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:	1822-1864 York Drive, Site Development Plan
Record ID (Permit) No(s):	PDS2021-MUP-21-008, PDS2021-ER-08-008
Assessor's Parcel No(s):	184-040-18, 184-040-19, 184-040-20, 184-040-21, 184-040-22, 184-040-04
Street Address (or Intersection):	1822-1864 York Drive
City, State, Zip:	Vista, CA 92084
Part 2. Applicant / Project Proponent Information	
Name:	Timed Investment, LLC
Company:	Timed Investment, LLC
Street Address:	3189 Airway Avenue, Unit D
City, State, Zip:	Costa Mesa, CA 92626
Phone Number	(949) 903-4445
Email:	harryc@wholeinone.us

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)**
	4,520	125,150	191,078

Ⓑ		
☐	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**	→ **Standard *SWQMP Form***
☐ a. Project is East of the Pacific/Salton Sea Divide	
☐ b. None of the PDP criteria below applies	
☒ **Priority Development Project (PDP)**	→ **PDP *SWQMP Form***
☐ 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	
☐ **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: [signature] Date: 7/30/2021

- ***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.

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.

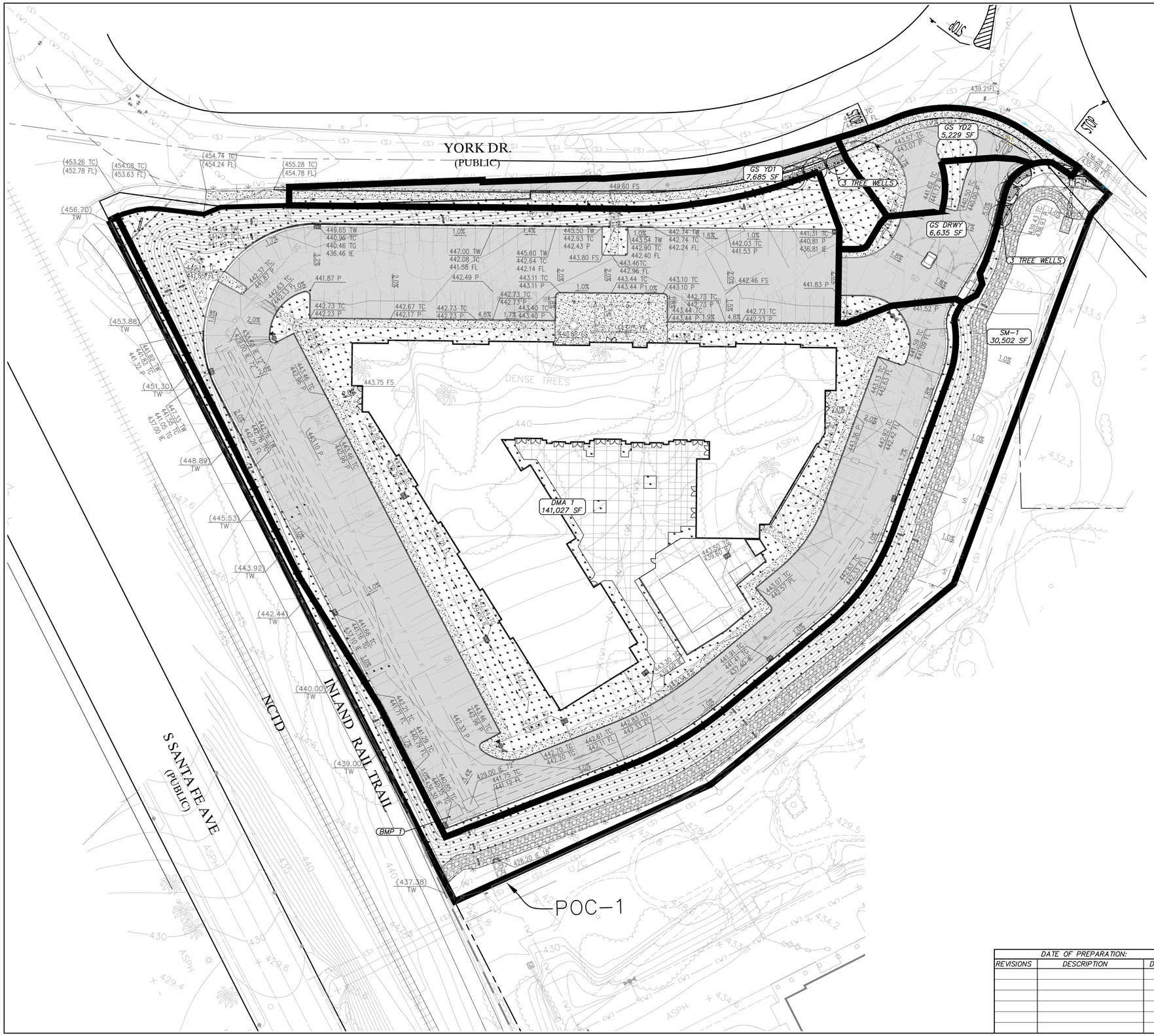
Sub-attachments	Requirement
☒ **2.1: DMA Exhibits**	All PDPs
☐ **2.2: Individual Structural BMP DMA Mapbook**	PDPs with structural BMPs
☐ **2.3: Construction Plan Sets**	All projects

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.



PROJECT CHARACTERISTICS	
SOIL TYPE	D
PARCEL AREA	4.272 ACRES
DISTURBED AREA	4.387 ACRES
PROPOSED IMPERVIOUS AREA	2.873 ACRES
PROPOSED PERVIOUS AREA	1.514 ACRES
DEPTH TO GROUNDWATER	> 20 FEET

LEGEND	SYMBOL
DMA NAME DMA AREA (SF)	DMA 1 141,027 SF
SELF-MITIGATING DMA	SM 1
DE MINIMIS AREA	DMIN 1
POINT OF CONCENTRATION	POC 1
DMA BOUNDARY	
PROJECT BOUDNARY	
FLOW PATH	
CATCH BASIN	
RIP RAP ENERGY DISSIPATER PER D40	
72" CMP STORMWATER SYSTEM	
ASPHALT PVMT	
MODULAR WETLAND SYSTEM	MWS
GREEN STREET TREE WELL	
STORM DRAIN	SD

SELF-MITIGATING DMAS:

VEGETATION IN THE NATURAL OR LANDSCAPE AREA IS NATIVE OR NON-NATIVE DROUGHT TOLERANT SPECIES.

SOILS ARE UNDISTURBED NATIVE TOPSOIL, OR DISTURBED SOILS HAVE BEEN AMENDED AND AERATED TO PROMOTE WATER RETENTION CHARACTERISTICS EQUIVALENT TO UNDISTURBED NATIVE TOPSOIL.

INCIDENTAL IMPERVIOUS AREAS ARE LESS THAN 5 PERCENT OF THE SELF-MITIGATING AREA.

IMPERVIOUS AREAS CALCULATED WITHIN THE SELF-MITIGATED AREA SHOULD NOT BE HYDRAULICALLY CONNECTED TO OTHER IMPERVIOUS AREAS UNLESS IT IS A STORM WATER CONVEYANCE SYSTEM (SUCH AS BROW DITCHES).

THE SELF-MITIGATING AREA IS HYDRAULICALLY SEPARATE FROM DMAS THAT CONTAIN PERMANENT STORM WATER POLLUTION CONTROL BMPS.

LID AND SITE DESIGN:

- 4.3.1 MAINTAIN NATURAL DRAINAGE PATHWAYS AND HYDROLOGIC FEATURES
- 4.3.2 CONSERVE NATURAL AREAS, SOILS, AND VEGETATION
- 4.3.3 MINIMIZE IMPERVIOUS AREA
- 4.3.4 MINIMIZE SOIL COMPACTION
- 4.3.7 LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES

SOURCE CONTROL BMPS:

- 4.2.1 PREVENTION OF ILLICIT DISCHARGES INTO THE MS4
- 4.2.2 STORM DRAIN STENCILING AND SIGNAGE
- 4.2.3 PROTECT OUTDOOR MATERIAL STORAGE AREAS FROM RAINFALL, RUN-ON, RUN-OFF AND WIND DISPERSAL
- 4.2.5 PROTECT TRASH STORAGE AREAS FROM RAINFALL, RUN-ON AND WIND DISPERSAL
- 4.2.6 ADDITIONAL BMPS BASED ON POTENTIAL RUNOFF POLLUTANTS:
- 4.2.6 A ON-SITE STORM DRAIN INLETS
- 4.2.6 D1 NEED FOR FUTURE INDOOR & STRUCTURAL PEST CONTROL
- 4.2.6 D2 LANDSCAPE/OUTDOOR PESTICIDE USE
- 4.2.6 G REFUSE AREAS
- 4.2.6 I OUTDOOR STORAGE OF EQUIPMENT OR MATERIALS
- 4.2.6 P PLAZAS, SIDEWALKS, AND PARKING LOTS

30' 15 0' 30' 60' 90'

SCALE: 1" = 30'

DATE OF PREPARATION:		
REVISIONS	DESCRIPTION	DATE

bHA, Inc.
land planning, civil engineering, surveying
5115 AVENIDA ENCINAS
SUITE "L"
CARLSBAD, CA. 92008-4387
(760) 931-8700

DRAINAGE MANAGEMENT AREA EXHIBIT
1822-1864 YORK DRIVE
PDS2021-MUP-21-008, PDS2021-ER-21-08-008

COUNTY OF SAN DIEGO, CALIFORNIA

HYDROMODIFICATION & TREATMENT CONTROL BMPS

DEVELOPED CONDITIONS

STORMWATER RUNOFF FROM THE PROPOSED PROJECT SITE IS ROUTED TO ONE (1) POINTS OF COMPLIANCE, POC-1 LOCATED NEAR THE SOUTHWEST CORNER OF THE PROJECT SITE. POC-1 COLLECTS RUNOFF FROM DMA 1, DMA GS YD1, DMA GS DRWY, DMA GA YD2 AND SM-1.

PRIOR TO DISCHARGING FROM THE PROJECT SITE, DEVELOPED ON-SITE RUNOFF FROM DMA-1 IS DRAINED TO A ONSITE RECEIVING 72-INCH CMP STORMWATER SYSTEM (HYDROMODIFICATION-BMPS OR HMP-BMPS) BEFORE FLOWS ARE TREATED IN MODULAR WETLAND SYSTEMS (PROPRIETARY BIOFILTRATION BMPS) FOR WATER QUALITY PURPOSES.

DMA GS YD1 INCLUDES A PORTION OF THE FRONTAGE STREET IMPROVEMENTS FOR YORK DRIVE WILL DRAIN INTO THREE (3) TREE WELLS FOR POLLUTANT CONTROL. FOR THE STORMWATER ANALYSIS, THIS STREET FRONTAGE IS CONSIDERED "GREEN STREETS".

DMA GS DRWY INCLUDES A PORTION OF THE ONSITE DRIVEWAY IMPROVEMENTS AND WILL BE TREATED BY THREE (3) TREE WELLS.

DMA GS YD2 INCLUDES A PORTION OF THE ONSITE DRIVEWAY IMPROVEMENTS AND YORK DRIVE IMPROVEMENTS.

HYDROMODIFICATION WILL BE COMPENSATED BY THE 72-INCH CMP STORMWATER SYSTEM IN DMA 1 THAT ALSO DRAINS TO POC 1.

DMA	Tributary Area, A (Ac)	Impervious Percentage, Ip
DMA 1	3.238	78.51%
GS DRWY	0.152	82.09%
SM 1	0.700	0.00%
GS YD2	0.120	82.06%
TOTAL	4.090	-

HYDROMODIFICATION VOLUME IS PROPOSED FOR HYDROMODIFICATION CONFORMANCE AND FLOOD CONTROL FOR THE PROJECT'S POCS. THE DIMENSIONS REQUIRED FOR HMP CONFORMANCE IS BASED ON THE SWMM MODEL THAT WAS UNDERTAKEN FOR THE PROJECT. HMP CONFORMANCE IS DISCUSSED WITHIN THE HYDROMODIFICATION MANAGEMENT PLAN PREPARED BY BHA INC. FOR THIS PROJECT .

STORM WATER WILL ENTER THE WATER QUALITY PORTION OF THE 72-INCH CMP STORMWATER SYSTEM THROUGH INFLOW PIPES. FLOWS WILL DISCHARGE FROM THE STORMDRAIN CLEANOUT AND THE DOWNSTREAM MODULAR WETLAND SYSTEM (MWS). THE 72-INCH CMP STORMWATER SYSTEM (BMP 1) WAS MODELED WITH THE STORAGE UNIT MODULE WITHIN SWMM. THE STORAGE UNIT CAN MODEL THE UNDERDRAIN WITH ORIFICE PLATE AND VAULT STORAGE POND UP TO THE ELEVATION OF THE REQUIRED DESIGN CAPTURE VOLUME (DCV) FOR THE 72-INCH CMP STORMWATER SYSTEM. PONDING ABOVE THE REQUIRED DCV IS MODELED AS A DETENTION BASIN: ELEVATION VS. AREA, AND ELEVATION VS. DISCHARGE TABLES, ARE NEEDED BY SWMM FOR MODIFIED PULS ROUTING PURPOSES. DETAILED OUTLET STRUCTURE LOCATION AND ELEVATIONS SHOULD BE SHOWN ON THE CONSTRUCTION PLANS BASED ON THE RECOMMENDATIONS OF THIS STUDY.

ONE (1) PROPRIETARY MODULAR WETLAND SYSTEM IS LOCATED DOWNSTREAM OF THE UNDERGROUND DETENTION FACILITIY AND IS RESPONSIBLE FOR HANDLING WATER QUALITY REQUIREMENTS FOR POC-1. THE TYPE OF PROPRIETARY BIOFILTRATION BMPS ARE MODULAR WETLAND SYSTEMS (MWS) OR EQUIVALENT.

SINCE THERE IS UPSTREAM DETENTION STORAGE, THE MODULAR WETLANDS SYSTEM CAN BE SIZED BASED ON THE REQUIRED POLLUTANT CONTROL TREATMENT VOLUME. THE REQUIRED TREATMENT VOLUME IS 1.5 TIMES THE DCV, PER THE COUNTY OF SAN DIEGO BMP DESIGN MANUAL.

