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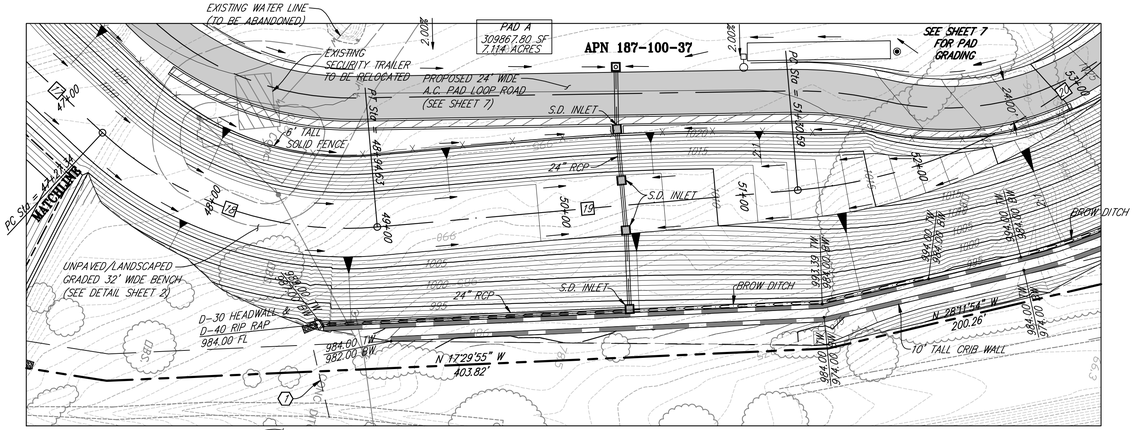

SCALE: 1"=40'
0 40 80 120 160

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Exp.12-31-18
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STATE OF CALIFORNIA

PERMITS

REZONE PERMIT NO. _____
SPECIAL USE PERMIT NO. _____
TENTATIVE MAP NO. _____

BENCH MARK

DESCRIPTION: *2" IP WITH 2.5" BRASS DISC STAMPED "EGCS 1992 1021" IN PAVEMENT*
LOCATION: *0.15MI S. OF INT. WHITING WOODS DR. & MESA ROCK RD.*
RECORD FROM: *MAP NO. 14236*
ELEVATION: *1045.829* DATUM: *USGS*

PRIVATE CONTRACT

SHEET	COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS	SHEETS
5		7

PRELIMINARY GRADING PLAN FOR: *STA 42+00 TO 52+00*

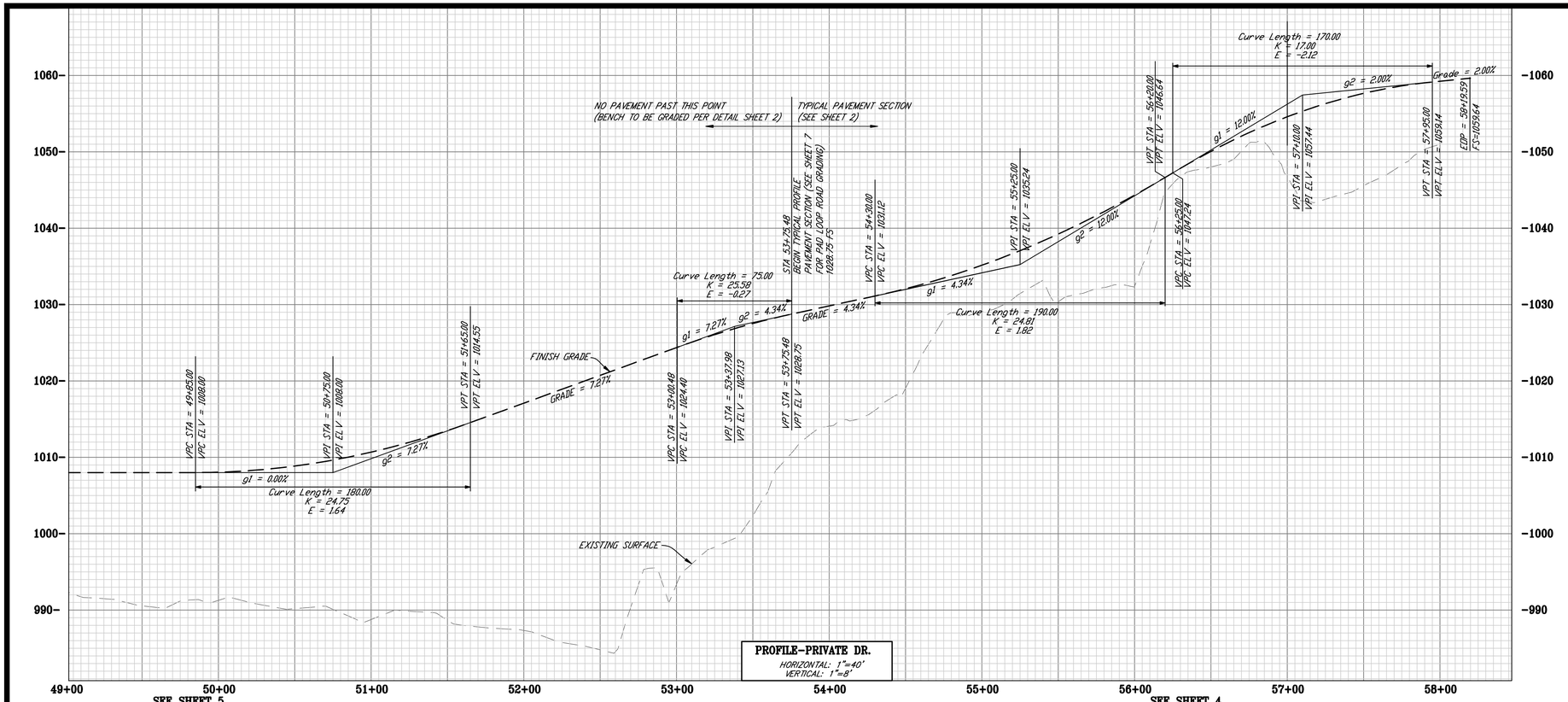
NORTH COUNTY ENVIRONMENTAL RESOURCES

APN: *187-100-23,31,33,35,37&38*
CALIFORNIA COORDINATE INDEX *362-1731*

APPROVED
DIRECTOR OF PUBLIC WORKS
BY:

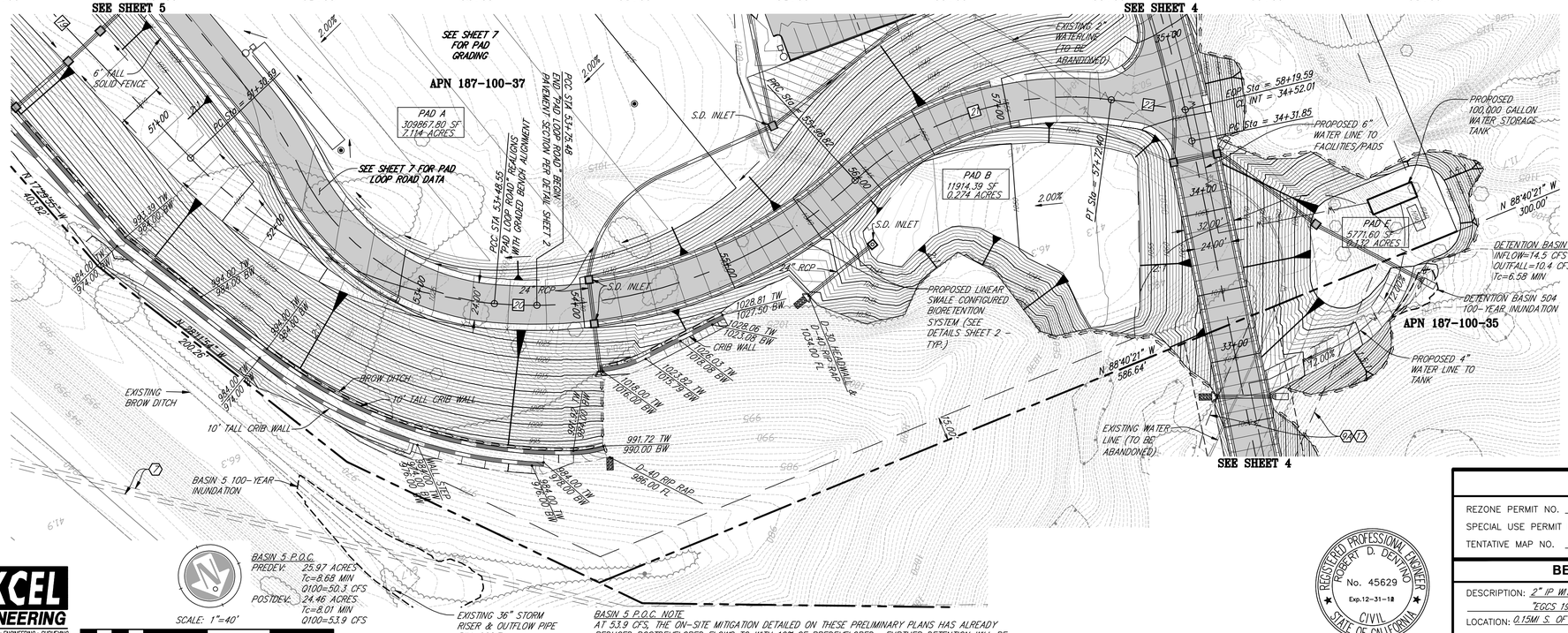
ENGINEER OF WORK
ROBERT D. DENTINO
R.C.E. *45629*

GRADING PERMIT NO:



SEE SHEET 5

SEE SHEET 4



CENTERLINE DATA				
NO	DELTA/BRG	RADIUS	LENGTH	REMARK
19	N19°56'31"W	--	235.96'	" "
20	Δ= 89°02'33"	300.00'	466.23'	" "
21	Δ= 50°18'03"	200.00'	175.58'	" "
22	N58°41'02"W	--	47.19'	" "

BASIN 5 P.O.C.
PREDEV: 25.97 ACRES
Tc=8.68 MIN
Q100=50.3 CFS
POSTDEV: 24.46 ACRES
Tc=8.01 MIN
Q100=53.9 CFS

BASIN 5 P.O.C. NOTE
AT 53.9 CFS, THE ON-SITE MITIGATION DETAILED ON THESE PRELIMINARY PLANS HAS ALREADY REDUCED POSTDEVELOPED FLOWS TO WITH 10% OF PREDEVELOPED. FURTHER DETENTION WILL BE PROVIDED BY THE ON-SITE BIORETENTION VOLUMES TO REDUCE FLOWS TO BELOW PREDEVELOPED LEVELS. THIS MITIGATION WILL BE CALCULATED/DETAILD AT FINAL ENGINEERING.

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ROBERT D. DENTINO
No. 45629
Exp.12-31-18
CIVIL
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PERMITS

REZONE PERMIT NO. _____
SPECIAL USE PERMIT NO. _____
TENTATIVE MAP NO. _____

BENCH MARK

DESCRIPTION: 2" IP WITH 2.5" BRASS DISC STAMPED "EGCS 1992 1021" IN PAVEMENT
LOCATION: 0.15MI S. OF INT. WHITING WOODS DR. & MESA ROCK RD.
RECORD FROM: MAP NO. 14236
ELEVATION: 1045.829 DATUM: USGS

PRIVATE CONTRACT

SHEET 6 | COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS | 7 SHEETS

PRELIMINARY GRADING PLAN FOR: STA 52+00 TO 58+19.59

NORTH COUNTY ENVIRONMENTAL RESOURCES

APN: 187-100-23,31,33,35,37&38
CALIFORNIA COORDINATE INDEX 362-1731

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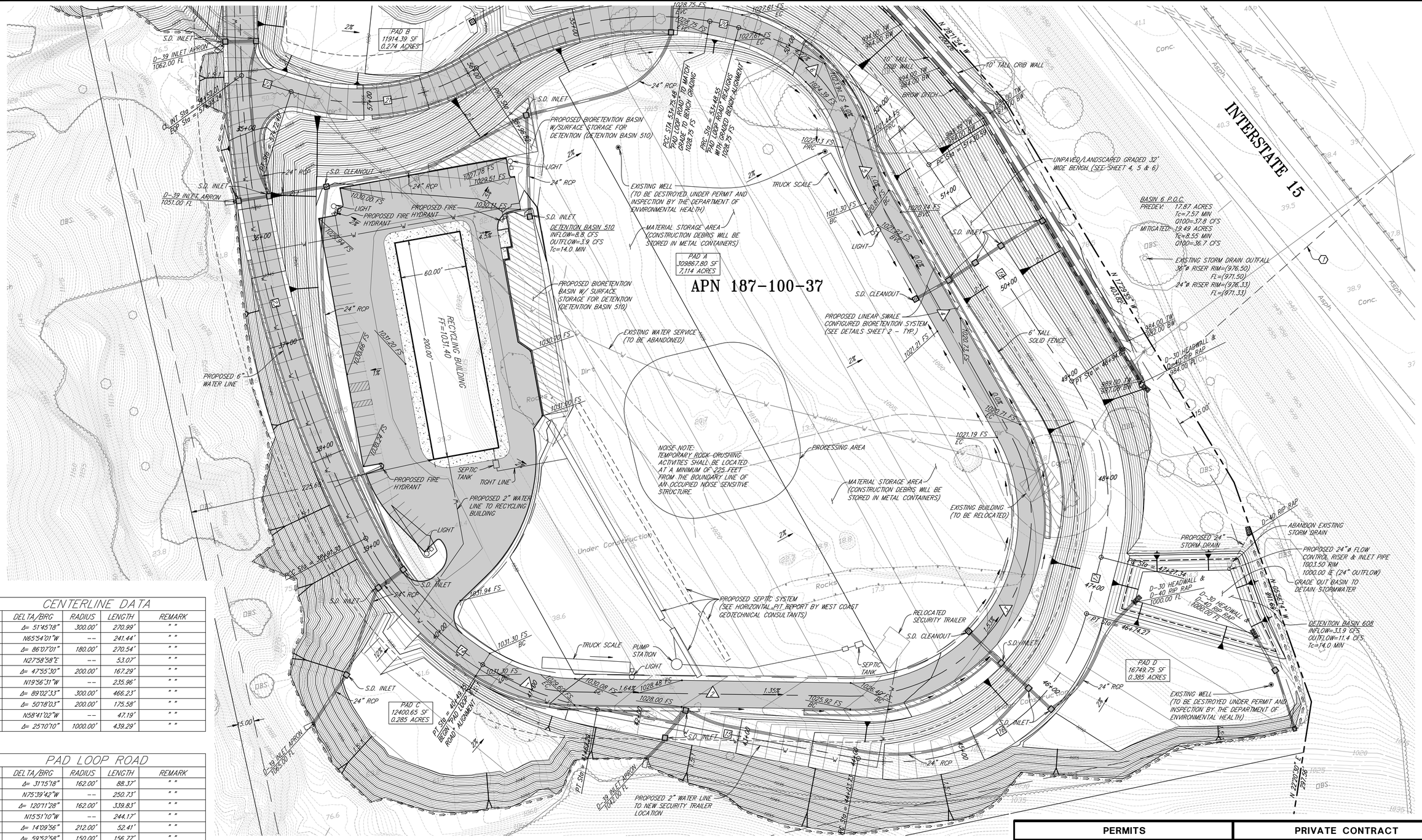
BY:

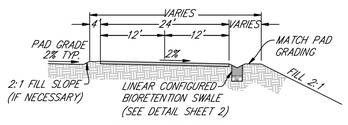
ENGINEER OF WORK
ROBERT D. DENTINO
R.C.E. 45629

GRADING PERMIT NO:



CENTERLINE DATA				
NO	DELTA/BRG	RADIUS	LENGTH	REMARK
14	Δ= 51°45'18"	300.00'	270.99'	" "
15	N65°54'01"W	--	241.44'	" "
16	Δ= 86°07'01"	180.00'	270.54'	" "
17	N27°58'58"E	--	53.07'	" "
18	Δ= 47°55'30"	200.00'	167.29'	" "
19	N19°56'31"W	--	235.96'	" "
20	Δ= 89°02'33"	300.00'	466.23'	" "
21	Δ= 50°18'03"	200.00'	175.58'	" "
22	N58°41'02"W	--	47.19'	" "
23	Δ= 25°10'10"	1000.00'	439.29'	" "

PAD LOOP ROAD				
NO	DELTA/BRG	RADIUS	LENGTH	REMARK
1	Δ= 31°15'18"	162.00'	88.37'	" "
2	N75°39'42"W	--	250.73'	" "
3	Δ= 120°11'28"	162.00'	339.83'	" "
4	N15°51'10"W	--	244.17'	" "
5	Δ= 14°09'56"	212.00'	52.41'	" "
6	Δ= 59°52'58"	150.00'	156.77'	" "



TYPICAL SECTION "PAD LOOP ROAD"
NOT TO SCALE

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ROBERT D. DENTINO
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Exp.12-31-14
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STATE OF CALIFORNIA

PERMITS

REZONE PERMIT NO. _____
SPECIAL USE PERMIT NO. _____
TENTATIVE MAP NO. _____

BENCH MARK

DESCRIPTION: 2" IP WITH 2.5" BRASS DISC STAMPED "EGCS 1992 1021" IN PAVEMENT
LOCATION: 0.15MI S. OF INT. WHITING WOODS DR. & MESA ROCK RD.
RECORD FROM: MAP NO. 14236
ELEVATION: 1045.829 DATUM: USGS

PRIVATE CONTRACT

SHEET 7 | COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS | 7 SHEETS

PRELIMINARY GRADING PLAN FOR:
NORTH COUNTY ENVIRONMENTAL RESOURCES
APN: 187-100-23,31,33,35,37&38
CALIFORNIA COORDINATE INDEX 362-1731

APPROVED
DIRECTOR OF PUBLIC WORKS
BY:

ENGINEER OF WORK
ROBERT D. DENTINO
R.C.E. 45629

GRADING PERMIT NO:

2.3 Construction Plan Sets

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

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

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

ATTACHMENT 3

Source Control BMP Worksheet

3.0 Cover Sheet and General Requirements

- Standard SWQMP Form Table 2 and PDP SWQMP Form Table 3 require the identification of pollutant-generating sources and associated BMPs for development projects.

- In some cases, County staff may request additional, more detailed documentation of source control BMP design details. If requested, applicants must submit a completed copy of this Source Control BMP Worksheet. This requirement can be satisfied either by submitting a copy of BMPDM Attachment E.1 (Source Control BMP Requirements) or equivalent documentation at the County's discretion.

- Submit this documentation using this cover sheet.

- Sources and BMPs must also be shown as applicable on DMA exhibits and construction plans (see Attachment 2).

Table 2 – Baseline BMPs for Existing and Proposed Site Features

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

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

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

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

Completion of Part B is not required because:

☐ This is a Small Residential Project, OR

☐ None of these sources or features is proposed.

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

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

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

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

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

ATTACHMENT 4

Previous SWQMP Submittals

4.0 Cover Sheet

- If this SWQMP implements any requirements of an earlier master SWQMP submittal, a copy of that previous submittal must be attached under cover of this sheet.

ATTACHMENT 5

Existing Site and Drainage Description

5.0 General Requirements

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

  ☒ **Yes**

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

    Title: Preliminary Hydrology Study For: North County Environmental Resources

    Prepared By: EXCEL Engineering

    Date: Updated October 22, 2018

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

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

5.1 Description of Existing Site Condition

Provide the requested information below for the project site in its existing condition.

a. Current Site Status

Select all that apply to any portion of the site.

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

b. Existing Land Cover

Provide the area (in acres or square feet) within all applicable categories of land cover below. The total area should equal that of the entire project site.

	Area *(acres or ft²)*
☐ Vegetative Cover	
☒ Non-Vegetated Pervious Areas	38,873
☐ Impervious Areas	

c. Underlying Soil

Select all soil groups that are present on the site.

NRCS Hydrologic Soil Group(s)			
Type A	Type B	Type C	Type D
☐	☐	☒	☒

5.2 Description of Existing Site Drainage

Describe how storm water runoff is conveyed from the site. At a minimum, address the following:

- Is the existing drainage conveyance ☐ **natural** or ☒ **urban**?
- Is runoff from offsite conveyed through the site? ☒ **Yes** ☐ **No**
  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.
- Describe the existing project site drainage conveyance network (including any existing storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels).
- 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. Summarize the pre-project drainage areas and design flows to each of the existing runoff discharge locations.
- Provide additional information as necessary or requested to describe the site drainage.

Description (add pages as necessary to provide all requested information).

The existing project site was used as the quarry pit and rock operations for the Interstate 15 construction. A dirt road was cut out of the existing, steeply sloped hillside and connected the frontage road to the quarry pit/pad area. The quarry pit/pad area was then left as-is and was allowed to regenerate growth of vegetation in some areas and the pad has sat, largely unused until recently when it was subjected to unauthorized grading and cited by the Planning and Development Services Department with a Grading Violation. The grading occurred within the previously graded quarry pit/pad area and caused a disturbance to the existing vegetation within the area and also extended the boundaries of where the clearing had previously been.

The topography of the site is generally quite steep to the west on up to the ridgeline of the hills that separate the Interstate 15 corridor from Twin Oaks Valley. As the slopes progress to the east towards the freeway, the slopes flatten out some and create several localized depressions that actually, in turn, make up the six individual drainage subbasins for the project (this will be further discussed below). The site is bordered to the east by Mesa Rock Road (Frontage Road) in the northeast corner, and Interstate 15 along the remainder of the eastern boundary. To the south is a parcel that is zoned residential, but is "separated" from the project by steep topography and a ridgeline roughly 500 feet south of the proposed grading operations. No portion of the developed residential parcel contributes flows to this project.

5.3 Description of Proposed Site Development

Provide a general description of the proposed site development, including at a minimum the information requested below. Add pages as necessary.

a. Project description/ Proposed land use and/or activities (project location, development type, size, numbers of units, etc.)

The project site is located in the County of San Diego, south of the Deer Springs Road exit off of Interstate 15 on Mesa Rock Road. The property previously was used (in the 1940's and 1950's) as the quarry pit and rock operations for the Interstate 15 construction. A dirt road was cut out of the existing, steeply sloped hillside and connected the frontage road to the quarry pit/pad area. The proposed facilities (a recycling building with a parking lot, a water storage tank, on site septic, new water service, new dry utilities, etc.) will realign the private road slightly to meet County Road Standards and to allow truck movements, and the previously graded area will be regraded to have a loop road serving several small auxiliary pads in addition to one large mass graded pad that will house the recycling center.

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

Driveway, Building, Parking lot, Sidewalk

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

Landscape areas

d. Does the project include grading and changes to site topography? ☒ **Yes** ☐ **No**
*If **yes**, describe below.*

Existing conditions consists of a dirt road that was cut out of a steeply sloped hillside and connected the frontage road to the quarry pit/pad area. The proposed facilities (a recycling building with a parking lot, a water storage tank, on site septic, new water service, new dry utilities, etc.) will slightly realign the existing private road to meet County Road Standards and to allow truck movements. In the instances that the proposed road deviates from the existing, 2:1 slopes will be graded to the east and west of the proposed road to match the existing grade. The previously graded area will be regraded to have a loop road serving several small auxiliary pads in addition to one large mass graded pad that will house the recycling center.

5.4 Description of Proposed Site Drainage

A. Changes to Site Drainage -- Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)? ☒ **Yes** ☐ **No**

If **yes**:

- Describe (1) the proposed project site drainage conveyance network (including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels), and (2) 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.

Description (add pages as necessary to provide all requested information).

The proposed project site will include new storm drain system to convey offsite flows through the site via culverts, brow ditches and storm drain pipes that discharge over appropriately sized riprap at locations where concentrated flow would occur naturally. All onsite flow from the realigned private road will sheet flow to the nearest proposed street trees and swales designed to capture and treat the runoff. All runoff from the graded pads, recycling facility parking lot will sheet flow to the nearest catch basin to be piped to either of the two biofiltration basin proposed on site. The proposed street trees, swales and biofiltration basins will also act as flow control devices to reduce flows to mimic the pre-developed conditions which then discharge over appropriately sized riprap where concentrated flow would occur naturally.

See table below and the attached corresponding map for a summary of the all drainage areas, discharge locations, and pipe sizes.

Culvert Identification (See Node Map)	Collection Area (Acres)	Flowrate (CFS)	n	Pipe Length (Feet)	Slope (%)	Pipe Diameter (Inches)	W.S. Elev Above Entrance Invert (Feet)	Velocity (FPS)
205-208	5.46	15.2	0.013	88	50	18	1.35	8.8
304-307	23.33	50.0	0.013	118	34.8	24	4.37	15.9
Blank-307	0.68	1.2	0.013	128	35.2	12	0.46	3.3
406-407	8.46	15.6	0.013	5	40.0	18	1.42	9.0
504-505	6.27	14.5	0.013	75	1.3	18	2.00	8.2
522-508	4.39	10.5	0.013	28	3.6	18	2.13	5.9
532-533	3.63	8.9	0.013	55	56.4	18	1.14	6.2
602-603	3.93	9.8	0.013	25	72	18	1.2	21.9

5.4 Description of Proposed Site Drainage

A. Changes to Site Drainage -- Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)? ☒ **Yes** ☐ **No**

If **yes**:

- Describe (1) the proposed project site drainage conveyance network (including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels), and (2) 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.

Description (add pages as necessary to provide all requested information).

Sub-Basin Number	Predeveloped				Postdeveloped				Mitigated
	Area (Acres)	C-Factor	Tc (Min)	100-Year Flowrate (cfs)	Area (Acres)	C-Factor	Tc (Min)	100-Year Flowrate (cfs)	100-Year Flowrate (cfs)
1	4.72	0.3	7.1	10.4	4.87	0.356	6.67	13.3	7.54
2	7.47	0.3	6.59	17.3	7.57	0.322	6.6	18.8	16.43
3	29.14	0.3	8.78	56.1	29.13	0.309	8.75	57.9	32.48
4	14.86	0.3	9.54	27.1	14.14	0.304	9.88	26.1	No mit Necessary
5	25.97	0.3	8.68	50.3	24.46	0.375	7.92	62.8	42.8
6	17.87	0.3	7.57	37.8	19.49	0.499	8.55	63.43	36.74

LEGEND

- WATERCOURSE
- WATERSHED BOUNDARY
- SUB-AREA BOUNDARY
- NODE NUMBER (101)

BASIN 100
4.867 Acres

BASIN 200
7.570 Acres

BASIN 300
29.129 Acres

BASIN 400
14.413 Acres

BASIN 500
24.435 Acres

BASIN 600
19.493 Acres

MESA ROCK RD.

INTERSTATE 15

100-YEAR INUNDATION ELEVATION

BASIN 1 – EXIST. DISCHARGE LOCATION
–DETENTION REQUIRED
–ADDITIONAL GRADING NECESSARY

BASIN 2 – EXIST. DISCHARGE LOCATION
–DETENTION REQUIRED
–NO ADDITIONAL GRADING NECESSARY
(NATURAL BASIN CONFIGURATION)

BASIN 3 – EXIST. DISCHARGE LOCATION
–DETENTION REQUIRED
–NO ADDITIONAL GRADING NECESSARY
(NATURAL BASIN CONFIGURATION)

BASIN 4 – EXIST. DISCHARGE LOCATION
–100-YEAR Q REDUCED
–NO DETENTION REQUIRED
–NO ADDITIONAL GRADING REQUIRED

BASIN 5 – EXIST. DISCHARGE LOCATION
–DETENTION REQUIRED
–NO ADDITIONAL GRADING NECESSARY
(NATURAL BASIN CONFIGURATION)

BASIN 6 – EXIST. DISCHARGE LOCATION
–DETENTION REQUIRED
–ADDITIONAL GRADING NECESSARY

BASIN #	TOTAL
100	4.867 AC
200	7.570 AC
300	29.129 AC
400	14.413 AC
500	24.435 AC
600	19.493 AC

SCALE 1"=150'

0 150 300 450 600

POST-DEVELOPMENT HYDROLOGY MAP

REVISED: 3-13-13

ATTACHMENT 6

Documentation of DMAs without Structural BMPs

6.0 General Requirements

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

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

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

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

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

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

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

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

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

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

<u>Natural and Landscaped Areas</u>

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

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

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

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

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

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

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

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

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

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

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

DMA #	***DMA Area (ft^2)***	***Permit # and Sheet #***

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

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

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

6.3 Self-retaining DMAs using Significant Site Design BMPs

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

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

DMA #	DMA Area (ft^2)	**BMP Type** (choose one per DMA)		*Permit # and Sheet #*
		Dispersion Area (Att. 6.3.1)	**Tree Wells (Att. 6.3.2)**	
101-102	20,430	☐	☒	
103-104	15,501	☐	☒	
111-112	112,912	☐	☒	
113-114	7,662	☐	☒	
121-122	25,004	☐	☒	
123-124	14,394	☐	☒	
131-132	6,915	☐	☒	
133-134	3,509	☐	☒	
201-202	25,393	☐	☒	
203-204	9,091	☐	☒	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	

Copy and Paste table here for additional DMAs

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

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

6.3.1 Self-retaining DMAs with Impervious Dispersion Areas

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

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

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

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

DMA #		
A. Minimum Sizing Requirements		
Verify that minimum standards are satisfied for the applicable dispersion area type below[2].		
Native Soil (Pollutant Control Only) Select one and provide calculations below.		
☐ Soil Group A: Ratio I:P is 2:1 or less ☐ Soil Group B: Ratio I:P is 1:1 or less		
Impervious Area (ft²)	*Permeable Dispersion Area (ft²)*	*Ratio I:P*
Amended Soil (Pollutant Control plus Hydromodification Management)		
Must satisfy both conditions and provide calculations below.		
☐ Ratio I:P is 1:1 or less, AND		
☐ 11 inches or more of the top of the pervious area consists of amended soils (Fact Sheet SD-F)		
Impervious Area (ft²)	*Permeable Dispersion Area (ft²)*	*Ratio I:P*
Permeable Pavement (Pollutant Control Only) Provide calculations below.		
☐ Ratio DMA area to area of permeable pavement is 1.5:1 or less		
DMA Area[3] (ft²)	*Permeable Pavement Area (ft²)*	*Ratio DMA:Pavement*
B. Minimum Design Criteria		
Check the boxes below to confirm that each design criterion has been satisfied for the DMA.		
Impervious Areas:		
☐ Are graded to ensure area that the full DCV drains to the dispersion area before the runoff discharges from the DMA.		
Pervious Dispersion Areas:		
☐ Are less than 5% slope and sheet flow over a distance of at least 10 feet from inflow to overflow route.		
☐ Have inflow velocities of 3 ft/s or less OR use energy dissipation methods (e.g., riprap, level spreader) for concentrated inflows.		
☐ Are densely and robustly vegetated with drought tolerant species.		
☐ Consist of soil types capable of supporting or being amended to support vegetation (e.g., with sand or compost). If applicable, media amendments have been tested to verify that they are not a source of pollutants.		
☐ Are owned by the project owner and will be dedicated to exclude future uses that might reduce their effectiveness.		

Copy and Paste table here for additional DMAs

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

6.3.2 Self-retaining DMAs with Tree Wells

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

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

DMA #	**Tree Wells Requiring Structural Soil (list Tree Well #s)**
101-104	18 Trees here in Tree Well #'s 1- 18
111-116	27 Trees here in Tree Well #'s 19- 45
121-122	9 Trees here in Tree Well #'s 46-54
131-134	18 Trees here in Tree Well #'s 55-72
201-204	18 Trees here in Tree Well #'s 73-90

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

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

DMA #: 101-204	**DMA Area (ft²):** 140,811

Required Retention Volume (RRV)			
a. Design Capture Volume (DCV; ft³):			3788
b. DCV Multiplier (Fact Sheet SD-A)			3.7
Applicable Structural Performance Standards (select one)	Tree well soil depth (inches)	Underlying soil type (A, B, C, or D)	DCV Multiplier
☒ Pollutant control only	Any	All	1.0
☒ Pollutant control plus hydromodification	48	D	3.7
c. Required Retention Volume (ft³) [DCV * DCV Multiplier]			14016

Tree Well Credit Volume (add records or copy this sheet as needed for additional tree wells)

Provide the information below for each tree well or group of tree wells within the DMA. A single entry can be used for any group of tree wells of the same species and soil depth.