THE BENEFIT OF THE MWS IS THAT ONE UNIT CAN BE INSTALLED BELOW GRADE OF THE PROPOSED SURFACE AND DOWNSTREAM OF THE UNDERGROUND STORAGE VAULT USED FOR HYDROMODIFICATION AND DETENTION STORAGE. THE MWS UNITS WILL ALSO BE CONFIGURED AS A VAULT, AND WILL ACCEPT FLOWS DIRECTLY INTO THE PRE-TREATMENT CHAMBER. THIS END-OF-THE-LINE INSTALLATION ENSURES THAT ALL DRAINAGE WILL BE TREATED BY THE BIOFILTRATION SYSTEM FOR MAXIMUM FEASIBILITY. THE MWS IS A PRE-ENGINEERED BIOFILTRATION SYSTEM COMPOSED OF A PRE-TREATMENT CHAMBER CONTAINING FILTRATION CARTRIDGES, A HORIZONTAL FLOW BIOFILTRATION CHAMBER WITH A PERIPHERAL VOID AREA AND A CENTRALIZED AND VERTICALLY EXTENDING UNDERDRAIN, THE BIOFILTER CHAMBER CONTAINING A SORPTIVE MEDIA MIX, AND A DISCHARGE CHAMBER CONTAINING AN ORIFICE CONTROL STRUCTURE. TREATED WATER FLOWS HORIZONTALLY IN SERIES THROUGH THE PRE-TREATMENT CHAMBER CARTRIDGES, BIOFILTRATION CHAMBER AND ORIFICE CONTROL STRUCTURE. DISCHARGES ARE CONVEYED VIA STORM DRAIN PIPE TO THE EXISTING STORM WATER CONVEYANCE SYSTEM.

BMP MODELING FOR WATER QUALITY PURPOSES

MODELING OF DUAL PURPOSE WATER QUALITY/HMP BMPS

ONE (1) BMP IS ARE PROPOSED FOR INTEGRATED HYDROMODIFICATION AND WATER QUALITY TREATMENT FOR THE PROJECT SITE. TABLE 2 ILLUSTRATES THE DIMENSIONS REQUIRED FOR HMP COMPLIANCE FOR THE PROPOSED 72-INCH CMP STORMWATER SYSTEM. TABLE 3 ILLUSTRATES THE DIMENSIONS REQUIRED FOR POLLUTANT CONTROL COMPLIANCE FOR THE PROPOSED MODULAR WETLANDS.

TABLE 2 - SUMMARY OF 72-INCH CMP STORMWATER SYSTEM:

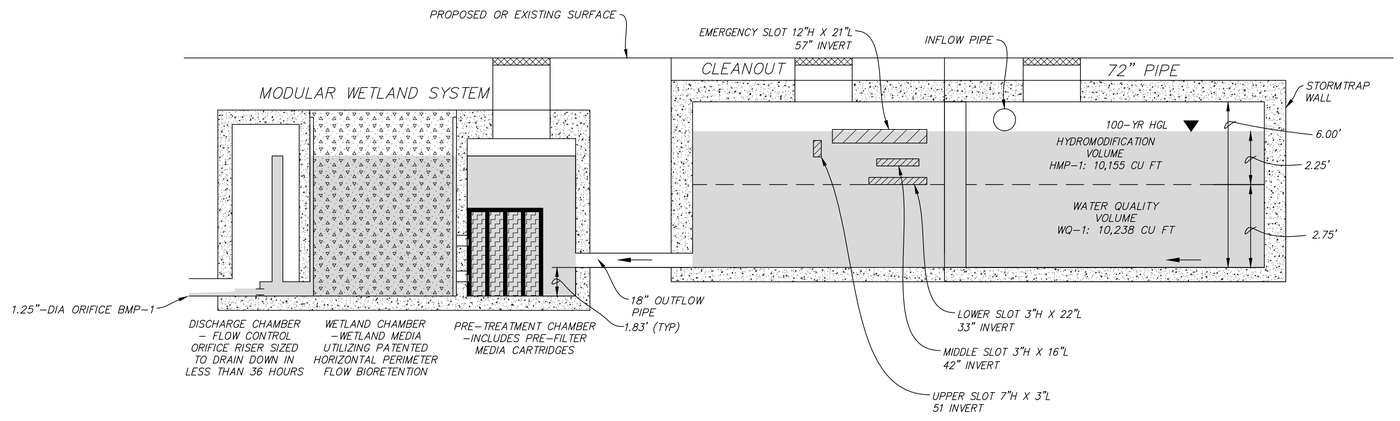
Underground Detention Facility	Tributary Area (Ac)	Pipe Dimensions		Lower Slot Dimensions			Middle Slot Dimensions			Upper Slot Dimensions			Emergency Slot Dimensions		
		Pipe Dia (in)	Pipe Length (ft)	Outlet Type[1]	Invert Elev, HL[2] (in)	(#) - Width x Height (in)[3]	Outlet Type[1]	Invert Elev, HL[2] (in)	(#) - Width x Height (in)[3]	Outlet Type[1]	Invert Elev, HL[2] (in)	(#) - Width x Height (in)[3]	Outlet Type[3]	Invert Elev, HL[2] (in)	(#) - Width x Height (in)[3]
BMP 1	3.238	72	810	Slot	33	(1) - 3 x 22	Slot	42	(1) - 3 x 16	Slot	51	(1) - 7 x 3	Slot	57	(1) - 12 x 21

Notes: (1): Shape of orifice opening in riser structure.
(2): Depth from bottom of pond to invert of lower slot or weir.
(3): Number of slots and slot dimensions.

TABLE 3 - SUMMARY OF TREATMENT CONTROL BMPS:

BMP	Tributary Area[1] (Ac)	DIMENSIONS	
		Volume Treated (cf)[2]	Model Number
BMP 1	DMA 1	10,238	MWS-L-6-8-8'-0"-V-UG
BMP 2	GS YD 1	264	Tree Wells 3 -15' Dia
BMP 3	GS DRWY	294	Tree Wells 3 -15' Dia
BMP 4	GS YD 2	232	Tree Wells 3 -15' Dia

Notes:
(1): BMP Areas are included in the overall DMA.
(2): For flow-based BMPs



72-INCH CMP STORMWATER SYSTEM & MWS DETAILS

NOT TO SCALE

bHA, Inc.
land planning, civil engineering, surveying
5115 AVENIDA ENCINAS
SUITE "L"
CARLSBAD, CA. 92008-4387
(760) 931-8700

DRAINAGE MANAGEMENT AREA EXHIBIT
1822-1864 YORK DRIVE
PDS2021-MUP-21-008, PDS2021-ER-21-08-008

COUNTY OF SAN DIEGO, CALIFORNIA

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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

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

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: Hydrology and Hydraulic Report, 1822-1864 York Drive, Major Use Permit

    Prepared By: BHA Inc.

    Date: March 25, 2025

  - 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.

HYDROLOGY AND HYDRAULIC REPORT

1822-1864 York Drive
Major Use Permit
PDS2021-MUP-21-008
PDS2021-ER-21-08-008

Prepared for:

Timed Investment, Inc.
3189 Airway Avenue, Unit D
Costa Mesa, CA 92626

Prepared by:

bHA, Inc
land planning, civil engineering, surveying
5115 Avenida Encinas, Suite L
Carlsbad, CA 92008-4387
(760) 931-8700

March 25, 2025

W.O. 1084-1119-601

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 or Printouts	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**	• DCV calculations from SSD-BMP tool • Dispersion Areas calculations from SSD-BMP tool	• Fact Sheet SD-B (Appendix E.8) • Appendix I
☒ **Tree Wells**	• DCV calculations from SSD-BMP tool • Tree Well calculations from SSD-BMP tool	• Fact Sheet SD-A (Appendix E.7) • Appendix I

- Submit this cover page and all "Required Sub-attachments or Printouts" 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)***	
SM 1	30,502	0	0	PDS2021-MUP-21-008, PDS2021-ER-21-08-008, Sheet 2

- "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)**	
GS YD1	7,685	☐	☒	PDS2021-MUP-21-008, PDS2021-ER-21-08-008, Sheet 2
GS DRWY	6,635	☐	☒	PDS2021-MUP-21-008, PDS2021-ER-21-08-008, Sheet 2
GS YD2	5,229	☐	☒	PDS2021-MUP-21-008, PDS2021-ER-21-08-008, Sheet 2
		☐	☐	
		☐	☐	
		☐	☐	
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		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	

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, BMPDM Appendix I, and any other guidance or instruction identified by the County.

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.

Summary Sheet for Self-retaining DMAs with Impervious Area Dispersion

Attach Printouts from SSD-BMP tool below

- DCV calculations from SSD-BMP tool
- Dispersion Areas calculations from SSD-BMP tool

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)**
GS YD1	3 Tree Wells at 5’ Dia.
GS DRWY	3 Tree Wells at 5’ Dia.
GS YD2	3 Tree Wells at 5’ Dia.

- 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 I.1. An automated version of Worksheet I.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

Attach Printouts from SSD-BMP tool below

- DCV calculations from SSD-BMP tool
- Tree Wells calculations from SSD-BMP tool

SSD-BMP Automated Worksheet I-1: Step 1. Calculation of Design Capture Volume (V1.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	GS-YD1	GS-DRWY	GS-YD2								unitless
	2	85th Percentile 24-hr Storm Depth	0.70	0.70	0.70								inches
	3	Is Hydromodification Control Applicable?	No	No	No								yes/no
	4	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	4,687	5,447	4,291								sq-ft
	5	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	6	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)	2,998	1,188	938								sq-ft
	7	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	8	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	9	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	10	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
SSD-BMPs Proposed	11	Does Tributary Incorporate Dispersion and/or Rain Barrels?	No	No	No								yes/no
	12	Does Tributary Incorporate Tree Wells?	Yes	Yes	Yes								yes/no
Dispersion Area & Rain Barrel Inputs (Optional)	13	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)											sq-ft
	14	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	15	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	16	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	17	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	18	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	19	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	7,685	6,635	5,229	0	0	0	0	0	0	0	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.59	0.76	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	0.59	0.76	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	26	Initial Design Capture Volume	264	294	232	0	0	0	0	0	0	0	cubic-feet
Dispersion Area Adjustment & Rain Barrel Adjustment	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 for DCV Reduction	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	0.59	0.76	0.76	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
	32	Design Capture Volume After Dispersion Techniques	264	294	232	0	0	0	0	0	0	0	cubic-feet
	33	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	34	Final Adjusted Runoff Factor	0.59	0.76	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	35	Final Effective Tributary Area	4,534	5,043	3,974	0	0	0	0	0	0	0	sq-ft
	36	Initial Design Capture Volume Retained by Dispersion Area and Rain Barrel(s)	0	0	0	0	0	0	0	0	0	0	cubic-feet
	37	Remaining Design Capture Volume Tributary to Tree Well(s)	264	294	232	0	0	0	0	0	0	0	cubic-feet

No Warning Messages

SSD-BMP Automated Worksheet I-3: Step 3. Tree Well Sizing (V1.0)													
Category	**#**	**Description**	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	**Units**
Standard Tree Well Inputs	1	Drainage Basin ID or Name	GS-YD1	GS-DRWY	GS-YD2	-	-	-	-	-	-	-	unitless
	2	Design Capture Volume Tributary to BMP	264	294	232	-	-	-	-	-	-	-	cubic-feet
	3	Is Hydromodification Control Applicable?	No	No	No	-	-	-	-	-	-	-	yes/no
	4	Predominant NRCS Soil Type Within Tree Well(s) Location	D	D	D								unitless
	5	Select a Tree Species for the Tree Well(s) Consistent with SD-A Tree Palette Table Note: Numbers shown in list are Tree Species Mature Canopy Diameters	15' - Other	15' - Other	15' - Other								unitless
	6	Tree Well(s) Soil Depth (Installation Depth) Must be 30, 36, 42, or 48 Inches; Select from Standard Depths**	48	48	36								inches
	7	Number of Identical* Tree Wells Proposed for this DMA	3	3	3								trees
	8	Proposed Width of Tree Well(s) Soil Installation for One (1) Tree	7.0	7.0	9.0								feet
	9	Proposed Length of Tree Well(s) Soil Installation for One (1) Tree	14.0	14.0	14.0								feet
Tree Data	10	Botanical Name of Tree Species	Provide in PDP SWQMP	Provide in PDP SWQMP	Provide in PDP SWQMP	-	-	-	-	-	-	-	unitless
	11	Tree Species Mature Height per SD-A	Provide in PDP SWQMP	Provide in PDP SWQMP	Provide in PDP SWQMP	-	-	-	-	-	-	-	feet
	12	Tree Species Mature Canopy Diameter per SD-A	15	15	15	-	-	-	-	-	-	-	feet
	13	Minimum Soil Volume Required In Tree Well (2 Cubic Feet Per Square Foot of Mature Tree Canopy Projection Area)	353	353	353	-	-	-	-	-	-	-	cubic-feet
	14	Credit Volume Per Tree	100	100	100	-	-	-	-	-	-	-	cubic-feet
Tree Well Sizing Calculations	15	DCV Multiplier To Meet Flow Control Requirements	n/a	n/a	n/a	-	-	-	-	-	-	-	unitless
	16	Required Retention Volume (RRV) To Meet Flow Control Requirements	n/a	n/a	n/a	-	-	-	-	-	-	-	cubic-feet
	17	Number of Trees Required	3	3	3	-	-	-	-	-	-	-	trees
	18	Total Area of Tree Well Soil Required for Each Tree	88	88	118	-	-	-	-	-	-	-	sq-ft
	19	Approximate Required Width of Tree Well Soil Area for Each Tree	10	10	11	-	-	-	-	-	-	-	feet
	20	Approximate Required Length of Tree Well Soil Area for Each Tree	10	10	11	-	-	-	-	-	-	-	feet
	21	Number of Trees Proposed for this DMA	3	3	3	-	-	-	-	-	-	-	trees
	22	Total Area of Tree Well Soil Proposed for Each Tree	98	98	126	-	-	-	-	-	-	-	sq-ft
	23	Minimum Spacing Between Multiple Trees To Meet Soil Area Requirements (when applicable)***	15.0	15.0	15.0	-	-	-	-	-	-	-	feet
Results	24	Are Tree Well Soil Installation Requirements Met?	Yes	Yes	Yes	-	-	-	-	-	-	-	yes/no
	25	Is Remaining DCV Requirement Fully Satisfied by Tree Well(s)?	Yes	Yes	Yes	-	-	-	-	-	-	-	yes/no
	26	Is Hydromodification Control Requirement Satisfied by Tree Well(s)?	n/a	n/a	n/a	-	-	-	-	-	-	-	yes/no

Attention!

-[Line 12] Applicant to provide supporting documentation for tree species in PDP SWQMP.

Notes:

*If using more than one mature canopy diameter within the same DMA, only the smallest mature canopy diameter should be entered. Alternatively, if more than one mature canopy diameter is proposed and/or the dimensions of multiple tree well installations will vary, separate DMAs may be delineated.

**If the actual proposed installation depth is not available in the table of standard depths, select the next lower depth.

***Tree Canopy or Agency Requirements May Also Influence the Minimum Spacing of Trees.

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 Bruce Rice
Permit Application Number PDS2021-MUP-21-008, PDS2021-ER-21-08-008

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).

Bruce Rice RCE 60676, Expires 12-31-2026
Engineer of Work's Signature, PE Number & Expiration Date

Bruce Rice
Print Name

BHA Inc.
Company

Engineer's Seal:

3-25-25
Date

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.

For the purpose of this SWQMP, the proposed site condition has been divided into one (3) drainage management areas, (1) self-mitigating DMAs, (1) de minimis area. The DMAs have been delineated based on onsite drainage patterns and BMP locations. All drain to POC 1.

The soils report titled "Preliminary Geotechnical Evaluation, York Independent Living Project, York Drive and South Santa Fe Avenue, City of Vista, San Diego County, California 92084, Dated March 12, 2020, prepared by Geosoils, Inc. recommended that bioretention and filtration systems be lined with an impermeable liner.

Developed onsite runoff will be drained to an onsite underground 72-inch cmp stormwater system for hydromodification and flow detention, then drained to a separate Modular Wetlands Systems (MWS) for pollutant control.

The 4.27 acre project site is approximately 65% impervious post-development.

The project will be split into four (4) Drainage Management Areas (DMA) draining to the BMPs:
DMA 1 will be comprised primarily of the majority of the project, and will be directed into BMP 1 for pollutant control and hydromodification compliance. BMP1 will consist of an underground 72-inch cmp stormwater system connected to a separate Modular Wetlands Systems (MWS). The 72-inch cmp stormwater system will provide hydromodification compliance and the MWS will provide pollutant control compliance. The 72-inch cmp stormwater system is divided in to two separate alignments and connected to a storm drain cleanout where the initial 2.75 feet of storage will be directed to the MWS for pollutant control treatment, the remaining stormwater above the 2.75 feet of storage will be detained and released via a system of orifices (slots) built within the storm drain cleanout to reduce the runoff to existing runoff flows at POC 1. See the DMA Exhibit for summary of the 72-inch cmp stormwater system and MWS.

DMA GS YD1 includes a portion of the frontage street improvements for York Drive that will drain into three (3) tree wells for pollutant control. For the stormwater analysis, this street frontage is considered "Green Streets".

DMA GS DRWY includes a portion of the onsite driveway improvements and will be treated by three (3) tree wells. Hydromodification will be compensated by the 72-inch cmp stormwater system in DMA 1 that also drains to POC 1.

DMA GS YD2 includes a portion of the onsite driveway improvements and will be treated by three (3) tree wells. Hydromodification will be compensated by the 72-inch cmp stormwater system in DMA 1 that also drains to POC 1.

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.									
			Structural BMP Type						
BMP ID #	**DMA #**	**DMA Area (ft^2)**	Harvest and Use	Infiltration	Unlined Biofiltration	Lined Biofiltration	Flow-thru treatment	Hydromodification Management [1]	Other	**Permit # and Sheet #**
1	1	141,027	☐	☐	☐	☐	☐	☒	☒	PDS2021-MUP-21-008, PDS2021-ER-08-008 Sheet 2
			☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	
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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 1	**Permit # and Sheet #**	PDS2021-MUP-21-008 PDS2021-ER-08-008 Sheet 2

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	Timed Investment, LLC 3189 Airway Avenue, Unit D Costa Mesa, CA 92626 (949) 903-4445 Harry C. Crowel

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)

[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.

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

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	1										unitless
	2	85th Percentile 24-hr Storm Depth	0.70										inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	110,725										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)	30,302										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	No	No	No	No	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	141,027	0	0	0	0	0	0	0	0	0	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	26	Initial Design Capture Volume	6,005	0	0	0	0	0	0	0	0	0	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	0.73	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
	32	Design Capture Volume After Dispersion Techniques	6,005	0	0	0	0	0	0	0	0	0	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	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	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	36	Final Effective Tributary Area	102,950	0	0	0	0	0	0	0	0	0	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	6,005	0	0	0	0	0	0	0	0	0	cubic-feet

No Warning Messages

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

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

No Warning Messages

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).

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

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 J.5)

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

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: HYDROMODIFICATION SCREENING FOR 1822-1844-1864 YORK DRIVE Date: JULY 15, 2021 Preparer: Chang Consultants
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.

HYDROMODIFICATION MANAGEMENT PLAN (HMP)

SWMM Modeling for Hydromodification Compliance of:

1822-1864 York Drive
Major Use Permit
PDS2021-MUP-21-008, PDS2021-ER-21-08-008

1822-1864 York Drive
Vista, CA 92084
A.P.N. 184-040-18, 184-040-19, 184-040-20, 184-040-21, 184-040-22, 184-040-04

Prepared For:

Timed Investments, LLC.
3189 Airway Avenue, Unit D
Costa Mesa, CA 92026

March 25, 2025

Prepared By:

3-25-25
Bruce Rice, R.C.E. 60676

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W.O. 1084-1119-602

HYDROMODIFICATION MANAGEMENT PLAN (HMP)

SWMM Modeling for Hydromodification Compliance of:
1822-1864 York Drive
Major Use Permit
PDS2021-MUP-21-008, PDS2021-ER-21-08-008

INTRODUCTION

This document summarizes the approach used to model the proposed 1822-1864 York Drive, Site Development Plan site in the County of San Diego using the Environmental Protection Agency (EPA) Storm Water Management Model 5.1 (SWMM). SWMM simulations were prepared for the pre and post-development conditions at the site in order to determine if the proposed 72-inch corrugated metal pipe (cmp) stormwater system underground detention facility has sufficient volume to meet the current Hydromodification Management Plan (HMP) requirements from the San Diego Regional Water Quality Control Board (SDRWQCB), as established in the Model BMP Design Manual San Diego Region (BMPDM) for the County of San Diego Copermittees, which includes the County of San Diego.

SWMM MODEL DEVELOPMENT

The site development plan proposes to develop a senior living facility on the 4.27 acre site. The property slopes from York Drive on the north toward the south at an average slope of 8 percent. There were three (3) single family homes existing on the property, 1822-1864 York Drive. These homes along with numerous ancillary structures have been demolished and removed from the property. The senior living facility will consist of one (1) four story building, parking lot, pool area, putting green and patio.

One (1) SWMM simulation were prepared for the study: the first for pre-development and the second for the post-developed conditions. Stormwater runoff from the proposed project site is routed to one (1) Point of Concentration (POC); POC-1 located near the southeast corner of the project site near the entrance of a 72-inch cmp that crosses underneath the Inland Rail Trail and North County Transit District Rail Road Tracks. The project will be split into three (3) Drainage Management Areas (DMA) draining to the BMPs: DMA 1 will be comprised primarily of the majority of the project, and will be directed into BMP 1, a 72-inch cmp stormwater pipe system, then drained to a separate Modular Wetlands Systems (MWS) for pollutant control. The 72-inch cmp stormwater system is divided into two separate alignments and connected to a storm drain cleanout where the initial 2.75 feet of storage will be directed to the MWS for pollutant control treatment, the remaining stormwater above the 2.75 feet of storage will be detained and released via a system of orifices (slots) built within the storm drain cleanout to reduce the runoff to existing runoff flows at POC 1.

Conveyances from the POC-1 confluences into an existing channel with a concrete bottom, then conveyed into an existing a 72-inch cmp that crosses underneath the Inland Rail Trail and North County Transit District Rail Road Tracks. The proposed drainage pattern mimics the existing drainage pattern with regard to overall area and discharge points.

The SWMM was used since we have found it to be more comparable to San Diego area watersheds that the alternative San Diego Hydrology Model (SDHM) and also because it is a non-proprietary model approved by the HMP document. For both SWMM simulations, flow duration curves were prepared for POC-1 to determine if the proposed HMP facilities are sufficient to meet the current HMP requirements.

The inputs required to develop SWMM simulations include rainfall, watershed characteristics, and BMP configuration. The Oceanside Gage from the Project Clean Water website was used for this study, since it is the most representative of the project site precipitation due to elevation and proximity to the project site.

Per the California Irrigation Management Information System "Reference Evaporation Zones" (CIMIS ETo Zone Map), the project site is located within the Zone 1 Evapotranspiration Area. Thus evapotranspiration values for the site were modeled using Zone 1 monthly values from Table G.1-1 from the County of San Diego BMP Design Manual. The site soil quality is predominately "undefined" with regions of Type-D soil by NRCS Web Soil Survey.

The soils report titled "Preliminary Geotechnical Evaluation, York Drive Independent Living Project, York Drive and South Santa Fe Avenue, City of Vista, San Diego County, California 92084, Dated March 12, 2020 recommended that bioretention and filtration systems be lined with an impermeable liner.

No evidence of scouring or excessive erosion resulting from concentrated runoff was in evidence at the site.

Onsite soil areas have been assumed to be compacted in the existing condition to represent the current condition of the site and fully compacted in the post development conditions. Other SWMM inputs for subareas are discussed in the appendices to this document, where the selection of the parameters is explained in detail.

HMP MODELING

Stormwater runoff from the proposed project site is routed to one (1) Points of Compliance, POC-1 located near the southeast corner of the project site. Conveyances confluence in the existing channel along the easterly project boundary. The proposed drainage pattern mimics the existing drainage pattern with regard to overall area and discharge points.

The project will be split into four (4) Drainage Management Areas (DMA) draining to the BMPs:

DMA 1 will be comprised primarily of the majority of the project, and will be directed into BMP 1 for pollutant control and hydromodification compliance. BMP1 will consist of an underground 72-inch cmp stormwater system connected to a separate Modular Wetlands Systems (MWS). The 72-inch cmp stormwater system will provide hydromodification compliance and the MWS will provide pollutant control compliance. The 72-inch cmp stormwater system is divided into two separate alignments and

connected to a storm drain cleanout where the initial 2.75 feet of storage will be directed to the MWS for pollutant control treatment, the remaining stormwater above the 2.75 feet of storage will be detained and released via a system of orifices (slots) built within the storm drain cleanout to reduce the runoff to existing runoff flows at POC 1. See the DMA Exhibit for summary of the 72-inch cmp stormwater system and MWS.

DMA GS YD1 includes a portion of the frontage street improvements for York Drive that will drain into three (3) tree wells for pollutant control. For the stormwater analysis, this street frontage is considered "Green Streets".

DMA GS DRWY includes a portion of the onsite driveway improvements and will be treated by three (3) tree wells. Hydromodification will be compensated by the 72-inch cmp stormwater system in DMA 1 that also drains to POC 1.

DMA GS YD2 includes a portion of the onsite driveway improvements and will be treated by three (3) tree wells. Hydromodification will be compensated by the 72-inch cmp stormwater system in DMA 1 that also drains to POC 1.

Self Mitigting Area (SM-1) consist of landscaped slopes along the easterly boundary of the project. This self-mitigation areas will not require storm water treatment.

The existing site was modeled as entirely pervious as required by RWQCB Order No. R9-2013-0001. BMP 1 will store runoff from the site and release it at a controlled rate for pollutant control, hydromodification and flow detention to reduce the proposed 100-year flows to existing 100-year flow levels. See the "Storm Water Quality Management Plan (SWQMP) for 1822-1864 York Drive, Site Development Plan" by BHA Inc. for pollutant and hydromodification control compliance. Treated water from BMP 1 will be conveyed via a storm drain system into existing channel at POC-1.

Tables 1.1 and 1.2 summarize data for the POC-1 DMAs.

TABLE 1.1 – SUMMARY OF EXISTING CONDITIONS FOR POC-1

DMA	Tributary Area, A (Ac)	Impervious Percentage, Ip
DMA 1	4.210	0.00%
TOTAL	4.210	-

TABLE 1.2 – SUMMARY OF DEVELOPED CONDITIONS FOR POC-1

DMA	Tributary Area, A (Ac)	Impervious Percentage, Ip	Impervious Area
DMA 1	3.238	78.51%	110,725
GS DRWY	0.152	82.09%	5,447
SM 1	0.700	0.00%	30,502
GS YD2	0.120	82.06%	4,291
TOTAL	4.210	-	-

(1) HMP Areas are separate from the overall DMA to ensure areas are not double counted.

General Considerations:

The 72-inch cmp system connected to a separate Modular Wetlands Systems (MWS) in BMP 1 were modeled using the Storage Unit and Outlet modules within SWMM. Stormwater storage and discharge above the 2.75 feet of ponding above the invert of the lowest surface discharge opening is modeled as a detention basin: elevation vs. area, and elevation vs. discharge tables, are needed by SWMM for Modified Puls routing purposes. Detailed outlet structure location and elevations should be shown on the construction plans based on the recommendations of this study.

Water Quality BMP Sizing:

It is assumed all storm water quality requirements for the project site will be met by the MWS and tree wells. For further information in regards to water quality requirements for the project (including sizing and drawdown) please refer to the SWQMP for this project.

BMP MODELING FOR HMP PURPOSES

Modeling of dual purpose Water Quality/HMP IMP

A 72-inch cmp stormwater system is proposed for hydromodification conformance and flood control for the project site. Tables 2.1 and 2.2 illustrates the dimensions required for HMP compliance according to the SWMM model that was undertaken for the project. Flood control is discussed within the Drainage Report prepared by BHA for this project.

TABLE 2.1 – SUMMARY OF DIMENSIONS FOR 72-INCH CMP STORMWATER SYSTEM

Underground Detention Facility	Tributary Area (Ac)	Pipe Dimensions		Lower Slot Dimensions			Middle Slot Dimensions			Upper Slot Dimensions			Emergency Slot Dimensions		
		Pipe Dia (in)	Pipe Length (ft)	Outlet Type[1]	Invert Elev, HL[2] (in)	(#) - Width x Height (in)[3]	Outlet Type[1]	Invert Elev, HL[2] (in)	(#) - Width x Height (in)[3]	Outlet Type[1]	Invert Elev, HL[2] (in)	(#) - Width x Height (in)[3]	Outlet Type[1]	Invert Elev, HL[2] (in)	(#) - Width x Height (in)[3]
BMP 1	3.238	72	810	Slot	33	(1) - 3 x 22	Slot	42	(1) - 3 x 16	Slot	51	(1) - 7 x 3	Slot	57	(1) - 12 x 21

Notes: (1): Shape of orifice opening in riser structure.

(2): Depth from bottom of pond to invert of lower slot or weir.

(3): Number of slots and slot dimensions.

FLOW DURATION CURVE COMPARISON

The Flow Duration Curve (FDC) for the site was compared at POC-1 by exporting the hourly runoff time series results from SWMM to a spreadsheet. At both POCs, the FDC was compared between 10% of the existing condition Q_2 up to the existing condition Q_{10}. The Q_2 and Q_{10} were determined using a partial duration statistical analysis of the runoff time series in an Excel spreadsheet using the Weibull plotting position method.