Tree species or name		**No. tree wells**	90
Mature Canopy Diameter (ft)	20	**Credit Volume per tree well (ft³)**	180
Tree well ID #(s)	1-90	**Combined Volume (ft³)**	16200
Tree species or name		**No. tree wells**	
Mature Canopy Diameter (ft)		**Credit Volume per tree well (ft³)**	
Tree well ID #(s)		**Combined Volume (ft³)**	
Tree species or name		**No. tree wells**	
Mature Canopy Diameter (ft)		**Credit Volume per tree well (ft³)**	
Tree well ID #(s)		**Combined Volume (ft³)**	
Tree species or name		**No. tree wells**	
Mature Canopy Diameter (ft)		**Credit Volume per tree well (ft³)**	
Tree well ID #(s)		**Combined Volume (ft³)**	
Tree species or name		**No. tree wells**	
Mature Canopy Diameter (ft)		**Credit Volume per tree well (ft³)**	
Tree well ID #(s)		**Combined Volume (ft³)**	
		Total Credit Volume (ft3)	

Add the combined volumes above. Total credit volume must equal or exceed the RRV.

Copy and Paste table here for additional DMAs

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

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	DMA-101, 102	DMA-103, 104	DMA-111, 112	DMA-113, 114	DMA-121, 122	DMA- 123,124	DMA-131, 132	DMA-133, 134	DMA-201,202	DMA-203,204	unitless
	2	85th Percentile 24-hr Storm Depth	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	8,843	11,841	5,496	5,418	8,346	8,359	2,442	2,442	5,092	5,218	sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)	11,587	3,660	7,416	2,243	16,658	6,035	4,473	1,067	20,302	3,874	sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)											sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A	9	9	9	9	9	9	9	9	9	9	#
	19	Average Mature Tree Canopy Diameter	20	20	20	20	20	20	20	20	20	20	ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	20,430	15,501	12,912	7,662	25,004	14,394	6,915	3,509	25,393	9,091	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.45	0.71	0.44	0.67	0.37	0.56	0.38	0.66	0.26	0.56	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.45	0.71	0.44	0.67	0.37	0.56	0.38	0.66	0.26	0.56	unitless
	26	Initial Design Capture Volume	536	642	331	299	540	470	153	135	385	297	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.45	0.71	0.44	0.67	0.37	0.56	0.38	0.66	0.26	0.56	unitless
	32	Design Capture Volume After Dispersion Techniques	536	642	331	299	540	470	153	135	385	297	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	36	Final Effective Tributary Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	0	0	0	0	0	0	0	0	0	0	cubic-feet

No Warning Messages

ATTACHMENT 7

Documentation of DMAs with Structural BMPs

7.0 General Requirements

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

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

7.1 Engineer of Work Certification for Structural BMPs

Project Name North County Environmental Recources
Permit Application Number

CERTIFICATION

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

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

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

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

Robert Dentino
Print Name

EXCEL Engineering
Company

8/29/19
Date

Engineer's Seal:

7.2 Structural BMP Strategy

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

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

The general strategy for structural BMP implementation on this project follows the steps outlined in the BMP manual (Manual) section 5.1 which refers to sections in appendix B of the Manual.

Step 1. Determine DCV per Appendix B.1

The first step in performing storm water pollutant control calculations is to calculate the Design Capture Volume (DCV). The DCV represents the volume of storm water runoff that must be retained and/or biofiltered in order to satisfy pollutant control requirements. The DCV is calculated through use of the automated worksheet (Worksheet B.1) which is part of the workbook provided by the County for this purpose:

(https://www.sandiegocounty.gov/content/dam/sdc/dpw/WATERSHED_PROTECTION_PROGRAM/watershedpdf/Dev_Sup/County_BMPDM_PC_Worksheet.xlsx) (County Workbook).

A. Determine rainfall depth per Appendix B.1.1.

The rainfall depth (D) used to calculate the DCV is determined through examination of the 85th percentile, 24-hour isopluvial map provided in Figure B.1-1 of the BMP Manual. The isopluvial map represents rainfall depths as blue line work provided at 0.02" intervals. Appropriate rainfall depths are determined by plotting the project location on the map, examining adjacent rainfall depths, and interpolating an appropriate depth to the nearest hundredth of an inch. The result is then entered into the appropriate field on Worksheet B.1.

B. Delineate tributary areas per Appendix B.1.2.

The entire project site is divided up into distinct tributary areas to each point of discharge from the site. All areas of the site that are intended to be developed with buildings or site improvements are delineated by their tributary area and available space to construct structural BMPs. BMPs must be sized to treat the DCV from the total area draining to the BMP, including any offsite or onsite areas that comingle with project runoff draining to the BMP. To minimize offsite flows treated by project BMPs, upgradient flows from offsite areas and self-treating cut and fill slopes are diverted around the developed portions of the project.

C. Determine runoff factors per Appendix B.1.3.
Runoff factors (C) represent the ratio of storm water runoff over rainfall that is anticipated for a particular surface type. Impervious surfaces typically have high runoff factors (0.90) as nearly all rainfall is converted into runoff. Pervious surfaces typically have low runoff factors (0.10) as much of the rainfall is retained in natural surface features. For each of the DMAs draining to structural BMPs, each DMA area is evaluated for the relative quantities of impervious surfaces (roofs, concrete, asphalt, etc.) and pervious surfaces (amended soils, landscaped areas, mulched areas). The respective areas are entered into Worksheet B.1 (County Workbook), and the worksheet calculates the respective weighted runoff factor. Dispersion Area Runoff Factor Adjustments are not considered for this project.

D. Determine site design volume reductions per Appendix B.1.4
Site design volume reductions (R) account for the effects of incorporating non-structural BMPs such as tree wells and rain barrels into the site design. Effective use of these site design elements can significantly reduce and/or completely eliminate the DCV requiring treatment through structural BMP strategies. Tree wells designed per the SD-A fact sheet provide the volume reductions to the DCV of up to 420 cf/tree (30 foot tree canopy). Rain barrels provide less substantial effects. For the preliminary nature of this project, the use of volume reductions is not considered.

Step 2. Determine Retention Requirements Appendix B.2
The second step in performing storm water pollutant control calculations is to determine the retention requirements for each drainage area. Retention requirements are calculated through use of the automated Worksheet B.2 (County Workbook).

A. Determine if capture and use analysis is required per Appendix B.2.1
Projects that propose habitable structures over 9 stories tall are required to perform a capture and use analysis to identify whether the DCV from the project site can be utilized for onsite toilet flushing and/or irrigation within 36 hours of the storm. This project does not propose this type development, therefore Capture and Use is not required.

B. Evaluate infiltration restrictions per Appendix B.2.2
Infiltration Restrictions are listed in table B.2-1 of the Manual. Restriction elements are divided into Mandatory Considerations and Optional Considerations. Mandatory Considerations include elements that may pose a significant risk to human health and safety. These elements must always be evaluated and discretion regarding the setbacks is not permitted, unless supported by the recommendations of a geotechnical engineer. None of the mandatory considerations are applicable to this project. Optional Considerations include elements that are not necessarily associated with human health and safety, so analysis is not mandated. Even though not mandated, none of the optional considerations are applicable to this project.

C. Determine design infiltration rate per Appendix B.2.3
The design infiltration rate for each drainage area must be determined through either a basic or advanced analysis. The basic analysis allows for the use of a default design infiltration rate based on the predominant NRCS soil type present within the proposed BMP footprint. The basic analysis is not permitted for BMPs that lack an underdrain. The advanced analysis allows for a geotechnical engineer to assign a more specific design infiltration rate based on field testing. Table B.2-3 of the Manual identifies the design infiltration rates that can be used for each analysis. For this project all of the proposed BMPs are located in areas of type B soil and have no infiltration restrictions, therefore the basic design infiltration rate of 0.2 in/hr is used.

D. Determine retention requirements per Appendix B.2.4
Using the results from the previous discussion, the values are entered into Automated Worksheet B.2 (County Workbook). From this worksheet the required retention volume is read.

Step 3. Determine BMP Performance per Appendix B.3

The third step in performing stormwater pollutant control calculations is to design a structural BMP with the characteristics that provide stormwater treatment for the DCV and meet the minimum retention requirements for the drainage area.

A. Identify proposed BMP characteristics per Appendix B.3.1.
The performance of a BMP is a function of its retention and biofiltration processes, which are directly related to the proposed BMP geometry and design components. BMP geometries identify the area and depth over which retention and/or biofiltration processes occur. Critical BMP geometries include: BMP surface area, surface ponding depth, biofiltration soil media depth, gravel depth, underdrain depth, underdrain diameter and underdrain offset. BMP components dictate how retention and biofiltration processes occur over the BMP footprint. Critical BMP components include: vegetation vs no vegetation, standard biofiltration soil media vs non-standard biofiltration soil media, impermeable liner vs no impermeable liner, underdrain vs no underdrain, and design infiltration rates. By default, these BMPs must be sized to provide a surface area that is equal to at least 3% of the tributary effective impervious area. If a smaller BMP surface area is desired, the application must include additional calculations determining the required maintenance interval required to maintain BMP effectiveness. This project does not propose BMPs smaller than the 3% limit. The most common BMPs proposed for storm water compliance are infiltration BMPs, bioretention BMPs, and biofiltration BMPs. For this project the site layout, soil characteristics, and maintenance requirements were considered against the advantages and disadvantages of each of the common BMP options.

B. Calculate retention processes per Appendix B.3.2

BMP retention processes include infiltration and evapotranspiration occurring within the BMP.

Part 1) Is to determine the amount of infiltration in a 6 hour storm event.
Located on the on the county spreadsheet B.3 Line 18 is located the infiltration over a 6 hour time frame, some basins may not be infiltrating and those basins will have a "zero" listed in line 18.

Part 2) Of this section is in reference to the retention capacity of the bmp. This item is characterized in the county's spreadsheet as well in terms of an efficiency of retention listed on line item 25.

C. Calculate biofiltration processes per Appendix B.3.3

Any portion of the DCV that has not been retained within site design or structural BMP elements must be biofiltered. BMP biofiltration processes include filtration, sedimentation, sorption, biochemical processes and/or vegetative uptake. This section presents how to calculate the biofiltration processes occurring within the proposed BMP.

Part 1) Determine the filtration rate (in/hr) of the proposed BMP. This is the rate in which storm water biofilters through the BMP and exits through the underdrain. Filtration rates can be governed by characteristics of the biofiltration soil media or by flow restrictions experienced due to the design of the BMP underdrain/orifice. The soil infiltration rate can be seen in the County's spreadsheet on B.3 Line item 30.

Part 2) Determine the volume of biofiltration occurring within the BMP during a 6 hour storm event. This volume is a function of the BMP filtration rate, BMP surface area, and the rainfall duration as shown below. The item can be found in the Countys spreadsheet in B.3 from ((item 33)/12) * Line 8 and is built into the spreadsheet to check for efficiency.

Part 3) Determine the static biofiltration capacity of the BMP assuming it is entirely full. This volume
is a function of the BMP surface area and the effective biofiltration depth.
This is located from Worksheet B.3 line 37 * Line 8

Part 4) Determine the drawdown time (hours) for surface ponding. This is the ponding depth divided by the sum of the design infiltration rate and BMP filtration rate. Surface ponding depths of 24 hours or less are typically required; however, longer drawdown times up to 96 hours may be proposed if supported by a landscape architect/agronomist and no safety hazards are anticipated due to excessive ponding. Surface ponding drawdown times over 96 hours are not permitted due to vector concerns. This item is located on worksheet B.3 item 11.

Part 5) Determine the efficacy of the biofiltration processes provided by the BMP. This value represents the portion of the pollutant control standard that is satisfied through the biofiltration processes of the BMP. There are two options available for establishing the biofiltration performance standard. Applicants may select the option of their choice. Option 1 requires that the BMP treat 1.5 times the portion of the DCV not reliably retained onsite (assuming a 6 hour routing period). Option 2 requires that the BMP treat 1.0 times the portion of the DCV not reliably retained onsite; and additionally check that the system has a total static (i.e., non-routed) storage volume, including pore spaces and pre-filter detention volume, equal to at least 0.75 times the portion of the DCV not reliably retained onsite.

For option of 1.5 times the DCV see worksheet B.3 Line item 41
For option of 1.0 times the DCV with a static volume of 0.75 DCV see worksheet B.3 Line item 43. Both items are calculated and the minimum value between the to is chosen to be used in the calculations.

D. Satisfaction of pollutant control requirements per Appendix B.3.4

The performance of a BMP with respect to the pollutant control performance standards is referred to as the BMP efficacy

Worksheet B.3 Line item 47 is the efficiency; if the efficiency is not at least 100% then changes to sizing parameter will need to be considered.

E. Satisfaction of minimum retention requirements per Appendix B.3.5

Minimum retention requirements can be satisfied by demonstrating that the all of the retention elements incorporated within a drainage area (rain barrels, tree wells, dispersion areas, and BMPs) retain a volume of water that is greater than or equal to what is required.

Worksheet B.1 will provided areas that have been incorporated into any retention volumes for rain barrels and or tree wells (this project uses neither of these for this portion of the project). the remaining retention requirements are on Worksheet B.2 Retention Requirements. When incorporated into worksheet B.3 a box is Labeled as " "YES" or "NO" to determine if the requirements have been met. for this project all items are to be reflective of "YES" in the box.

7.2.2 Structural BMP Summary Table (Complete for all proposed structural BMPs)

- List and provide the information requested below for all pollutant control and hydromodification management BMPs proposed for the project.
- For each BMP listed, complete the Structural BMP Checklist on the next page. Copy the Checklist as many times as needed.

BMP ID #	DMA #	DMA Area (ft^2)	Structural BMP Type							Permit # and Sheet #
			Harvest and Use	Infiltration	Unlined Biofiltration	Lined Biofiltration	Flow-thru treatment	Hydromodification Management [1]	Other	
BMP- I	211-263	256,824	☐	☐	☐	☒	☐	☒	☐	
BMP- J	211-263	137,870	☐	☐	☐	☒	☐	☒	☐	
			☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	
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			☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	

Copy and Paste table here for additional BMPs

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

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

Structural BMP ID # BMP- I	**Permit # and Sheet #**
BMP Type	
Infiltration ☐ Infiltration basin (INF-1) ☐ Bioretention (INF-2) ☐ Permeable pavement (INF-3) **Unlined Biofiltration** ☐ Biofiltration with partial retention (PR-1) **Lined Biofiltration** ☐ Biofiltration (BF-1) ☒ Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3)	**Harvest and Use** ☐ Cistern (HU-1) **Flow-thru Treatment** (describe below) ☐ With prior lawful approval to meet earlier PDP requirements ☐ Pre-treatment/forebay for an onsite retention or biofiltration BMP[2] ☐ With alternative compliance **Hydromodification Management**[3] ☐ Detention pond or vault ☐ **Other** (describe below)
BMP Purpose	
☐ Pollutant control only ☐ Hydromodification control only ☒ Combined pollutant control and hydromodification	☐ Pre-treatment/forebay for another BMP ☐ Other (describe below)
BMP Verification (See BMPDM Section 8.3)	
Provide name and contact information for the party responsible to sign BMP verification forms	Robert D. Dentino Excel Engineering 440 State Place Escondido, CA 92029 760-746-8118

BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)				
BMP Maintenance Category	Cat. 1 ☐	Cat. 2 ☒	Cat. 3 ☐	Cat. 4 ☐
Final owner of BMP	☐ HOA	☒ Property Owner	☐ County	
	☐ Other (describe):			
Maintenance of BMP into perpetuity	☐ HOA	☒ Property Owner	☐ County	
	☐ Other (describe):			
Discussion (As needed; Continue on subsequent pages as necessary)				

Copy and Paste table here for additional BMPs

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

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

Structural BMP ID # BMP-J	**Permit # and Sheet #**

BMP Type

Infiltration

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

Unlined Biofiltration

- ☐ Biofiltration with partial retention (PR-1)

Lined Biofiltration

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

Harvest and Use

- ☐ Cistern (HU-1)

Flow-thru Treatment (describe below)

- ☐ With prior lawful approval to meet earlier PDP requirements
- ☐ Pre-treatment/forebay for an onsite retention or biofiltration BMP[2]
- ☐ With alternative compliance

Hydromodification Management[3]

- ☐ Detention pond or vault
- ☐ **Other** (describe below)

BMP Purpose

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

BMP Verification (See BMPDM Section 8.3)

Provide name and contact information for the party responsible to sign BMP verification forms	Robert D. Dentino Excel Engineering 440 State Place Escondido, CA 92029 760-746-8118

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

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

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

Copy and Paste table here for additional BMPs

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

7.4 Storm Water Pollutant Control Worksheet Calculations

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

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

7.5 Identification and Narrative of Receiving Water and Pollutants of Concern

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

A. General Description

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

The project drains indirectly to Escondido Creek. Escondido Creek drains westerly to ultimately discharges into the Pacific Ocean at the Batiquitos Lagoon.

B. Water Body Impairments and Priorities

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

303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs / WQIP Highest Priority Pollutant
Escondido Creek	Pesticides, Fecal Indicator Bacteria	-
	Metals, Other Inorganics	-
	Nutrients, Salinity, Toxicity	Bacteria

C. Identification of Project Site Pollutants

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

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

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

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

Category	#	Description	*i*	*ii*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	BMP-I	BMP-J	unitless
	2	85th Percentile 24-hr Storm Depth	0.70	0.70	inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	215,797	77,941	sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)			sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)	41,027	59,929	sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)			sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)			sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)			sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)			sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)			sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)			sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)			sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)			sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)			sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)			sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)			sq-ft
	18	Number of Tree Wells Proposed per SD-A			#
	19	Average Mature Tree Canopy Diameter			ft
	20	Number of Rain Barrels Proposed per SD-E			#
	21	Average Rain Barrel Size			gal
Initial Runoff Factor Calculation	22	Total Tributary Area	256,824	137,870	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.77	0.55	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.77	0.55	unitless
	26	Initial Design Capture Volume	11,536	4,423	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.77	0.55	unitless
	32	Design Capture Volume After Dispersion Techniques	11,536	4,423	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.77	0.55	unitless
	36	Final Effective Tributary Area	197,754	75,829	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	11,536	4,423	cubic-feet

No Warning Messages

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

Category	#	Description	*i*	*ii*	Units
Basic Analysis	1	Drainage Basin ID or Name	BMP-I	BMP-J	unitless
	2	85th Percentile Rainfall Depth	0.70	0.70	inches
	3	Predominant NRCS Soil Type Within BMP Location	D	D	unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted	Restricted	unitless
	5	Nature of Restriction	Slopes	Slopes	unitless
	6	Do Minimum Retention Requirements Apply to this Project?	Yes	Yes	yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No	No	yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	No	No	yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	~~0.110~~		in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	0.000	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	1.5%	1.5%	percentage
	12	Fraction of DCV Requiring Retention	0.01	0.01	ratio
	13	Required Retention Volume	115	44	cubic-feet

No Warning Messages

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

Category	#	Description	*i*	*ii*	Units
BMP Inputs	1	Drainage Basin ID or Name	BMP-I	BMP-J	sq-ft
	2	Design Infiltration Rate Recommended	0.000	0.000	in/hr
	3	Design Capture Volume Tributary to BMP	11,536	4,423	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated	Vegetated	unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined	Lined	unitless
	6	Does BMP Have an Underdrain?	Underdrain	Underdrain	unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard	Standard	unitless
	8	Provided Surface Area	7,800	3,500	sq-ft
	9	Provided Surface Ponding Depth	6	6	inches
	10	Provided Soil Media Thickness	18	18	inches
	11	Provided Gravel Thickness (Total Thickness)	12	12	inches
	12	Underdrain Offset	3	3	inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	1.88	1.25	inches
	14	Specialized Soil Media Filtration Rate			in/hr
	15	Specialized Soil Media Pore Space for Retention			unitless
	16	Specialized Soil Media Pore Space for Biofiltration			unitless
	17	Specialized Gravel Media Pore Space			unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	0.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.00	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	unitless
	23	Effective Retention Depth	2.10	2.10	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.12	0.14	ratio
	25	Calculated Retention Storage Drawdown Time	120	120	hours
	26	Efficacy of Retention Processes	0.14	0.16	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	1,625	712	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	9,911	3,711	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	0.1509	0.0674	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	0.84	0.83	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	0.84	0.83	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	5.02	4.99	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	1.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	13.20	13.20	inches
	38	Drawdown Time for Surface Ponding	7	7	hours
	39	Drawdown Time for Effective Biofiltration Depth	16	16	hours
	40	Total Depth Biofiltered	18.22	18.19	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	14,867	5,567	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	11,840	5,306	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	7,433	2,783	cubic-feet
	44	Option 2 - Provided Storage Volume	7,433	2,783	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	1.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	1.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	**0**	**0**	cubic-feet

No Warning Messages

ATTACHMENT 8

Documentation of DMAs with Structural Hydromodification Management BMPs

8.0 General Requirements

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

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

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

8.1 Flow Control Facility Design

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

```
[TITLE]
;;Project Title/Notes

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

START_DATE            09/24/1964
START_TIME            13:00:00
REPORT_START_DATE     09/24/1964
REPORT_START_TIME     13:00:00
END_DATE              05/23/2008
END_TIME              22:00:00
SWEEP_START           01/01
SWEEP_END             12/31
DRY_DAYS              0
REPORT_STEP           01:00:00
WET_STEP              01:00:00
DRY_STEP              01:00:00
ROUTING_STEP          0:01:00

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

[EVAPORATION]
;;Data Source       Parameters
;;--------------    ----------------
MONTHLY             0.06    0.08    0.11    0.16    0.18    0.21    0.21    0.2
0.16    0.12    0.08    0.06
DRY_ONLY            NO

[RAINGAGES]
;;Name              Format      Interval    SCF         Source
;;--------------    ---------   ------  ------  ----------
Escondido           INTENSITY   1:00        1.0         FILE        "R:\Rain gage
dat\Escondido ALERT Station.dat"  Escondido   IN

[SUBCATCHMENTS]
;;Name              Rain Gage           Outlet              Area        %Imperv
Width       %Slope      CurbLen     SnowPack
;;--------------    ----------------    ----------------    --------    --------
--------    --------    --------    ----------------
Basin-1             Escondido           POC                 9.06093411386593
0           710         2           0

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

```

```
[INFILTRATION]
;;Subcatchment      Suction     Ksat        IMD
;;--------------    ----------  ----------  ----------
Basin-1             9           0.025       0.33

[LID_CONTROLS]
;;Name              Type/Layer  Parameters
;;--------------    ----------  ----------
BMP-I               BC
BMP-I               SURFACE     6           0.0         0           0
5
BMP-I               SOIL        18          0.4         0.2         0.1
5           5           1.5
BMP-I               STORAGE     12          0.67        0           0
BMP-I               DRAIN       0           0.5         3           6

BMP-J               BC
BMP-J               SURFACE     6           0.0         0           0
5
BMP-J               SOIL        18          0.5         0.2         0.1
5           5           1.5
BMP-J               STORAGE     12          0.67        0           0
BMP-J               DRAIN       0           0.5         3           6

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

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

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

[TAGS]

[MAP]
DIMENSIONS  0.000   0.000   10000.000   10000.000
Units       None

[COORDINATES]
;;Node              X-Coord             Y-Coord
;;--------------    ------------------  ------------------
POC                 2961.500            4442.251

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

[Polygons]
;;Subcatchment      X-Coord             Y-Coord
;;--------------    ------------------  ------------------
Basin-1             1510.365            5893.386

[SYMBOLS]
;;Gage              X-Coord             Y-Coord
;;--------------    ------------------  ------------------
```

Escondido	-918.065	8943.731

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

****
Rainfall File Summary
****

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
Escondido	09/24/1964	05/23/2008	60 min	7025	0	0

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

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Starting Date 09/24/1964 13:00:00
Ending Date 05/23/2008 22:00:00
Antecedent Dry Days 0.0
Report Time Step 01:00:00
Wet Time Step 01:00:00
Dry Time Step 01:00:00

Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	461.443	611.120
Evaporation Loss	14.112	18.690
Infiltration Loss	362.050	479.487
Surface Runoff	94.375	124.987
Final Storage	0.000	0.000
Continuity Error (%)	-1.971	

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	94.375	30.754
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	94.375	30.754
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****

Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
Basin-1	611.12	0.00	18.69	479.49	124.99	30.75	6.35	0.205

Analysis begun on: Thu Aug 01 16:55:31 2019
Analysis ended on: Thu Aug 01 16:56:01 2019
Total elapsed time: 00:00:30

```
[TITLE]
;;Project Title/Notes
  Drawdown Time:  5 hours
  Drawdown Time:  13 hours

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

START_DATE            09/24/1964
START_TIME            13:00:00
REPORT_START_DATE     09/24/1964
REPORT_START_TIME     13:00:00
END_DATE              05/23/2008
END_TIME              22:00:00
SWEEP_START           01/01
SWEEP_END             12/31
DRY_DAYS              0
REPORT_STEP           01:00:00
WET_STEP              01:00:00
DRY_STEP              01:00:00
ROUTING_STEP          0:01:00

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

[EVAPORATION]
;;Data Source       Parameters
;;--------------    ----------------
MONTHLY             0.06    0.08    0.11    0.16    0.18    0.21    0.21    0.2
0.16    0.12    0.08    0.06
DRY_ONLY            NO

[RAINGAGES]
;;Name              Format      Interval    SCF         Source
;;--------------    ---------   ------  ------  ----------
Escondido           INTENSITY   1:00        1.0         FILE        "R:\Rain gage
dat\Escondido ALERT Station.dat"  Escondido   IN

[SUBCATCHMENTS]
;;Name              Rain Gage           Outlet              Area        %Imperv
Width       %Slope      CurbLen     SnowPack
;;--------------    ----------------    ----------------    --------    --------
--------    --------    --------    ----------------
Basin-1             Escondido           BMP-I               5.71680532598714
65          710         2           0
Basin-2             Escondido           BMP-J               3.08471648301194
0.5653      455         2.5         0
BMP-I               Escondido           1                   0.179063360881543
0           20          0           0
BMP-J               Escondido           POC                 0.0803489439853076
25          10          0           0

```

```
[SUBAREAS]
;;Subcatchment      N-Imperv    N-Perv      S-Imperv    S-Perv      PctZero
RouteTo     PctRouted
;;--------------    ----------  ----------  ----------  ----------  ----------
----------  ----------
Basin-1             0.012       0.15        0.05        0.1         25
OUTLET
Basin-2             0.012       0.15        0.05        0.1         25
OUTLET
BMP-I               0.012       0.1         0.05        0.1         25
OUTLET
BMP-J               0.012       0.15        0.05        0.1         25
OUTLET

[INFILTRATION]
;;Subcatchment      Suction     Ksat        IMD
;;--------------    ----------  ----------  ----------
Basin-1             9           0.01875     0.33
Basin-2             9           0.01875     0.33
BMP-I               9           0.01875     0.33
BMP-J               9           0.01875     0.33

[LID_CONTROLS]
;;Name              Type/Layer  Parameters
;;--------------    ----------  ----------
BMP-J               BC
BMP-J               SURFACE     18          0           0           0
5
BMP-J               SOIL        18          0.4         0.2         0.1
5           5           1.5
BMP-J               STORAGE     36          0.67        0.1         0
BMP-J               DRAIN       0.148643274322517   0.5         3           6

BMP-I               BC
BMP-I               SURFACE     18          0           0           0
5
BMP-I               SOIL        18          0.4         0.2         0.1
5           5           1.5
BMP-I               STORAGE     36          0.67        0.1         0
BMP-I               DRAIN       0.143924828279056   0.5         3           6

[LID_USAGE]
;;Subcatchment      LID Process         Number  Area        Width       InitSat
FromImp     ToPerv      RptFile                         DrainTo
;;--------------    ----------------    ------- ----------  ----------  ----------
----------  ----------  ------------------------    ----------------
BMP-I               BMP-I               1       7800.00     0           0
0           0           *                           POC
BMP-J               BMP-J               1       3500.00     0           0
0           0

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

[STORAGE]
;;Name              Elev.       MaxDepth    InitDepth   Shape       Curve
Name/Params               N/A         Fevap       Psi         Ksat        IMD
;;--------------    --------    ----------  ----------- ----------
----------------------------    --------    --------                --------    --------
1                   0           2           0           TABULAR
Sto-1                           0           0

[ORIFICES]
;;Name              From Node           To Node             Type            Offset
```

```
    Qcoeff      Gated       CloseTime
111 ;;--------------    ----------------    ----------------    ------------    ----------
    ----------  --------    ----------
112 2                   1                   POC                 SIDE            0
    0.61        NO          0
113 3                   1                   POC                 SIDE            0
    0.61        NO          0
114
115 [WEIRS]
116 ;;Name              From Node           To Node             Type            CrestHt
    Qcoeff      Gated       EndCon      EndCoeff    Surcharge   RoadWidth   RoadSurf
117 ;;--------------    ----------------    ----------------    ------------    ----------
    ----------  --------    --------    ----------  ----------  ----------  ----------
118 1                   1                   POC                 TRANSVERSE      2
    3.33        NO          0           0           YES
119
120 [XSECTIONS]
121 ;;Link              Shape           Geom1               Geom2       Geom3
    Geom4       Barrels     Culvert
122 ;;--------------    ------------    ----------------    ----------  ----------
    ----------  ----------  ----------
123 2                   RECT_CLOSED     0.33                2           0           0
124 3                   RECT_CLOSED     0.33                2           0           0
125 1                   RECT_OPEN       1                   16          0
    0
126
127 [CURVES]
128 ;;Name              Type        X-Value     Y-Value
129 ;;--------------    ----------  ----------  ----------
130 Sto-1               Storage     0           7800
131 Sto-1                           1           8349
132 Sto-1                           2           9598.48
133
134 [REPORT]
135 ;;Reporting Options
136 INPUT       NO
137 CONTROLS    NO
138 SUBCATCHMENTS   ALL
139 NODES   ALL
140 LINKS   ALL
141
142 [TAGS]
143
144 [MAP]
145 DIMENSIONS  0.000   0.000   10000.000   10000.000
146 Units       None
147
148 [COORDINATES]
149 ;;Node              X-Coord             Y-Coord
150 ;;--------------    ------------------  ------------------
151 POC                 2961.500            4442.251
152 1                   2398.815            4422.507
153
154 [VERTICES]
155 ;;Link              X-Coord             Y-Coord
156 ;;--------------    ------------------  ------------------
157 2                   2625.864            4876.604
158 2                   2902.270            4807.502
159 3                   2615.992            4600.197
160 3                   2823.297            4580.454
161 1                   2053.307            3711.747
162 1                   2852.912            3682.132
163
164 [Polygons]
165 ;;Subcatchment      X-Coord             Y-Coord
166 ;;--------------    ------------------  ------------------
167 Basin-1             1510.365            5893.386
168 Basin-2             3405.726            6465.943
169 BMP-I               2477.789            5310.958
```

```
BMP-J               3563.672            5547.878

[SYMBOLS]
;;Gage              X-Coord             Y-Coord
;;--------------    ------------------  ------------------
Escondido           -918.065            8943.731


```

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

  Drawdown Time: 5 hours
  Drawdown Time: 13 hours

****
Rainfall File Summary
****

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
Escondido	09/24/1964	05/23/2008	60 min	7025	0	0

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

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... KINWAVE
Starting Date 09/24/1964 13:00:00
Ending Date 05/23/2008 22:00:00
Antecedent Dry Days 0.0
Report Time Step 01:00:00
Wet Time Step 01:00:00
Dry Time Step 01:00:00
Routing Time Step ..... 60.00 sec

********** Runoff Quantity Continuity **********	Volume acre-feet	Depth inches
Initial LID Storage	0.039	0.052
Total Precipitation	461.443	611.120
Evaporation Loss	49.024	64.926
Infiltration Loss	237.457	314.481
Surface Runoff	24.488	32.431
LID Drainage	173.566	229.865
Final Storage	0.089	0.118
Continuity Error (%)	-5.015	

********** Flow Routing Continuity **********	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	198.054	64.539
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	198.053	64.539
Flooding Loss	0.000	0.000

```
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


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


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :    59.00 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
Percent Not Converging      :     0.00


***************************
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
-------------------------------------------------------------------------------------------------
Basin-1                  611.12       0.00      61.42     151.48     436.21     67.71     4.96   0.714
Basin-2                  611.12       0.00      23.15     437.82     169.66     14.21     2.42   0.278
BMP-I                    611.12   13926.49     724.25    2985.56   10826.03     52.64     4.77   0.745
BMP-J                    611.12    6513.62     448.79    1223.96    5452.49     11.90     2.31   0.765


**********************
LID Performance Summary
**********************


-------------------------------------------------------------------------------------------------
                                      Total      Evap     Infil   Surface
                                      Drain    Initial     Final  Continuity
                                     Inflow      Loss      Loss   Outflow
                                    Outflow   Storage   Storage       Error
Subcatchment      LID Control            in        in        in        in        in        in          %
-------------------------------------------------------------------------------------------------
BMP-I             BMP-I             14537.61    724.28   2985.67   1194.18   9632.24      1.80      4.31      -0.01
BMP-J             BMP-J              7124.74    448.80   1224.00    996.04
```

4456.65 1.80 1.97 -0.01

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
POC	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
1	STORAGE	0.00	0.51	0.51	10332 05:13	0.46

****
Node Inflow Summary
****

Node	Type	Maximum Total Lateral Inflow Inflow CFS	Maximum Flow Balance Error Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Percent
POC	OUTFALL	2.53	6.13	10332 05:02	58.7	64.5	0.000
1	STORAGE	4.56	4.56	10332 05:01	5.81	5.81	0.003

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
1	0.002	0	0	0	4.080	24	10332 05:12	3.81

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
POC	4.89	0.13	6.13	64.534
System	4.89	0.13	6.13	64.534

****
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
2	ORIFICE	1.91	10332 05:13			0.00
3	ORIFICE	1.91	10332 05:13			0.00
1	WEIR	0.00	0 00:00			0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Fri Aug 02 09:53:38 2019
Analysis ended on: Fri Aug 02 09:54:22 2019
Total elapsed time: 00:00:44

STATISTICS ANALYSIS OF THE SWMM FILES FOR:

DISCHARGE NODE: POC

ANALYSIS DETAILS

Statistics Selection: Nodes/Total Inflow
Stream Susceptibility to Channel Erosion: High (Qlf = (0.1)Q2)
Assumed time between storms (hours): 24

PRE-DEVELOPMENT SWMM FILE

SWMM file name: Q:\12\12025\GPIP\STORM\SWMM\12025-PRE-POC-1.out
SWMM file time stamp: 8/1/2019 4:56:01 PM
Selected Node to Analyze: POC

POST-DEVELOPMENT MITIGATED SWMM FILE

SWMM file name: Q:\12\12025\GPIP\STORM\SWMM\12025-POST-POC-1-5-6-13.out
SWMM file time stamp: 8/2/2019 9:54:22 AM
Selected Node to Analyze: POC

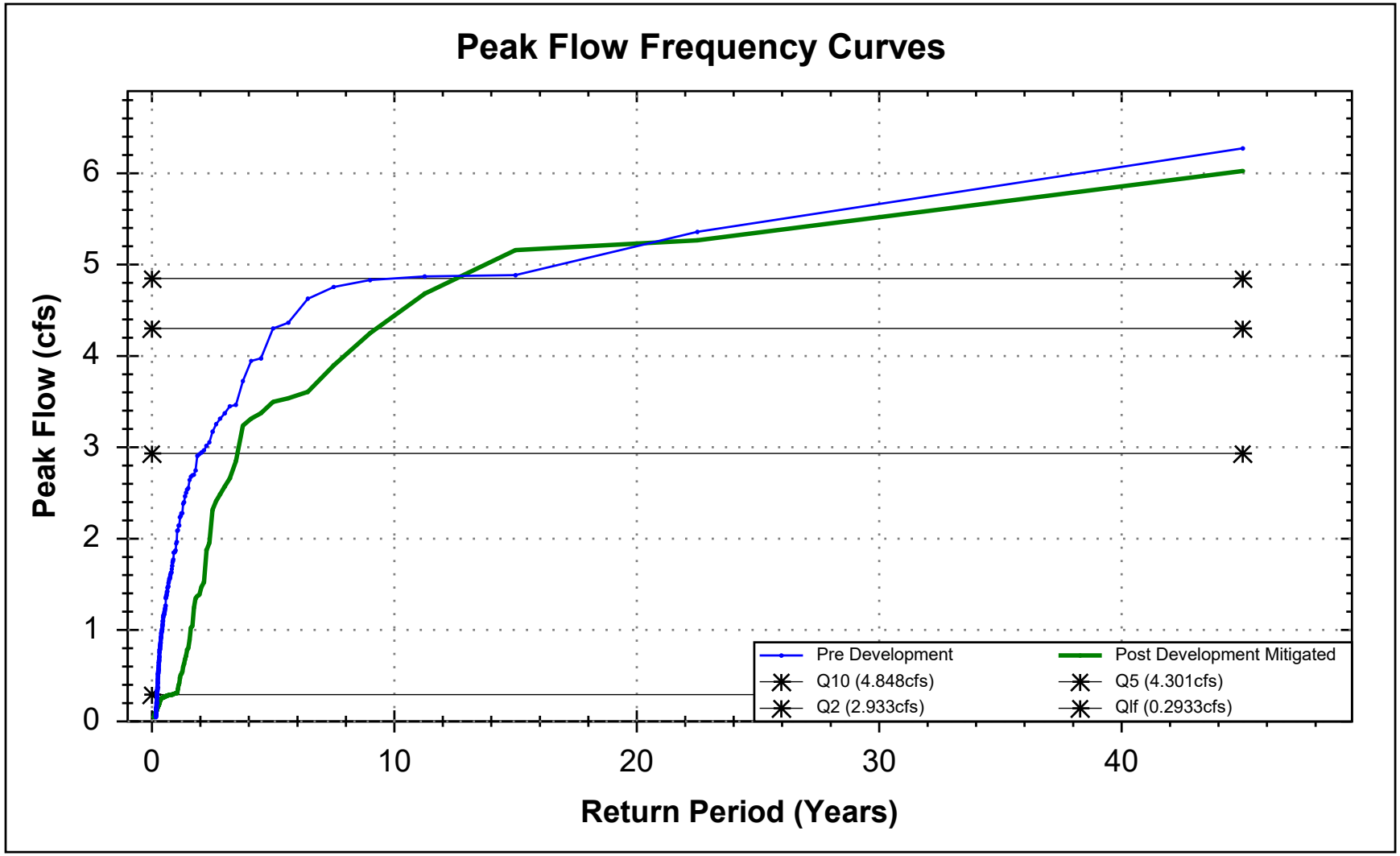
MITIGATED CONDITIONS RESULTS

For the Mitigated Conditions:

Peak Flow Conditions PASS
Flow Duration Conditions PASS

The Mitigated Conditions peak flow frequency curve is composed of 488 points. Of the points, 3 point(s) are above the flow control upper limit (Q10), 435 point(s) are below the low flow threshold value (Qlf). Of the points within the flow control range (Qlf to Q10), 50 point(s) have a lower peak flow rate than pre-development conditions. These points all pass. There are no points that failed, therefore the unmitigated conditions peak flow requirements have been met.

The Mitigated Conditions flow duration curve is composed of 100 flow bins (points) between the upper flow threshold (cfs) and lower flow threshold (cfs). Each point represents the number of hours where the discharge was equal to or greater than the discharge value, but less than the next greater flow value. Comparing the post-development flow duration curve to the pre-development curve, 99 point(s) have a lower duration than pre-development conditions. These points all pass. There are no points that failed, therefore the unmitigated conditions flow duration requirements have been met.


Peak Flow Frequency Curves
Peak Flow (cfs)
0
1
2
3
4
5
6
0
10
20
30
40
Return Period (Years)
Pre Development
Post Development Mitigated
Q10 (4.848cfs)
Q5 (4.301cfs)
Q2 (2.933cfs)
Qlf (0.2933cfs)

Compare Post-Development Curve to Pre-Development Curve

post-development SWMM file: Q:\12\12025\GPIP\STORM\SWMM\12025-POST-POC-1-5-6-13.out
post-development time stamp: 8/2/2019 9:54:22 AM
Compared to:
pre-development SWMM file: Q:\12\12025\GPIP\STORM\SWMM\12025-PRE-POC-1.out
pre-development time stamp: 8/1/2019 4:56:01 PM

Post PT #	Rtn Prd (yrs)	Post Dev Q	Pre Dev Q	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
0	45.00	6.03	6.27	FALSE	FALSE	FALSE	Pass- Qpost Above Flow Control Upper Limit
1	22.50	5.27	5.36	FALSE	FALSE	FALSE	Pass- Qpost Above Flow Control Upper Limit
2	15.00	5.16	4.88	FALSE	FALSE	FALSE	Pass- Qpost Above Flow Control Upper Limit
3	11.25	4.68	4.87	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
4	9.00	4.25	4.83	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
5	7.50	3.90	4.76	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
6	6.43	3.61	4.63	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
7	5.63	3.54	4.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
8	5.00	3.50	4.30	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
9	4.50	3.37	3.97	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
10	4.09	3.31	3.95	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
11	3.75	3.24	3.72	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
12	3.46	2.85	3.46	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
13	3.21	2.66	3.45	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
14	3.00	2.57	3.37	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
15	2.81	2.49	3.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
16	2.65	2.41	3.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
17	2.50	2.31	3.17	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
18	2.37	1.95	3.05	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
19	2.25	1.88	3.02	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
20	2.14	1.52	2.97	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
21	2.05	1.47	2.94	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
22	1.96	1.38	2.92	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
23	1.88	1.37	2.91	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
24	1.80	1.35	2.75	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
25	1.73	1.24	2.70	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
26	1.67	1.04	2.69	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
27	1.61	1.03	2.68	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
28	1.55	0.89	2.64	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
29	1.50	0.80	2.55	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
30	1.45	0.79	2.54	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
31	1.41	0.71	2.50	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
32	1.36	0.68	2.46	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
33	1.32	0.63	2.40	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q	Pre Dev Q	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
34	1.29	0.60	2.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
35	1.25	0.54	2.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
36	1.22	0.52	2.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
37	1.18	0.51	2.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
38	1.15	0.48	2.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
39	1.13	0.42	2.14	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
40	1.10	0.40	2.14	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
41	1.07	0.35	2.09	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
42	1.05	0.31	2.09	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
43	1.02	0.31	1.97	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
44	1.00	0.31	1.95	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
45	0.98	0.31	1.87	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
46	0.96	0.31	1.86	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
47	0.94	0.30	1.85	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
48	0.92	0.30	1.85	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
49	0.90	0.30	1.85	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
50	0.88	0.30	1.77	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
51	0.87	0.29	1.76	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
52	0.85	0.29	1.74	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
53	0.83	0.29	1.70	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
54	0.82	0.29	1.67	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
55	0.80	0.29	1.63	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
56	0.79	0.29	1.63	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
57	0.78	0.29	1.62	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
58	0.76	0.29	1.60	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
59	0.75	0.29	1.58	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
60	0.74	0.29	1.57	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
61	0.73	0.29	1.56	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
62	0.71	0.29	1.56	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
63	0.70	0.29	1.54	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
64	0.69	0.29	1.52	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
65	0.68	0.29	1.51	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
66	0.67	0.28	1.48	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
67	0.66	0.28	1.48	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
68	0.65	0.28	1.46	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
69	0.64	0.28	1.46	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
70	0.63	0.28	1.42	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
71	0.63	0.28	1.42	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
72	0.62	0.28	1.41	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
73	0.61	0.28	1.39	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
74	0.60	0.28	1.38	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
75	0.59	0.28	1.37	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold

Post PT #	Rtn Prd (yrs)	Post Dev Q	Pre Dev Q	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
76	0.58	0.28	1.36	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
77	0.58	0.27	1.36	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
78	0.57	0.27	1.35	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
79	0.56	0.27	1.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
80	0.56	0.27	1.26	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
81	0.55	0.27	1.24	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
82	0.54	0.27	1.23	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
83	0.54	0.27	1.22	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
84	0.53	0.27	1.21	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
85	0.52	0.27	1.20	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
86	0.52	0.27	1.19	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
87	0.51	0.27	1.18	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
88	0.51	0.27	1.17	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
89	0.50	0.26	1.17	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
90	0.50	0.26	1.17	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
91	0.49	0.26	1.17	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
92	0.48	0.26	1.16	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
93	0.48	0.26	1.16	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
94	0.47	0.26	1.16	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
95	0.47	0.26	1.14	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
96	0.46	0.26	1.14	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
97	0.46	0.26	1.11	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
98	0.46	0.26	1.10	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
99	0.45	0.26	1.10	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
100	0.45	0.26	1.09	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
101	0.44	0.26	1.07	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
102	0.44	0.26	1.06	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
103	0.43	0.26	1.05	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
104	0.43	0.26	1.04	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
105	0.43	0.26	1.03	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
106	0.42	0.25	1.01	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
107	0.42	0.25	1.01	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
108	0.41	0.25	0.99	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
109	0.41	0.25	0.99	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
110	0.41	0.25	0.99	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
111	0.40	0.25	0.99	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
112	0.40	0.25	0.98	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
113	0.40	0.25	0.98	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
114	0.39	0.25	0.97	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
115	0.39	0.25	0.96	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
116	0.39	0.25	0.96	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
117	0.38	0.25	0.94	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold

Post PT #	Rtn Prd (yrs)	Post Dev Q	Pre Dev Q	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
118	0.38	0.25	0.93	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
119	0.38	0.25	0.92	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
120	0.37	0.25	0.92	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
121	0.37	0.25	0.91	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
122	0.37	0.25	0.91	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
123	0.36	0.25	0.89	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
124	0.36	0.25	0.89	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
125	0.36	0.24	0.87	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
126	0.35	0.24	0.86	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
127	0.35	0.24	0.85	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
128	0.35	0.24	0.84	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
129	0.35	0.24	0.84	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
130	0.34	0.24	0.83	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
131	0.34	0.23	0.83	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
132	0.34	0.23	0.82	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
133	0.34	0.23	0.82	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
134	0.33	0.23	0.80	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
135	0.33	0.22	0.80	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
136	0.33	0.22	0.79	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
137	0.33	0.22	0.79	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
138	0.32	0.22	0.78	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
139	0.32	0.22	0.78	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
140	0.32	0.21	0.78	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
141	0.32	0.21	0.78	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
142	0.32	0.21	0.76	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
143	0.31	0.21	0.76	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
144	0.31	0.21	0.74	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
145	0.31	0.21	0.72	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
146	0.31	0.20	0.71	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
147	0.30	0.20	0.71	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
148	0.30	0.20	0.70	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
149	0.30	0.19	0.68	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
150	0.30	0.19	0.68	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
151	0.30	0.19	0.67	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
152	0.29	0.19	0.67	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
153	0.29	0.19	0.66	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
154	0.29	0.19	0.65	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
155	0.29	0.19	0.64	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
156	0.29	0.19	0.64	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
157	0.29	0.19	0.64	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
158	0.28	0.18	0.64	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
159	0.28	0.18	0.62	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold

Post PT #	Rtn Prd (yrs)	Post Dev Q	Pre Dev Q	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
160	0.28	0.18	0.61	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
161	0.28	0.18	0.60	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
162	0.28	0.18	0.59	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
163	0.27	0.18	0.58	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
164	0.27	0.18	0.57	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
165	0.27	0.18	0.57	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
166	0.27	0.17	0.57	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
167	0.27	0.17	0.56	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
168	0.27	0.17	0.56	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
169	0.27	0.17	0.55	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
170	0.26	0.17	0.55	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
171	0.26	0.17	0.54	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
172	0.26	0.17	0.53	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
173	0.26	0.17	0.53	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
174	0.26	0.17	0.52	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
175	0.26	0.17	0.52	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
176	0.25	0.17	0.52	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
177	0.25	0.17	0.52	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
178	0.25	0.17	0.52	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
179	0.25	0.16	0.51	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
180	0.25	0.16	0.50	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
181	0.25	0.16	0.49	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
182	0.25	0.16	0.48	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
183	0.25	0.16	0.47	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
184	0.24	0.16	0.46	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
185	0.24	0.16	0.45	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
186	0.24	0.16	0.44	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
187	0.24	0.16	0.43	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
188	0.24	0.16	0.42	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
189	0.24	0.16	0.42	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
190	0.24	0.16	0.41	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
191	0.23	0.15	0.40	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
192	0.23	0.15	0.39	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
193	0.23	0.15	0.38	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
194	0.23	0.15	0.38	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
195	0.23	0.15	0.37	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
196	0.23	0.15	0.36	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
197	0.23	0.15	0.36	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
198	0.23	0.15	0.35	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
199	0.23	0.15	0.35	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
200	0.22	0.15	0.35	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
201	0.22	0.15	0.35	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold

Post PT #	Rtn Prd (yrs)	Post Dev Q	Pre Dev Q	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
202	0.22	0.14	0.34	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
203	0.22	0.14	0.34	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
204	0.22	0.14	0.33	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
205	0.22	0.14	0.33	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
206	0.22	0.14	0.33	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
207	0.22	0.14	0.33	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
208	0.22	0.14	0.33	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
209	0.21	0.14	0.33	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
210	0.21	0.14	0.33	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
211	0.21	0.14	0.32	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
212	0.21	0.14	0.32	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
213	0.21	0.14	0.30	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
214	0.21	0.14	0.29	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
215	0.21	0.14	0.29	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
216	0.21	0.14	0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
217	0.21	0.14	0.26	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
218	0.21	0.14	0.26	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
219	0.21	0.13	0.26	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
220	0.20	0.13	0.26	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
221	0.20	0.13	0.25	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
222	0.20	0.13	0.25	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
223	0.20	0.13	0.25	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
224	0.20	0.13	0.23	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
225	0.20	0.13	0.21	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
226	0.20	0.13	0.21	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
227	0.20	0.13	0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
228	0.20	0.12	0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
229	0.20	0.12	0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
230	0.20	0.12	0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
231	0.19	0.12	0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
232	0.19	0.12	0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
233	0.19	0.12	0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
234	0.19	0.12	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
235	0.19	0.12	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
236	0.19	0.12	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
237	0.19	0.12	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
238	0.19	0.12	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
239	0.19	0.12	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
240	0.19	0.12	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
241	0.19	0.12	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
242	0.19	0.12	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
243	0.18	0.11	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold

Post PT #	Rtn Prd (yrs)	Post Dev Q	Pre Dev Q	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
244	0.18	0.11	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
245	0.18	0.11	0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
246	0.18	0.11	0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
247	0.18	0.11	0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
248	0.18	0.11	0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
249	0.18	0.11	0.12	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
250	0.18	0.11	0.12	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
251	0.18	0.11	0.12	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
252	0.18	0.11	0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
253	0.18	0.11	0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
254	0.18	0.11	0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
255	0.18	0.11	0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
256	0.18	0.11	0.10	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
257	0.17	0.11	0.10	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
258	0.17	0.11	0.10	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
259	0.17	0.11	0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
260	0.17	0.11	0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
261	0.17	0.11	0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
262	0.17	0.11	0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
263	0.17	0.11	0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
264	0.17	0.11	0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
265	0.17	0.11	0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
266	0.17	0.11	0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
267	0.17	0.11	0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
268	0.17	0.10	0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
269	0.17	0.10	0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
270	0.17	0.10	0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
271	0.17	0.10	0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
272	0.17	0.10	0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
273	0.16	0.10	0.06	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
274	0.16	0.10	0.06	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
275	0.16	0.10	0.05	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
276	0.16	0.10	0.04	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
277	0.16	0.10	0.04	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
278	0.16	0.10	0.04	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
279	0.16	0.10	0.04	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
280	0.16	0.10	0.03	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
281	0.16	0.10	0.03	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
282	0.16	0.10	0.03	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
283	0.16	0.10	0.02	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
284	0.16	0.10	0.02	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
285	0.16	0.10	0.02	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold

Post PT #	Rtn Prd (yrs)	Post Dev Q	Pre Dev Q	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
286	0.16	0.10	0.02	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
287	0.16	0.10	0.01	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
288	0.16	0.10	0.01	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
289	0.16	0.10	0.01	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
290	0.16	0.10	0.01	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
291	0.15	0.10	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
292	0.15	0.10	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
293	0.15	0.10	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
294	0.15	0.10	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
295	0.15	0.10	-0.01	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
296	0.15	0.09	-0.01	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
297	0.15	0.09	-0.01	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
298	0.15	0.09	-0.01	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
299	0.15	0.09	-0.02	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
300	0.15	0.09	-0.02	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
301	0.15	0.09	-0.02	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
302	0.15	0.09	-0.02	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
303	0.15	0.09	-0.02	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
304	0.15	0.09	-0.02	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
305	0.15	0.09	-0.03	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
306	0.15	0.09	-0.03	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
307	0.15	0.09	-0.03	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
308	0.15	0.09	-0.03	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
309	0.15	0.09	-0.04	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
310	0.15	0.09	-0.04	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
311	0.14	0.09	-0.04	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
312	0.14	0.09	-0.04	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
313	0.14	0.09	-0.05	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
314	0.14	0.09	-0.05	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
315	0.14	0.09	-0.05	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
316	0.14	0.09	-0.05	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
317	0.14	0.09	-0.05	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
318	0.14	0.09	-0.06	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
319	0.14	0.09	-0.06	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
320	0.14	0.09	-0.06	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
321	0.14	0.08	-0.06	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
322	0.14	0.08	-0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
323	0.14	0.08	-0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
324	0.14	0.08	-0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
325	0.14	0.08	-0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
326	0.14	0.08	-0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
327	0.14	0.08	-0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold

Post PT #	Rtn Prd (yrs)	Post Dev Q	Pre Dev Q	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
328	0.14	0.08	-0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
329	0.14	0.08	-0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
330	0.14	0.08	-0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
331	0.14	0.08	-0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
332	0.14	0.08	-0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
333	0.14	0.08	-0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
334	0.13	0.08	-0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
335	0.13	0.08	-0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
336	0.13	0.08	-0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
337	0.13	0.08	-0.10	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
338	0.13	0.08	-0.10	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
339	0.13	0.08	-0.10	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
340	0.13	0.08	-0.10	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
341	0.13	0.08	-0.10	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
342	0.13	0.08	-0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
343	0.13	0.08	-0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
344	0.13	0.08	-0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
345	0.13	0.08	-0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
346	0.13	0.08	-0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
347	0.13	0.08	-0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
348	0.13	0.08	-0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
349	0.13	0.08	-0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
350	0.13	0.08	-0.12	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
351	0.13	0.08	-0.12	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
352	0.13	0.08	-0.12	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
353	0.13	0.08	-0.12	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
354	0.13	0.08	-0.12	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
355	0.13	0.08	-0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
356	0.13	0.08	-0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
357	0.13	0.08	-0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
358	0.13	0.07	-0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
359	0.13	0.07	-0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
360	0.13	0.07	-0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
361	0.12	0.07	-0.14	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
362	0.12	0.07	-0.14	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
363	0.12	0.07	-0.14	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
364	0.12	0.07	-0.14	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
365	0.12	0.07	-0.14	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
366	0.12	0.07	-0.14	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
367	0.12	0.07	-0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
368	0.12	0.07	-0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
369	0.12	0.07	-0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold

Post PT #	Rtn Prd (yrs)	Post Dev Q	Pre Dev Q	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
370	0.12	0.07	-0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
371	0.12	0.07	-0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
372	0.12	0.07	-0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
373	0.12	0.07	-0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
374	0.12	0.07	-0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
375	0.12	0.07	-0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
376	0.12	0.07	-0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
377	0.12	0.07	-0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
378	0.12	0.07	-0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
379	0.12	0.07	-0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
380	0.12	0.07	-0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
381	0.12	0.07	-0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
382	0.12	0.07	-0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
383	0.12	0.07	-0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
384	0.12	0.07	-0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
385	0.12	0.07	-0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
386	0.12	0.07	-0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
387	0.12	0.07	-0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
388	0.12	0.07	-0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
389	0.12	0.07	-0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
390	0.12	0.07	-0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
391	0.12	0.07	-0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
392	0.12	0.07	-0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
393	0.11	0.07	-0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
394	0.11	0.07	-0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
395	0.11	0.07	-0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
396	0.11	0.07	-0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
397	0.11	0.07	-0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
398	0.11	0.07	-0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
399	0.11	0.07	-0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
400	0.11	0.07	-0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
401	0.11	0.07	-0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
402	0.11	0.07	-0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
403	0.11	0.06	-0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
404	0.11	0.06	-0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
405	0.11	0.06	-0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
406	0.11	0.06	-0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
407	0.11	0.06	-0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
408	0.11	0.06	-0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
409	0.11	0.06	-0.21	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
410	0.11	0.06	-0.21	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
411	0.11	0.06	-0.21	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold

Post PT #	Rtn Prd (yrs)	Post Dev Q	Pre Dev Q	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
412	0.11	0.06	-0.21	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
413	0.11	0.06	-0.21	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
414	0.11	0.06	-0.21	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
415	0.11	0.06	-0.21	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
416	0.11	0.06	-0.21	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
417	0.11	0.06	-0.22	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
418	0.11	0.06	-0.22	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
419	0.11	0.06	-0.22	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
420	0.11	0.06	-0.22	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
421	0.11	0.06	-0.22	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
422	0.11	0.06	-0.22	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
423	0.11	0.06	-0.22	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
424	0.11	0.06	-0.22	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
425	0.11	0.06	-0.23	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
426	0.11	0.06	-0.23	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
427	0.11	0.06	-0.23	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
428	0.11	0.06	-0.23	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
429	0.10	0.06	-0.23	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
430	0.10	0.06	-0.23	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
431	0.10	0.06	-0.23	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
432	0.10	0.06	-0.23	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
433	0.10	0.06	-0.24	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
434	0.10	0.06	-0.24	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
435	0.10	0.06	-0.24	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
436	0.10	0.06	-0.24	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
437	0.10	0.06	-0.24	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
438	0.10	0.06	-0.24	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
439	0.10	0.06	-0.24	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
440	0.10	0.06	-0.24	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
441	0.10	0.06	-0.24	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
442	0.10	0.06	-0.25	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
443	0.10	0.06	-0.25	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
444	0.10	0.06	-0.25	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
445	0.10	0.06	-0.25	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
446	0.10	0.06	-0.25	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
447	0.10	0.06	-0.25	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
448	0.10	0.06	-0.25	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
449	0.10	0.06	-0.25	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
450	0.10	0.06	-0.26	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
451	0.10	0.06	-0.26	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
452	0.10	0.06	-0.26	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
453	0.10	0.06	-0.26	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold

Post PT #	Rtn Prd (yrs)	Post Dev Q	Pre Dev Q	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
454	0.10	0.06	-0.26	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
455	0.10	0.06	-0.26	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
456	0.10	0.06	-0.26	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
457	0.10	0.06	-0.26	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
458	0.10	0.06	-0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
459	0.10	0.05	-0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
460	0.10	0.05	-0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
461	0.10	0.05	-0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
462	0.10	0.05	-0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
463	0.10	0.05	-0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
464	0.10	0.05	-0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
465	0.10	0.05	-0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
466	0.10	0.05	-0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
467	0.10	0.05	-0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
468	0.10	0.05	-0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
469	0.10	0.05	-0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
470	0.10	0.05	-0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
471	0.10	0.05	-0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
472	0.10	0.05	-0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
473	0.09	0.05	-0.28	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
474	0.09	0.05	-0.28	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
475	0.09	0.05	-0.28	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
476	0.09	0.05	-0.28	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
477	0.09	0.05	-0.28	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
478	0.09	0.05	-0.28	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
479	0.09	0.05	-0.28	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
480	0.09	0.05	-0.28	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
481	0.09	0.05	-0.28	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
482	0.09	0.05	-0.28	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
483	0.09	0.05	-0.29	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
484	0.09	0.05	-0.29	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
485	0.09	0.05	-0.29	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
486	0.09	0.05	-0.29	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
487	0.09	0.05	-0.29	FALSE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold

SWMM.out file name: Q:\12\12025\GPIP\STORM\SWMM\12025-PRE-POC-1.out
SWMM.out time stamp: 8/1/2019 4:56:01 PM

Q10: 4.848
Q5: 4.301
Q2: 2.933

Peak Flow Statistics Table Values

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
1	1993/01/06 17:00:00	1993/01/10 18:00:00	98	6.272	0.36%	45
2	1995/01/04 15:00:00	1995/01/05 02:00:00	12	5.358	0.72%	22.5
3	1983/03/01 14:00:00	1983/03/03 09:00:00	44	4.884	1.08%	15
4	1966/12/05 01:00:00	1966/12/07 01:00:00	49	4.87	1.44%	11.25
5	1978/03/17 03:00:00	1978/03/18 14:00:00	36	4.831	1.81%	9
6	1986/02/15 02:00:00	1986/02/15 11:00:00	10	4.755	2.17%	7.5
7	1978/01/14 16:00:00	1978/01/16 14:00:00	47	4.626	2.53%	6.43
8	1998/02/14 15:00:00	1998/02/15 01:00:00	11	4.363	2.89%	5.63
9	1971/02/23 05:00:00	1971/02/23 16:00:00	12	4.301	3.25%	5
10	1980/01/28 20:00:00	1980/01/30 21:00:00	50	3.973	3.61%	4.5
11	1969/01/24 18:00:00	1969/01/25 18:00:00	25	3.946	3.97%	4.09
12	1995/01/25 09:00:00	1995/01/26 00:00:00	16	3.725	4.33%	3.75
13	1965/11/22 04:00:00	1965/11/23 07:00:00	28	3.465	4.69%	3.46
14	1983/12/25 06:00:00	1983/12/25 13:00:00	8	3.449	5.05%	3.21
15	1981/02/09 05:00:00	1981/02/09 09:00:00	5	3.371	5.42%	3
16	1988/04/21 19:00:00	1988/04/22 00:00:00	6	3.314	5.78%	2.81
17	1967/11/19 07:00:00	1967/11/20 03:00:00	21	3.253	6.14%	2.65
18	2005/01/09 04:00:00	2005/01/11 10:00:00	55	3.171	6.50%	2.5
19	2007/08/26 07:00:00	2007/08/26 09:00:00	3	3.055	6.86%	2.37
20	1998/02/03 12:00:00	1998/02/04 01:00:00	14	3.017	7.22%	2.25
21	1972/11/14 14:00:00	1972/11/14 16:00:00	3	2.966	7.58%	2.14
22	1979/01/05 08:00:00	1979/01/06 08:00:00	25	2.942	7.94%	2.05
23	1993/02/08 01:00:00	1993/02/08 05:00:00	5	2.924	8.30%	1.96
24	1983/11/25 01:00:00	1983/11/25 04:00:00	4	2.907	8.66%	1.88
25	1998/01/09 16:00:00	1998/01/10 19:00:00	28	2.746	9.03%	1.8
26	1993/01/12 23:00:00	1993/01/14 07:00:00	33	2.699	9.39%	1.73
27	1967/04/11 10:00:00	1967/04/12 05:00:00	20	2.692	9.75%	1.67
28	1980/02/16 18:00:00	1980/02/21 04:00:00	107	2.678	10.11%	1.61
29	1970/03/04 21:00:00	1970/03/05 02:00:00	6	2.642	10.47%	1.55
30	1991/03/20 07:00:00	1991/03/21 03:00:00	21	2.553	10.83%	1.5
31	1967/12/18 15:00:00	1967/12/19 15:00:00	25	2.537	11.19%	1.45
32	1980/03/02 21:00:00	1980/03/03 04:00:00	8	2.502	11.55%	1.41
33	2007/01/31 00:00:00	2007/01/31 01:00:00	2	2.464	11.91%	1.36
34	2004/10/27 04:00:00	2004/10/27 10:00:00	7	2.399	12.27%	1.32
35	2004/10/18 10:00:00	2004/10/18 12:00:00	3	2.382	12.64%	1.29
36	1985/11/25 00:00:00	1985/11/25 08:00:00	9	2.279	13.00%	1.25
37	1992/02/06 17:00:00	1992/02/07 02:00:00	10	2.276	13.36%	1.22
38	2004/02/26 07:00:00	2004/02/26 11:00:00	5	2.247	13.72%	1.18
39	1995/03/05 09:00:00	1995/03/06 03:00:00	19	2.233	14.08%	1.15