The range between 50% of Q_2 and Q_{10} was divided into 100 equal time intervals; the number of hours that each flow rate was exceeded was counted from the hourly series. Additionally, the intermediate peaks with a return period "I" were obtained (Qi with i=3 to 9). For the purpose of the plot, the values were presented as percentage of time exceeded for each flow rate. FDC comparison at POC-1 is illustrated in Figure 1 and Figure 2, respectively, in both normal and logarithmic scale.

As can be seen in Figure 1 and Figure 2, the FDCs for the proposed condition with the HMP facilities is within 110% of the curve for the existing condition in both peak and duration. The additional runoff volume generated from developing the site will be released to the existing point of discharge at a flow rate below the 10% Q_2 lower threshold. Additionally, the project will also not increase peak flow rates between the pre-development Q_2 and the Q_{10}, as shown in the graphic and also in the peak flow tables listed in Attachment 1.

DRAWDOWN TIME

To ensure compliance with the 24 hour and 96 hour drawdown requirements (per Section 6.3.7 of the BMP Design Manual); drawdown calculations are provided in Attachment 10 of this report.

SUMMARY

This study has demonstrated that the proposed biofiltration basins provided for the 1822-1844-1864 York Drive, Site Development Plan is sufficient to meet current HMP criteria if the cross-section areas and volumes recommended within this document, and the respective orifice and outlet structure are incorporated as specified within the proposed project site.

KEY ASSUMPTIONS

1. Type D Soil is representative of the existing condition site soil.
2. The biofiltration basin BMP are designed with no infiltration.

ATTACHMENTS

1. Q_2 to Q_{10} Comparison Tables
2. FDC Plots (log and natural "x" scale) and Flow Duration Table
3. List of the "n" largest Peaks: Pre-Development and Post-Development Conditions
4. Elevations vs. Discharge & Stage- Storage Curves to be used in SWMM
5. Biofiltration Basin Details
6. SWMM Input Data in Input Format (Existing and Proposed Models)
7. SWMM Screens and Explanation of Significant Variables
8. Geotechnical Documentation
9. Summary files from the SWMM Model
10. Drawdown calculations

REFERENCES

[1] – "County of San Diego BMP Design Manual", September 15 2020, County of San Diego.

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

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

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

[5] – "*San Diego County Hydraulic Design Manual*", September 2014, County of San Diego Department of Public Works Flood Control Section.

ATTACHMENT 1

Q_2 to Q_{10} Comparison Tables

Peak flows calculated with the Weibull Plotting Position

Return Period	Existing Condition (cfs)	Mitigated Condition (cfs)	Reduction, Exist - Mitigated (cfs)
LF = $0.1xQ_2$	1.041	0.924	0.117
2-year	2.081	1.848	0.233
3-year	2.259	2.057	0.202
4-year	2.699	2.205	0.494
5-year	2.760	2.239	0.521
6-year	2.879	2.580	0.299
7-year	3.062	2.630	0.432
8-year	3.135	2.753	0.382
9-year	3.243	2.980	0.264
10-year	3.409	3.201	0.209

ATTACHMENT 2

FDC Plots (log and natural “x” scale) and Flow Duration Table

Flow Duration Curve Analysis

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

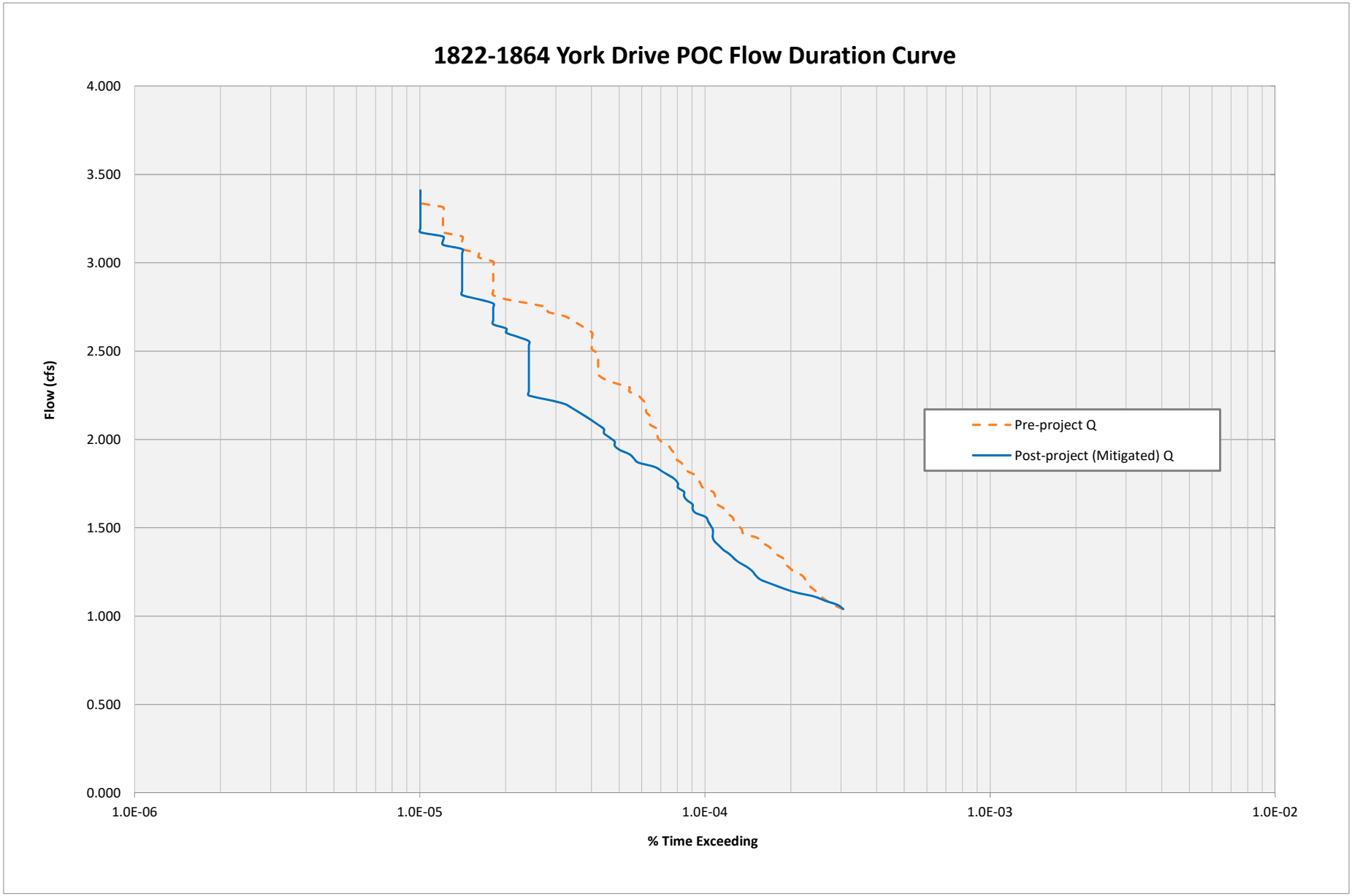
The figures on the following pages illustrate that the flow duration curve in post-development conditions after the proposed BMP is below the existing flow duration curve. The flow duration curve table following the curve shows that if the interval $0.1Q_2 – Q_{10}$ is divided into 100 sub intervals, the post development divided by pre-development durations is never larger than 110% (the permit allows up to 110%)

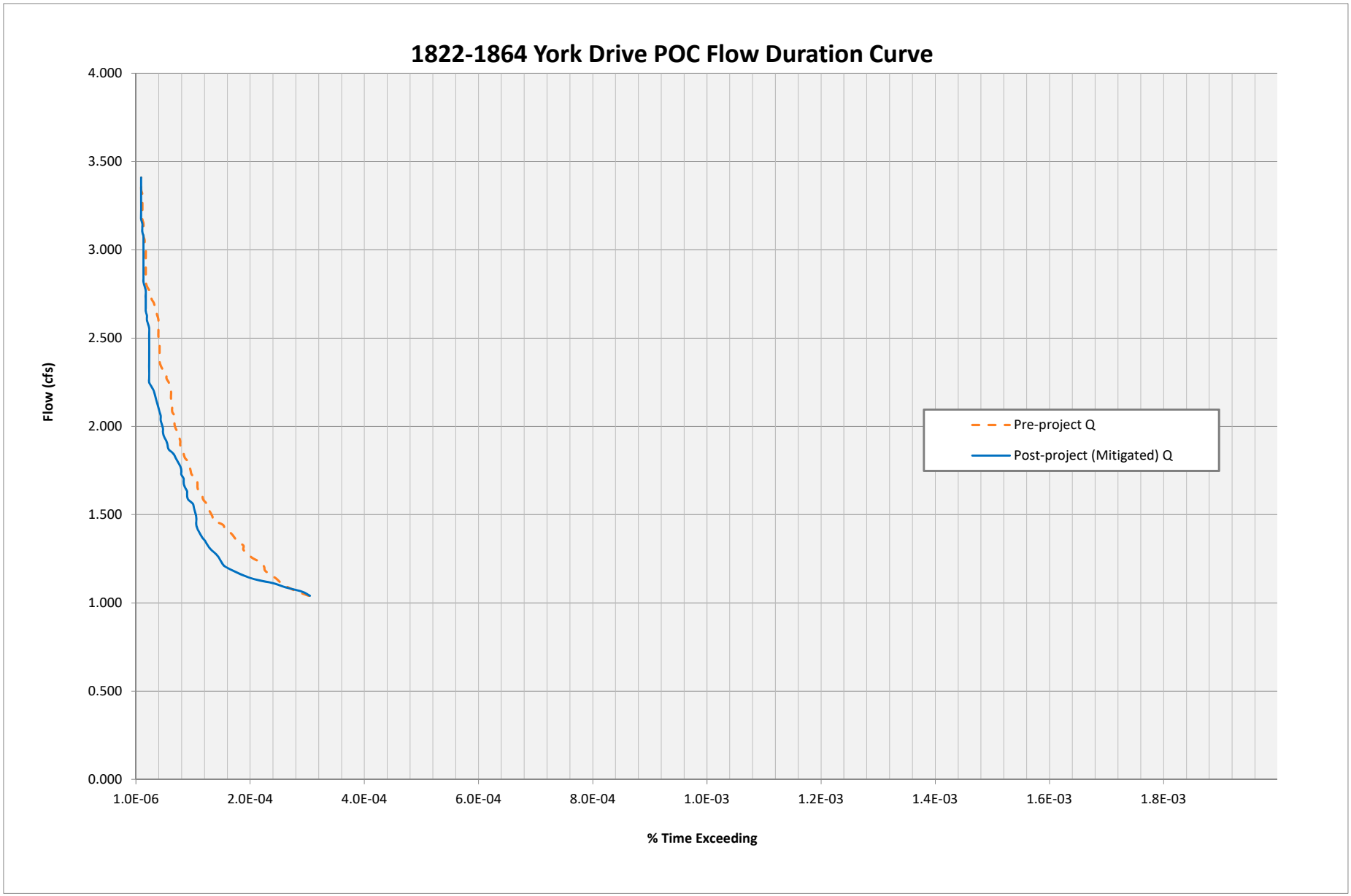
Consequently, the design passes the hydromodification test.

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

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

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


1822-1864 York Drive POC Flow Duration Curve
Flow (cfs)
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
1.0E-06
1.0E-05
1.0E-04
1.0E-03
1.0E-02
% Time Exceeding
Pre-project Q
Post-project (Mitigated) Q


1822-1864 York Drive POC Flow Duration Curve
Flow (cfs)
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
1.0E-06
2.0E-04
4.0E-04
6.0E-04
8.0E-04
1.0E-03
1.2E-03
1.4E-03
1.6E-03
1.8E-03
% Time Exceeding
Pre-project Q
Post-project (Mitigated) Q

Flow Duration Curve Data for 1822-1864 York Drive, Site Development Plan

Low Flow Threshold: 50%
0.1xQ2 (Pre): 1.041 cfs
Q10 (Pre): 3.409 cfs
# of Ordinates: 100
Incremental Q (Pre): 0.02369 cfs
Total Hourly Data: 497370 hours

The proposed BMP: PASSED

Interval	Pre-project Flow (cfs)	Pre-project Hours	Pre-project % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
0	1.041	151	3.04E-04	152	3.06E-04	101%	Pass
1	1.064	141	2.83E-04	145	2.92E-04	103%	Pass
2	1.088	133	2.67E-04	131	2.63E-04	98%	Pass
3	1.112	127	2.55E-04	120	2.41E-04	94%	Pass
4	1.135	123	2.47E-04	103	2.07E-04	84%	Pass
5	1.159	118	2.37E-04	93	1.87E-04	79%	Pass
6	1.183	113	2.27E-04	85	1.71E-04	75%	Pass
7	1.206	112	2.25E-04	78	1.57E-04	70%	Pass
8	1.230	109	2.19E-04	75	1.51E-04	69%	Pass
9	1.254	102	2.05E-04	73	1.47E-04	72%	Pass
10	1.277	98	1.97E-04	70	1.41E-04	71%	Pass
11	1.301	94	1.89E-04	66	1.33E-04	70%	Pass
12	1.325	94	1.89E-04	63	1.27E-04	67%	Pass
13	1.348	89	1.79E-04	61	1.23E-04	69%	Pass
14	1.372	86	1.73E-04	58	1.17E-04	67%	Pass
15	1.396	83	1.67E-04	56	1.13E-04	67%	Pass
16	1.420	78	1.57E-04	54	1.09E-04	69%	Pass
17	1.443	76	1.53E-04	53	1.07E-04	70%	Pass
18	1.467	68	1.37E-04	53	1.07E-04	78%	Pass
19	1.491	67	1.35E-04	53	1.07E-04	79%	Pass
20	1.514	65	1.31E-04	52	1.05E-04	80%	Pass
21	1.538	63	1.27E-04	51	1.03E-04	81%	Pass
22	1.562	62	1.25E-04	50	1.01E-04	81%	Pass
23	1.585	59	1.19E-04	46	9.25E-05	78%	Pass
24	1.609	58	1.17E-04	45	9.05E-05	78%	Pass
25	1.633	55	1.11E-04	45	9.05E-05	82%	Pass
26	1.656	54	1.09E-04	43	8.65E-05	80%	Pass
27	1.680	54	1.09E-04	42	8.44E-05	78%	Pass