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
40	1980/01/10 23:00:00	1980/01/11 15:00:00	17	2.143	14.44%	1.13
41	1982/03/18 10:00:00	1982/03/19 07:00:00	22	2.142	14.80%	1.1
42	1985/11/29 09:00:00	1985/11/29 19:00:00	11	2.092	15.16%	1.07
43	1992/02/15 14:00:00	1992/02/15 19:00:00	6	2.085	15.52%	1.05
44	2007/11/30 10:00:00	2007/12/01 01:00:00	16	1.965	15.88%	1.02
45	1991/02/27 16:00:00	1991/03/01 14:00:00	47	1.945	16.25%	1
46	1978/02/05 02:00:00	1978/02/06 22:00:00	45	1.871	16.61%	0.98
47	1966/12/03 14:00:00	1966/12/03 20:00:00	7	1.864	16.97%	0.96
48	1991/03/19 01:00:00	1991/03/19 06:00:00	6	1.854	17.33%	0.94
49	1970/02/28 16:00:00	1970/03/02 08:00:00	41	1.849	17.69%	0.92
50	1969/02/06 08:00:00	1969/02/06 12:00:00	5	1.847	18.05%	0.9
51	1991/03/25 08:00:00	1991/03/27 12:00:00	53	1.773	18.41%	0.88
52	1967/01/24 18:00:00	1967/01/25 02:00:00	9	1.757	18.77%	0.87
53	1977/05/08 19:00:00	1977/05/08 23:00:00	5	1.738	19.13%	0.85
54	2004/10/20 11:00:00	2004/10/20 17:00:00	7	1.702	19.49%	0.83
55	1974/03/08 02:00:00	1974/03/08 15:00:00	14	1.667	19.86%	0.82
56	1978/12/17 20:00:00	1978/12/18 14:00:00	19	1.631	20.22%	0.8
57	1983/02/27 17:00:00	1983/02/27 22:00:00	6	1.626	20.58%	0.79
58	1965/04/09 20:00:00	1965/04/10 01:00:00	6	1.621	20.94%	0.78
59	2003/02/12 17:00:00	2003/02/13 19:00:00	27	1.603	21.30%	0.76
60	1982/01/01 11:00:00	1982/01/01 12:00:00	2	1.579	21.66%	0.75
61	1983/03/23 18:00:00	1983/03/23 23:00:00	6	1.568	22.02%	0.74
62	1981/03/01 05:00:00	1981/03/01 18:00:00	14	1.56	22.38%	0.73
63	1974/12/04 09:00:00	1974/12/04 11:00:00	3	1.558	22.74%	0.71
64	1976/02/08 15:00:00	1976/02/09 03:00:00	13	1.537	23.10%	0.7
65	1967/11/21 13:00:00	1967/11/21 15:00:00	3	1.519	23.47%	0.69
66	2005/02/21 04:00:00	2005/02/21 17:00:00	14	1.513	23.83%	0.68
67	1981/03/19 21:00:00	1981/03/19 23:00:00	3	1.478	24.19%	0.67
68	1998/02/08 16:00:00	1998/02/08 23:00:00	8	1.477	24.55%	0.66
69	2006/04/05 06:00:00	2006/04/05 09:00:00	4	1.465	24.91%	0.65
70	1969/02/24 00:00:00	1969/02/26 00:00:00	49	1.462	25.27%	0.64
71	1994/02/17 12:00:00	1994/02/17 14:00:00	3	1.424	25.63%	0.63
72	1970/12/21 03:00:00	1970/12/21 11:00:00	9	1.419	25.99%	0.63
73	1967/01/22 19:00:00	1967/01/23 02:00:00	8	1.409	26.35%	0.62
74	1996/01/31 18:00:00	1996/02/01 08:00:00	15	1.39	26.71%	0.61
75	2003/02/25 17:00:00	2003/02/25 20:00:00	4	1.379	27.08%	0.6
76	1970/11/29 14:00:00	1970/11/30 03:00:00	14	1.373	27.44%	0.59
77	2008/02/03 10:00:00	2008/02/03 18:00:00	9	1.361	27.80%	0.58
78	1993/01/15 14:00:00	1993/01/16 22:00:00	33	1.356	28.16%	0.58
79	1988/12/24 23:00:00	1988/12/25 03:00:00	5	1.349	28.52%	0.57
80	1973/01/16 20:00:00	1973/01/16 23:00:00	4	1.267	28.88%	0.56
81	2005/01/03 08:00:00	2005/01/04 05:00:00	22	1.264	29.24%	0.56
82	1992/02/12 18:00:00	1992/02/13 07:00:00	14	1.238	29.60%	0.55
83	1996/11/21 20:00:00	1996/11/22 04:00:00	9	1.235	29.96%	0.54
84	1970/03/08 12:00:00	1970/03/08 20:00:00	9	1.222	30.32%	0.54
85	1965/04/08 14:00:00	1965/04/08 20:00:00	7	1.208	30.69%	0.53
86	1973/03/08 13:00:00	1973/03/08 21:00:00	9	1.195	31.05%	0.52

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
87	1979/01/17 12:00:00	1979/01/18 16:00:00	29	1.194	31.41%	0.52
88	1981/02/25 21:00:00	1981/02/26 01:00:00	5	1.177	31.77%	0.51
89	1983/01/27 09:00:00	1983/01/27 14:00:00	6	1.175	32.13%	0.51
90	2001/01/11 05:00:00	2001/01/12 09:00:00	29	1.17	32.49%	0.5
91	1967/03/13 16:00:00	1967/03/13 23:00:00	8	1.168	32.85%	0.5
92	1994/02/07 15:00:00	1994/02/07 22:00:00	8	1.166	33.21%	0.49
93	1976/04/14 11:00:00	1976/04/14 12:00:00	2	1.161	33.57%	0.48
94	1974/01/06 13:00:00	1974/01/08 05:00:00	41	1.158	33.94%	0.48
95	1995/03/11 03:00:00	1995/03/12 01:00:00	23	1.155	34.30%	0.47
96	1965/11/16 18:00:00	1965/11/17 00:00:00	7	1.139	34.66%	0.47
97	1993/11/14 17:00:00	1993/11/14 18:00:00	2	1.136	35.02%	0.46
98	1986/11/17 23:00:00	1986/11/18 03:00:00	5	1.109	35.38%	0.46
99	1998/02/22 17:00:00	1998/02/24 20:00:00	52	1.099	35.74%	0.46
100	1992/12/07 11:00:00	1992/12/07 18:00:00	8	1.096	36.10%	0.45
101	2004/02/22 14:00:00	2004/02/23 08:00:00	19	1.09	36.46%	0.45
102	1971/12/25 02:00:00	1971/12/26 00:00:00	23	1.066	36.82%	0.44
103	1969/01/20 09:00:00	1969/01/21 17:00:00	33	1.056	37.18%	0.44
104	1976/03/03 00:00:00	1976/03/03 04:00:00	5	1.05	37.55%	0.43
105	1974/01/04 19:00:00	1974/01/05 03:00:00	9	1.041	37.91%	0.43
106	1980/02/14 01:00:00	1980/02/14 11:00:00	11	1.026	38.27%	0.43
107	1991/12/29 16:00:00	1991/12/29 19:00:00	4	1.008	38.63%	0.42
108	1970/12/19 02:00:00	1970/12/19 06:00:00	5	1.008	38.99%	0.42
109	1975/03/08 09:00:00	1975/03/08 14:00:00	6	0.993	39.35%	0.41
110	1998/02/17 17:00:00	1998/02/17 22:00:00	6	0.991	39.71%	0.41
111	1973/02/11 05:00:00	1973/02/13 02:00:00	46	0.991	40.07%	0.41
112	1972/11/16 13:00:00	1972/11/16 18:00:00	6	0.986	40.43%	0.4
113	1992/01/05 16:00:00	1992/01/06 05:00:00	14	0.979	40.79%	0.4
114	1982/02/10 10:00:00	1982/02/10 21:00:00	12	0.976	41.16%	0.4
115	1994/03/25 01:00:00	1994/03/25 16:00:00	16	0.971	41.52%	0.39
116	2005/02/22 19:00:00	2005/02/23 11:00:00	17	0.962	41.88%	0.39
117	1982/12/22 23:00:00	1982/12/23 01:00:00	3	0.957	42.24%	0.39
118	1969/01/14 12:00:00	1969/01/14 13:00:00	2	0.944	42.60%	0.38
119	1965/12/09 06:00:00	1965/12/10 10:00:00	29	0.927	42.96%	0.38
120	1975/03/10 12:00:00	1975/03/11 14:00:00	27	0.921	43.32%	0.38
121	1978/03/13 07:00:00	1978/03/15 03:00:00	45	0.918	43.68%	0.37
122	1980/03/06 02:00:00	1980/03/06 11:00:00	10	0.911	44.04%	0.37
123	1979/03/17 06:00:00	1979/03/17 09:00:00	4	0.909	44.40%	0.37
124	1973/11/22 23:00:00	1973/11/23 02:00:00	4	0.89	44.77%	0.36
125	1979/03/01 16:00:00	1979/03/01 21:00:00	6	0.887	45.13%	0.36
126	1975/04/08 10:00:00	1975/04/09 02:00:00	17	0.865	45.49%	0.36
127	2008/02/22 04:00:00	2008/02/22 11:00:00	8	0.857	45.85%	0.35
128	1980/03/10 19:00:00	1980/03/10 21:00:00	3	0.85	46.21%	0.35
129	1986/09/25 04:00:00	1986/09/25 07:00:00	4	0.844	46.57%	0.35
130	1987/01/07 08:00:00	1987/01/07 09:00:00	2	0.841	46.93%	0.35
131	1965/12/14 15:00:00	1965/12/14 18:00:00	4	0.834	47.29%	0.34
132	1965/12/13 01:00:00	1965/12/13 03:00:00	3	0.827	47.65%	0.34
133	1995/02/14 09:00:00	1995/02/14 11:00:00	3	0.82	48.01%	0.34

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
134	1969/02/22 03:00:00	1969/02/22 08:00:00	6	0.816	48.38%	0.34
135	2002/12/20 17:00:00	2002/12/20 21:00:00	5	0.8	48.74%	0.33
136	1966/11/07 16:00:00	1966/11/07 18:00:00	3	0.799	49.10%	0.33
137	1983/02/08 04:00:00	1983/02/08 07:00:00	4	0.786	49.46%	0.33
138	1971/05/07 20:00:00	1971/05/07 22:00:00	3	0.786	49.82%	0.33
139	1988/01/17 12:00:00	1988/01/17 22:00:00	11	0.784	50.18%	0.32
140	1964/11/17 18:00:00	1964/11/18 00:00:00	7	0.782	50.54%	0.32
141	1982/11/30 12:00:00	1982/11/30 20:00:00	9	0.782	50.90%	0.32
142	1982/03/15 16:00:00	1982/03/16 00:00:00	9	0.779	51.26%	0.32
143	1986/02/08 05:00:00	1986/02/08 08:00:00	4	0.763	51.62%	0.32
144	2003/03/15 17:00:00	2003/03/16 18:00:00	26	0.757	51.99%	0.31
145	1995/01/12 10:00:00	1995/01/12 15:00:00	6	0.744	52.35%	0.31
146	1976/02/06 05:00:00	1976/02/06 07:00:00	3	0.722	52.71%	0.31
147	1976/12/31 09:00:00	1976/12/31 12:00:00	4	0.707	53.07%	0.31
148	1998/02/06 17:00:00	1998/02/06 21:00:00	5	0.707	53.43%	0.3
149	1997/01/12 17:00:00	1997/01/13 12:00:00	20	0.696	53.79%	0.3
150	1993/02/19 18:00:00	1993/02/20 00:00:00	7	0.683	54.15%	0.3
151	1987/12/16 20:00:00	1987/12/16 23:00:00	4	0.675	54.51%	0.3
152	1998/03/28 17:00:00	1998/03/28 21:00:00	5	0.67	54.87%	0.3
153	1993/01/17 23:00:00	1993/01/18 18:00:00	20	0.666	55.23%	0.29
154	1979/03/27 23:00:00	1979/03/28 04:00:00	6	0.662	55.60%	0.29
155	2003/04/14 17:00:00	2003/04/14 18:00:00	2	0.651	55.96%	0.29
156	1978/11/13 23:00:00	1978/11/14 00:00:00	2	0.644	56.32%	0.29
157	1968/03/08 10:00:00	1968/03/08 13:00:00	4	0.643	56.68%	0.29
158	1976/09/10 06:00:00	1976/09/10 21:00:00	16	0.638	57.04%	0.29
159	1995/01/07 19:00:00	1995/01/08 04:00:00	10	0.638	57.40%	0.28
160	1977/08/17 01:00:00	1977/08/17 10:00:00	10	0.618	57.76%	0.28
161	1983/03/18 08:00:00	1983/03/18 23:00:00	16	0.611	58.12%	0.28
162	1965/12/29 20:00:00	1965/12/29 22:00:00	3	0.603	58.48%	0.28
163	1986/03/15 22:00:00	1986/03/16 20:00:00	23	0.592	58.84%	0.28
164	2002/12/16 17:00:00	2002/12/16 21:00:00	5	0.582	59.21%	0.27
165	1972/12/04 15:00:00	1972/12/04 19:00:00	5	0.573	59.57%	0.27
166	1997/01/25 23:00:00	1997/01/26 09:00:00	11	0.567	59.93%	0.27
167	1988/04/20 08:00:00	1988/04/20 14:00:00	7	0.565	60.29%	0.27
168	2006/01/02 14:00:00	2006/01/02 15:00:00	2	0.558	60.65%	0.27
169	1973/01/18 22:00:00	1973/01/19 02:00:00	5	0.558	61.01%	0.27
170	1990/01/14 04:00:00	1990/01/14 06:00:00	3	0.55	61.37%	0.27
171	1983/04/30 04:00:00	1983/04/30 06:00:00	3	0.55	61.73%	0.26
172	1983/11/20 12:00:00	1983/11/20 13:00:00	2	0.544	62.09%	0.26
173	2004/03/02 03:00:00	2004/03/02 05:00:00	3	0.534	62.45%	0.26
174	1998/05/12 17:00:00	1998/05/12 20:00:00	4	0.531	62.82%	0.26
175	1983/01/29 02:00:00	1983/01/29 05:00:00	4	0.524	63.18%	0.26
176	1992/12/29 14:00:00	1992/12/29 21:00:00	8	0.524	63.54%	0.26
177	1992/01/07 20:00:00	1992/01/07 23:00:00	4	0.52	63.90%	0.25
178	1965/12/16 06:00:00	1965/12/16 10:00:00	5	0.519	64.26%	0.25
179	2008/01/05 05:00:00	2008/01/07 05:00:00	49	0.517	64.62%	0.25
180	2004/12/29 02:00:00	2004/12/29 06:00:00	5	0.513	64.98%	0.25

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
181	1971/12/27 16:00:00	1971/12/28 16:00:00	25	0.498	65.34%	0.25
182	1995/04/18 11:00:00	1995/04/18 17:00:00	7	0.489	65.70%	0.25
183	1990/01/17 03:00:00	1990/01/17 04:00:00	2	0.479	66.06%	0.25
184	2004/02/03 00:00:00	2004/02/03 01:00:00	2	0.467	66.43%	0.25
185	1994/04/28 00:00:00	1994/04/28 02:00:00	3	0.464	66.79%	0.24
186	1976/11/12 02:00:00	1976/11/12 04:00:00	3	0.454	67.15%	0.24
187	1988/12/21 07:00:00	1988/12/21 08:00:00	2	0.438	67.51%	0.24
188	1979/03/19 03:00:00	1979/03/20 03:00:00	25	0.427	67.87%	0.24
189	1987/01/04 17:00:00	1987/01/05 01:00:00	9	0.418	68.23%	0.24
190	2006/02/28 00:00:00	2006/02/28 07:00:00	8	0.417	68.59%	0.24
191	1996/12/09 18:00:00	1996/12/09 21:00:00	4	0.414	68.95%	0.24
192	1982/11/10 12:00:00	1982/11/11 01:00:00	14	0.396	69.31%	0.23
193	1996/12/11 15:00:00	1996/12/11 17:00:00	3	0.386	69.68%	0.23
194	2005/01/07 15:00:00	2005/01/07 17:00:00	3	0.379	70.04%	0.23
195	1995/03/23 12:00:00	1995/03/23 14:00:00	3	0.377	70.40%	0.23
196	1993/03/28 03:00:00	1993/03/28 04:00:00	2	0.368	70.76%	0.23
197	1985/12/03 00:00:00	1985/12/03 03:00:00	4	0.365	71.12%	0.23
198	1973/03/11 13:00:00	1973/03/11 17:00:00	5	0.358	71.48%	0.23
199	1986/03/10 16:00:00	1986/03/10 20:00:00	5	0.35	71.84%	0.23
200	2006/03/28 23:00:00	2006/03/29 01:00:00	3	0.349	72.20%	0.23
201	1973/03/22 00:00:00	1973/03/22 03:00:00	4	0.346	72.56%	0.22
202	1987/11/04 17:00:00	1987/11/05 00:00:00	8	0.346	72.92%	0.22
203	2001/11/24 17:00:00	2001/11/24 18:00:00	2	0.343	73.29%	0.22
204	1980/01/09 05:00:00	1980/01/09 19:00:00	15	0.34	73.65%	0.22
205	1979/02/21 06:00:00	1979/02/21 18:00:00	13	0.332	74.01%	0.22
206	1977/12/26 04:00:00	1977/12/26 18:00:00	15	0.331	74.37%	0.22
207	1976/03/01 17:00:00	1976/03/01 19:00:00	3	0.331	74.73%	0.22
208	1994/02/20 16:00:00	1994/02/20 17:00:00	2	0.33	75.09%	0.22
209	1980/01/19 00:00:00	1980/01/19 01:00:00	2	0.33	75.45%	0.22
210	2002/11/08 17:00:00	2002/11/09 17:00:00	25	0.329	75.81%	0.21
211	1988/11/25 11:00:00	1988/11/25 14:00:00	4	0.325	76.17%	0.21
212	2006/03/10 17:00:00	2006/03/11 04:00:00	12	0.323	76.53%	0.21
213	1978/04/07 02:00:00	1978/04/07 02:00:00	1	0.316	76.90%	0.21
214	1986/03/12 14:00:00	1986/03/12 14:00:00	1	0.295	77.26%	0.21
215	2000/02/21 17:00:00	2000/02/21 20:00:00	4	0.293	77.62%	0.21
216	2002/11/29 17:00:00	2002/11/29 20:00:00	4	0.293	77.98%	0.21
217	1969/02/18 18:00:00	1969/02/18 20:00:00	3	0.271	78.34%	0.21
218	1973/03/07 00:00:00	1973/03/07 01:00:00	2	0.265	78.70%	0.21
219	1969/01/26 19:00:00	1969/01/26 21:00:00	3	0.262	79.06%	0.21
220	1981/03/05 07:00:00	1981/03/05 16:00:00	10	0.259	79.42%	0.21
221	1998/04/11 17:00:00	1998/04/11 19:00:00	3	0.257	79.78%	0.2
222	1996/02/27 22:00:00	1996/02/27 22:00:00	1	0.251	80.14%	0.2
223	1997/12/06 17:00:00	1997/12/06 19:00:00	3	0.249	80.51%	0.2
224	1976/04/13 00:00:00	1976/04/13 04:00:00	5	0.245	80.87%	0.2
225	1998/03/25 17:00:00	1998/03/26 17:00:00	25	0.232	81.23%	0.2
226	2005/03/22 23:00:00	2005/03/23 00:00:00	2	0.211	81.59%	0.2
227	1976/02/07 08:00:00	1976/02/07 09:00:00	2	0.211	81.95%	0.2

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
228	2003/02/11 17:00:00	2003/02/11 17:00:00	1	0.204	82.31%	0.2
229	1985/11/11 10:00:00	1985/11/11 16:00:00	7	0.201	82.67%	0.2
230	1975/04/06 12:00:00	1975/04/06 13:00:00	2	0.197	83.03%	0.2
231	1982/04/02 13:00:00	1982/04/02 16:00:00	4	0.197	83.39%	0.2
232	1982/01/20 23:00:00	1982/01/21 01:00:00	3	0.194	83.75%	0.19
233	1983/05/01 07:00:00	1983/05/01 08:00:00	2	0.191	84.12%	0.19
234	1983/03/20 20:00:00	1983/03/20 20:00:00	1	0.186	84.48%	0.19
235	1965/04/03 08:00:00	1965/04/03 09:00:00	2	0.185	84.84%	0.19
236	1972/12/08 14:00:00	1972/12/08 14:00:00	1	0.175	85.20%	0.19
237	1978/03/31 03:00:00	1978/03/31 03:00:00	1	0.175	85.56%	0.19
238	2008/02/14 13:00:00	2008/02/14 13:00:00	1	0.167	85.92%	0.19
239	1969/03/13 14:00:00	1969/03/13 18:00:00	5	0.15	86.28%	0.19
240	1996/02/25 10:00:00	1996/02/26 00:00:00	15	0.15	86.64%	0.19
241	1973/03/20 09:00:00	1973/03/20 11:00:00	3	0.148	87.00%	0.19
242	1967/04/22 03:00:00	1967/04/22 05:00:00	3	0.147	87.36%	0.19
243	1978/01/30 12:00:00	1978/01/30 13:00:00	2	0.147	87.73%	0.19
244	1993/02/23 23:00:00	1993/02/24 05:00:00	7	0.146	88.09%	0.18
245	1983/04/21 01:00:00	1983/04/21 03:00:00	3	0.141	88.45%	0.18
246	1970/03/11 13:00:00	1970/03/11 16:00:00	4	0.135	88.81%	0.18
247	1992/03/02 11:00:00	1992/03/02 11:00:00	1	0.134	89.17%	0.18
248	1990/06/10 04:00:00	1990/06/10 05:00:00	2	0.13	89.53%	0.18
249	2005/02/18 07:00:00	2005/02/18 07:00:00	1	0.129	89.89%	0.18
250	1996/01/21 19:00:00	1996/01/21 20:00:00	2	0.124	90.25%	0.18
251	1965/04/01 22:00:00	1965/04/02 02:00:00	5	0.118	90.61%	0.18
252	1972/11/11 08:00:00	1972/11/11 08:00:00	1	0.117	90.97%	0.18
253	1979/10/20 14:00:00	1979/10/20 15:00:00	2	0.114	91.34%	0.18
254	1992/03/23 04:00:00	1992/03/23 04:00:00	1	0.113	91.70%	0.18
255	2003/12/25 19:00:00	2003/12/25 19:00:00	1	0.11	92.06%	0.18
256	1979/01/31 10:00:00	1979/01/31 10:00:00	1	0.106	92.42%	0.18
257	2008/01/23 22:00:00	2008/01/23 22:00:00	1	0.104	92.78%	0.18
258	2002/03/17 23:00:00	2002/03/17 23:00:00	1	0.098	93.14%	0.17
259	1994/12/25 03:00:00	1994/12/25 03:00:00	1	0.097	93.50%	0.17
260	2000/02/13 17:00:00	2000/02/13 18:00:00	2	0.095	93.86%	0.17
261	1974/04/02 07:00:00	1974/04/02 07:00:00	1	0.094	94.22%	0.17
262	1977/01/04 00:00:00	1977/01/04 00:00:00	1	0.094	94.58%	0.17
263	1986/03/13 19:00:00	1986/03/13 19:00:00	1	0.092	94.95%	0.17
264	1994/04/26 21:00:00	1994/04/26 21:00:00	1	0.091	95.31%	0.17
265	1976/04/15 17:00:00	1976/04/15 17:00:00	1	0.088	95.67%	0.17
266	1968/04/01 20:00:00	1968/04/01 20:00:00	1	0.081	96.03%	0.17
267	1969/01/28 20:00:00	1969/01/28 20:00:00	1	0.081	96.39%	0.17
268	1975/02/10 03:00:00	1975/02/10 03:00:00	1	0.074	96.75%	0.17
269	2001/12/21 17:00:00	2001/12/21 17:00:00	1	0.07	97.11%	0.17
270	2005/02/12 01:00:00	2005/02/12 10:00:00	10	0.068	97.47%	0.17
271	1973/02/28 06:00:00	1973/02/28 06:00:00	1	0.067	97.83%	0.17
272	1993/01/31 02:00:00	1993/01/31 02:00:00	1	0.065	98.19%	0.17
273	1995/12/20 17:00:00	1995/12/20 17:00:00	1	0.063	98.56%	0.17
274	1980/03/26 01:00:00	1980/03/26 01:00:00	1	0.061	98.92%	0.16

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
275	1979/02/02 16:00:00	1979/02/02 16:00:00	1	0.051	99.28%	0.16
276	2006/03/21 02:00:00	2006/03/21 02:00:00	1	0.046	99.64%	0.16
--End of Data----------						

SWMM.out file name: Q:\12\12025\GPIP\STORM\SWMM\12025-POST-POC-1-5-6-13.out
SWMM.out time stamp: 8/2/2019 9:54:22 AM

Q10: 0.000
Q5: 0.000
Q2: 0.000

Peak Flow Statistics Table Values

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
1	1993/01/06 12:00:00	1993/01/11 20:00:00	129	6.025	0.20%	45
2	1995/01/03 15:00:00	1995/01/06 16:00:00	74	5.266	0.41%	22.5
3	1966/12/03 11:00:00	1966/12/08 15:00:00	125	5.159	0.61%	15
4	1978/01/14 18:00:00	1978/01/18 04:00:00	83	4.683	0.81%	11.25
5	1980/01/28 07:00:00	1980/02/01 05:00:00	95	4.25	1.02%	9
6	1969/01/24 10:00:00	1969/01/29 06:00:00	117	3.899	1.22%	7.5
7	1965/11/22 07:00:00	1965/11/26 00:00:00	90	3.606	1.42%	6.43
8	1978/03/12 00:00:00	1978/03/19 12:00:00	181	3.537	1.63%	5.63
9	2007/08/26 08:00:00	2007/08/27 18:00:00	35	3.497	1.83%	5
10	1986/02/15 03:00:00	1986/02/17 03:00:00	49	3.374	2.03%	4.5
11	1983/02/24 12:00:00	1983/03/05 04:00:00	209	3.313	2.24%	4.09
12	1979/01/05 10:00:00	1979/01/07 22:00:00	61	3.237	2.44%	3.75
13	1980/02/13 16:00:00	1980/02/22 17:00:00	218	2.849	2.64%	3.46
14	1995/03/05 06:00:00	1995/03/07 18:00:00	61	2.659	2.85%	3.21
15	1967/11/19 09:00:00	1967/11/23 12:00:00	100	2.568	3.05%	3
16	2005/01/07 15:00:00	2005/01/13 02:00:00	132	2.486	3.25%	2.81
17	1980/01/09 06:00:00	1980/01/13 13:00:00	104	2.412	3.46%	2.65
18	1971/02/23 06:00:00	1971/02/25 04:00:00	47	2.314	3.66%	2.5
19	1980/03/02 23:00:00	1980/03/04 22:00:00	48	1.954	3.86%	2.37
20	2007/11/30 11:00:00	2007/12/02 16:00:00	54	1.876	4.07%	2.25
21	1970/02/28 18:00:00	1970/03/03 21:00:00	76	1.521	4.27%	2.14
22	1993/01/12 21:00:00	1993/01/20 02:00:00	174	1.471	4.47%	2.05
23	1998/02/14 08:00:00	1998/02/18 19:00:00	108	1.384	4.67%	1.96
24	2004/10/27 06:00:00	2004/10/29 06:00:00	49	1.373	4.88%	1.88
25	1991/02/27 18:00:00	1991/03/03 04:00:00	83	1.346	5.08%	1.8
26	2005/02/21 06:00:00	2005/02/24 17:00:00	84	1.244	5.28%	1.73
27	1985/11/25 01:00:00	1985/11/27 01:00:00	49	1.042	5.49%	1.67
28	1991/03/19 03:00:00	1991/03/22 16:00:00	86	1.025	5.69%	1.61
29	1974/03/07 19:00:00	1974/03/10 05:00:00	59	0.89	5.89%	1.55
30	1965/12/09 09:00:00	1965/12/17 02:00:00	186	0.799	6.10%	1.5
31	1982/03/18 02:00:00	1982/03/21 02:00:00	73	0.785	6.30%	1.45
32	1985/11/29 10:00:00	1985/12/01 10:00:00	49	0.715	6.50%	1.41
33	1996/11/21 19:00:00	1996/11/23 21:00:00	51	0.678	6.71%	1.36
34	1969/02/22 05:00:00	1969/02/27 15:00:00	131	0.63	6.91%	1.32
35	1991/03/25 10:00:00	1991/03/29 04:00:00	91	0.598	7.11%	1.29
36	1967/12/18 18:00:00	1967/12/21 05:00:00	60	0.541	7.32%	1.25
37	1970/11/29 02:00:00	1970/12/01 15:00:00	62	0.519	7.52%	1.22
38	1977/05/08 16:00:00	1977/05/10 21:00:00	54	0.507	7.72%	1.18
39	1996/01/31 09:00:00	1996/02/02 21:00:00	61	0.476	7.93%	1.15

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
40	1993/02/07 23:00:00	1993/02/10 08:00:00	58	0.416	8.13%	1.13
41	1967/01/22 19:00:00	1967/01/26 14:00:00	92	0.397	8.33%	1.1
42	1981/02/28 19:00:00	1981/03/03 13:00:00	67	0.353	8.54%	1.07
43	1974/01/04 22:00:00	1974/01/09 23:00:00	122	0.31	8.74%	1.05
44	1976/02/04 12:00:00	1976/02/11 03:00:00	160	0.308	8.94%	1.02
45	1981/02/08 23:00:00	1981/02/11 02:00:00	52	0.308	9.15%	1
46	1995/03/11 05:00:00	1995/03/13 10:00:00	54	0.307	9.35%	0.98
47	1983/12/24 22:00:00	1983/12/27 18:00:00	69	0.305	9.55%	0.96
48	1995/01/24 04:00:00	1995/01/27 15:00:00	84	0.303	9.76%	0.94
49	2004/02/22 17:00:00	2004/02/24 16:00:00	48	0.301	9.96%	0.92
50	1998/01/09 09:00:00	1998/01/11 23:00:00	63	0.299	10.16%	0.9
51	2004/10/17 14:00:00	2004/10/22 03:00:00	110	0.298	10.37%	0.88
52	1998/02/03 10:00:00	1998/02/05 12:00:00	51	0.294	10.57%	0.87
53	1992/01/05 14:00:00	1992/01/08 17:00:00	76	0.294	10.77%	0.85
54	2004/02/26 07:00:00	2004/02/28 03:00:00	45	0.293	10.98%	0.83
55	1988/04/20 04:00:00	1988/04/23 08:00:00	77	0.291	11.18%	0.82
56	1997/01/12 17:00:00	1997/01/16 03:00:00	83	0.291	11.38%	0.8
57	1982/02/09 23:00:00	1982/02/12 02:00:00	52	0.29	11.59%	0.79
58	1992/02/15 16:00:00	1992/02/17 02:00:00	35	0.288	11.79%	0.78
59	1992/02/12 21:00:00	1992/02/14 14:00:00	42	0.288	11.99%	0.76
60	1970/03/05 00:00:00	1970/03/07 15:00:00	64	0.288	12.20%	0.75
61	1965/04/07 07:00:00	1965/04/11 09:00:00	99	0.288	12.40%	0.74
62	1992/12/07 11:00:00	1992/12/09 02:00:00	40	0.288	12.60%	0.73
63	1975/04/06 00:00:00	1975/04/10 11:00:00	108	0.287	12.80%	0.71
64	1965/11/14 21:00:00	1965/11/18 11:00:00	87	0.287	13.01%	0.7
65	1977/08/16 20:00:00	1977/08/18 23:00:00	52	0.286	13.21%	0.69
66	1967/04/11 11:00:00	1967/04/13 07:00:00	45	0.286	13.41%	0.68
67	2001/01/11 03:00:00	2001/01/13 06:00:00	52	0.285	13.62%	0.67
68	1972/11/14 16:00:00	1972/11/18 03:00:00	84	0.283	13.82%	0.66
69	1969/02/05 11:00:00	1969/02/07 23:00:00	61	0.282	14.02%	0.65
70	1983/11/25 03:00:00	1983/11/26 10:00:00	32	0.282	14.23%	0.64
71	1983/03/20 23:00:00	1983/03/25 05:00:00	103	0.281	14.43%	0.63
72	1975/03/08 11:00:00	1975/03/12 11:00:00	97	0.281	14.63%	0.63
73	1976/03/01 18:00:00	1976/03/04 11:00:00	66	0.281	14.84%	0.62
74	1978/02/05 04:00:00	1978/02/08 01:00:00	70	0.28	15.04%	0.61
75	2008/02/22 06:00:00	2008/02/24 15:00:00	58	0.278	15.24%	0.6
76	1982/11/29 22:00:00	1982/12/02 02:00:00	53	0.277	15.45%	0.59
77	1995/01/07 21:00:00	1995/01/09 09:00:00	37	0.276	15.65%	0.58
78	1970/03/08 15:00:00	1970/03/09 21:00:00	31	0.274	15.85%	0.58
79	1974/12/04 09:00:00	1974/12/05 22:00:00	38	0.273	16.06%	0.57
80	1988/12/25 00:00:00	1988/12/26 12:00:00	37	0.273	16.26%	0.56
81	1986/11/17 22:00:00	1986/11/19 13:00:00	40	0.272	16.46%	0.56
82	1967/03/13 16:00:00	1967/03/15 03:00:00	36	0.272	16.67%	0.55
83	1973/01/16 21:00:00	1973/01/20 01:00:00	77	0.272	16.87%	0.54
84	1978/12/17 02:00:00	1978/12/20 05:00:00	76	0.271	17.07%	0.54
85	1987/01/04 17:00:00	1987/01/08 06:00:00	86	0.271	17.28%	0.53
86	1993/02/18 18:00:00	1993/02/21 07:00:00	62	0.27	17.48%	0.52

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
87	1973/03/05 08:00:00	1973/03/09 22:00:00	111	0.27	17.68%	0.52
88	1976/09/10 02:00:00	1976/09/12 06:00:00	53	0.269	17.89%	0.51
89	1966/11/07 18:00:00	1966/11/09 04:00:00	35	0.265	18.09%	0.51
90	1992/02/06 15:00:00	1992/02/08 09:00:00	43	0.264	18.29%	0.5
91	1987/12/16 16:00:00	1987/12/18 09:00:00	42	0.263	18.50%	0.5
92	2007/01/30 17:00:00	2007/02/01 10:00:00	42	0.262	18.70%	0.49
93	2008/01/05 05:00:00	2008/01/08 07:00:00	75	0.262	18.90%	0.48
94	1979/03/01 12:00:00	1979/03/03 01:00:00	38	0.262	19.11%	0.48
95	2006/04/04 21:00:00	2006/04/06 14:00:00	42	0.262	19.31%	0.47
96	1972/12/04 16:00:00	1972/12/06 02:00:00	35	0.261	19.51%	0.47
97	1983/01/27 11:00:00	1983/01/29 23:00:00	61	0.26	19.72%	0.46
98	1982/12/22 22:00:00	1982/12/24 07:00:00	34	0.26	19.92%	0.46
99	1969/01/14 05:00:00	1969/01/15 20:00:00	40	0.259	20.12%	0.46
100	2003/02/25 12:00:00	2003/02/28 01:00:00	62	0.259	20.33%	0.45
101	1971/12/22 09:00:00	1971/12/29 09:00:00	169	0.259	20.53%	0.45
102	1970/12/17 05:00:00	1970/12/22 20:00:00	136	0.259	20.73%	0.44
103	1988/01/17 14:00:00	1988/01/19 04:00:00	39	0.258	20.93%	0.44
104	1986/09/24 03:00:00	1986/09/26 11:00:00	57	0.257	21.14%	0.43
105	1994/02/07 15:00:00	1994/02/09 05:00:00	39	0.256	21.34%	0.43
106	1968/03/08 05:00:00	1968/03/09 19:00:00	39	0.255	21.54%	0.43
107	1982/03/15 16:00:00	1982/03/17 01:00:00	34	0.255	21.75%	0.42
108	1994/02/17 14:00:00	1994/02/19 08:00:00	43	0.254	21.95%	0.42
109	2005/01/03 09:00:00	2005/01/05 09:00:00	49	0.253	22.15%	0.41
110	2004/12/28 11:00:00	2005/01/01 04:00:00	90	0.253	22.36%	0.41
111	1973/11/23 02:00:00	1973/11/24 05:00:00	28	0.253	22.56%	0.41
112	1997/01/26 00:00:00	1997/01/27 14:00:00	39	0.252	22.76%	0.4
113	1964/11/17 18:00:00	1964/11/19 02:00:00	33	0.252	22.97%	0.4
114	2003/02/11 17:00:00	2003/02/15 06:00:00	86	0.252	23.17%	0.4
115	1981/12/30 11:00:00	1982/01/02 21:00:00	83	0.251	23.37%	0.39
116	1998/02/06 16:00:00	1998/02/09 23:00:00	80	0.251	23.58%	0.39
117	1983/03/17 08:00:00	1983/03/19 22:00:00	63	0.25	23.78%	0.39
118	1995/02/13 23:00:00	1995/02/15 18:00:00	44	0.249	23.98%	0.38
119	2008/02/03 12:00:00	2008/02/04 22:00:00	35	0.249	24.19%	0.38
120	1986/02/07 23:00:00	1986/02/09 16:00:00	42	0.248	24.39%	0.38
121	1981/03/19 23:00:00	1981/03/21 05:00:00	31	0.248	24.59%	0.37
122	1995/01/10 21:00:00	1995/01/13 15:00:00	67	0.248	24.80%	0.37
123	1979/03/27 10:00:00	1979/03/29 15:00:00	54	0.248	25.00%	0.37
124	2006/02/28 02:00:00	2006/03/01 13:00:00	36	0.247	25.20%	0.36
125	1980/03/06 03:00:00	1980/03/07 13:00:00	35	0.246	25.41%	0.36
126	1976/12/30 19:00:00	1977/01/01 15:00:00	45	0.242	25.61%	0.36
127	1998/02/22 19:00:00	1998/02/25 16:00:00	70	0.238	25.81%	0.35
128	1980/03/10 18:00:00	1980/03/11 21:00:00	28	0.237	26.02%	0.35
129	1985/11/11 08:00:00	1985/11/13 04:00:00	45	0.237	26.22%	0.35
130	1976/04/11 22:00:00	1976/04/16 07:00:00	106	0.237	26.42%	0.35
131	1976/11/12 03:00:00	1976/11/13 14:00:00	36	0.236	26.63%	0.34
132	1973/02/11 07:00:00	1973/02/13 18:00:00	60	0.234	26.83%	0.34
133	2005/02/11 06:00:00	2005/02/13 16:00:00	59	0.229	27.03%	0.34

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
134	1969/01/20 07:00:00	1969/01/22 17:00:00	59	0.227	27.24%	0.34
135	2003/04/14 14:00:00	2003/04/16 07:00:00	42	0.225	27.44%	0.33
136	1979/03/17 08:00:00	1979/03/21 09:00:00	98	0.223	27.64%	0.33
137	1987/11/04 20:00:00	1987/11/06 05:00:00	34	0.221	27.85%	0.33
138	1991/12/29 18:00:00	1991/12/30 20:00:00	27	0.219	28.05%	0.33
139	1986/03/16 01:00:00	1986/03/17 18:00:00	42	0.217	28.25%	0.32
140	1994/03/19 05:00:00	1994/03/20 21:00:00	41	0.216	28.46%	0.32
141	1979/10/20 05:00:00	1979/10/21 19:00:00	39	0.214	28.66%	0.32
142	2006/01/02 06:00:00	2006/01/03 17:00:00	36	0.214	28.86%	0.32
143	1988/11/25 11:00:00	1988/11/26 13:00:00	27	0.213	29.07%	0.32
144	1990/01/14 07:00:00	1990/01/15 15:00:00	33	0.212	29.27%	0.31
145	1965/12/29 22:00:00	1965/12/30 21:00:00	24	0.209	29.47%	0.31
146	1986/03/10 10:00:00	1986/03/14 14:00:00	101	0.208	29.67%	0.31
147	1983/02/07 08:00:00	1983/02/09 06:00:00	47	0.204	29.88%	0.31
148	1992/12/29 16:00:00	1992/12/30 18:00:00	27	0.2	30.08%	0.3
149	1989/03/25 15:00:00	1989/03/26 22:00:00	32	0.196	30.28%	0.3
150	1973/03/11 16:00:00	1973/03/12 19:00:00	28	0.194	30.49%	0.3
151	1977/12/25 20:00:00	1977/12/27 18:00:00	47	0.193	30.69%	0.3
152	2006/03/10 20:00:00	2006/03/13 02:00:00	55	0.192	30.89%	0.3
153	1974/10/28 13:00:00	1974/10/30 10:00:00	46	0.19	31.10%	0.29
154	1979/01/17 13:00:00	1979/01/19 09:00:00	45	0.19	31.30%	0.29
155	1996/12/09 21:00:00	1996/12/12 14:00:00	66	0.189	31.50%	0.29
156	1982/11/09 19:00:00	1982/11/11 22:00:00	52	0.189	31.71%	0.29
157	1985/12/02 22:00:00	1985/12/04 00:00:00	27	0.187	31.91%	0.29
158	1994/03/25 02:00:00	1994/03/26 12:00:00	35	0.187	32.11%	0.29
159	1971/05/07 22:00:00	1971/05/08 20:00:00	23	0.185	32.32%	0.28
160	1982/01/20 10:00:00	1982/01/22 10:00:00	49	0.184	32.52%	0.28
161	1965/03/31 18:00:00	1965/04/04 08:00:00	87	0.184	32.72%	0.28
162	2003/03/15 15:00:00	2003/03/17 13:00:00	47	0.183	32.93%	0.28
163	2006/03/29 01:00:00	2006/03/29 20:00:00	20	0.178	33.13%	0.28
164	1973/03/20 11:00:00	1973/03/22 19:00:00	57	0.176	33.33%	0.27
165	2004/03/02 05:00:00	2004/03/03 01:00:00	21	0.176	33.54%	0.27
166	1998/03/25 19:00:00	1998/03/30 06:00:00	108	0.175	33.74%	0.27
167	1993/11/14 20:00:00	1993/11/15 13:00:00	18	0.174	33.94%	0.27
168	1969/02/18 13:00:00	1969/02/20 08:00:00	44	0.173	34.15%	0.27
169	1986/12/06 07:00:00	1986/12/08 00:00:00	42	0.172	34.35%	0.27
170	2002/12/20 15:00:00	2002/12/22 00:00:00	34	0.172	34.55%	0.27
171	1995/03/23 13:00:00	1995/03/24 07:00:00	19	0.168	34.76%	0.26
172	1983/04/29 08:00:00	1983/05/01 20:00:00	61	0.168	34.96%	0.26
173	1994/03/07 02:00:00	1994/03/07 23:00:00	22	0.168	35.16%	0.26
174	2008/02/14 15:00:00	2008/02/15 12:00:00	22	0.167	35.37%	0.26
175	1988/12/21 06:00:00	1988/12/22 01:00:00	20	0.167	35.57%	0.26
176	1979/02/21 05:00:00	1979/02/23 13:00:00	57	0.167	35.77%	0.26
177	2004/02/03 02:00:00	2004/02/03 20:00:00	19	0.167	35.98%	0.25
178	1978/11/14 01:00:00	1978/11/14 21:00:00	21	0.166	36.18%	0.25
179	1972/11/11 08:00:00	1972/11/12 05:00:00	22	0.165	36.38%	0.25
180	1990/01/17 05:00:00	1990/01/17 22:00:00	18	0.164	36.59%	0.25

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
181	1980/03/26 02:00:00	1980/03/26 18:00:00	17	0.163	36.79%	0.25
182	1981/02/26 00:00:00	1981/02/26 20:00:00	21	0.163	36.99%	0.25
183	1964/12/27 13:00:00	1964/12/28 22:00:00	34	0.162	37.20%	0.25
184	2005/02/18 07:00:00	2005/02/20 04:00:00	46	0.162	37.40%	0.25
185	1995/04/18 13:00:00	1995/04/19 10:00:00	22	0.162	37.60%	0.24
186	2003/12/25 08:00:00	2003/12/26 15:00:00	32	0.162	37.80%	0.24
187	1978/01/30 13:00:00	1978/01/31 11:00:00	23	0.158	38.01%	0.24
188	1994/04/25 21:00:00	1994/04/28 16:00:00	68	0.157	38.21%	0.24
189	1983/11/20 14:00:00	1983/11/21 21:00:00	32	0.157	38.41%	0.24
190	1970/03/11 15:00:00	1970/03/12 15:00:00	25	0.157	38.62%	0.24
191	1974/04/02 05:00:00	1974/04/03 04:00:00	24	0.156	38.82%	0.24
192	1981/11/27 04:00:00	1981/11/29 23:00:00	68	0.155	39.02%	0.23
193	1979/01/31 08:00:00	1979/02/03 01:00:00	66	0.154	39.23%	0.23
194	1978/03/31 05:00:00	1978/04/01 04:00:00	24	0.154	39.43%	0.23
195	2002/11/08 15:00:00	2002/11/10 13:00:00	47	0.154	39.63%	0.23
196	1994/02/20 18:00:00	1994/02/21 09:00:00	16	0.153	39.84%	0.23
197	1973/02/28 02:00:00	1973/03/01 00:00:00	23	0.153	40.04%	0.23
198	2000/10/30 02:00:00	2000/10/30 17:00:00	16	0.149	40.24%	0.23
199	1980/01/18 07:00:00	1980/01/19 16:00:00	34	0.149	40.45%	0.23
200	1982/04/02 15:00:00	1982/04/03 15:00:00	25	0.148	40.65%	0.23
201	1992/03/02 12:00:00	1992/03/03 22:00:00	35	0.147	40.85%	0.22
202	1978/04/07 04:00:00	1978/04/08 13:00:00	34	0.146	41.06%	0.22
203	1981/03/05 10:00:00	1981/03/06 06:00:00	21	0.145	41.26%	0.22
204	1978/11/11 06:00:00	1978/11/12 21:00:00	40	0.143	41.46%	0.22
205	2000/02/21 18:00:00	2000/02/23 00:00:00	31	0.143	41.67%	0.22
206	1983/10/01 07:00:00	1983/10/02 04:00:00	22	0.143	41.87%	0.22
207	2005/03/23 00:00:00	2005/03/23 16:00:00	17	0.143	42.07%	0.22
208	1965/02/06 05:00:00	1965/02/07 17:00:00	37	0.142	42.28%	0.22
209	1996/01/21 21:00:00	1996/01/22 23:00:00	27	0.141	42.48%	0.22
210	1988/02/02 08:00:00	1988/02/03 13:00:00	30	0.141	42.68%	0.21
211	2001/11/24 15:00:00	2001/11/25 16:00:00	26	0.141	42.89%	0.21
212	1993/02/23 22:00:00	1993/02/24 22:00:00	25	0.141	43.09%	0.21
213	1993/01/31 04:00:00	1993/01/31 20:00:00	17	0.14	43.29%	0.21
214	1975/02/09 15:00:00	1975/02/10 19:00:00	29	0.14	43.50%	0.21
215	1966/02/06 14:00:00	1966/02/08 08:00:00	43	0.14	43.70%	0.21
216	1967/04/21 18:00:00	1967/04/22 20:00:00	27	0.14	43.90%	0.21
217	1977/01/03 16:00:00	1977/01/04 15:00:00	24	0.139	44.11%	0.21
218	1980/12/04 16:00:00	1980/12/05 15:00:00	24	0.139	44.31%	0.21
219	1969/03/13 04:00:00	1969/03/14 08:00:00	29	0.136	44.51%	0.21
220	1972/12/07 10:00:00	1972/12/09 11:00:00	50	0.134	44.72%	0.21
221	1978/11/21 22:00:00	1978/11/24 02:00:00	53	0.134	44.92%	0.2
222	1983/12/03 19:00:00	1983/12/04 11:00:00	17	0.134	45.12%	0.2
223	2005/04/28 12:00:00	2005/04/29 09:00:00	22	0.132	45.33%	0.2
224	1990/06/09 13:00:00	1990/06/10 22:00:00	34	0.131	45.53%	0.2
225	1998/04/11 19:00:00	1998/04/12 09:00:00	15	0.128	45.73%	0.2
226	1988/04/15 00:00:00	1988/04/15 18:00:00	19	0.128	45.93%	0.2
227	1996/02/25 13:00:00	1996/02/26 19:00:00	31	0.127	46.14%	0.2

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
228	1990/02/17 15:00:00	1990/02/19 03:00:00	37	0.126	46.34%	0.2
229	1973/11/18 01:00:00	1973/11/19 03:00:00	27	0.125	46.54%	0.2
230	2008/01/23 23:00:00	2008/01/24 13:00:00	15	0.124	46.75%	0.2
231	1996/03/12 20:00:00	1996/03/14 03:00:00	32	0.124	46.95%	0.2
232	1975/11/27 22:00:00	1975/11/29 12:00:00	39	0.123	47.15%	0.19
233	2000/04/17 21:00:00	2000/04/18 18:00:00	22	0.122	47.36%	0.19
234	1982/03/27 03:00:00	1982/03/27 21:00:00	19	0.121	47.56%	0.19
235	2006/05/22 07:00:00	2006/05/22 23:00:00	17	0.121	47.76%	0.19
236	1978/09/05 21:00:00	1978/09/06 14:00:00	18	0.121	47.97%	0.19
237	1987/12/05 00:00:00	1987/12/05 15:00:00	16	0.119	48.17%	0.19
238	1975/12/12 02:00:00	1975/12/13 03:00:00	26	0.118	48.37%	0.19
239	1977/12/18 08:00:00	1977/12/18 22:00:00	15	0.117	48.58%	0.19
240	1977/03/25 04:00:00	1977/03/26 03:00:00	24	0.117	48.78%	0.19
241	1977/03/16 16:00:00	1977/03/17 15:00:00	24	0.117	48.98%	0.19
242	2007/02/19 07:00:00	2007/02/20 07:00:00	25	0.116	49.19%	0.19
243	1996/02/28 00:00:00	1996/02/28 08:00:00	9	0.115	49.39%	0.19
244	1971/05/28 12:00:00	1971/05/29 11:00:00	24	0.114	49.59%	0.18
245	1985/02/02 08:00:00	1985/02/03 05:00:00	22	0.114	49.80%	0.18
246	1995/12/20 20:00:00	1995/12/21 09:00:00	14	0.114	50.00%	0.18
247	1968/04/01 23:00:00	1968/04/02 22:00:00	24	0.114	50.20%	0.18
248	1996/10/30 18:00:00	1996/10/31 07:00:00	14	0.114	50.41%	0.18
249	1981/01/28 10:00:00	1981/01/30 23:00:00	62	0.114	50.61%	0.18
250	1986/01/30 08:00:00	1986/02/01 05:00:00	46	0.113	50.81%	0.18
251	1998/05/12 18:00:00	1998/05/13 11:00:00	18	0.113	51.02%	0.18
252	2002/12/16 17:00:00	2002/12/17 12:00:00	20	0.112	51.22%	0.18
253	1983/10/07 11:00:00	1983/10/08 00:00:00	14	0.112	51.42%	0.18
254	1969/03/21 22:00:00	1969/03/22 11:00:00	14	0.112	51.63%	0.18
255	1995/04/16 11:00:00	1995/04/17 06:00:00	20	0.112	51.83%	0.18
256	1994/02/03 23:00:00	1994/02/05 00:00:00	26	0.112	52.03%	0.18
257	1986/04/06 10:00:00	1986/04/07 05:00:00	20	0.11	52.24%	0.18
258	1986/03/08 18:00:00	1986/03/09 10:00:00	17	0.11	52.44%	0.17
259	1975/02/03 13:00:00	1975/02/04 21:00:00	33	0.109	52.64%	0.17
260	1986/10/09 22:00:00	1986/10/10 19:00:00	22	0.109	52.85%	0.17
261	2001/01/26 15:00:00	2001/01/27 15:00:00	25	0.108	53.05%	0.17
262	1979/01/15 18:00:00	1979/01/16 11:00:00	18	0.108	53.25%	0.17
263	1972/05/19 23:00:00	1972/05/20 22:00:00	24	0.107	53.46%	0.17
264	1994/12/24 13:00:00	1994/12/25 18:00:00	30	0.107	53.66%	0.17
265	1992/03/23 06:00:00	1992/03/23 16:00:00	11	0.106	53.86%	0.17
266	1970/10/03 17:00:00	1970/10/04 05:00:00	13	0.106	54.07%	0.17
267	1995/03/21 14:00:00	1995/03/22 04:00:00	15	0.106	54.27%	0.17
268	1983/11/12 05:00:00	1983/11/13 12:00:00	32	0.105	54.47%	0.17
269	1975/03/06 06:00:00	1975/03/07 03:00:00	22	0.105	54.67%	0.17
270	2007/12/07 08:00:00	2007/12/09 01:00:00	42	0.105	54.88%	0.17
271	1969/11/07 01:00:00	1969/11/07 15:00:00	15	0.104	55.08%	0.17
272	1964/11/09 16:00:00	1964/11/11 06:00:00	39	0.104	55.28%	0.17
273	1992/12/28 00:00:00	1992/12/28 16:00:00	17	0.103	55.49%	0.17
274	1993/03/28 06:00:00	1993/03/28 16:00:00	11	0.103	55.69%	0.16

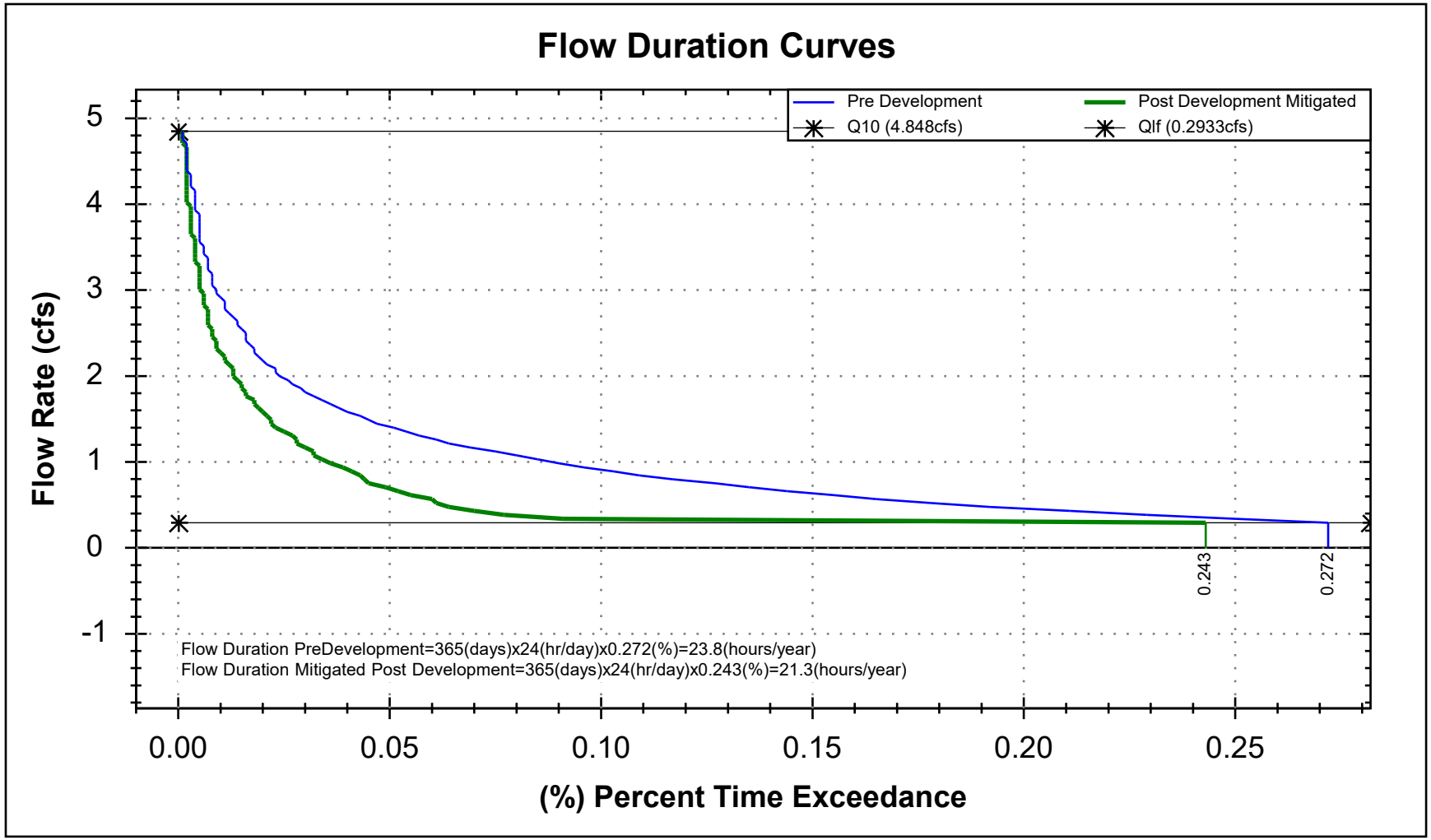
Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
275	1971/01/02 08:00:00	1971/01/03 02:00:00	19	0.102	55.89%	0.16
276	1995/12/23 13:00:00	1995/12/23 20:00:00	8	0.102	56.10%	0.16
277	2006/12/10 03:00:00	2006/12/10 17:00:00	15	0.101	56.30%	0.16
278	1968/12/25 22:00:00	1968/12/26 17:00:00	20	0.101	56.50%	0.16
279	1992/03/20 19:00:00	1992/03/21 18:00:00	24	0.101	56.71%	0.16
280	1991/01/09 17:00:00	1991/01/10 03:00:00	11	0.1	56.91%	0.16
281	1988/01/05 18:00:00	1988/01/06 06:00:00	13	0.099	57.11%	0.16
282	1979/11/07 22:00:00	1979/11/09 07:00:00	34	0.099	57.32%	0.16
283	2007/04/20 18:00:00	2007/04/21 04:00:00	11	0.098	57.52%	0.16
284	1985/09/18 12:00:00	1985/09/19 00:00:00	13	0.098	57.72%	0.16
285	1992/03/26 21:00:00	1992/03/27 06:00:00	10	0.098	57.93%	0.16
286	1991/10/27 02:00:00	1991/10/27 12:00:00	11	0.098	58.13%	0.16
287	1983/04/21 00:00:00	1983/04/21 18:00:00	19	0.097	58.33%	0.16
288	2003/11/12 09:00:00	2003/11/12 21:00:00	13	0.097	58.54%	0.16
289	2004/12/05 15:00:00	2004/12/06 05:00:00	15	0.097	58.74%	0.16
290	1971/10/16 08:00:00	1971/10/17 16:00:00	33	0.096	58.94%	0.16
291	1985/02/09 12:00:00	1985/02/10 02:00:00	15	0.096	59.15%	0.16
292	2001/12/21 19:00:00	2001/12/22 06:00:00	12	0.096	59.35%	0.15
293	1982/11/19 06:00:00	1982/11/20 00:00:00	19	0.096	59.55%	0.15
294	1970/02/10 05:00:00	1970/02/11 13:00:00	33	0.095	59.76%	0.15
295	1987/10/22 19:00:00	1987/10/23 13:00:00	19	0.095	59.96%	0.15
296	1974/01/01 08:00:00	1974/01/02 04:00:00	21	0.095	60.16%	0.15
297	1979/02/14 06:00:00	1979/02/14 16:00:00	11	0.095	60.37%	0.15
298	1970/11/26 05:00:00	1970/11/26 20:00:00	16	0.094	60.57%	0.15
299	1978/01/10 21:00:00	1978/01/11 07:00:00	11	0.094	60.77%	0.15
300	1968/02/14 01:00:00	1968/02/14 10:00:00	10	0.094	60.98%	0.15
301	1985/03/27 15:00:00	1985/03/28 16:00:00	26	0.094	61.18%	0.15
302	2002/11/29 19:00:00	2002/11/30 08:00:00	14	0.094	61.38%	0.15
303	2004/11/21 10:00:00	2004/11/21 18:00:00	9	0.093	61.59%	0.15
304	1976/11/27 07:00:00	1976/11/27 16:00:00	10	0.093	61.79%	0.15
305	1964/10/15 13:00:00	1964/10/16 00:00:00	12	0.093	61.99%	0.15
306	1985/12/11 06:00:00	1985/12/11 17:00:00	12	0.092	62.20%	0.15
307	2005/10/18 04:00:00	2005/10/18 20:00:00	17	0.092	62.40%	0.15
308	1969/03/10 08:00:00	1969/03/10 21:00:00	14	0.091	62.60%	0.15
309	2000/02/13 19:00:00	2000/02/14 07:00:00	13	0.091	62.80%	0.15
310	2005/03/05 03:00:00	2005/03/05 14:00:00	12	0.091	63.01%	0.15
311	1997/12/06 19:00:00	1997/12/08 01:00:00	31	0.09	63.21%	0.15
312	1997/04/04 13:00:00	1997/04/04 21:00:00	9	0.089	63.41%	0.14
313	1982/01/28 23:00:00	1982/01/29 10:00:00	12	0.089	63.62%	0.14
314	2001/04/21 07:00:00	2001/04/21 21:00:00	15	0.089	63.82%	0.14
315	1987/02/24 03:00:00	1987/02/26 09:00:00	55	0.087	64.02%	0.14
316	1968/12/20 12:00:00	1968/12/20 19:00:00	8	0.087	64.23%	0.14
317	1968/11/15 15:00:00	1968/11/16 03:00:00	13	0.086	64.43%	0.14
318	2004/02/18 20:00:00	2004/02/19 03:00:00	8	0.086	64.63%	0.14
319	2002/03/18 02:00:00	2002/03/18 12:00:00	11	0.086	64.84%	0.14
320	1994/01/25 05:00:00	1994/01/25 19:00:00	15	0.086	65.04%	0.14
321	1982/12/09 22:00:00	1982/12/10 06:00:00	9	0.085	65.24%	0.14

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
322	1987/04/04 02:00:00	1987/04/04 09:00:00	8	0.084	65.45%	0.14
323	1996/04/18 05:00:00	1996/04/18 16:00:00	12	0.084	65.65%	0.14
324	1993/03/26 07:00:00	1993/03/27 05:00:00	23	0.084	65.85%	0.14
325	1966/10/10 15:00:00	1966/10/10 22:00:00	8	0.083	66.06%	0.14
326	1992/12/18 02:00:00	1992/12/18 12:00:00	11	0.082	66.26%	0.14
327	1990/01/31 04:00:00	1990/01/31 11:00:00	8	0.082	66.46%	0.14
328	1969/11/10 04:00:00	1969/11/10 11:00:00	8	0.082	66.67%	0.14
329	1990/01/02 07:00:00	1990/01/02 16:00:00	10	0.082	66.87%	0.14
330	1978/03/22 08:00:00	1978/03/23 17:00:00	34	0.082	67.07%	0.14
331	1970/01/16 21:00:00	1970/01/17 03:00:00	7	0.081	67.28%	0.14
332	1967/03/31 14:00:00	1967/03/31 20:00:00	7	0.081	67.48%	0.14
333	1983/12/09 21:00:00	1983/12/10 05:00:00	9	0.081	67.68%	0.14
334	1977/01/07 00:00:00	1977/01/07 13:00:00	14	0.081	67.89%	0.14
335	2006/03/21 05:00:00	2006/03/21 13:00:00	9	0.08	68.09%	0.13
336	1982/09/26 07:00:00	1982/09/26 22:00:00	16	0.08	68.29%	0.13
337	1998/01/29 20:00:00	1998/01/30 05:00:00	10	0.08	68.50%	0.13
338	1971/04/14 15:00:00	1971/04/14 23:00:00	9	0.079	68.70%	0.13
339	1988/11/14 11:00:00	1988/11/14 18:00:00	8	0.079	68.90%	0.13
340	1983/02/02 17:00:00	1983/02/03 04:00:00	12	0.078	69.11%	0.13
341	1973/01/04 13:00:00	1973/01/05 01:00:00	13	0.078	69.31%	0.13
342	1987/10/31 07:00:00	1987/11/01 06:00:00	24	0.078	69.51%	0.13
343	1981/03/27 02:00:00	1981/03/27 08:00:00	7	0.078	69.72%	0.13
344	1967/12/16 23:00:00	1967/12/17 10:00:00	12	0.078	69.92%	0.13
345	1982/01/10 22:00:00	1982/01/11 05:00:00	8	0.078	70.12%	0.13
346	1967/08/31 10:00:00	1967/08/31 16:00:00	7	0.077	70.33%	0.13
347	1967/04/18 23:00:00	1967/04/20 02:00:00	28	0.077	70.53%	0.13
348	1975/03/22 12:00:00	1975/03/22 18:00:00	7	0.077	70.73%	0.13
349	1995/01/16 10:00:00	1995/01/17 12:00:00	27	0.077	70.93%	0.13
350	1974/03/02 14:00:00	1974/03/03 18:00:00	29	0.077	71.14%	0.13
351	2000/02/17 20:00:00	2000/02/18 04:00:00	9	0.077	71.34%	0.13
352	1965/01/24 11:00:00	1965/01/24 17:00:00	7	0.077	71.54%	0.13
353	1997/01/23 10:00:00	1997/01/23 19:00:00	10	0.076	71.75%	0.13
354	1991/12/28 04:00:00	1991/12/28 10:00:00	7	0.076	71.95%	0.13
355	1965/03/11 17:00:00	1965/03/11 23:00:00	7	0.076	72.15%	0.13
356	1967/04/04 20:00:00	1967/04/05 02:00:00	7	0.075	72.36%	0.13
357	2007/02/13 05:00:00	2007/02/13 13:00:00	9	0.075	72.56%	0.13
358	1974/12/28 10:00:00	1974/12/29 17:00:00	32	0.075	72.76%	0.13
359	1994/04/09 16:00:00	1994/04/09 21:00:00	6	0.075	72.97%	0.13
360	1973/02/03 23:00:00	1973/02/04 04:00:00	6	0.075	73.17%	0.13
361	2005/10/16 20:00:00	2005/10/17 03:00:00	8	0.074	73.37%	0.13
362	1990/11/20 05:00:00	1990/11/20 13:00:00	9	0.074	73.58%	0.12
363	1984/12/08 04:00:00	1984/12/08 09:00:00	6	0.074	73.78%	0.12
364	1983/01/19 09:00:00	1983/01/19 14:00:00	6	0.074	73.98%	0.12
365	1993/11/23 06:00:00	1993/11/23 11:00:00	6	0.074	74.19%	0.12
366	1991/03/14 01:00:00	1991/03/14 11:00:00	11	0.073	74.39%	0.12
367	1979/01/09 13:00:00	1979/01/09 20:00:00	8	0.073	74.59%	0.12
368	1989/02/04 15:00:00	1989/02/04 21:00:00	7	0.073	74.80%	0.12