28	1.704	53	1.07E-04	42	8.44E-05	79%	Pass
29	1.728	49	9.85E-05	40	8.04E-05	82%	Pass
30	1.751	48	9.65E-05	40	8.04E-05	83%	Pass
31	1.775	47	9.45E-05	39	7.84E-05	83%	Pass
32	1.799	46	9.25E-05	37	7.44E-05	80%	Pass
33	1.822	43	8.65E-05	35	7.04E-05	81%	Pass
34	1.846	42	8.44E-05	33	6.63E-05	79%	Pass
35	1.870	41	8.24E-05	29	5.83E-05	71%	Pass
36	1.893	39	7.84E-05	28	5.63E-05	72%	Pass
37	1.917	39	7.84E-05	27	5.43E-05	69%	Pass
38	1.941	38	7.64E-05	25	5.03E-05	66%	Pass
39	1.964	37	7.44E-05	24	4.83E-05	65%	Pass
40	1.988	35	7.04E-05	24	4.83E-05	69%	Pass
41	2.012	34	6.84E-05	23	4.62E-05	68%	Pass
42	2.035	34	6.84E-05	22	4.42E-05	65%	Pass
43	2.059	34	6.84E-05	22	4.42E-05	65%	Pass
44	2.083	32	6.43E-05	21	4.22E-05	66%	Pass
45	2.107	32	6.43E-05	20	4.02E-05	63%	Pass
46	2.130	32	6.43E-05	19	3.82E-05	59%	Pass
47	2.154	31	6.23E-05	18	3.62E-05	58%	Pass
48	2.178	31	6.23E-05	17	3.42E-05	55%	Pass
49	2.201	31	6.23E-05	16	3.22E-05	52%	Pass
50	2.225	30	6.03E-05	14	2.81E-05	47%	Pass
51	2.249	29	5.83E-05	12	2.41E-05	41%	Pass
52	2.272	27	5.43E-05	12	2.41E-05	44%	Pass
53	2.296	27	5.43E-05	12	2.41E-05	44%	Pass
54	2.320	24	4.83E-05	12	2.41E-05	50%	Pass
55	2.343	22	4.42E-05	12	2.41E-05	55%	Pass
56	2.367	21	4.22E-05	12	2.41E-05	57%	Pass
57	2.391	21	4.22E-05	12	2.41E-05	57%	Pass
58	2.415	21	4.22E-05	12	2.41E-05	57%	Pass
59	2.438	21	4.22E-05	12	2.41E-05	57%	Pass
60	2.462	21	4.22E-05	12	2.41E-05	57%	Pass
61	2.486	21	4.22E-05	12	2.41E-05	57%	Pass
62	2.509	20	4.02E-05	12	2.41E-05	60%	Pass
63	2.533	20	4.02E-05	12	2.41E-05	60%	Pass
64	2.557	20	4.02E-05	12	2.41E-05	60%	Pass
65	2.580	20	4.02E-05	11	2.21E-05	55%	Pass
66	2.604	20	4.02E-05	10	2.01E-05	50%	Pass
67	2.628	19	3.82E-05	10	2.01E-05	53%	Pass
68	2.651	18	3.62E-05	9	1.81E-05	50%	Pass

69	2.675	17	3.42E-05	9	1.81E-05	53%	Pass
70	2.699	16	3.22E-05	9	1.81E-05	56%	Pass
71	2.722	14	2.81E-05	9	1.81E-05	64%	Pass
72	2.746	14	2.81E-05	9	1.81E-05	64%	Pass
73	2.770	12	2.41E-05	9	1.81E-05	75%	Pass
74	2.794	10	2.01E-05	8	1.61E-05	80%	Pass
75	2.817	9	1.81E-05	7	1.41E-05	78%	Pass
76	2.841	9	1.81E-05	7	1.41E-05	78%	Pass
77	2.865	9	1.81E-05	7	1.41E-05	78%	Pass
78	2.888	9	1.81E-05	7	1.41E-05	78%	Pass
79	2.912	9	1.81E-05	7	1.41E-05	78%	Pass
80	2.936	9	1.81E-05	7	1.41E-05	78%	Pass
81	2.959	9	1.81E-05	7	1.41E-05	78%	Pass
82	2.983	9	1.81E-05	7	1.41E-05	78%	Pass
83	3.007	9	1.81E-05	7	1.41E-05	78%	Pass
84	3.030	8	1.61E-05	7	1.41E-05	88%	Pass
85	3.054	8	1.61E-05	7	1.41E-05	88%	Pass
86	3.078	7	1.41E-05	7	1.41E-05	100%	Pass
87	3.102	7	1.41E-05	6	1.21E-05	86%	Pass
88	3.125	7	1.41E-05	6	1.21E-05	86%	Pass
89	3.149	7	1.41E-05	6	1.21E-05	86%	Pass
90	3.173	6	1.21E-05	5	1.01E-05	83%	Pass
91	3.196	6	1.21E-05	5	1.01E-05	83%	Pass
92	3.220	6	1.21E-05	5	1.01E-05	83%	Pass
93	3.244	6	1.21E-05	5	1.01E-05	83%	Pass
94	3.267	6	1.21E-05	5	1.01E-05	83%	Pass
95	3.291	6	1.21E-05	5	1.01E-05	83%	Pass
96	3.315	6	1.21E-05	5	1.01E-05	83%	Pass
97	3.338	5	1.01E-05	5	1.01E-05	100%	Pass
98	3.362	5	1.01E-05	5	1.01E-05	100%	Pass
99	3.386	5	1.01E-05	5	1.01E-05	100%	Pass
100	3.409	5	1.01E-05	5	1.01E-05	100%	Pass

ATTACHMENT 3

List of the “n” largest Peaks: Pre-Development and Post-Development Conditions

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

- Basic Probabilistic Equation: $R = \frac{1}{P}$

  where,

  R = Return period in years; and

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

- Weibull Equation: $P = \frac{i}{n+1}$

  where,

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

  n = number of years analyzed.

Explanation of Variables for the Tables in this Attachment

- Peak: Refers to the peak flow at the date given, taken from the continuous simulation hourly results of the n year analyzed.
- Posit: If all peaks are sorted from large to small, the position of the peak in a sorting analysis is included under the variable Posit.
- Date: Date of the occurrence of the peak at the outlet form the continuous simulation.
- Note: All peaks are not annual maxima; instead they are defined as event maxima, with a threshold to separate peaks of at least 12 hours. In other words, any peak P in a time series is defined as a value where dP/dt=0, and the peak is the largest value in 25 hours (12 hours before the hour of occurrence and 12 hours after the occurrence, so it is in essence a daily peak).

1822-1864 York Drive, Pre-Developed Runoff Condition

Statistics - Node POC-1 Total Inflow

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
1	4/14/2003	8	4.699	0.28	58
2	1/4/1978	3	4.316	0.56	29
3	10/1/1983	3	4.21	0.84	19.33
4	1/15/1979	4	3.965	1.12	14.5
5	1/4/1995	7	3.824	1.4	11.6
6	9/23/1986	2	3.324	1.68	9.67
7	2/25/2003	7	3.158	1.96	8.29
8	2/3/1958	31	3.077	2.24	7.25
9	2/24/1969	45	3.028	2.52	6.44
10	10/27/2004	8	2.811	2.8	5.8
11	2/18/2005	19	2.77	3.08	5.27
12	2/20/1980	13	2.754	3.36	4.83
13	1/13/1993	10	2.716	3.64	4.46
14	10/29/2000	2	2.703	3.92	4.14
15	1/16/1952	9	2.695	4.2	3.87
16	2/28/1978	16	2.667	4.48	3.63
17	3/17/1982	17	2.649	4.76	3.41
18	4/1/1958	10	2.617	5.04	3.22
19	2/10/1978	5	2.357	5.32	3.05
20	3/2/1980	14	2.343	5.6	2.9
21	12/29/1991	13	2.322	5.88	2.76
22	11/22/1965	26	2.32	6.16	2.64
23	2/3/1998	7	2.314	6.44	2.52
24	2/27/1983	4	2.255	6.72	2.42
25	1/29/1983	4	2.253	7	2.32
26	12/19/1970	20	2.225	7.28	2.23
27	2/22/1998	34	2.208	7.56	2.15
28	1/27/2008	21	2.136	7.84	2.07
29	2/16/1980	3	2.081	8.12	2
30	2/16/1998	31	2.078	8.4	1.93
31	12/1/1961	20	2.009	8.68	1.87
32	10/20/2004	7	1.985	8.96	1.81
33	11/15/1952	2	1.978	9.24	1.76
34	1/16/1978	9	1.944	9.52	1.71

35	11/11/1985	5	1.929	9.8	1.66
36	2/18/1993	1	1.883	10.08	1.61
37	1/28/1980	29	1.874	10.36	1.57
38	2/3/1994	12	1.858	10.64	1.53
39	1/15/1993	76	1.827	10.92	1.49
40	2/14/1986	11	1.822	11.2	1.45
41	2/14/1998	8	1.817	11.48	1.41
42	1/5/2008	44	1.814	11.76	1.38
43	3/11/1995	23	1.74	12.04	1.35
44	2/22/2008	8	1.726	12.32	1.32
45	3/17/1963	3	1.725	12.61	1.29
46	1/16/1972	3	1.711	12.89	1.26
47	3/15/1986	22	1.705	13.17	1.23
48	4/27/1960	4	1.685	13.45	1.21
49	2/12/1992	15	1.629	13.73	1.18
50	3/19/1981	2	1.615	14.01	1.16
51	2/11/2003	28	1.586	14.29	1.14
52	8/17/1977	2	1.581	14.57	1.12
53	2/27/1991	42	1.57	14.85	1.09
54	2/8/1993	10	1.57	15.13	1.07
55	1/11/2005	9	1.541	15.41	1.05
56	3/1/1983	69	1.523	15.69	1.04
57	2/21/2005	53	1.501	15.97	1.02
58	12/22/1982	1	1.487	16.25	1

Pre-project

10-year Q:	3.409	cfs
5-year Q:	2.760	cfs
2-year Q:	2.081	cfs

Lower Flow Threshold: 50%

$0.1xQ_2$ (Pre): 1.041 cfs

1822-1864 York Drive, Post-Developed Mitigated Runoff Condition - Basins
Statistics - Node POC-1 Total Inflow

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
1/1/1900	4/14/2003	41	4.049	0.09	58
2	9/29/1983	52	3.801	0.18	29
3	1/3/1995	46	3.692	0.26	19.33
4	1/14/1979	34	3.687	0.35	14.5
5	1/3/1978	74	3.427	0.44	11.6
6	9/23/1986	32	3.154	0.53	9.67
7	2/25/2003	70	2.795	0.61	8.29
8	2/21/1969	112	2.646	0.7	7.25
9	2/3/1958	39	2.594	0.79	6.44
10	10/27/2004	35	2.573	0.88	5.8
11	10/29/2000	29	2.242	0.96	5.27
12	2/17/2005	42	2.237	1.05	4.83
13	2/13/1980	189	2.221	1.14	4.46
14	3/2/1980	23	2.214	1.23	4.14
15	2/27/1978	143	2.196	1.31	3.87
16	1/16/1952	10	2.159	1.4	3.63
17	3/17/1982	45	2.136	1.49	3.41
18	1/12/1993	152	2.126	1.58	3.22
19	2/5/1978	207	2.073	1.66	3.05
20	3/30/1958	47	2.026	1.75	2.9
21	12/16/1970	75	2.003	1.84	2.76
22	11/11/1985	30	1.947	1.93	2.64
23	1/27/1980	68	1.922	2.01	2.52
24	2/3/1998	41	1.897	2.1	2.42
25	11/14/1952	46	1.892	2.19	2.32
26	8/16/1977	35	1.865	2.28	2.23
27	1/16/1978	13	1.86	2.36	2.15
28	12/29/1991	14	1.854	2.45	2.07
29	2/18/1993	53	1.848	2.54	2
30	11/21/1965	49	1.819	2.63	1.93
31	1/28/1983	15	1.818	2.71	1.87
32	2/26/1983	165	1.785	2.8	1.81
33	2/20/2008	55	1.781	2.89	1.76
34	2/22/1998	70	1.775	2.98	1.71

35	1/16/1972	16	1.712	3.06	1.66
36	3/16/1963	25	1.661	3.15	1.61
37	2/27/1991	43	1.654	3.24	1.57
38	2/14/1986	13	1.639	3.33	1.53
39	1/26/2008	27	1.595	3.42	1.49
40	2/16/1998	43	1.571	3.5	1.45
41	4/28/2005	5	1.571	3.59	1.41
42	1/5/1979	33	1.566	3.68	1.38
43	3/7/1968	19	1.544	3.77	1.35
44	10/17/2004	89	1.53	3.85	1.32
45	1/5/2008	55	1.405	3.94	1.29
46	11/17/1986	17	1.373	4.03	1.26
47	1/20/1962	60	1.36	4.12	1.23
48	12/22/1982	26	1.353	4.2	1.21
49	2/3/1994	33	1.353	4.29	1.18
50	12/1/1961	35	1.347	4.38	1.16
51	4/27/1960	10	1.307	4.47	1.14
52	3/15/1986	31	1.304	4.55	1.12
53	3/11/1995	25	1.294	4.64	1.09
54	3/19/1981	10	1.288	4.73	1.07
55	12/28/2004	54	1.282	4.82	1.05
56	1/30/2007	19	1.279	4.9	1.04
57	2/12/1992	22	1.277	4.99	1.02
58	2/14/1998	25	1.272	5.08	1

Post-project (Mitigated)

10-year Q:	3.201	cfs
5-year Q:	2.239	cfs
2-year Q:	1.848	cfs

Lower Flow Threshold: 50%

$0.1xQ_2$ (Pre): 0.924 cfs

ATTACHMENT 4

Elevation vs. Area Curves and Elevation vs. Discharge Curves to be used in SWMM

Elevation vs. Area

The elevation vs. area curves in the model are calculated in Excel and imported into the model. The summary of elevation vs. area for each BMP has been provided on the following pages.

The LID surface storage depth beneath the lowest surface discharge structure is accounted for in the LID module as illustrated in Attachment 7.

Elevation vs. Discharge

The total elevation vs. discharge curve is imported from an Excel spreadsheet that calculates the elevation vs. discharge of the outlet system. Elevation vs. discharge relationships are provided in the surface discharge of the biofiltration basin as this is where a Modified Puls routing procedure will be applied in the continuous simulation model.

The low-flow orifice size has been selected to maximum its size while still restricting flows to conform with the required 10% of the Q_2 event flow as mandated in the Final Hydromodification Management Plan by Brown & Caldwell, dated March 2011. While BHA acknowledges that this orifice is small, to increase the size of these outlets would impact the basin's ability to restrict flows beneath the HMP thresholds, thus preventing the BMP from conforming with HMP requirements.