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
369	1997/02/28 00:00:00	1997/02/28 08:00:00	9	0.072	75.00%	0.12
370	1978/04/16 01:00:00	1978/04/16 06:00:00	6	0.072	75.20%	0.12
371	1973/03/13 22:00:00	1973/03/14 04:00:00	7	0.071	75.41%	0.12
372	2007/12/21 06:00:00	2007/12/21 10:00:00	5	0.071	75.61%	0.12
373	1971/01/12 23:00:00	1971/01/13 06:00:00	8	0.071	75.81%	0.12
374	1971/03/13 09:00:00	1971/03/13 21:00:00	13	0.071	76.02%	0.12
375	1982/03/28 21:00:00	1982/03/29 02:00:00	6	0.071	76.22%	0.12
376	1976/10/22 23:00:00	1976/10/23 04:00:00	6	0.071	76.42%	0.12
377	2004/04/02 01:00:00	2004/04/02 19:00:00	19	0.07	76.63%	0.12
378	1967/11/30 20:00:00	1967/12/01 04:00:00	9	0.07	76.83%	0.12
379	1973/01/09 16:00:00	1973/01/10 08:00:00	17	0.07	77.03%	0.12
380	1972/01/09 15:00:00	1972/01/10 06:00:00	16	0.069	77.24%	0.12
381	1972/10/19 06:00:00	1972/10/20 21:00:00	40	0.069	77.44%	0.12
382	1992/02/10 03:00:00	1992/02/10 08:00:00	6	0.069	77.64%	0.12
383	1993/06/05 18:00:00	1993/06/05 23:00:00	6	0.069	77.85%	0.12
384	1983/04/18 06:00:00	1983/04/18 11:00:00	6	0.069	78.05%	0.12
385	1987/11/02 06:00:00	1987/11/02 10:00:00	5	0.069	78.25%	0.12
386	1980/03/21 22:00:00	1980/03/22 06:00:00	9	0.068	78.46%	0.12
387	1997/01/05 14:00:00	1997/01/05 21:00:00	8	0.068	78.66%	0.12
388	1967/04/01 23:00:00	1967/04/02 10:00:00	12	0.068	78.86%	0.12
389	2008/01/27 06:00:00	2008/01/28 18:00:00	37	0.068	79.07%	0.12
390	1982/01/05 14:00:00	1982/01/05 20:00:00	7	0.068	79.27%	0.12
391	1966/10/04 17:00:00	1966/10/04 21:00:00	5	0.068	79.47%	0.12
392	1980/04/23 07:00:00	1980/04/23 10:00:00	4	0.068	79.67%	0.12
393	1985/10/09 15:00:00	1985/10/09 20:00:00	6	0.068	79.88%	0.12
394	2001/12/09 20:00:00	2001/12/10 03:00:00	8	0.067	80.08%	0.11
395	2007/02/23 01:00:00	2007/02/23 10:00:00	10	0.067	80.28%	0.11
396	2006/04/15 01:00:00	2006/04/15 09:00:00	9	0.067	80.49%	0.11
397	1971/02/17 01:00:00	1971/02/17 16:00:00	16	0.067	80.69%	0.11
398	1991/01/03 22:00:00	1991/01/04 18:00:00	21	0.067	80.89%	0.11
399	1975/04/01 05:00:00	1975/04/01 11:00:00	7	0.066	81.10%	0.11
400	1965/12/22 05:00:00	1965/12/23 01:00:00	21	0.066	81.30%	0.11
401	1985/03/03 04:00:00	1985/03/03 07:00:00	4	0.066	81.50%	0.11
402	1983/08/16 20:00:00	1983/08/16 23:00:00	4	0.066	81.71%	0.11
403	1990/04/04 13:00:00	1990/04/04 18:00:00	6	0.065	81.91%	0.11
404	1975/03/14 10:00:00	1975/03/14 17:00:00	8	0.065	82.11%	0.11
405	1975/01/31 00:00:00	1975/01/31 03:00:00	4	0.065	82.32%	0.11
406	1971/12/04 04:00:00	1971/12/04 07:00:00	4	0.064	82.52%	0.11
407	1983/01/24 22:00:00	1983/01/25 01:00:00	4	0.064	82.72%	0.11
408	1987/10/29 01:00:00	1987/10/29 05:00:00	5	0.064	82.93%	0.11
409	1980/12/07 15:00:00	1980/12/07 18:00:00	4	0.064	83.13%	0.11
410	1971/12/07 05:00:00	1971/12/07 08:00:00	4	0.063	83.33%	0.11
411	1968/03/18 17:00:00	1968/03/18 19:00:00	3	0.063	83.54%	0.11
412	1998/03/31 20:00:00	1998/04/01 21:00:00	26	0.063	83.74%	0.11
413	1995/01/21 08:00:00	1995/01/21 10:00:00	3	0.063	83.94%	0.11
414	1986/07/19 18:00:00	1986/07/19 21:00:00	4	0.063	84.15%	0.11
415	1994/01/27 15:00:00	1994/01/27 17:00:00	3	0.063	84.35%	0.11

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
416	1971/04/16 02:00:00	1971/04/16 13:00:00	12	0.062	84.55%	0.11
417	1993/12/11 21:00:00	1993/12/12 07:00:00	11	0.062	84.76%	0.11
418	1968/01/28 02:00:00	1968/01/28 12:00:00	11	0.062	84.96%	0.11
419	1987/12/19 19:00:00	1987/12/19 22:00:00	4	0.062	85.16%	0.11
420	1973/03/04 03:00:00	1973/03/04 06:00:00	4	0.061	85.37%	0.11
421	1990/02/04 14:00:00	1990/02/04 17:00:00	4	0.061	85.57%	0.11
422	1969/01/19 03:00:00	1969/01/19 05:00:00	3	0.061	85.77%	0.11
423	1988/03/01 02:00:00	1988/03/02 07:00:00	30	0.061	85.98%	0.11
424	1973/12/01 18:00:00	1973/12/01 21:00:00	4	0.061	86.18%	0.11
425	1964/11/12 08:00:00	1964/11/12 10:00:00	3	0.061	86.38%	0.11
426	1971/12/31 09:00:00	1971/12/31 11:00:00	3	0.061	86.59%	0.11
427	1982/12/08 03:00:00	1982/12/08 05:00:00	3	0.061	86.79%	0.11
428	1989/10/22 08:00:00	1989/10/22 11:00:00	4	0.061	86.99%	0.11
429	1973/02/06 06:00:00	1973/02/06 08:00:00	3	0.06	87.20%	0.11
430	1988/12/18 23:00:00	1988/12/19 02:00:00	4	0.06	87.40%	0.11
431	1983/03/06 08:00:00	1983/03/06 17:00:00	10	0.06	87.60%	0.1
432	2005/01/28 19:00:00	2005/01/28 21:00:00	3	0.06	87.80%	0.1
433	1990/12/20 02:00:00	1990/12/20 05:00:00	4	0.059	88.01%	0.1
434	1969/04/06 00:00:00	1969/04/06 02:00:00	3	0.059	88.21%	0.1
435	2003/05/03 20:00:00	2003/05/04 00:00:00	5	0.059	88.41%	0.1
436	2005/12/31 22:00:00	2006/01/01 03:00:00	6	0.058	88.62%	0.1
437	1977/01/28 22:00:00	1977/01/29 00:00:00	3	0.058	88.82%	0.1
438	2006/12/17 00:00:00	2006/12/17 04:00:00	5	0.058	89.02%	0.1
439	1977/12/23 09:00:00	1977/12/23 11:00:00	3	0.058	89.23%	0.1
440	1967/12/13 16:00:00	1967/12/13 18:00:00	3	0.058	89.43%	0.1
441	1989/01/06 03:00:00	1989/01/06 05:00:00	3	0.058	89.63%	0.1
442	1970/01/11 21:00:00	1970/01/12 08:00:00	12	0.057	89.84%	0.1
443	1983/01/23 07:00:00	1983/01/23 09:00:00	3	0.057	90.04%	0.1
444	2007/12/19 05:00:00	2007/12/19 12:00:00	8	0.057	90.24%	0.1
445	1995/06/17 03:00:00	1995/06/17 05:00:00	3	0.057	90.45%	0.1
446	2004/01/28 09:00:00	2004/01/28 11:00:00	3	0.057	90.65%	0.1
447	1973/03/27 12:00:00	1973/03/27 19:00:00	8	0.057	90.85%	0.1
448	1984/12/14 17:00:00	1984/12/14 19:00:00	3	0.057	91.06%	0.1
449	2007/02/28 08:00:00	2007/02/28 10:00:00	3	0.057	91.26%	0.1
450	1969/03/01 05:00:00	1969/03/01 07:00:00	3	0.057	91.46%	0.1
451	1991/12/18 02:00:00	1991/12/18 09:00:00	8	0.057	91.67%	0.1
452	2006/10/14 15:00:00	2006/10/14 16:00:00	2	0.057	91.87%	0.1
453	1972/04/30 07:00:00	1972/04/30 14:00:00	8	0.056	92.07%	0.1
454	1973/04/30 08:00:00	1973/04/30 15:00:00	8	0.056	92.28%	0.1
455	1981/04/19 04:00:00	1981/04/19 13:00:00	10	0.056	92.48%	0.1
456	2008/02/20 16:00:00	2008/02/20 18:00:00	3	0.056	92.68%	0.1
457	1969/02/16 00:00:00	1969/02/16 01:00:00	2	0.056	92.89%	0.1
458	1985/02/21 00:00:00	1985/02/21 01:00:00	2	0.056	93.09%	0.1
459	1994/11/10 15:00:00	1994/11/10 17:00:00	3	0.056	93.29%	0.1
460	1996/02/22 03:00:00	1996/02/22 05:00:00	3	0.056	93.50%	0.1
461	1987/10/12 23:00:00	1987/10/13 00:00:00	2	0.056	93.70%	0.1
462	1990/11/26 06:00:00	1990/11/26 07:00:00	2	0.056	93.90%	0.1

Rank	Start Date	End Date	Duration	Peak	Frequency	Return Period
463	1996/03/05 02:00:00	1996/03/05 08:00:00	7	0.054	94.11%	0.1
464	1992/01/03 19:00:00	1992/01/03 20:00:00	2	0.054	94.31%	0.1
465	1993/12/14 21:00:00	1993/12/14 23:00:00	3	0.054	94.51%	0.1
466	1974/01/21 01:00:00	1974/01/21 02:00:00	2	0.054	94.72%	0.1
467	1991/03/15 23:00:00	1991/03/16 01:00:00	3	0.053	94.92%	0.1
468	1970/12/09 14:00:00	1970/12/09 15:00:00	2	0.053	95.12%	0.1
469	1977/12/28 20:00:00	1977/12/29 19:00:00	24	0.053	95.33%	0.1
470	1977/05/13 03:00:00	1977/05/13 04:00:00	2	0.052	95.53%	0.1
471	1996/12/06 09:00:00	1996/12/06 14:00:00	6	0.052	95.73%	0.1
472	1971/05/06 14:00:00	1971/05/06 15:00:00	2	0.052	95.93%	0.1
473	2006/03/17 23:00:00	2006/03/18 04:00:00	6	0.052	96.14%	0.1
474	1967/03/04 13:00:00	1967/03/04 14:00:00	2	0.052	96.34%	0.1
475	1982/03/31 12:00:00	1982/03/31 13:00:00	2	0.051	96.54%	0.1
476	2006/02/19 08:00:00	2006/02/19 08:00:00	1	0.051	96.75%	0.1
477	1983/04/12 14:00:00	1983/04/13 03:00:00	14	0.051	96.95%	0.09
478	2000/11/11 07:00:00	2000/11/11 10:00:00	4	0.051	97.15%	0.09
479	1965/03/15 07:00:00	1965/03/15 08:00:00	2	0.051	97.36%	0.09
480	1983/02/06 04:00:00	1983/02/06 05:00:00	2	0.051	97.56%	0.09
481	1993/01/02 20:00:00	1993/01/02 21:00:00	2	0.05	97.76%	0.09
482	1971/04/23 12:00:00	1971/04/23 12:00:00	1	0.05	97.97%	0.09
483	1981/10/11 10:00:00	1981/10/11 10:00:00	1	0.05	98.17%	0.09
484	1988/12/15 18:00:00	1988/12/15 18:00:00	1	0.05	98.37%	0.09
485	2004/11/29 15:00:00	2004/11/29 15:00:00	1	0.05	98.58%	0.09
486	1998/02/19 20:00:00	1998/02/19 21:00:00	2	0.05	98.78%	0.09
487	1967/06/13 19:00:00	1967/06/13 19:00:00	1	0.049	98.98%	0.09
488	1988/12/16 19:00:00	1988/12/16 21:00:00	3	0.049	99.19%	0.09
489	1983/08/18 19:00:00	1983/08/18 19:00:00	1	0.048	99.39%	0.09
490	1980/04/29 03:00:00	1980/04/29 03:00:00	1	0.048	99.59%	0.09
491	1994/11/16 12:00:00	1994/11/16 12:00:00	1	0.046	99.80%	0.09
--End of Data----------						


Flow Duration Curves
Pre Development
Post Development Mitigated
Q10 (4.848cfs)
Qlf (0.2933cfs)
Flow Rate (cfs)
5
4
3
2
1
0
-1
0.243
0.272
Flow Duration PreDevelopment=365(days)x24(hr/day)x0.272(%)=23.8(hours/year)
Flow Duration Mitigated Post Development=365(days)x24(hr/day)x0.243(%)=21.3(hours/year)
0.00
0.05
0.10
0.15
0.20
0.25
(%) Percent Time Exceedance

Compare Post-Development Curve to Pre-Development Curve

post-development SWMM file: Q:\12\12025\GPIP\STORM\SWMM\12025-POST-POC-1-5-6-13.out
post-development time stamp: 8/2/2019 9:54:22 AM
Compared to:
pre-development SWMM file: Q:\12\12025\GPIP\STORM\SWMM\12025-PRE-POC-1.out
pre-development time stamp: 8/1/2019 4:56:01 PM

Post PT #	Flow Rate	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
0	0.29	0.24	0.27	TRUE	FALSE	FALSE	Pass- Qpost Below Flow Control Threshold
1	0.34	0.09	0.25	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
2	0.39	0.08	0.23	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
3	0.43	0.07	0.21	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
4	0.48	0.06	0.19	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
5	0.52	0.06	0.18	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
6	0.57	0.06	0.17	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
7	0.62	0.06	0.16	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
8	0.66	0.05	0.14	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
9	0.71	0.05	0.14	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
10	0.75	0.05	0.13	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
11	0.80	0.04	0.12	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
12	0.85	0.04	0.11	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
13	0.89	0.04	0.10	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
14	0.94	0.04	0.10	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
15	0.98	0.04	0.09	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
16	1.03	0.03	0.09	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
17	1.08	0.03	0.08	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
18	1.12	0.03	0.08	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
19	1.17	0.03	0.07	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
20	1.21	0.03	0.06	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
21	1.26	0.03	0.06	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
22	1.31	0.03	0.06	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
23	1.35	0.03	0.05	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
24	1.40	0.02	0.05	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
25	1.44	0.02	0.05	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
26	1.49	0.02	0.05	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
27	1.54	0.02	0.04	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
28	1.58	0.02	0.04	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
29	1.63	0.02	0.04	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
30	1.67	0.02	0.04	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
31	1.72	0.02	0.03	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration

Post PT #	Flow Rate	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
32	1.77	0.02	0.03	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
33	1.81	0.02	0.03	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
34	1.86	0.02	0.03	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
35	1.90	0.02	0.03	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
36	1.95	0.01	0.03	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
37	2.00	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
38	2.04	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
39	2.09	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
40	2.13	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
41	2.18	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
42	2.23	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
43	2.27	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
44	2.32	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
45	2.36	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
46	2.41	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
47	2.46	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
48	2.50	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
49	2.55	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
50	2.59	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
51	2.64	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
52	2.69	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
53	2.73	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
54	2.78	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
55	2.82	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
56	2.87	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
57	2.92	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
58	2.96	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
59	3.01	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
60	3.05	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
61	3.10	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
62	3.15	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
63	3.19	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
64	3.24	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
65	3.28	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
66	3.33	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
67	3.38	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
68	3.42	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
69	3.47	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
70	3.51	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
71	3.56	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration

Post PT #	Flow Rate	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
72	3.61	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
73	3.65	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
74	3.70	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
75	3.74	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
76	3.79	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
77	3.84	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
78	3.88	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
79	3.93	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
80	3.97	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
81	4.02	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
82	4.07	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
83	4.11	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
84	4.16	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
85	4.20	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
86	4.25	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
87	4.30	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
88	4.34	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
89	4.39	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
90	4.43	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
91	4.48	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
92	4.53	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
93	4.57	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
94	4.62	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
95	4.66	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
96	4.71	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
97	4.76	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
98	4.80	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration
99	4.85	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration < Pre Duration

Duration Table Summary at Project Discharge Point

file name: Q:\12\12025\GPIP\STORM\SWMM\12025-PRE-POC-1.out
time stamp: 8/1/2019 4:56:01 PM

DISCHARGE		Number of periods when discharge was equal to or greater than DISCHARGE column but less than that shown on the next line		
Bin Number	Discharge Rate	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
1	0.29	85	1041	0.272
2	0.34	81	956	0.250
3	0.39	66	875	0.229
4	0.43	75	809	0.211
5	0.48	54	734	0.192
6	0.52	50	680	0.178
7	0.57	35	630	0.165
8	0.62	44	595	0.155
9	0.66	34	551	0.144
10	0.71	30	517	0.135
11	0.75	40	487	0.127
12	0.80	31	447	0.117
13	0.85	22	416	0.109
14	0.89	26	394	0.103
15	0.94	25	368	0.096
16	0.98	18	343	0.090
17	1.03	20	325	0.085
18	1.08	18	305	0.080
19	1.12	22	287	0.075
20	1.17	21	265	0.069
21	1.21	11	244	0.064
22	1.26	13	233	0.061
23	1.31	13	220	0.057
24	1.35	12	207	0.054
25	1.40	15	195	0.051
26	1.44	8	180	0.047
27	1.49	9	172	0.045
28	1.54	9	163	0.043
29	1.58	9	154	0.040
30	1.63	6	145	0.038
31	1.67	9	139	0.036
32	1.72	9	130	0.034
33	1.77	5	121	0.032
34	1.81	4	116	0.030
35	1.86	8	112	0.029
36	1.90	5	104	0.027
37	1.95	6	99	0.026
38	2.00	4	93	0.024
39	2.04	2	89	0.023
40	2.09	6	87	0.023
41	2.13	5	81	0.021
42	2.18	2	76	0.020
43	2.23	5	74	0.019
44	2.27	2	69	0.018
45	2.32	1	67	0.018
46	2.36	3	66	0.017
47	2.41	1	63	0.016
48	2.46	2	62	0.016
49	2.50	4	60	0.016
50	2.55	3	56	0.015
51	2.59	0	53	0.014

Bin Number	Discharge Rate	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
52	2.64	3	53	0.014
53	2.69	3	50	0.013
54	2.73	3	47	0.012
55	2.78	1	44	0.011
56	2.82	1	43	0.011
57	2.87	3	42	0.011
58	2.92	4	39	0.010
59	2.96	2	35	0.009
60	3.01	1	33	0.009
61	3.05	2	32	0.008
62	3.10	0	30	0.008
63	3.15	1	30	0.008
64	3.19	1	29	0.008
65	3.24	1	28	0.007
66	3.28	1	27	0.007
67	3.33	1	26	0.007
68	3.38	1	25	0.007
69	3.42	2	24	0.006
70	3.47	0	22	0.006
71	3.51	1	22	0.006
72	3.56	1	21	0.005
73	3.61	1	20	0.005
74	3.65	0	19	0.005
75	3.70	1	19	0.005
76	3.74	0	18	0.005
77	3.79	0	18	0.005
78	3.84	0	18	0.005
79	3.88	1	18	0.005
80	3.93	2	17	0.004
81	3.97	0	15	0.004
82	4.02	1	15	0.004
83	4.07	0	14	0.004
84	4.11	0	14	0.004
85	4.16	1	14	0.004
86	4.20	0	13	0.003
87	4.25	1	13	0.003
88	4.30	2	12	0.003
89	4.34	1	10	0.003
90	4.39	0	9	0.002
91	4.43	0	9	0.002
92	4.48	0	9	0.002
93	4.53	1	9	0.002
94	4.57	0	8	0.002
95	4.62	1	8	0.002
96	4.66	0	7	0.002
97	4.71	2	7	0.002
98	4.76	0	5	0.001
99	4.80	1	5	0.001
100	4.85	0	4	0.001
---------End of Data----------				

Duration Table Summary at Project Discharge Point

file name: Q:\12\12025\GPIP\STORM\SWMM\12025-POST-POC-1-5-6-13.out
time stamp: 8/2/2019 9:54:22 AM

DISCHARGE		Number of periods when discharge was equal to or greater than DISCHARGE column but less than that shown on the next line		
Bin Number	Discharge Rate	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
1	0.29	580	930	0.243
2	0.34	56	350	0.091
3	0.39	25	294	0.077
4	0.43	23	269	0.070
5	0.48	12	246	0.064
6	0.52	6	234	0.061
7	0.57	18	228	0.060
8	0.62	12	210	0.055
9	0.66	11	198	0.052
10	0.71	14	187	0.049
11	0.75	5	173	0.045
12	0.80	5	168	0.044
13	0.85	6	163	0.043
14	0.89	8	157	0.041
15	0.94	13	149	0.039
16	0.98	6	136	0.036
17	1.03	7	130	0.034
18	1.08	2	123	0.032
19	1.12	8	121	0.032
20	1.17	5	113	0.030
21	1.21	2	108	0.028
22	1.26	3	106	0.028
23	1.31	6	103	0.027
24	1.35	8	97	0.025
25	1.40	3	89	0.023
26	1.44	3	86	0.022
27	1.49	3	83	0.022
28	1.54	5	80	0.021
29	1.58	3	75	0.020
30	1.63	3	72	0.019
31	1.67	2	69	0.018
32	1.72	5	67	0.018
33	1.77	1	62	0.016
34	1.81	2	61	0.016
35	1.86	3	59	0.015
36	1.90	1	56	0.015
37	1.95	4	55	0.014
38	2.00	0	51	0.013
39	2.04	2	51	0.013
40	2.09	3	49	0.013
41	2.13	3	46	0.012
42	2.18	2	43	0.011
43	2.23	3	41	0.011
44	2.27	3	38	0.010
45	2.32	0	35	0.009
46	2.36	0	35	0.009
47	2.41	3	35	0.009
48	2.46	3	32	0.008
49	2.50	0	29	0.008
50	2.55	3	29	0.008
51	2.59	0	26	0.007

Bin Number	Discharge Rate	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
52	2.64	1	26	0.007
53	2.69	0	25	0.007
54	2.73	0	25	0.007
55	2.78	1	25	0.007
56	2.82	1	24	0.006
57	2.87	0	23	0.006
58	2.92	1	23	0.006
59	2.96	2	22	0.006
60	3.01	0	20	0.005
61	3.05	0	20	0.005
62	3.10	0	20	0.005
63	3.15	0	20	0.005
64	3.19	1	20	0.005
65	3.24	1	19	0.005
66	3.28	1	18	0.005
67	3.33	1	17	0.004
68	3.38	0	16	0.004
69	3.42	0	16	0.004
70	3.47	1	16	0.004
71	3.51	1	15	0.004
72	3.56	0	14	0.004
73	3.61	1	14	0.004
74	3.65	0	13	0.003
75	3.70	0	13	0.003
76	3.74	0	13	0.003
77	3.79	0	13	0.003
78	3.84	2	13	0.003
79	3.88	1	11	0.003
80	3.93	0	10	0.003
81	3.97	1	10	0.003
82	4.02	0	9	0.002
83	4.07	0	9	0.002
84	4.11	0	9	0.002
85	4.16	0	9	0.002
86	4.20	2	9	0.002
87	4.25	0	7	0.002
88	4.30	0	7	0.002
89	4.34	0	7	0.002
90	4.39	0	7	0.002
91	4.43	0	7	0.002
92	4.48	1	7	0.002
93	4.53	0	6	0.002
94	4.57	0	6	0.002
95	4.62	0	6	0.002
96	4.66	1	6	0.002
97	4.71	0	5	0.001
98	4.76	0	5	0.001
99	4.80	1	5	0.001
100	4.85	0	4	0.001
---------End of Data----------				

END OF STATISTICS ANALYSIS

8.2 Hydromodification Management Points of Compliance

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

POC name or #	Channel name or #	POC Description
POC-1		South Easterly Corner of the site prior to discharging offsite

8.3 Geomorphic Assessment of Receiving Water Channels

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

Not Applicable at this time

8.4 Vector Control Plan

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

Not Applicable at this time

ATTACHMENT 9

Management of Critical Coarse Sediment Yield Areas

9.0 General Requirements

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

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

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

9.1 Documentation of Hydromodification Management Exemption (BMPDM Section 1.6)

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

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

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

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

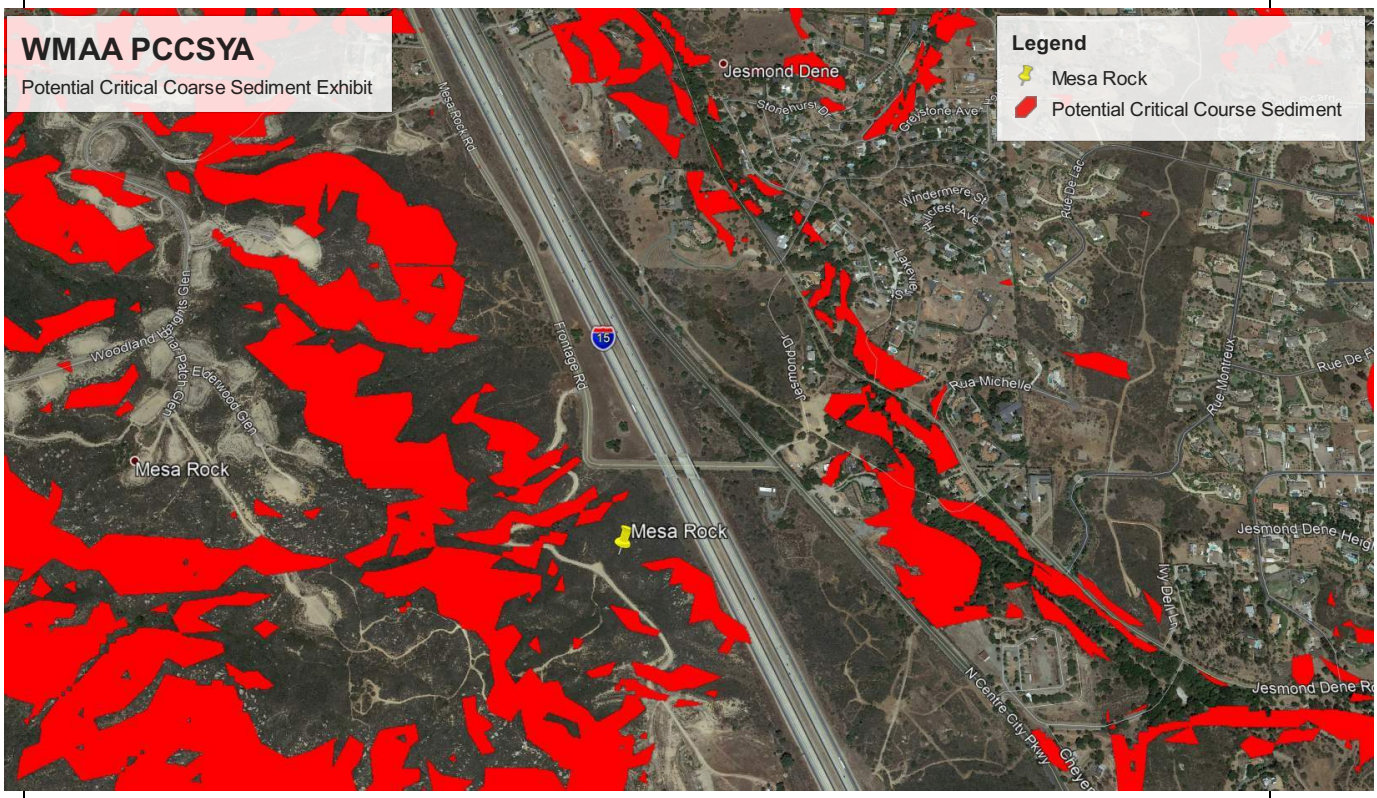
Watershed Management Area Analysis (WMAA) mapping is a simple way to screen projects to determine the presence of onsite or offsite upstream Potential Critical Coarse Sediment Yield Areas (PCCSYAs). The San Diego County Regional WMAA mapping data can be found on the Project Clean Water website here: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

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

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

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

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



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

Hydromodification Critical Coarse Sediment Analysis

FOR:

North County Environmental Resources

25568 Mesa Rock Road

City of San Marcos, CA

PREPARED FOR:
ADJ Holdings, LLC, A California Limited Liability Company

807 E. Mission Road

San Marcos, CA 92069

PREPARED BY:
EXCEL ENGINEERING

440 State Place

Escondido, CA 92029

Tel: (760) 745-8118

Project No: 12025

DATE PREPARED:
August 02, 2019

Summary

This report presents the findings of the Potential Critical Coarse Sediment analysis of the site. The analysis was conducted using the following the guidelines…

1. February 2016 San Diego Region Model BMP Design Manual, and associated Appendix
2. February 2016 County of San Diego BMP Design Manual, and associated appendix
3. March 2016 San Luis Rey Watershed Management Area Water Quality Improvement Plan To meet requirements of the San Diego Regional Water Quality Control Board Order R9-2013-0001 https://www.waterboards.ca.gov/sandiego/water_issues/programs/stormwater/wqip.html
4. http://www.projectcleanwater.org/san-luis-rey-water-quality-improvement-plan/#
5. January 2018 Model BMP Design Manual San Diego Region for Permanent Site Design, Storm Water Treatment and Hydromodification Management
6. The San Diego County Help Desk Questions and Answers.

Per results following, it is determined that the site is not a source of Critical Coarse Sediment for the downstream receiving waters and avoidance or mitigation is not necessary.

Table of Contents

Contents

Introduction

The project that this study is associated with is classified as a Priority development Project with respect to stormwater discharge and is subject to Hydromodification requirements.

Hydromodification requirements are intended to minimize excessive downstream erosion in receiving waters due to land development activities. Unlined runoff conveyance systems, when in equilibrium, transport a specific quantity of sediment downstream. The amount of sediment flow is dependent on the discharge rate of the stream at the point in question. When a stream is in equilibrium, the amount of upstream sediment arriving at the point in question is equal to the streams ability to move that sediment downstream based on the velocity of the flow. If the flow rate and associated sediment transport rate of the stream should exceed the sediment supply entering that point of the stream, the difference in sediment load will be made up by erosion of the stream bed. With this in mind, there are two main components to hydromodification design. The first component is the mitigation of the increase in peak flow and flow duration rates that result from the addition of impervious surfaces and concentration of runoff that are typical of land development activities. The flow/duration component of the design is covered in a separate report. The second component of hydromodification is protection of the Potential Critical Coarse Sediment Yield Areas (PCCSYA) supply of the stream.

The PCCSYA component of the hydromodification requirements is intended to maintain any present sources of stream coarse sediment supply.

Sources of Methodology

The initial reference for analyzing the PCCSYA's is the February 2016 San Diego Regional Model BMP Design Manual for the City of Vista. Coarse sediments are addressed in Chapter 6 which primarily discusses Hydromodification requirements. This section is followed up with greater detail on the PCCSYA's topic in Appendix H. However, due to limited information in this version, other sources were needed to support this report. Since the printing of the February 2016 San Diego Regional Model BMP Design Manual, updates from the San Diego County Help Desk have been included (including some more in-depth explanation and methodology) in a revised, extended Appendix H. These updates were shown to have been included within the more recent updated additions of the BMP Design Manual including the February 2016 County of San Diego BMP Design Manual, and associated Appendix and the January 2018 Model BMP Design Manual San Diego Region for Permanent Site Design, Storm Water Treatment and Hydromodification Management.

Also, the San Diego County Regional Watershed Management Area Analysis (WMAA) printed October 1, 2015 was a reference as well as the March 2016 **San Luis Rey Watershed**

Management Area Water Quality Improvement Plan regarding water quality and CCSYA that discusses the Geomorphic Landscape Units (GLU) in more detail than the BMP Manuals. This manual was referenced for greater clarity and provides criteria dictating whether avoidance is required for protection purposes.

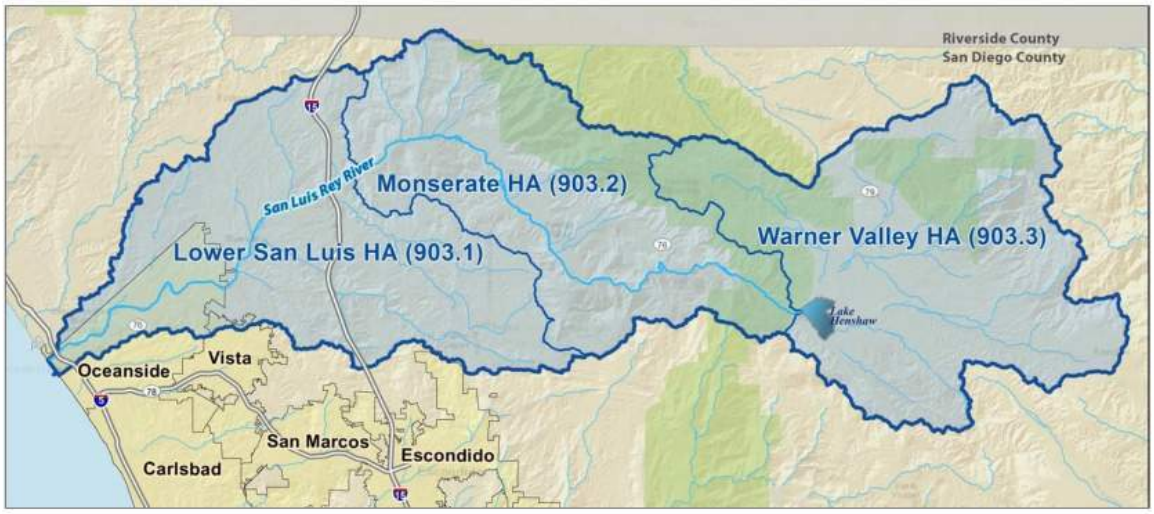


Figure 1-1. San Luis Rey Watershed
(Large format figure provided in Appendix 2F)

Figure 2 Taken from March 2016 San Luis Rey Watershed Management Area (Water Quality Improvement Plan)-

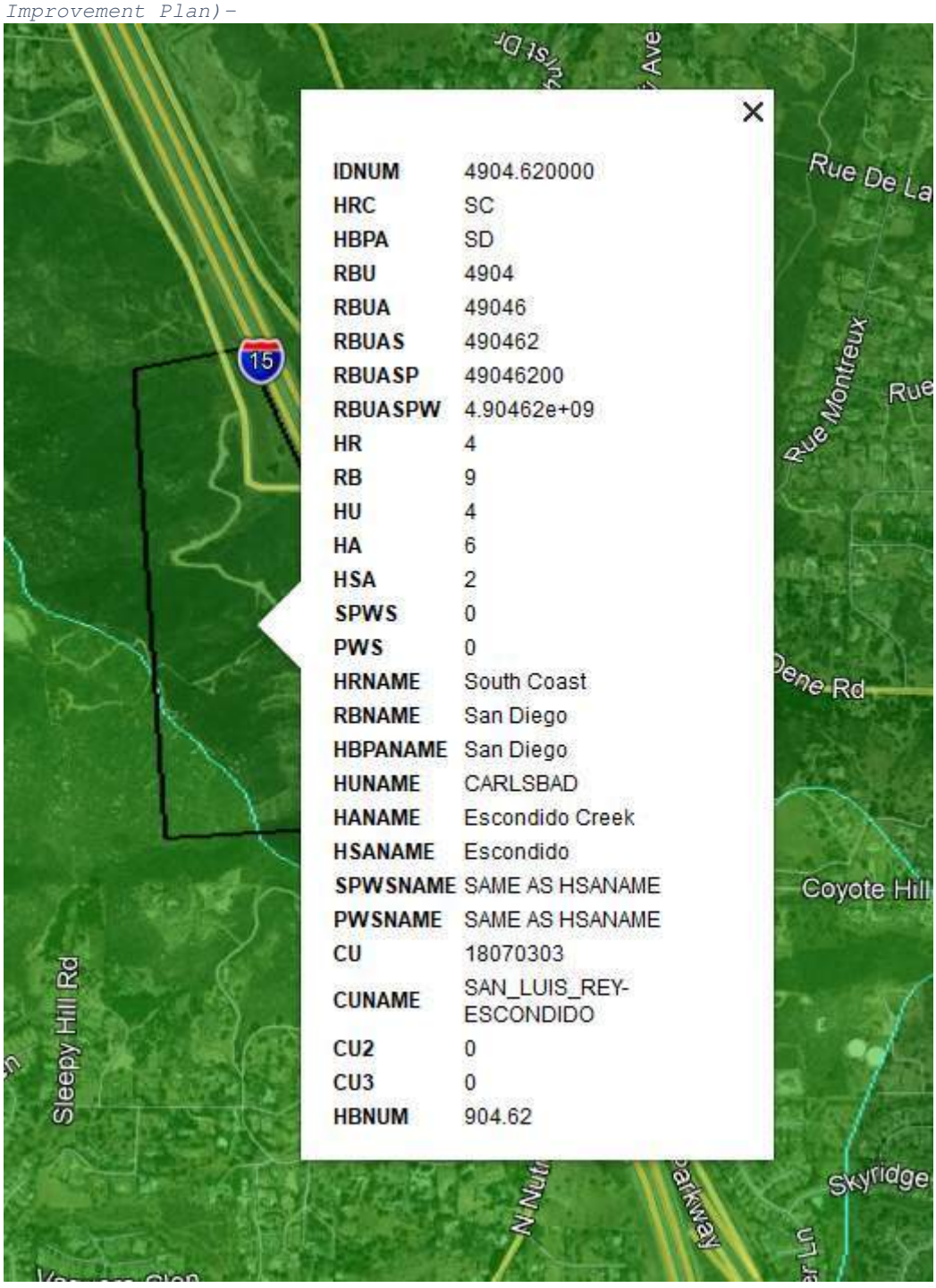


Figure 1.1 and Figure Google Earth Image of Rancho Lomas Verde Project with overlay of Hydrologic Area provided courtesy of SANGIS. The Watershed is defined as San Luis Rey, HA is Lower San Luis; HAS Bonsall (904.62)

Steps of the Analysis

Section 6.2 of Chapter 6 of the February 2016 San Diego Region Model BMP Design Manual and subsequent related publications outline the steps necessary to evaluate if the project will impact the supply of critical coarse sediment to downstream receiving waters. The steps used in this report are summarized below:

Step 1: Consult the Potential Critical Coarse Sediment Yield Map included in the Regional WMAA (found on the Project Clean Water website). If potential areas exist within the project boundaries, then proceed to step 2.

Step 2: Verify the Geomorphic Landscape Units (GLUs) onsite. This process is outlined in Section 6.2.1 and 6.2.2 of Chapter 6 and Appendix H of the February 2016 San Diego Region Model BMP Design Manual. Further discussion for San Luis Rey Watershed Specific areas are in the San Luis Rey Watershed Management Area – Water Quality Improvement Plan (WQIP). If GLU analysis confirms the CCS mapping in the WMAA, then proceed to step 3.

Step 3: Relate GLU to relative sediment production of the local site region. Per CCSYA criteria from the San Luis Rey Watershed Management Area Analysis, perform a quantitative analysis of relative sediment production (RSP) using the RUSLE Equation. If RUSLE indicates a High sediment production for the specific site area and the site underlying Geologic Formation is CB, CSI or CSP, either implement avoidance or go on to Step 4.

Step 1-Critical Coarse Sediment Mapping

The mapping of Potential Critical Coarse Sediment Areas obtained from the Project Clean Water web site was overlaid into the project site as well as the aerial photo. The resulting composite map shows that there are areas of the project that have the potential to provide critical coarse sediment to downstream waterbodies (See Map).


WMAA PCCSYA
Potential Critical Coarse Sediment Exhibit
Legend
Mesa Rock
Potential Critical Course Sediment
Jesmond Dene
Mesa Rock
Mesa Rock
Mesa Rock Rd
Frontage Rd
15
Jesmond Dr
Rue Michelle
Lakevie Dr
Windermere St
Forest Ave
Stonehurst Dr
Ivy Dell Ln
Rue Montreux
Jesmond Dene Hedge
Jesmond Dene Rd
N Centre City Pkwy
Cheyenne
Meadowland Heights Glen
Elderwood Glen
Patch Glen

Based on the results of the map on the previous page, the site does show the presence of PCCSYA's. The analysis will move on to Step 2, the verification of GLUs onsite.

Step 2-Verification of GLUs Onsite

The WMAA map used in the first part of the analysis is based on regional level data sets. The inherent resolution of these regional level datasets may not accurately depict site specific conditions. Appendix H of the San Diego Region BMP Design Manual provides guidance to confirm if site specific GLUs exist within the project boundary. The following table was taken from the 2016 San Diego Region BMP Design Manual – 6-4 and provides criteria for PCCSYA's which must be investigated further.

TABLE 6-1. Potential Critical Coarse Sediment Yield Areas

GLU	Geology	Land Cover	Slope (%)
CB-Agricultural/Grass-3	Coarse Bedrock	Agricultural/Grass	20% - 40%
CB-Agricultural/Grass-4	Coarse Bedrock	Agricultural/Grass	>40%
CB-Forest-2	Coarse Bedrock	Forest	10 – 20%
CB-Forest-3	Coarse Bedrock	Forest	20% - 40%
CB-Forest-4	Coarse Bedrock	Forest	>40%
CB-Scrub/Shrub-4	Coarse Bedrock	Scrub/Shrub	>40%
CB-Unknown-4	Coarse Bedrock	Unknown	>40%
CSI-Agricultural/Grass-2	Coarse Sedimentary Impermeable	Agricultural/Grass	10 – 20%
CSI-Agricultural/Grass-3	Coarse Sedimentary Impermeable	Agricultural/Grass	20% - 40%
CSI-Agricultural/Grass-4	Coarse Sedimentary Impermeable	Agricultural/Grass	>40%
CSP-Agricultural/Grass-4	Coarse Sedimentary Permeable	Agricultural/Grass	>40%
CSP-Forest-3	Coarse Sedimentary Permeable	Forest	20% - 40%
CSP-Forest-4	Coarse Sedimentary Permeable	Forest	>40%
CSP-Scrub/Shrub-4	Coarse Sedimentary Permeable	Scrub/Shrub	>40%

The first step of this process was to classify Land Cover of the site. Table H.1-2 provides a list of names regarding the different types of vegetation land cover but doesn't specify what these looks like in the field. SanGIS provides shape files that can be used to determine the land cover in the area. These shape files are added to Google Earth (or AutoCAD) as an overlay to determine the project landcover. Below is a sample of appendix H that is listed in the Model BMP manual.

Id	SanGIS Legend	SanGIS Grouping	Land Cover Grouping
134	34000 Mojavean Desert Scrub		Scrub/Shrub
135	34300 Blackbush Scrub		Scrub/Shrub
136	35000 Great Basin Scrub		Scrub/Shrub
137	35200 Sagebrush Scrub		Scrub/Shrub
138	35210 Big Sagebrush Scrub		Scrub/Shrub
139	35210 Sagebrush Scrub		Scrub/Shrub
140	36110 Desert Saltbush Scrub		Scrub/Shrub
141	36120 Desert Sink Scrub		Scrub/Shrub
142	37000 Chaparral		Scrub/Shrub
143	37120 Southern Mixed Chaparral		Scrub/Shrub
144	37120 Southern Mixed Chapparal		Scrub/Shrub

When these shapes are overlaid upon the project site we obtain the following:

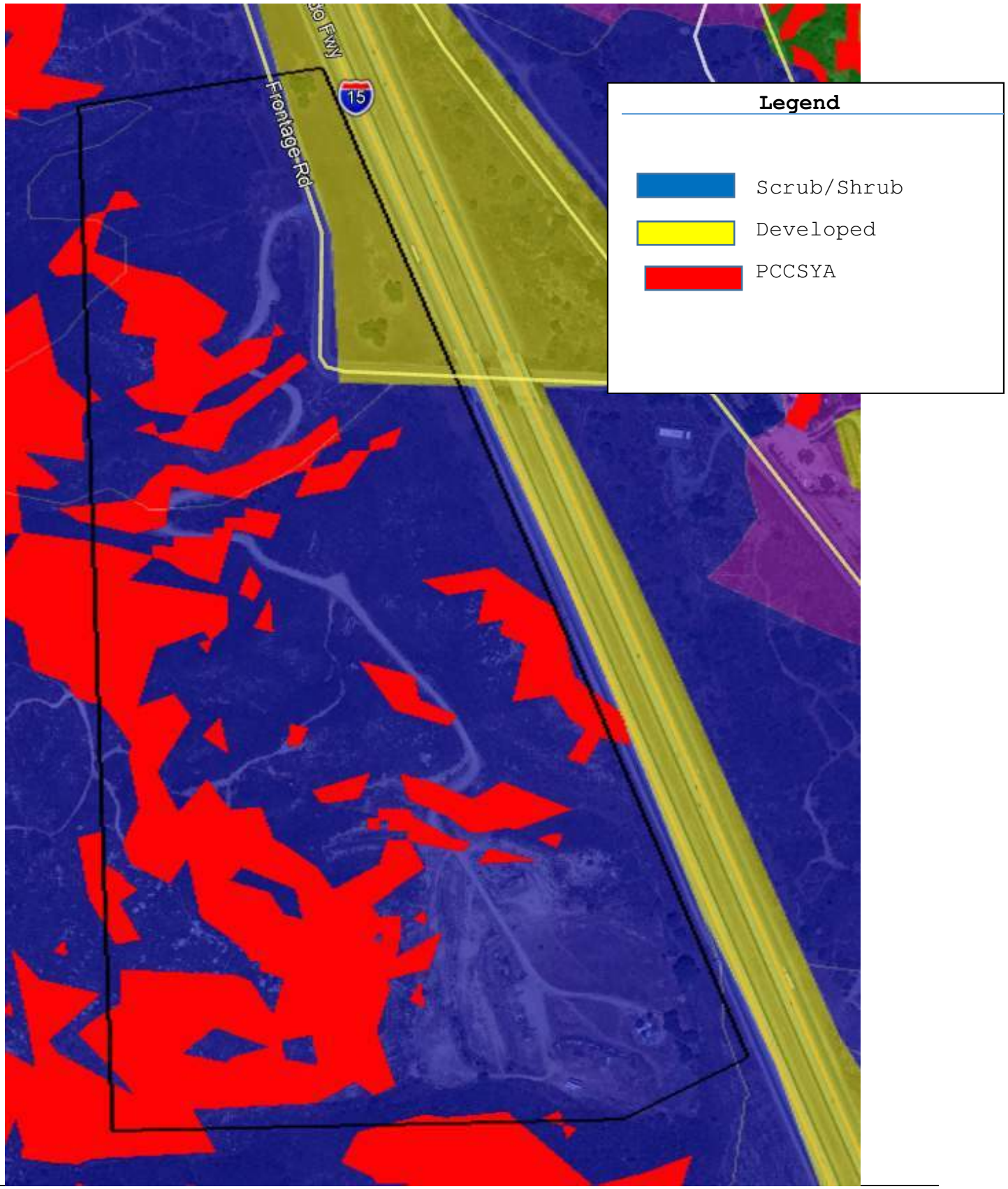

Frontage Rd
15
Legend
Scrub/Shrub
Developed
PCCSYA

Figure 3 SanGIS Vegetation overlay with PCCSYA and Google Earth.

Since the analysis of PCCSYA will consist of the red areas above, areas that do not incorporate any PCCSYA will not be addressed; this will remove Scrub/Shrub, and Developed areas.

The second step was to classify the site-specific soil types into the seven listed GLU categories. This was done by determining the local geology. The specific geologic map used in the stage is the GEOLOGIC MAP OF THE OCEANSIDE 30'X60' QUADRANGLE, CALIFORNIA, California Geological Survey, Regional Geologic Map No. 2, 1:100,000 scale, Compiled by: Michael P. Kennedy and Siang S. Tan, 2002. This map can be found at: http://www.quake.ca.gov/gmaps/RGM/oceanside/oceanside.html#

The project site is then located on the geologic map and found to be within the Kt geologic unit and Mzu. From Table H.1-1 of the BMP Design Manual, map unit Kt is Geologic Grouping of CB. See Figure 1 Below.

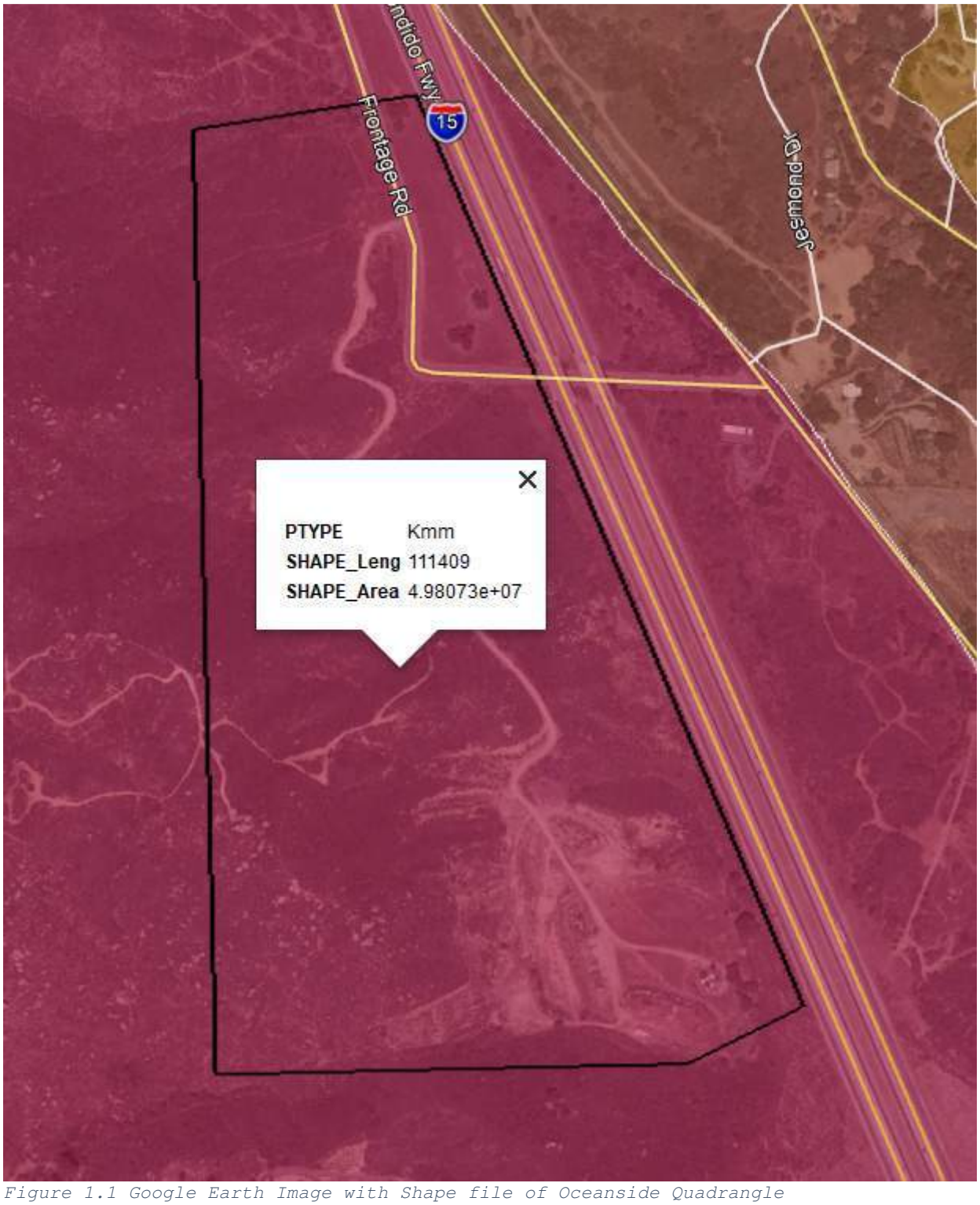


Figure 1.1 Google Earth Image with Shape file of Oceanside Quadrangle

Since the geology is now identified as a Kmm and will be treated as such at this time. The data can now be referenced back to the 2019 January Model BMP Design Manual to Table H.6-1 which is seen below in Figure 2 and defines the grouping as CB.

Map Unit	Map Name	Anticipated Grain size of Weathered Material	Bedrock or Sedimentary	Impermeable / Permeable	Geology Grouping
Kgd	San Diego & Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kgdf	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kgh	San Diego 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kgm	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kgm1	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kgm2	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kgm3	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kgm4	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kgp	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kgr	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kgu	San Diego 30' x 60'	Coarse	Bedrock	Impermeable	CB
Khg	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Ki	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kis	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kjd	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
KJem	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
KJld	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kjv	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
Klb	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
Klh	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Klp	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
Km	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kmg	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kmgp	El Cajon 30' x 60'	Coarse	Bedrock	Impermeable	CB
Kmm	Oceanside 30' x 60'	Coarse	Bedrock	Impermeable	CB

Figure 2 Table H.1-1: Geologic Grouping for Different Map Units

The third step in the analysis was to review slopes of the project site for comparison to the potential GLU's. Using Table H.6-3 as a guide, the site was divided into two groups according to the Geology and Land cover; slopes that are 20% to 40%, and slopes that are greater than 40%.

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

Table H.1-3: Potential Critical Coarse Sediment Yield Areas

GLU	Geology	Land Cover	Slope (%)
CB-Agricultural/Grass-3	Coarse Bedrock	Agricultural/Grass	20% - 40%
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CSP-Forest-4	Coarse Sedimentary Permeable	Forest	>40%
CSP-Scrub/Shrub-4	Coarse Sedimentary Permeable	Scrub/Shrub	>40%

As presented in Table 6-1 (or table H.1-3), two matching GLU's have the potential to supply critical coarse sediments. These areas will now be the focus of further verification efforts.

The identifying GLUs lead the BMP manual to section 6.2.3 "When it has been determined based on the GLU analysis that potential critical coarse sediment yield areas are present within the project boundary, and it has been determined that downstream systems require protection, additional analysis may be performed that may refine the extents of actual critical coarse sediment yield areas to be protected onsite.

The GLU analysis that identifies potential critical coarse sediment yield areas does not define whether the areas are producing sediment that is critical to receiving streams. The GLU analysis identifies "potential" areas, which will be assumed to be critical unless further investigation determines the sediment is not critical to the receiving stream. Sediment that is critical to receiving streams is the sediment that is a significant source of bed material to the receiving stream (bed sediment supply)." (Section 6.2.3 - *County of San Diego Model BMP Design Manual February 2016)*.

After analysis of Section 6.2.2, 6.2.3 and Appendix H of the BMP manual as stated above in Step 3 of **Step 2-Verification of GLUs Onsite** the sediment has a high probability of settlement and sinking which would conclude the site does not provide a Significant Source of Coarse Sediment

to be considered “Critical” for this reach. The receiving channel that the proposed Sandy Lane site flows to has a significantly larger watershed with similar GLU profiles contributing to the receiving channel that is considered Coarse Sediment and is also “Critical” to the reach. The addition of the RUSLE applied from the San Luis Rey Water Quality Improvement Plan will also be included to show another method that the sediment production is low and thereby not deemed a Source of Critical Coarse Sediment.

Insert updated potential course sediment

STEP 3-Determine Relative Sediment Production of the Local Site Area

If identified GLU's are not large enough or steep enough to produce a significant amount of CCS they can be made exempt from avoidance. In order for a specific GLU to be considered valid it must rate as having a High Relative Sediment Production (RSP) rating. To conduct a Quantitative Analysis of identified GLU's use the following steps from the San Luis Rey Watershed Management Area – Water Quality Improvement Plan, Section A.4.2.

After all the preceding steps are used to confirm the GLU Verifications of the Potential Critical Coarse Sediment onsite, the soil loss equation is used to determine if the local area will produce a significant amount of soil loss to contribute to the determination of the verified GLU's being a Critical Coarse Sediment Yield Area.

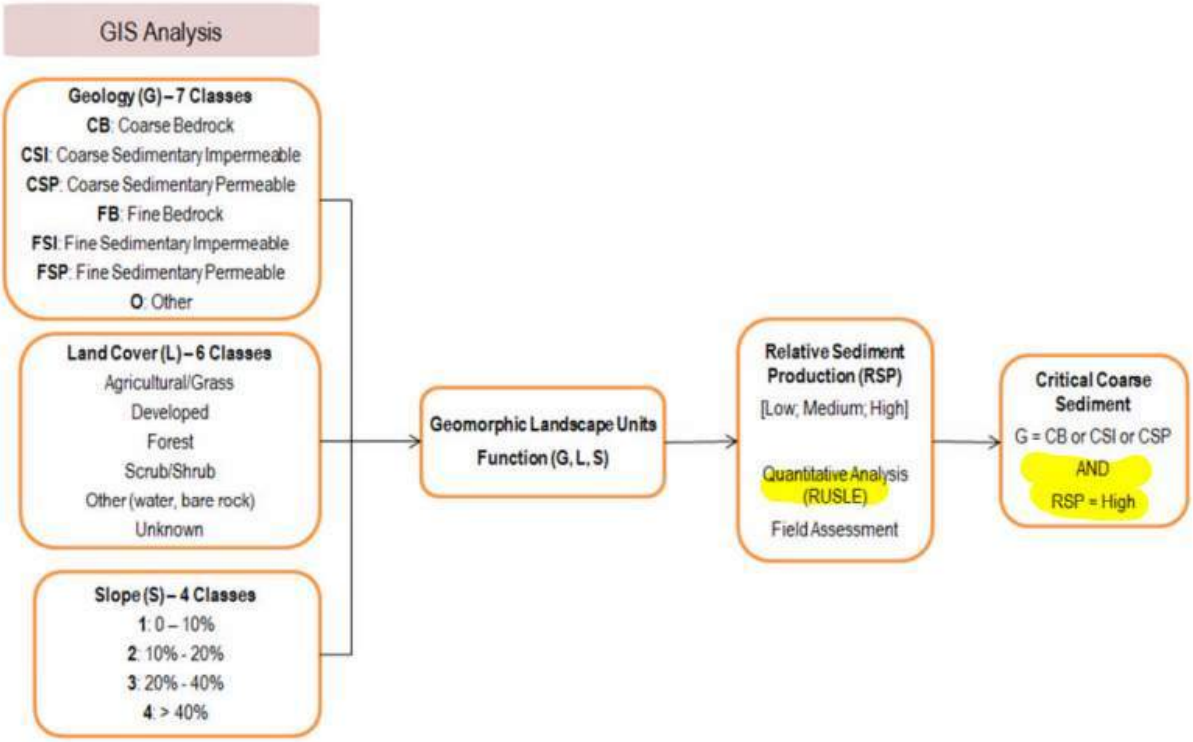


Image 1 Taken from June 30, 2016 San Luis Rey Watershed Management Area (Water Quality Improvement Plan)–San Luis Rey Watershed Management Area Analysis–Section 2.42 Methodology/ Assumptions/ Criteria for identifying potential critical coarse sediment yield areas

This is accomplished by using the RUSLE (RUSLE; Renard et al. 1997) Equation in Appendix D – Watershed Management Area Analysis Section A.4.2 Quantitative Analysis.

A= R X K X LS X C X P

Where

A = estimated average soil loss in tons/acre/year

R = rainfall-runoff erosivity factor

K = soil erodibility factor

LS = slope length and steepness factor

C = cover-management factor

P = support practice factor; assumed 1 for this analysis

Regional datasets used to determine the inputs required to estimate the soil loss from each GLU are listed in table below:

https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/guidance/k_factor_map.pdf

https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/guidance/ls_factor_map.pdf

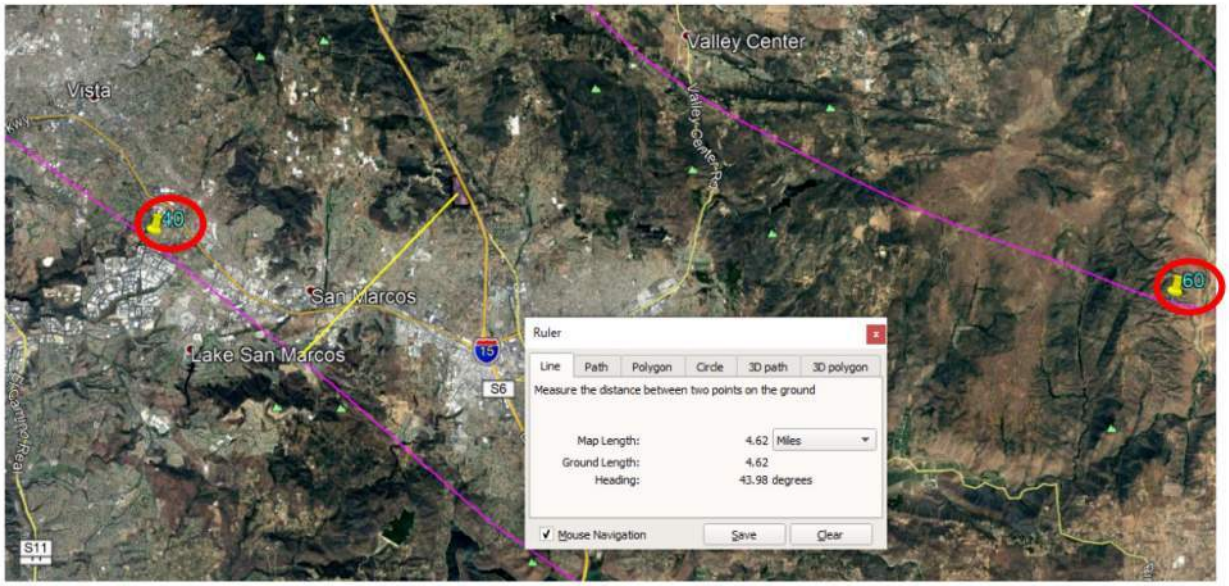
https://www.epa.gov/npdes/rainfall-erosivity-factor-calculator-small-construction-sites

The following criterion was developed using the suggestions listed above and then used to assign relative sediment production rating to each GLU:

- Low: Soil Loss < 5.6 tons/acre/year [GLUs that have a soil loss of 0 to 5.6 tons/acre/year produces around 10% of the total coarse sediment soil loss from the study area]
- Medium: 5.6 tons/acre/year < Soil Loss < 8.4 tons/acre/year
- High: > 8.4 tons/acre/year [GLUs that have a soil loss greater than 8.4 tons/acre/year produces around 42% of the total coarse sediment soil loss from the study area]

Image 2 Taken from June 30, 2016 San Luis Rey Watershed Management Area (Water Quality Improvement Plan)-San Luis Rey Watershed Management Area Analysis-Section A.4.2 Quantitative Analysis

The results ended giving



Value of 40 and 60 on screen. An over all distance of 9.12 miles between. 60-40 = 20 with 20/9.12 each "mile" is 2.19 the site is 4.62 from the 40 line, and 2.19*4.62 = 10.1178. 40+10.1178 = 50.12. The R value being used is **50.12**

R = 50.12

K = 0.20

LS = 4.6 (the largest of the two to be the most conservative.

C factor will be placed as 0.14 to be conservative; this is the highest value in Table A.4.2 Located in the San Luis Rey Watershed Management Area – Water Quality Improvement Plan.

P is set as 1 per analysis direction

To recap the values are

R = 50.12

K = 0.2

Ls = 4.6

C = 0.14 (this is the largest value used in the WQIP)

P = 1

Therefore, there will be three values for A = 50.12 X 0.2 X 4.6 X 0.14 X 1 = 6.5

A = 6.46 tons/acre/year

By comparing this value to the soil loss criteria in Section A.4.2 the resultant annual soil loss for this specific region is considered Medium for Areas. For qualification of the area to be a Critical Coarse Sediment Yield Area per the San Luis Rey WMAA (Image 1 from Page 14 the area must

have a GLU of CB, CSI, or CSP **AND a High RSP**. Due to the project sediment production being MED this indicates that the overall region does not produce enough overall soil loss to be considered a source of Critical Coarse Sediment. It should be restated that the natural channel running through the property will allow any upstream CCSYA to travel through and bypass the property; this channel will not involve any development

This analysis has shown that this site to have a low erodibility and to be of low sediment production. With the low production of sediment from the site and the heavily vegetated and or rocky terrain it can be concluded that sediment from this site would settle and sink as stated in 6.2.2. Lastly the City does not have plans to improve this reach and maintenance activities to the reach do not indicate there is either too much sediment or excessive erosion.