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

Discharge Equations

The following equations are based on the *San Diego County Hydraulic Design Manual* (September 2014):

- Weir:
  $Q_W = C_W * L * H^{3/2}$ (1)

- Slot:

  As an orifice: $Q_S = B_S * h_S * c_g * \sqrt{2g(H - \frac{h_S}{2})}$ (2.a)

  As a weir: $Q_S = C_W * B_S * H^{3/2}$ (2.b)

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

- Vertical Orifices:

  As an orifice: $Q_O = 0.25 * \pi D^2 * c_g * \sqrt{2g(H - \frac{D}{2})}$ (3.a)

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

  $$\frac{Q_o^2}{g} = \frac{A_{cr}^3}{T_{cr}}; H = y_{cr} + \frac{A_{cr}}{2*T_{cr}}; T_{cr} = 2\sqrt{y_{cr}(D - y_{cr})}; A_{cr} = \frac{D^2}{8}[a_{cr} - \sin(a_{cr})];$$
  $$y_{cr} = \frac{D}{2}[1 - \sin(0.5 * a_{cr})]$$ (3.b.1, 3.b.2, 3.b.3, 3.b.4 and 3.b.5)

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

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

The following are the variables used above:

Q_W, Q_s, Q_o : Discharge of weir, slot or orifice (cfs)

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

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

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

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

Storage - SWPC	
Flow Depth (ft)	Area (sf)
0.00	0
0.08	1,138
0.17	1,597
0.25	1,942
0.33	2,226
0.42	2,471
0.50	2,686
0.58	2,880
0.67	3,055
0.75	3,215
0.83	3,361
0.92	3,497
1.00	3,622
1.08	3,739
1.17	3,847
1.25	3,947
1.33	4,041
1.42	4,128
1.50	4,209
1.58	4,284
1.67	4,354
1.75	4,418
1.83	4,477
1.92	4,532
2.00	4,582
2.08	4,628
2.17	4,669
2.25	4,706
2.33	4,738
2.42	4,767
2.50	4,792
2.58	4,813
2.67	4,830
2.75	4,843

Storage - STOR-1	
Flow Depth (ft)	Area (sf)
0.00	4843
0.08	4852
0.17	4858
0.25	4860
0.33	4858
0.42	4852
0.50	4843
0.58	4830
0.67	4813
0.75	4792
0.83	4767
0.92	4738
1.00	4706
1.08	4669
1.17	4628
1.25	4582
1.33	4532
1.42	4477
1.50	4418
1.58	4354
1.67	4284
1.75	4209
1.83	4128
1.92	4041
2.00	3947
2.08	3847
2.17	3739
2.25	3622
2.33	3497
2.42	3361
2.50	3215
2.58	3055
2.67	2880
2.75	2686
2.83	2471
2.92	2226
3.00	1942
3.08	1597
3.17	1138
3.25	0

Outlet Structure for Discharge of BMP 1

Discharge vs. Elevation Table

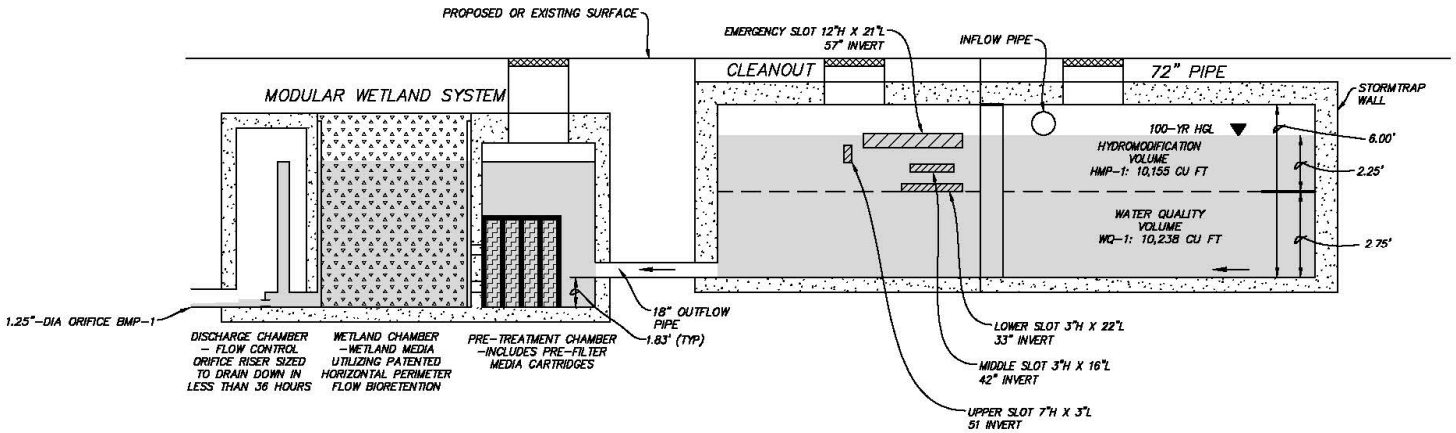
Lower Slot				Emergency Slot	
No. of slots:	1			No. of slots	1
Invert:	0.000 ft			Invert:	2.000 ft
B (width):	1.833 ft			B (width):	1.750 ft
Area:	0.458 sf			Area:	1.750 sf
h_{slot} (height):	0.250 ft			h_{slot} (height	1.000 ft
Cg-low:	0.62			Cg-low:	0.62
Middle Slot		Upper slot			
No. of slots:	1	No. of slots:	1		
Invert:	0.750 ft	Invert:	1.500 ft		
B (width):	1.333 ft	B (width):	0.250 ft		
Area:	0.333 sf	Area:	0.146 sf		
h_{slot} (height):	0.250 ft	h_{slot} (height):	0.583 ft		
Cg-low:	0.62	Cg-low:	0.62		

HMP Elevation-Storage-Discharge							
Flow Depth (ft)	**Adj. Flow Depth (ft)**	**HMP Vol (acre-ft)**	**$Q_{Lower\ Slot}$ (cfs)**	**$Q_{Middle\ Slot}$ (cfs)**	**$Q_{Upper\text{-}Slot}$ (cfs)**	**$Q_{emerg\ Slot}$ (cfs)**	**Q_{tot} (cfs)**
0.000	0.000	0.00000	0.000	0.000	0.000	0.000	0.067
0.083	0.000	0.00145	0.000	0.000	0.000	0.000	0.067
0.167	0.000	0.00410	0.000	0.000	0.000	0.000	0.067
0.250	0.000	0.00750	0.000	0.000	0.000	0.000	0.067
0.333	0.000	0.01149	0.000	0.000	0.000	0.000	0.067
0.417	0.000	0.01599	0.000	0.000	0.000	0.000	0.067
0.500	0.000	0.02093	0.000	0.000	0.000	0.000	0.067
0.583	0.000	0.02625	0.000	0.000	0.000	0.000	0.067
0.667	0.000	0.03193	0.000	0.000	0.000	0.000	0.067
0.750	0.000	0.03793	0.000	0.000	0.000	0.000	0.067
0.833	0.000	0.04422	0.000	0.000	0.000	0.000	0.067
0.917	0.000	0.05079	0.000	0.000	0.000	0.000	0.067
1.000	0.000	0.05760	0.000	0.000	0.000	0.000	0.067
1.083	0.000	0.06464	0.000	0.000	0.000	0.000	0.067
1.167	0.000	0.07190	0.000	0.000	0.000	0.000	0.067
1.250	0.000	0.07935	0.000	0.000	0.000	0.000	0.067
1.333	0.000	0.08700	0.000	0.000	0.000	0.000	0.067
1.417	0.000	0.09481	0.000	0.000	0.000	0.000	0.067
1.500	0.000	0.10279	0.000	0.000	0.000	0.000	0.067
1.583	0.000	0.11091	0.000	0.000	0.000	0.000	0.067
1.667	0.000	0.11917	0.000	0.000	0.000	0.000	0.067
1.750	0.000	0.12757	0.000	0.000	0.000	0.000	0.067
1.833	0.000	0.13608	0.000	0.000	0.000	0.000	0.067
1.917	0.000	0.14469	0.000	0.000	0.000	0.000	0.067
2.000	0.000	0.15341	0.000	0.000	0.000	0.000	0.067
2.083	0.000	0.16222	0.000	0.000	0.000	0.000	0.067
2.167	0.000	0.17112	0.000	0.000	0.000	0.000	0.067
2.250	0.000	0.18008	0.000	0.000	0.000	0.000	0.067
2.333	0.000	0.18912	0.000	0.000	0.000	0.000	0.067
2.417	0.000	0.19821	0.000	0.000	0.000	0.000	0.067
2.500	0.000	0.20736	0.000	0.000	0.000	0.000	0.067
2.583	0.000	0.21654	0.000	0.000	0.000	0.000	0.067
2.667	0.000	0.22577	0.000	0.000	0.000	0.000	0.067
2.750	0.000	0.23502	0.000	0.000	0.000	0.000	0.067

2.833	0.333	0.24430	0.531	0.000	0.000	0.000	0.531
2.917	0.417	0.25358	0.594	0.000	0.000	0.000	0.594
3.000	0.500	0.26288	0.650	0.000	0.000	0.000	0.650
3.083	0.583	0.27218	0.702	0.000	0.000	0.000	0.702
3.167	0.667	0.28147	0.751	0.000	0.000	0.000	0.751
3.250	0.750	0.29074	0.796	0.000	0.000	0.000	0.796
3.333	0.833	0.29999	0.839	0.337	0.000	0.000	1.176
3.417	0.917	0.30922	0.880	0.476	0.000	0.000	1.357
3.500	1.000	0.31841	0.920	0.583	0.000	0.000	1.503
3.583	1.083	0.32755	0.957	0.942	0.000	0.000	1.900
3.667	1.167	0.33664	0.993	1.057	0.000	0.000	2.050
3.750	1.250	0.34568	1.028	1.160	0.000	0.000	2.189
3.833	1.333	0.35465	1.062	1.255	0.000	0.000	2.317
3.917	1.417	0.36354	1.094	1.344	0.000	0.000	2.438
4.000	1.500	0.37235	1.126	1.426	0.000	0.000	2.552
4.083	1.583	0.38107	1.157	1.504	0.147	0.000	2.809
4.167	1.667	0.38969	1.187	1.579	0.208	0.000	2.974
4.250	1.750	0.39820	1.216	1.650	0.255	0.000	3.121
4.333	1.833	0.40659	1.245	1.718	0.295	0.000	3.258
4.417	1.917	0.41485	1.273	1.783	0.329	0.000	3.386
4.500	2.000	0.42298	1.300	1.847	0.361	0.000	3.508
4.583	2.083	0.43095	1.327	1.908	0.390	1.768	5.393
4.667	2.167	0.43877	1.354	1.967	0.582	2.501	6.402
4.750	2.250	0.44641	1.379	2.024	0.618	3.063	7.084
4.833	2.333	0.45386	1.405	2.080	0.653	3.536	7.674
4.917	2.417	0.46112	1.429	2.134	0.685	3.954	8.203
5.000	2.500	0.46816	1.454	2.187	0.717	4.331	8.689
5.083	2.583	0.47498	1.478	2.239	0.747	6.408	10.872
5.167	2.667	0.48154	1.502	2.290	0.776	6.884	11.450
5.250	2.750	0.48783	1.525	2.339	0.803	7.328	11.996
5.333	2.833	0.49383	1.548	2.388	0.830	7.747	12.513
5.417	2.917	0.49951	1.570	2.435	0.856	8.145	13.007
5.500	3.000	0.50484	1.593	2.482	0.881	8.524	13.480
5.583	3.083	0.50977	1.615	2.528	0.906	8.887	13.935
5.667	3.167	0.51427	1.636	2.573	0.930	9.235	14.374
5.750	3.250	0.51827	1.658	2.617	0.953	9.571	14.799
5.833	3.333	0.52166	1.679	2.660	0.976	9.896	15.211
5.917	3.417	0.52431	1.700	2.703	0.998	10.210	15.611
6.000	3.500	0.52576	1.720	2.745	1.020	10.515	16.000

ATTACHMENT 5

72-inch CMP Stormwater System and MWS Details



72-INCH CMP STORMWATER SYSTEM & MWS DETAILS

NOT TO SCALE

ATTACHMENT 6

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

PRE POC-1

```
[TITLE]
;;Project Title/Notes
1822-1864 York Drive, Pre-Developed Runoff Condition

[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           08/28/1951
START_TIME           05:00:00
REPORT_START_DATE    08/28/1951
REPORT_START_TIME    05:00:00
END_DATE             05/23/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00

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

[EVAPORATION]
;;Data Source    Parameters
```

```
;;-------------- ----------------
MONTHLY          0.03   0.05   0.08   0.11   0.13   0.15   0.15   0.13   0.11   0.08   0.04   0.02
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
OCEANSIDE        INTENSITY 1:00     1.0      TIMESERIES OCEANSIDE

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
DMA-1            OCEANSIDE        POC-1            4.210    0        512      5.3      0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA-1            0.012      0.10       0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
DMA-1            9          0.025      0.30

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC-1            0          FREE                        NO

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
OUT_1            Rating     0.000      0.000
OUT_1                       0.083      0.018
OUT_1                       0.167      0.025
OUT_1                       0.250      0.031
OUT_1                       0.333      0.035
OUT_1                       0.417      0.040
OUT_1                       0.500      0.043
OUT_1                       0.583      0.047
OUT_1                       0.667      0.050
OUT_1                       0.750      0.053
OUT_1                       0.833      0.056
OUT_1                       0.917      0.059
OUT_1                       1.000      0.061
```

```
OUT_1                       1.083      0.064
OUT_1                       1.167      0.241
OUT_1                       1.250      0.316
OUT_1                       1.333      0.374
OUT_1                       1.417      0.460
OUT_1                       1.500      0.584
OUT_1                       1.583      0.672
OUT_1                       1.667      0.746
OUT_1                       1.750      0.812
OUT_1                       1.833      0.871
OUT_1                       1.917      0.927
OUT_1                       2.000      0.979
OUT_1                       2.083      1.084
OUT_1                       2.167      1.262
OUT_1                       2.250      1.444
OUT_1                       2.333      1.581
OUT_1                       2.417      1.699
OUT_1                       2.500      1.805
OUT_1                       2.583      1.903
OUT_1                       2.667      1.995
OUT_1                       2.750      2.081
OUT_1                       2.833      2.313
OUT_1                       2.917      2.664
OUT_1                       3.000      3.093
;
BASIN            Storage    0.00       1260
BASIN                       3          1260

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
OCEANSIDE        FILE "K:\Library\Stormwater\SWMM\RAIN GAGES\Oceanside Rain Data.dat"

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

[TAGS]

[MAP]
DIMENSIONS 191.920 4920.830 1021.827 5718.627
```

```
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            757.069            4959.747

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA-1            756.070            5130.777

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
OCEANSIDE        757.548            5779.526
```