Conclusions

The analyzed results can be summarized as follows:

1. WMAA Map does show onsite Potential Critical Coarse Sediment, and GLU analysis does confirm GLU's to be onsite per Table 6-1; however, the potential sediment will need to travel through dense vegetation and velocity dissipaters (Rip-Rap) where the probability of sediment being trapped, or sinking is high.

2. The RUSLE method provided showed a very low production volume which leads to this area not being an area of significant source of coarse sediment.

In accordance with the Model BMP Design manual, the project site includes the potential CCYA as outlined in 6.2.1. Further analysis suggests that sediments will likely sink as stated in (6.2.2) and settle out as stormwater runoff passes through the dense agriculture areas that has also includes berms and channels to direct water to plants causing settlement (sinking). The RUSLE calculations shown support the determination that the site is not a significant source of Coarse Sediment to be considered "Critical" and the receiving channel accepts runoff from a significantly larger area where other GLUS are identified. It is based upon these results that this site is not a significant source of Coarse Sediment and not Considered "Critical" needing protection or mitigation.

If there are questions or concerns as related to this report, please contact Excel Engineering.

References

1) San Diego Region BMP Design Manual Chapter 6, February 2016

2) San Diego Region BMP Design Manual, Appendix H, February 2016

3) GEOLOGIC MAP OF THE OCEANSIDE 30'X60' QUADRANGLE, CALIFORNIA, California Geological Survey, Regional Geologic Map No. 2, 1:100,000 scale, Compiled by: Michael P. Kennedy and Siang S. Tan, 2002.
http://www.quake.ca.gov/gmaps/RGM/oceanside/oceanside.html#

End of Report

Appendix A

SAN LUIS REY RIVER
WATERSHED MANAGEMENT AREA
WATER QUALITY IMPROVEMENT PLAN

Submitted by

City of Oceanside
City of Vista
County of San Diego
Caltrans

Prepared by:

Modeling by:

September 2015 – revised March 2016

County of San Diego

SARAH E. AGHASSI
DEPUTY CHIEF ADMINISTRATIVE OFFICER

LAND USE AND ENVIRONMENT GROUP
1600 PACIFIC HIGHWAY, ROOM 212, SAN DIEGO, CA 92101
(619) 531-6256 • Fax (619) 531-5476
www.sdcounty.ca.gov/lueg

SAN LUIS REY WATERSHED MANAGEMENT AREA, WATER QUALITY IMPROVEMENT PLAN REVISED AS OF JANUARY 2016, STATEMENT OF CERTIFICATION (PERMIT PROVISION F.1.b)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sarah Aghassi
SARAH E. AGHASSI

Date 3/3/16

CITY OF VISTA
CALIFORNIA

SAN LUIS REY WATERSHED MANAGEMENT AREA, WATER QUALITY IMPROVEMENT PLAN, STATEMENT OF CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

John Conley

3-16-16

John Conley
Director
Community Development & Engineering
City of Vista

Date

P: 760-726-1340 | cityofvista.com | F: 760-639-6132
200 Civic Center Drive, Vista, California 92084-8275

DEPARTMENT OF TRANSPORTATION
DISTRICT 11
4050 TAYLOR STREET, M.S. 242
SAN DIEGO, CA 92110
PHONE (619) 688-0100
FAX (619) 688-4237
TTY 711
www.dot.ca.gov

Serious Drought.
Serious drought.
Help save water!

February 5, 2016

SAN LUIS REY RIVER WATERSHED MANAGEMENT AREA, WATER QUALITY IMPROVEMENT PLAN, STATEMENT OF CERTIFICATION

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

BRUCE L. APRIL
Deputy District Director, Environmental

2/25/16
Date

CHAPTER 1 – APPENDIX A: DOCUMENT CROSSWALK

A.4.2 Quantitative Analysis

Soil loss estimates for each Geomorphic Landscape Unit were estimated using the Revised Universal Soil Loss Equation (RUSLE; Renard et al. 1997) listed below:

$$A = R \times K \times LS \times C \times P$$

Where

A = estimated average soil loss in tons/acre/year

R = rainfall-runoff erosivity factor

K = soil erodibility factor

LS = slope length and steepness factor

C = cover-management factor

P = support practice factor; assumed 1 for this analysis

Regional datasets used to estimate the inputs required to estimate the soil loss from each GLU are listed in table below:

Dataset	Source	Download year	Description
RUSLE – R Factor	SWRCB	2014	Regional R factor map was downloaded from ftp://swrcb2a.waterboards.ca.gov/pub/swrcb/dwq/cgp/Risk/RUSLE/RUSLE_R_Factor/
RUSLE – K Factor	SWRCB	2014	Regional K factor map was downloaded from ftp://swrcb2a.waterboards.ca.gov/pub/swrcb/dwq/cgp/Risk/RUSLE/RUSLE_K_Factor/
RUSLE – LS Factor	SWRCB	2014	Regional LS factor map was downloaded from ftp://swrcb2a.waterboards.ca.gov/pub/swrcb/dwq/cgp/Risk/RUSLE/RUSLE_LS_Factor/
RUSLE – C Factor	USEPA	2014	Regional C factor map was downloaded from http://www.epa.gov/esd/land-sci/emap_west_browser/pages/wemap_mm_sl_rusle_c_qt.htm#mapnav

GIS analysis was used to calculate the area weighted estimate of R, K, LS and C factors using the regional datasets listed in the table above. For the developed land cover the C factor was then adjusted to 0 from the regional estimate to account for management actions implemented on developed sites (e.g. impervious surfaces). Soil loss estimates ranged from 0 to 15.2 tons/acre/year.

For evaluating the degree of relative risk to a stream solely arising from changes in sediment and/or water delivery SCCWRP Technical Report 605, 2010 states:

> *"The challenge in implementing this step is that presently we have insufficient basis to defensibly identify either low-risk or high-risk conditions using these metrics. For example, channels that are close to a threshold for geomorphic change may display significant morphological changes under nothing more than natural year-to-year variability in flow or sediment load.*

- *Acknowledging this caveat, we nonetheless anticipate that changes of less than 10% in either driver are unlikely to instigate, on their own, significant channel changes. This value is a conservative estimate of the year-to-year variability in either discharge or sediment flux that can be accommodated by a channel system in a state of dynamic equilibrium. It does not "guarantee," however, that channel change may not occur—either in response to yet modest alterations in water or sediment delivery, or because of other urbanization impacts (e.g., point discharge of runoff or the trapping of the upstream sediment flux; see Booth 1990) that are not represented with this analysis.*
- *In contrast, recognizing a condition of undisputed "high risk" must await broader collection of regionally relevant data. We note that >60% reductions in predicted sediment production have resulted in both minimal (McGonigle) and dramatic (Agua Hedionda) channel changes, indicating that "more data" may never provide absolute guidance. At present, we suggest using predicted watershed changes of 50% or more in either runoff (as indexed by change in impervious area) or sediment production as provisional criteria for requiring a more detailed evaluation of both the drivers and the resisting factors for channel change, regardless of other screening-level assessments. Clearly, however, only more experience with the application of such "thresholds," and the actual channel conditions that accompany them, will provide a defensible basis for setting numeric standards."*

The following criterion was developed using the suggestions listed above and then used to assign relative sediment production rating to each GLU:

- Low: Soil Loss < 5.6 tons/acre/year [GLUs that have a soil loss of 0 to 5.6 tons/acre/year produces around 10% of the total coarse sediment soil loss from the study area]
- Medium: 5.6 tons/acre/year < Soil Loss < 8.4 tons/acre/year
- High: > 8.4 tons/acre/year [GLUs that have a soil loss greater than 8.4 tons/acre/year produces around 42% of the total coarse sediment soil loss from the study area]

Results from the quantitative analysis are summarized in Table A.4.2.

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

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

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

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

ATTACHMENT 10

Installation Verification Form

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

PART 1 General Project and Applicant Information

Table 1: Project and Applicant Information

A. Project Summary Information	**ID No. IVF-20___-____ To be assigned by DPW-WPP**
Project Name	Click here to enter text.
Record ID (e.g. grading/improvement plan number, building permit)	Click here to enter text.
Project Address	Click here to enter text.
Assessor's Parcel Number(s) APN(s)	Click here to enter text.
Project Watershed (complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	Click here to enter text.
B. Owner Information	
Name	Click here to enter text.
Address	Click here to enter text.
Email Address	Click here to enter text.
Phone Number	Click here to enter text.

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

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

Table 2: Information for Partial IVF Submittals

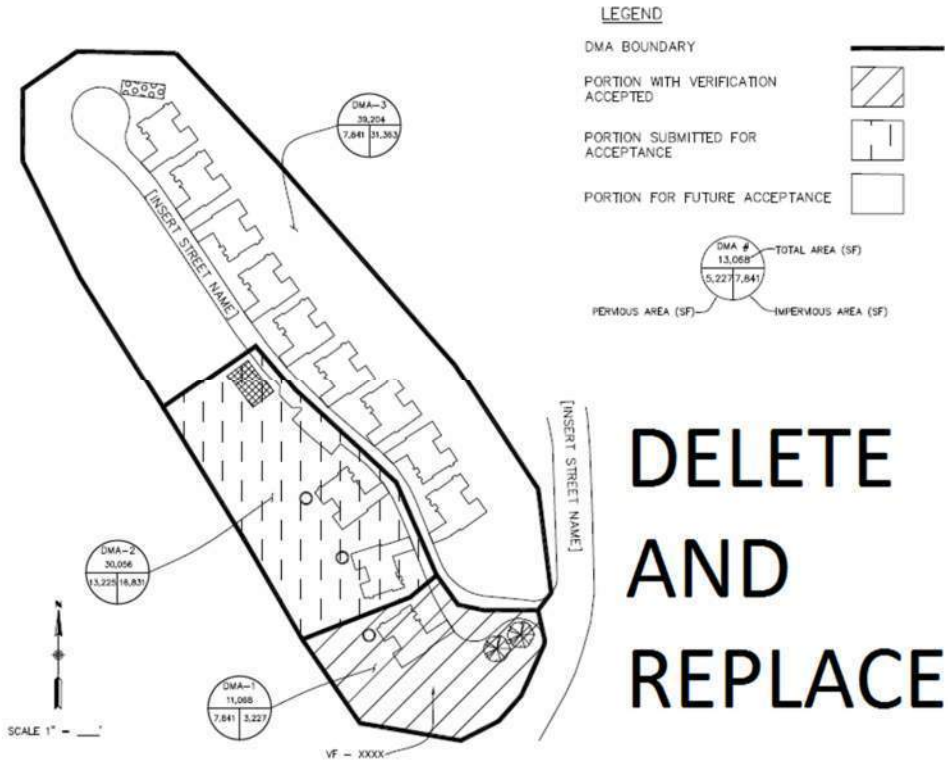
A: DMA and BMP Information

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

B: DMA and BMP Map

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

SAMPLE DMA MAP



PART 2 DMA and BMP Inventory Information

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

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

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

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

PART 3 Required Attachments for All BMPs Listed in Table 3

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

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

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

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

For Grading and Improvement projects only, ALSO submit:

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

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

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

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

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

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

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

Required only for Verifications for Partial Record Plans

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

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

PART 4 Preparer's Certification

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

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

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

[SEAL]

Preparer's Printed Name:

Click here to enter text.

Email: Click here to enter text.

Phone Number: Click here to enter text.

Preparer's Signed Name:

Date: Click here to enter text.

COUNTY - OFFICIAL USE ONLY:

For County Inspectors

County Department: _____

Date verification received from EOW: _____

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

Inspector Name: _____

Inspector's Signature: _____ Date: _____

For Building Division Only

Inspection Supervisor Name: _____

Inspector Supervisor's Signature: _____ Date: _____

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

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

For Watershed Protection Program Only

Date Received: _____

WPP Reviewer: _____

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

WPP Reviewer's Signature: _____ Date: _____

ATTACHMENT 11

BMP Maintenance Agreements and Plans

11.0 Cover Sheet and General Requirements

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

a. Applicability of Maintenance Agreements

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

☐ Maintenance Notification (Category 1 BMPs)

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

☐ Stormwater Maintenance Agreement (Category 2 BMPs)

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

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

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

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

b. Maintenance Plan Requirements

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

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

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

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

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

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

☐ Recommended **equipment** to perform maintenance.

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

EXHIBIT A

LEGAL DESPCRITION

Parcel 1: (187-100-23)

That portion of the Easterly 687.07 feet of the Southerly 489.00 feet of the Southwest quarter of the Northwest quarter of Section 32, Township 11 South, Range 2 West, San Bernardino Meridian, in the County of San Diego, State of California, according to the official plat thereof, lying Westerly of a line described as follows:

Beginning at the Southeast corner of the Southwest quarter of said Northwest quarter; thence along the South line of said Southeast quarter, North 89°00'21" West 52.24 feet to the true point of beginning of the herein described line; Thence leaving said South line on a non-tangent curve to the right from a tangent which bears North 19°21'35" West having a radius of 92.00 feet through an angel of 20°22'34" a distance of 32.72 feet; Thence North 01°00'59" East 237.71 feet; Thence on a tangent curve to the left having a radius of 558.00 feet; Through an angle of 21°29'17" a distance of 209.27 feet; thence North 20°28'18" West 15.52 feet to the Northerly line of the Southerly 489.00 feet of said Northwest quarter.

Parcel 2: (187-100-31)

That portion of the North half of the Northeast quarter of the Southwest quarter of Section 32, Township 11 South, Range 2 West, San Bernardino Meridian, in the County of San Diego, State of California, according to the official plat thereof, that lies Southerly and Westerly of the following described line:

Beginning at the Northwest corner of said North half; Thence (1) along the Northerly line of said Southwest corner South 89°00'21" East, 1026.76 feet to the Southwesterly boundary of that 200 foot wide road described in deed to the State of California, recorded March 29, 1948, in Book 2731 Page 95 of Official Records of said County; Thence (2) along said Southwesterly boundary South 39°34'52" East, 119.00 feet thence (3) leaving said Southwesterly boundary South 89°41'29" West, 160.25 feet thence (4) South 19°37'48" East, 604.00 feet to the Southerly line of said North half, distant along said Southerly line, North 88°50'43" West, 167.44 feet from the Southeast corner of said North half; Thence (5) along said Southerly line North 88°50'43" West, 903.90 feet to a point distant thereon South 88°50'43" East, 255.03 feet from the Southwesterly corner of said North half and the True Point of Beginning; Thence (6) leaving said Southerly line, North 17°30;41" West 250.08 feet; Thence (7) North 07°41'00" East, 238.54 feet; Thence (8) North 43°02'11" West, 186.22 feet; Thence (9) North 89°00'21" West, 38.42 feet; Thence (10) on a tangent curve to the right having a radius of 92.00 feet through an angle of 21°47'00", a distance of 34.98 feet to the Westerly line of said North half; Thence (11) along said Westerly line North 01°07'45" East, 53.43 feet to the point of beginning.

Parcel 3: (187-100-35)

The South half of the Northeast quarter of the Southwest Quarter of Section 32, Township 11 South, Range 2 West, San Bernardino Meridian, in the County of San Diego, State of California, according to the official plat thereof, lying Westerly and Southwesterly of a line described as follows:

Beginning at the Southeast corner of the Southwest quarter of said Section 32, thence

North 72°53'43" West 118.52 feet; Thence North 25°20'26" West 150.00 feet; Thence North 22°23'09" East 297.32 feet; Thence North 06°03'03" West 211.90 feet; Thence North 17°30'41" West 403.76 feet;

Thence North 28°12’09” West 200.25 feet; Thence North 40°43’02” West 207.43; Thence North 65°42’18” West 393.73 feet; Thence North 28°55’01” West 400.78 feet; Thence North 17°30’41” West 153.68 feet; to the Southerly line of the North half of the Northeast quarter of the Southwest quarter of said Section 32.

Parcel 4: (187-100-37)

That portion of the Southeast quarter of the Southwest quarter of Section 32, Township 11 South, Range 2 West, San Bernardino Meridian, in the County of San Diego, State of California, according to the official plat thereof, lying Westerly and Southwesterly of a line described as follows:

Beginning at the Southeast corner of said Southeast quarter of the Southwest quarter; Thence North 72°53’43” West 118.52 feet; Thence North 25°20’26” West 150.00 feet thence North 22°23’09” East 297.32 feet; Thence North 06°03’03” West 211.90 feet thence North 17°30’41” West 403.76 feet; Thence North 28°12’09” West 200.25 feet; thence North 40°43’02” West to the North line of said Southeast quarter of the Southwest quarter.

Parcel 5: (187-100-38)

The West half of the Southwest quarter of Section 32, Township 11 South, Range 2 West, San Bernardino Meridian, in the County of San Diego, State of California, according to the official plat thereof.

Excepting therefrom that portion described as follows: Beginning at the Northeast corner of the West half of the Southwest quarter of said Section 32, thence along the East line of said West half, South 01°07’45” West 53.43 feet; Thence leaving said East line from a tangent which bears North 67°13’21” West along a non-tangent curve concave Northeasterly, having a radius of 92.00 feet through a central angle of 47°51’46” an arc distance of 76.85 feet to a point on the North line of said Southwest quarter, which point bears North 89°00’21” West, 52.24 feet along said North line from the point of beginning; Thence along said North line South 89°00’21” East 52.23 feet to the point of beginning.

EXHIBIT B

BF-1
Biofiltration

BMP MAINTENANCE FACT SHEET
FOR
STRUCTURAL BMP BF-1 BIOFILTRATION

Biofiltration facilities are vegetated surface water systems that filter water through vegetation, and soil or engineered media prior to discharge via underdrain or overflow to the downstream conveyance system. Biofiltration facilities have limited or no infiltration. They are typically designed to provide enough hydraulic head to move flows through the underdrain connection to the storm drain system. Typical biofiltration components include:

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

Normal Expected Maintenance

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

Non-Standard Maintenance or BMP Failure

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

- The BMP is not drained between storm events. Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging of the media layer, filter course, aggregate storage layer, underdrain, or outlet structure. The specific cause of the drainage issue must be determined and corrected.
- Sediment, trash, or debris accumulation greater than 25% of the surface ponding volume within one month. This means the load from the tributary drainage area is too high, reducing BMP function or clogging the BMP. This would require pretreatment measures within the tributary area draining to the BMP to intercept the materials. Pretreatment components, especially for sediment, will extend the life of components that are more expensive to replace such as media, filter course, and aggregate layers.
- Erosion due to concentrated storm water runoff flow that is not readily corrected by adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.

Other Special Considerations

Biofiltration is a vegetated structural BMP. Vegetated structural BMPs that are constructed in the vicinity of, or connected to, an existing jurisdictional water or wetland could inadvertently result in creation of expanded waters or wetlands. As such, vegetated structural BMPs have the potential to come under the jurisdiction of the United States Army Corps of Engineers, SDRWQCB, California Department of Fish and Wildlife, or the United States Fish and Wildlife Service. This could result in the need for specific resource agency permits and costly mitigation to perform maintenance of the structural BMP. Along with proper placement of a structural BMP, **routine maintenance is key to preventing this scenario**.

BF-1
Biofiltration

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR BF-1 BIOFILTRATION		
The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district. Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.		
Threshold/Indicator	**Maintenance Action**	**Typical Maintenance Frequency**
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation or compaction of the media layer.	• Inspect monthly. If the BMP is 25% full* or more in one month, increase inspection frequency to monthly plus after every 0.1-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Obstructed inlet or outlet structure	Clear blockage.	• Inspect monthly and after every 0.5-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable	• Inspect annually. • Maintenance when needed.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintenance when needed.
Dead or diseased vegetation	Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintenance when needed.
Overgrown vegetation	Mow or trim as appropriate.	• Inspect monthly. • Maintenance when needed.
2/3 of mulch has decomposed, or mulch has been removed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches.	• Inspect monthly. • Replenish mulch annually, or more frequently when needed based on inspection.

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

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR BF-1 BIOFILTRATION (Continued from previous page)		
Threshold/Indicator	**Maintenance Action**	**Typical Maintenance Frequency**
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.	• Inspect monthly. • Maintenance when needed.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.	• Inspect after every 0.5-inch or larger storm event. If erosion due to storm water flow has been observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.
Standing water in BMP for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains, or repairing/replacing clogged or compacted soils.	• Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed.
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology	If mosquitos/larvae are observed: first, immediately remove any standing water by dispersing to nearby landscaping; second, make corrective measures as applicable to restore BMP drainage to prevent standing water. If mosquitos persist following corrective measures to remove standing water, or if the BMP design does not meet the 96-hour drawdown criteria due to release rates controlled by an orifice installed on the underdrain, the [City Engineer] shall be contacted to determine a solution. A different BMP type, or a Vector Management Plan prepared with concurrence from the County of San Diego Department of Environmental Health, may be required.	• Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed.
Underdrain clogged	Clear blockage.	• Inspect if standing water is observed for longer than 24-96 hours following a storm event. • Maintenance when needed.

References

American Mosquito Control Association.
http://www.mosquito.org/
California Storm Water Quality Association (CASQA). 2003. Municipal BMP Handbook.
https://www.casqa.org/resources/bmp-handbooks/municipal-bmp-handbook
County of San Diego. 2014. Low Impact Development Handbook.
http://www.sandiegocounty.gov/content/sdc/dpw/watersheds/susmp/lid.html
San Diego County Copermittees. 2016. Model BMP Design Manual, Appendix E, Fact Sheet BF-1.
http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=250&Itemid=220

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BF-1
Biofiltration

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	
Property / Development Name:	Responsible Party Name and Phone Number:	
Property Address of BMP:	Responsible Party Address:	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 1 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Accumulation of sediment, litter, or debris Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove and properly dispose of accumulated materials, without damage to the vegetation ☐ If sediment, litter, or debris accumulation exceeds 25% of the surface ponding volume within one month (25% full*), add a forebay or other pre-treatment measures within the tributary area draining to the BMP to intercept the materials. ☐ Other / Comments:		
Poor vegetation establishment Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Re-seed, re-plant, or re-establish vegetation per original plans ☐ Other / Comments:		

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

BF-1
Biofiltration

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 2 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Dead or diseased vegetation Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans ☐ Other / Comments:		
Overgrown vegetation Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Mow or trim as appropriate ☐ Other / Comments:		
2/3 of mulch has decomposed, or mulch has been removed Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches ☐ Other / Comments:		

Date:	Inspector:	BMP ID No.:
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INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 3 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Erosion due to concentrated irrigation flow Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Repair/re-seed/re-plant eroded areas and adjust the irrigation system ☐ Other / Comments:		
Erosion due to concentrated storm water runoff flow Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ 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 ☐ Other / Comments:		

Date:	Inspector:	BMP ID No.:
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INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 4 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Obstructed inlet or outlet structure Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Clear blockage ☐ Other / Comments:		
Underdrain clogged (inspect underdrain if standing water is observed for longer than 24-96 hours following a storm event) Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Clear blockage ☐ Other / Comments:		
Damage to structural components such as weirs, inlet or outlet structures Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Repair or replace as applicable ☐ Other / Comments:		

BF-1
Biofiltration

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 5 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Standing water in BMP for longer than 24-96 hours following a storm event* Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ 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 ☐ Other / Comments:		
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Apply corrective measures to remove standing water in BMP when standing water occurs for longer than 24-96 hours following a storm event.** ☐ Other / Comments:		

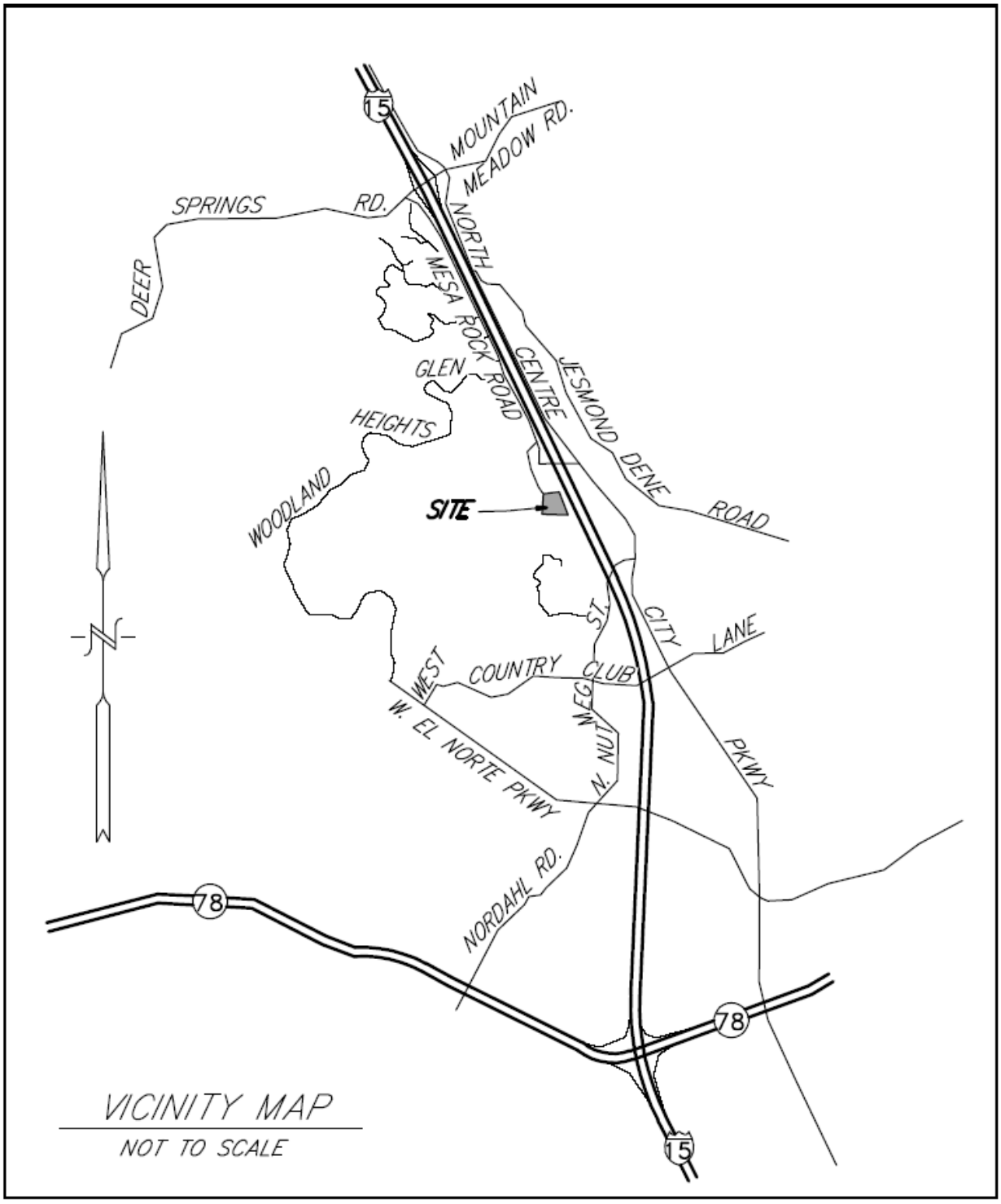
*Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging of the media layer, filter course, aggregate storage layer, underdrain, or outlet structure. The specific cause of the drainage issue must be determined and corrected.

**If mosquitos persist following corrective measures to remove standing water, or if the BMP design does not meet the 96-hour drawdown criteria due to release rates controlled by an orifice installed on the underdrain, the [City Engineer] shall be contacted to determine a solution. A different BMP type, or a Vector Management Plan prepared with concurrence from the County of San Diego Department of Environmental Health, may be required.

EXHIBIT C

Project Vicinity Map

Project Name: North County Environmental Resources
Record ID:



BMP: Bifiltration Basin
MAINTENANCE ACTIVITIES

ROUTINE ACTION	MAINTENANCE INDICATOR	FIELD MEASUREMENT	MEASUREMENT FREQUENCY	MAINTENANCE ACTIVITY	Frequency (# of times per year)	Hours per Event	# of Units Requiring Maintenence	Total Hours of Action	Average Labor Crew Size	Total Hours For Year	Avg. (Pro-Rated) Labor Rate/Hr. ($)	Equipment	Equipment Cost/Hour ($)	Materials & Incidentals Cost or Disposal Cost/Event ($)	Total cost per visit ($)	Total cost per year ($)
Vegetation Management for Aesthetics (optional)	Average vegetation height greater than 12-inches, emergence of trees or woody vegetation,	Visual observation and random measurements through out the side slope area	Annually, prior to start of wet season	Cut vegetation to an average height of 6-inches and remove trimmings. Remove any trees, or woody vegetation.	2.0	4.000	2.0	8.0	2	32	$74.97/hr	Utility Truck	$ 14.39	$ 50.00	$ 2,910	$ 5,819
Soil Repair	Evidence of erosion	Visual observation	Annually, prior to start of wet season	Reseed/revegetate barren spots prior to wet season.	2.0	4.000	2.0	8.0	2	32	$74.97/hr	Utility Truck	$ 14.39	$ 150.00	$ 3,010	$ 6,019
Standing Water	Standing water for more than 96 hrs	Visual observation	Annually, 96 hours after a target storm (0.60 in) event	Drain facility. Corrective action prior to wet season. Consult engineers if immediate solution is not evident.	1.0	1.000	2.0	2.0	2	4	$74.97/hr	Utility Truck	$ 14.39		$ 357	$ 357
Trash and Debris	Trash and Debris present	Visual observation	Annually, prior to start of wet season	Remove and dispose of trash and debris	6.0	1.000	2.0	2.0	2	24	$74.97/hr	Utility Truck	$ 14.39		$ 2,145	$ 12,868
Sediment Management	Sediment depth exceeds 10% of the facility design	Measure depth at apparent maximum and minimum accumulation of sediment. Calculate average depth	Annually, prior to start of wet season	Remove and properly dispose of sediment. Regrade if necessary. (expected every 2 years)	1.0	1.500	2.0	3.0	2	6	$74.97/hr	Utility Truck, 10-15 yd Truck, Backhoe	$ 56.02	$ 400.00	$ 1,186	$ 1,186
Underdrains	Evidence of Clogging	Visual Observation	Annually, prior to start of wet season	Corrective action prior to wet season. Consult engineers if immediate solution is not evident.	1.0	1.000	2.0	2.0	2	4	$74.97/hr	Utility Truck	$ 14.39		$ 357	$ 357
General Maintenance Inspection	Inlet structures, outlet structures, side slopes or other features damaged, significant erosion, burrows, emergence of trees or woody vegetation, graffiti or vandalism, fence damage, etc.	Visual observation	Annually, prior to start of wet season	Corrective action prior to wet season. Consult engineers if immediate solution is not evident.	1.0	0.250	2.0	0.5	2	1	$74.97/hr	Utility Truck	$ 14.39		$ 89	$ 89
Trash and Debris from Wier	Trash and Debris present	Visual observation	Monthly during wet season	Remove and dispose of trash and debris	0.0	0.1	0.0	0.0	1	0	$74.97/hr	Utility Truck	$ 14.39		$ -	$ -
Water Seal on Wier	Water Seepage Through side of Wier Plate	Visual observation	Monthly during wet season	Remove Caulking around Wier Plate, Recaulk, Replace Wier Plate if Necessary	0.0	0.125	0.0	0.0	2	0	$74.97/hr	Utility Truck	$ 14.39	$ 15.00	$ 15	$ -
Sediment Management Around Orifice of Wier Plate	Any and all Sediment Around Wier Plate	Visual observation	Monthly during wet season	Remove and properly dispose of sediment.	0.0	0.125	0.0	0.0	2	0	$74.97/hr	Utility Truck	$ 14.39	$ 10.00	$ 10	$ -
Reporting					1.0	3.0	1.0	3.0	1	3	$74.97/hr				$ 225	$ 225
				Average Annual Total Hours						106		Average Annual Total Cost				$ 26,921.01
												Average Two Year Cost				$ 53,842.02

Labor Rate	$74.97/hr

Equipment	Equipment Cost
Utility Truck	$14.39/hr
10-15 yd truck	$28.27/hr
Backhoe	$13.36/hr
Vactor	$62.70/hr
Sweeper	$123.26/hr

ATTACHMENT 12

Documentation of Alternative Compliance Projects (ACPs)

12.0 Alternative Compliance Project (ACP) Requirements

- This attachment is required for any project proposing to construct an Alternative Compliance Project (ACP) either for crediting toward a concurrently proposed Priority Development Project (PDP) or for the generation of credits to be used in offsetting future PDP compliance deficits.
- This section provides minimum required documentation for proposed ACPs. Consult your project manager for additional required documentation.

Offsite Alternative Compliance Participation Form

PDP INFORMATION	
Record ID:	Click here to enter text.
Assessor's Parcel Number(s) [APN(s)]	Click here to enter text.
ACP Information	
Record ID:	Click here to enter text.
Assessor's Parcel Number(s) [APN(s)]	Click here to enter text.
Project Owner/Address	Click here to enter text.
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) Click here to enter text.