POST POC-1

```
[TITLE]
;;Project Title/Notes
1822-1864 York Drive, Post-Developed Mitigated Runoff Condition - Basins

[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           08/28/1951
START_TIME           05:00:00
REPORT_START_DATE    08/28/1951
REPORT_START_TIME    05:00:00
END_DATE             05/23/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           0
HEAD_TOLERANCE       0
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
```

```
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          0.03   0.05   0.08   0.11   0.13   0.15   0.15   0.13   0.11   0.08   0.04   0.02
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
OCEANSIDE        INTENSITY 1:00     1.0      TIMESERIES OCEANSIDE

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
DMA-1            OCEANSIDE        SWPC             3.238    78.51    400      5.3      0
GSDRWY           OCEANSIDE        POC-1            0.152    82.09    152      7        0
SM-1             OCEANSIDE        POC-1            0.702    0        650      1.2      0
GSYD2            OCEANSIDE        POC-1            0.12     82.06    156      4.6      0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA-1            0.012      0.10       0.05       0.10       25         OUTLET
GSDRWY           0.012      0.10       0.05       0.10       25         OUTLET
SM-1             0.012      0.10       0.05       0.10       25         OUTLET
GSYD2            0.012      0.10       0.05       0.10       25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
DMA-1            9          0.01875    0.3
GSDRWY           9          0.01875    0.3
SM-1             9          0.025      0.3
GSYD2            9          0.01875    0.3

[LID_CONTROLS]
;;Name           Type/Layer Parameters
;;-------------- ---------- ----------
BMP-1            BC
BMP-1            SURFACE    9.36       0          0          0          5
BMP-1            SOIL       18         0.4        0.2        0.1        5          5          1.5
BMP-1            STORAGE    12         0.67       0          0
BMP-1            DRAIN      0.1442     0.5        0          0
```

```
BMP-2            BC
BMP-2            SURFACE    9.38       0.0        0.1        1.0        5
BMP-2            SOIL       18         0.4        0.2        0.1        5          5          1.5
BMP-2            STORAGE    12         0.67       0          0
BMP-2            DRAIN      18.5755    0.5        0          6

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

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC-1            0          FREE                        NO

[DIVIDERS]
;;Name           Elevation  Diverted Link    Type       Parameters
;;-------------- ---------- ---------------- ---------- ----------
DIV-1            0          BYPASS-1         CUTOFF     0.0674     0          0          0          0

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap    Psi      Ksat
IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- -------- --------          ---
----- --------
STOR-1           0        3.25       0          TABULAR    STORAGE-1A                   0        0
SWPC             0        2.75       0          TABULAR    STORAGE-SWPC                 0        0

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- ----------
BYPASS-1         DIV-1            STOR-1           10         0.01       0          0          0          0
DUM_1            DIV-1            POC-1            10         0.01       0          0          0          0
SWFL             SWPC             DIV-1            10         0.01       0          0          0          0

[OUTLETS]
;;Name           From Node        To Node          Offset     Type            QTable/Qcoeff    Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- --------------- ---------------- ---------- --------
STOR-1-ORIFICE   STOR-1           POC-1            0          TABULAR/DEPTH   STOR-1AORIFICE              NO

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
```

```
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
BYPASS-1         DUMMY        0                0          0          0          1
DUM_1            DUMMY        0                0          0          0          1
SWFL             CIRCULAR     12               0          0          0          1

[CURVES]
;;Name           Type         X-Value    Y-Value
;;-------------- ---------- ---------- ----------
STOR-1AORIFICE   Rating     0.000      0.000
STOR-1AORIFICE              0.083      0.531
STOR-1AORIFICE              0.167      0.594
STOR-1AORIFICE              0.250      0.650
STOR-1AORIFICE              0.333      0.702
STOR-1AORIFICE              0.417      0.751
STOR-1AORIFICE              0.500      0.796
STOR-1AORIFICE              0.583      1.176
STOR-1AORIFICE              0.667      1.357
STOR-1AORIFICE              0.750      1.503
STOR-1AORIFICE              0.833      1.900
STOR-1AORIFICE              0.917      2.050
STOR-1AORIFICE              1.000      2.189
STOR-1AORIFICE              1.083      2.317
STOR-1AORIFICE              1.167      2.438
STOR-1AORIFICE              1.250      2.552
STOR-1AORIFICE              1.333      2.809
STOR-1AORIFICE              1.417      2.974
STOR-1AORIFICE              1.500      3.121
STOR-1AORIFICE              1.583      3.258
STOR-1AORIFICE              1.667      3.386
STOR-1AORIFICE              1.750      3.508
STOR-1AORIFICE              1.833      5.393
STOR-1AORIFICE              1.917      6.402
STOR-1AORIFICE              2.000      7.084
STOR-1AORIFICE              2.083      7.674
STOR-1AORIFICE              2.167      8.203
STOR-1AORIFICE              2.250      8.689
STOR-1AORIFICE              2.333      10.872
STOR-1AORIFICE              2.417      11.450
STOR-1AORIFICE              2.500      11.996
STOR-1AORIFICE              2.583      12.513
STOR-1AORIFICE              2.667      13.007
STOR-1AORIFICE              2.750      13.480
STOR-1AORIFICE              2.833      13.935
STOR-1AORIFICE              2.917      14.374
STOR-1AORIFICE              3.000      14.799
```

```
STOR-1AORIFICE              3.083      15.211
STOR-1AORIFICE              3.167      15.611
STOR-1AORIFICE              3.250      16.000
;
STORAGE-1A       Storage    0.00       4843
STORAGE-1A                  0.08       4852
STORAGE-1A                  0.17       4858
STORAGE-1A                  0.25       4860
STORAGE-1A                  0.33       4858
STORAGE-1A                  0.42       4852
STORAGE-1A                  0.50       4843
STORAGE-1A                  0.58       4830
STORAGE-1A                  0.67       4813
STORAGE-1A                  0.75       4792
STORAGE-1A                  0.83       4767
STORAGE-1A                  0.92       4738
STORAGE-1A                  1.00       4706
STORAGE-1A                  1.08       4669
STORAGE-1A                  1.17       4628
STORAGE-1A                  1.25       4582
STORAGE-1A                  1.33       4532
STORAGE-1A                  1.42       4477
STORAGE-1A                  1.50       4418
STORAGE-1A                  1.58       4354
STORAGE-1A                  1.67       4284
STORAGE-1A                  1.75       4209
STORAGE-1A                  1.83       4128
STORAGE-1A                  1.92       4041
STORAGE-1A                  2.00       3947
STORAGE-1A                  2.08       3847
STORAGE-1A                  2.17       3739
STORAGE-1A                  2.25       3622
STORAGE-1A                  2.33       3497
STORAGE-1A                  2.42       3361
STORAGE-1A                  2.50       3215
STORAGE-1A                  2.58       3055
STORAGE-1A                  2.67       2880
STORAGE-1A                  2.75       2686
STORAGE-1A                  2.83       2471
STORAGE-1A                  2.92       2226
STORAGE-1A                  3.00       1942
STORAGE-1A                  3.08       1597
STORAGE-1A                  3.17       1138
STORAGE-1A                  3.25       0
;
```

```
STORAGE-SWPC     Storage    0.00       0
STORAGE-SWPC                0.08       997
STORAGE-SWPC                0.17       1400
STORAGE-SWPC                0.25       1703
STORAGE-SWPC                0.33       1952
STORAGE-SWPC                0.42       2166
STORAGE-SWPC                0.50       2355
STORAGE-SWPC                0.58       2524
STORAGE-SWPC                0.67       2678
STORAGE-SWPC                0.75       2818
STORAGE-SWPC                0.83       2946
STORAGE-SWPC                0.92       3065
STORAGE-SWPC                1.00       3175
STORAGE-SWPC                1.08       3277
STORAGE-SWPC                1.17       3372
STORAGE-SWPC                1.25       3460
STORAGE-SWPC                1.33       3542
STORAGE-SWPC                1.42       3618
STORAGE-SWPC                1.50       3689
STORAGE-SWPC                1.58       3755
STORAGE-SWPC                1.67       3816
STORAGE-SWPC                1.75       3873
STORAGE-SWPC                1.83       3925
STORAGE-SWPC                1.92       3973
STORAGE-SWPC                2.00       4016
STORAGE-SWPC                2.08       4056
STORAGE-SWPC                2.17       4092
STORAGE-SWPC                2.25       4125
STORAGE-SWPC                2.33       4153
STORAGE-SWPC                2.42       4179
STORAGE-SWPC                2.50       4200
STORAGE-SWPC                2.58       4219
STORAGE-SWPC                2.67       4234
STORAGE-SWPC                2.75       4245

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
OCEANSIDE        FILE "K:\Library\Stormwater\SWMM\RAIN GAGES\Oceanside Rain Data.dat"

[REPORT]
;;Reporting Options
INPUT      NO
CONTROLS   NO
SUBCATCHMENTS ALL
```

```
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 191.920 4920.830 1021.827 5718.627
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            756.070            5298.734
DIV-1            599.929            5442.567
STOR-1           361.197            5440.830
SWPC             599.726            5500.640

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA-1            596.153            5569.431
DMA-1            596.153            5569.431
GSDRWY           756.963            5531.909
SM-1             904.372            5514.934
GSYD2            1031.234           5294.267

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
OCEANSIDE        594.366            5693.612
```

ATTACHMENT 7

SWMM Screens and Explanation of Significant Variables

EPA SWMM Figures and Explanations

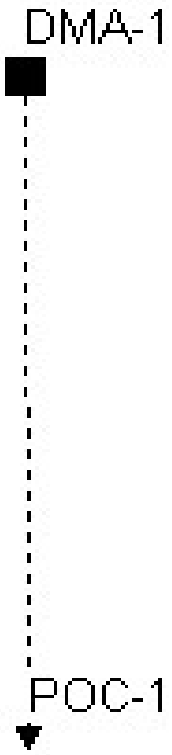
Per the attached, the reader can see the screens associated with the EPA-SWMM Model in both pre-development and post-development conditions. Each portion, i.e., sub-catchments, storage units, weirs and orifices as a discharge, and outfalls (point of compliance), are also shown.

Variables for modeling are associated with typical recommended values by the EPA-SWMM model and the Model BMP Design Manual San Diego Region.

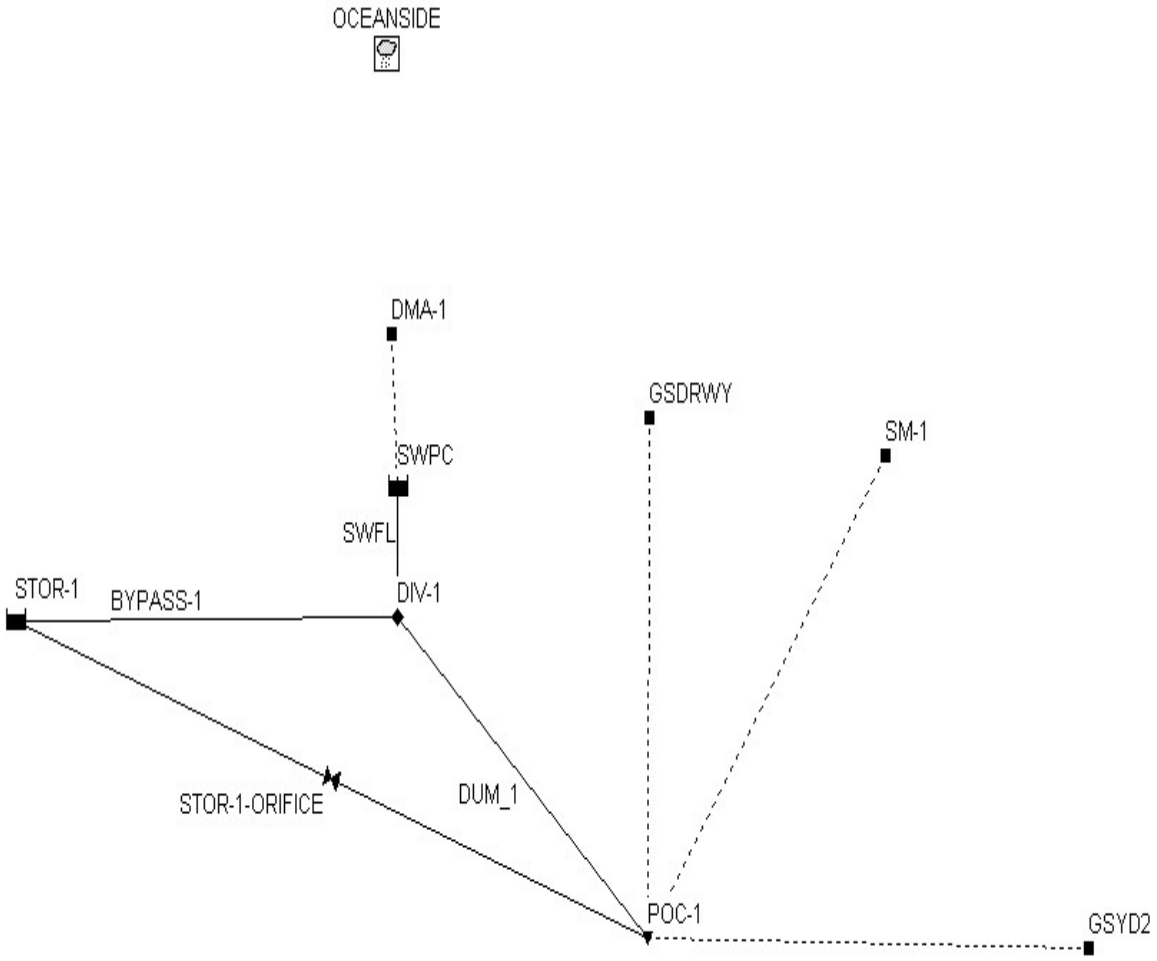
Soil characteristics of the existing soils were determined from the site specific NRCS Web Soil Survey.

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

PRE-DEVELOPED CONDITION (POC-1)



POST-DEVELOPED CONDITION (POC-1)



Explanation of Selected Variables

- Sub Catchment Areas: Please refer to the attached diagram that indicates the DMA and biofiltration basin BMP sub-areas modeled within the project site at both the pre and post developed conditions draining to the POCs.

Parameters for the pre-developed model include soils Type D as assumed for "unknown" soils from the NRCS Web Soils Survey (see Attachment 8). Suction head, conductivity and initial deficit correspond to average values expected for this soil type, according to the BMP Design Manual (BMPDM). Type D soil has been assumed in post-developed conditions to account for the anticipated fill soils onsite, as required by the BMPDM.

The BMPDM default value for the pervious overland flow roughness (N-perv was used for this project).

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

- Sub Catchment BMP: The subcatchment BMP is assigned the area of biofiltration basin, which is equal to the area of the biofiltration basin. At least five (5) decimal places were given regarding the area of the biofiltration basin to insure that the area used by the program for the LID subroutine corresponds exactly with the actual biofiltration basin.

LID Control Editor: Explanation of Significant Variables

- Storage Depth: The storage depth (barrel height) variable within the SWMM model is representative of the storage volume provided beneath the lowest surface outlet within the biofiltration basin. This is the volume that can only discharge from the facility via the LID portion of the biofiltration basin.

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

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

where,

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

The general orifice equation can be expressed as:

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

where,

Q is the peak flow in cfs;

D is the underdrain orifice diameter in inches;

c_g is the typical discharge coefficient for orifices (0.60-0.65 for thin walls and 0.75-0.80 for thick walls);

g is the gravitational constant (32.2 ft/s^2); and

H and H_D are defined above are also used in inches in Equation (3).

It is clear that:

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

The flow coefficient used in the SWMM Model characterizes the rate of discharge to the outlet as a function of the height of water stored in the biofiltration basin. The flow coefficient, as presented in the BMPDM, can be determined by the following equation:

$$C = c_g \left(\frac{605}{A_{lid}}\right) \left(\frac{\pi D^2}{8}\right) \sqrt{\frac{g}{6}} \quad (5)$$

where,

c_g is the orifice discharge coefficient (0.60-0.65 for thin walls and 0.75-0.80 for thick walls);

A_{lid} is the cumulative footprint area (ft2) of all LID controls;

D is the underdrain orifice diameter in inches; and

g is the gravitational constant (32.2 ft/s^2);

- Cut-Off Flow: The cut-off flow represents the maximum flow rate leaving the "low flow" outlet. Therefore, the orifice equation is used to calculate the cutoff flow when H is maximum.

ATTACHMENT 8

Soil Map


Hydrologic Soil Group—San Diego County Area, California
117° 12' 45" W
117° 12' 37" W
33° 10' 38" N
33° 10' 29" N
480180
480210
480240
480270
480300
480330
480360
480390
3670960
3670930
3670900
3670870
3670840
3670810
3670780
3670750
3670720
3670690
York Dr
GrC
BID2
BIC2
S14
S Santa Fe Ave
Soil Map may not be valid at this scale.
Map Scale: 1:1,380 if printed on A portrait (8.5" x 11") sheet.
Meters
0 20 40 80 120
N
Feet
0 50 100 200 300
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 14, Sep 16, 2019

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

Date(s) aerial images were photographed: Nov 3, 2014—Nov 22, 2014

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BIC2	Bonsall sandy loam, 2 to 9 percent slopes, eroded	D	3.1	66.2%
BID2	Bonsall sandy loam, 9 to 15 percent slopes, eroded	D	1.0	21.4%
GrC	Greenfield sandy loam, 5 to 9 percent slopes	A	0.6	12.4%
Totals for Area of Interest			**4.6**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

ATTACHMENT 9

Summary Files from the SWMM Model

SUMMARY PRE POC-1

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

1822-1864 York Drive, Pre-Developed Runoff Condition


***********************************************************
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 ............ 08/28/1951 05:00:00
Ending Date .............. 05/23/2008 23:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00


**************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
**************************     ---------       -------
Total Precipitation ......       236.851       675.110
Evaporation Loss .........         5.726        16.321
Infiltration Loss ........       183.181       522.130
Surface Runoff ...........        51.034       145.464
Final Storage ............         0.000         0.000
```

Continuity Error (%) ..... -1.304

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	51.034	16.630
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	51.034	16.630
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
DMA-1	675.11	0.00	16.32	522.13	145.46	16.63	4.70	0.215

Analysis begun on: Tue Nov 30 09:21:18 2021
Analysis ended on: Tue Nov 30 09:21:53 2021
Total elapsed time: 00:00:35

SUMMARY POST POC-1

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

1822-1864 York Drive, Post-Developed Mitigated Runoff Condition - Basins

WARNING 04: minimum elevation drop used for Conduit BYPASS-1
WARNING 04: minimum elevation drop used for Conduit DUM_1
WARNING 04: minimum elevation drop used for Conduit SWFL

*****************************************************
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 ............ 08/28/1951 05:00:00
Ending Date .............. 05/23/2008 23:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00
Routing Time Step ........ 60.00 sec


*************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
```

**************************	---------	-------
Total Precipitation	236.964	675.110
Evaporation Loss	20.754	59.127
Infiltration Loss	59.675	170.013
Surface Runoff	159.699	454.984
Final Storage	0.011	0.031
Continuity Error (%)	-1.340	

**************************	Volume	Volume
Flow Routing Continuity	acre-feet	10^6 gal
**************************	---------	---------
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	159.698	52.040
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	159.670	52.031
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	0.001	0.000
Continuity Error (%)	0.017	

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

```
************************
Routing Time Step Summary
************************
Minimum Time Step           :    60.00 sec
Average Time Step           :    60.00 sec
Maximum Time Step           :    60.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00
```

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

****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
DMA-1	675.11	0.00	68.30	103.11	512.91	45.10	3.86	0.760
GSDRWY	675.11	0.00	67.77	84.94	534.25	2.21	0.18	0.791
SM-1	675.11	0.00	13.45	511.54	157.10	2.99	0.79	0.233
GSYD2	675.11	0.00	67.72	85.01	534.29	1.74	0.14	0.791

****
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-1	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DIV-1	DIVIDER	0.00	0.89	0.89	18857 12:01	0.89
STOR-1	STORAGE	0.00	1.44	1.44	18857 12:10	1.36
SWPC	STORAGE	0.00	0.89	0.89	18857 12:01	0.89

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
POC-1	OUTFALL	1.11	4.07	18857 12:01	6.94	52	0.000
DIV-1	DIVIDER	0.00	3.86	18857 12:01	0	45.1	0.000
STOR-1	STORAGE	0.00	3.79	18857 12:01	0	30.6	0.006
SWPC	STORAGE	3.86	3.86	18857 12:01	45.1	45.1	0.020

****

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
STOR-1	0.003	0	0	0	6.830	54	18857 12:09	3.01
SWPC	0.003	0	0	0	1.829	20	18857 12:01	3.86

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
POC-1	2.81	0.14	4.07	52.027
System	2.81	0.14	4.07	52.027

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
BYPASS-1	DUMMY	3.79	18857 12:01			
DUM_1	DUMMY	0.07	141 06:29			
SWFL	CONDUIT	3.86	18857 12:01	1.02	0.01	0.07

STOR-1-ORIFICE DUMMY 3.01 18857 12:10

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Nov 30 09:22:17 2021
Analysis ended on: Tue Nov 30 09:23:19 2021
Total elapsed time: 00:01:02

ATTACHMENT 10

Drawdown Calculations

Drawdown Calculations - WQ

Surface Ponding Depth:	PD	2.75	in
Surface Ponding Volume:	V_{PD}	10,238	ft^3
Low Flow Orifice Diameter:	D	1.25	in
Flow Rate (volumetric):	Q	0.067	ft^3/s
Drawdown Time:		42.19	hrs

PROJECT CHARACTERISTICS	
SOIL TYPE	D
PARCEL AREA	4.272 ACRES
DISTURBED AREA	4.387 ACRES
PROPOSED IMPERVIOUS AREA	2.873 ACRES
PROPOSED PERVIOUS AREA	1.514 ACRES
DEPTH TO GROUNDWATER	> 20 FEET

LEGEND	SYMBOL
DMA NAME DMA AREA (SF)	DMA 1 141,027 SF
SELF-MITIGATING DMA	SM 1
DE MINIMIS AREA	DMIN 1
POINT OF CONCENTRATION	POC 1
DMA BOUNDARY	
PROJECT BOUDNARY	
FLOW PATH	
CATCH BASIN	
RIP RAP ENERGY DISSIPATER PER D40	
72" CMP STORMWATER SYSTEM	
ASPHALT PVMT	
MODULAR WETLAND SYSTEM	MWS
GREEN STREET TREE WELL	
STORM DRAIN	SD

30' 15 0' 30' 60' 90'

SCALE: 1" = 30'

DATE OF PREPARATION:		
REVISIONS	DESCRIPTION	DATE

bHA, Inc.
land planning, civil engineering, surveying
5115 AVENIDA ENCINAS
SUITE "L"
CARLSBAD, CA. 92008-4387
(760) 931-8700

HMP EXHIBIT
1822-1864 YORK DRIVE
PDS2021-MUP-21-008, PDS2021-ER-21-08-008

COUNTY OF SAN DIEGO, CALIFORNIA

SHEET 1 OF 2

HYDROMODIFICATION & TREATMENT CONTROL BMPS

DEVELOPED CONDITIONS

STORMWATER RUNOFF FROM THE PROPOSED PROJECT SITE IS ROUTED TO ONE (1) POINTS OF COMPLIANCE, POC-1 LOCATED NEAR THE SOUTHWEST CORNER OF THE PROJECT SITE. POC-1 COLLECTS RUNOFF FROM DMA 1, DMA GS YD1, DMA GS DRWY, DMA GA YD2 AND SM-1.

PRIOR TO DISCHARGING FROM THE PROJECT SITE, DEVELOPED ON-SITE RUNOFF FROM DMA-1 IS DRAINED TO A ONSITE RECEIVING 72-INCH CMP STORMWATER SYSTEM (HYDROMODIFICATION-BMPS OR HMP-BMPS) BEFORE FLOWS ARE TREATED IN MODULAR WETLAND SYSTEMS (PROPRIETARY BIOFILTRATION BMPS) FOR WATER QUALITY PURPOSES.

DMA GS YD1 INCLUDES A PORTION OF THE FRONTAGE STREET IMPROVEMENTS FOR YORK DRIVE WILL DRAIN INTO THREE (3) TREE WELLS FOR POLLUTANT CONTROL. FOR THE STORMWATER ANALYSIS, THIS STREET FRONTAGE IS CONSIDERED "GREEN STREETS".

DMA GS DRWY INCLUDES A PORTION OF THE ONSITE DRIVEWAY IMPROVEMENTS AND WILL BE TREATED BY THREE (3) TREE WELLS.

DMA GS YD2 INCLUDES A PORTION OF THE ONSITE DRIVEWAY IMPROVEMENTS AND YORK DRIVE IMPROVEMENTS.

HYDROMODIFICATION WILL BE COMPENSATED BY THE 72-INCH CMP STORMWATER SYSTEM IN DMA 1 THAT ALSO DRAINS TO POC 1.

DMA	Tributary Area, A (Ac)	Impervious Percentage, Ip
DMA 1	3.238	78.51%
GS DRWY	0.152	82.09%
SM 1	0.700	0.00%
GS YD2	0.120	82.06%
TOTAL	4.090	-

HYDROMODIFICATION VOLUME IS PROPOSED FOR HYDROMODIFICATION CONFORMANCE AND FLOOD CONTROL FOR THE PROJECT'S POCS. THE DIMENSIONS REQUIRED FOR HMP CONFORMANCE IS BASED ON THE SWMM MODEL THAT WAS UNDERTAKEN FOR THE PROJECT. HMP CONFORMANCE IS DISCUSSED WITHIN THE HYDROMODIFICATION MANAGEMENT PLAN PREPARED BY BHA INC. FOR THIS PROJECT .

STORM WATER WILL ENTER THE WATER QUALITY PORTION OF THE 72-INCH CMP STORMWATER SYSTEM THROUGH INFLOW PIPES. FLOWS WILL DISCHARGE FROM THE STORMDRAIN CLEANOUT AND THE DOWNSTREAM MODULAR WETLAND SYSTEM (MWS). THE 72-INCH CMP STORMWATER SYSTEM (BMP 1) WAS MODELED WITH THE STORAGE UNIT MODULE WITHIN SWMM. THE STORAGE UNIT CAN MODEL THE UNDERDRAIN WITH ORIFICE PLATE AND VAULT STORAGE POND UP TO THE ELEVATION OF THE REQUIRED DESIGN CAPTURE VOLUME (DCV) FOR THE 72-INCH CMP STORMWATER SYSTEM. PONDING ABOVE THE REQUIRED DCV IS MODELED AS A DETENTION BASIN: ELEVATION VS. AREA, AND ELEVATION VS. DISCHARGE TABLES, ARE NEEDED BY SWMM FOR MODIFIED PULS ROUTING PURPOSES. DETAILED OUTLET STRUCTURE LOCATION AND ELEVATIONS SHOULD BE SHOWN ON THE CONSTRUCTION PLANS BASED ON THE RECOMMENDATIONS OF THIS STUDY.

ONE (1) PROPRIETARY MODULAR WETLAND SYSTEM IS LOCATED DOWNSTREAM OF THE UNDERGROUND DETENTION FACILITIY AND IS RESPONSIBLE FOR HANDLING WATER QUALITY REQUIREMENTS FOR POC-1. THE TYPE OF PROPRIETARY BIOFILTRATION BMPS ARE MODULAR WETLAND SYSTEMS (MWS) OR EQUIVALENT.

SINCE THERE IS UPSTREAM DETENTION STORAGE, THE MODULAR WETLANDS SYSTEM CAN BE SIZED BASED ON THE REQUIRED POLLUTANT CONTROL TREATMENT VOLUME. THE REQUIRED TREATMENT VOLUME IS 1.5 TIMES THE DCV, PER THE COUNTY OF SAN DIEGO BMP DESIGN MANUAL.

THE BENEFIT OF THE MWS IS THAT ONE UNIT CAN BE INSTALLED BELOW GRADE OF THE PROPOSED SURFACE AND DOWNSTREAM OF THE UNDERGROUND STORAGE VAULT USED FOR HYDROMODIFICATION AND DETENTION STORAGE. THE MWS UNITS WILL ALSO BE CONFIGURED AS A VAULT, AND WILL ACCEPT FLOWS DIRECTLY INTO THE PRE-TREATMENT CHAMBER. THIS END-OF-THE-LINE INSTALLATION ENSURES THAT ALL DRAINAGE WILL BE TREATED BY THE BIOFILTRATION SYSTEM FOR MAXIMUM FEASIBILITY. THE MWS IS A PRE-ENGINEERED BIOFILTRATION SYSTEM COMPOSED OF A PRE-TREATMENT CHAMBER CONTAINING FILTRATION CARTRIDGES, A HORIZONTAL FLOW BIOFILTRATION CHAMBER WITH A PERIPHERAL VOID AREA AND A CENTRALIZED AND VERTICALLY EXTENDING UNDERDRAIN, THE BIOFILTER CHAMBER CONTAINING A SORPTIVE MEDIA MIX, AND A DISCHARGE CHAMBER CONTAINING AN ORIFICE CONTROL STRUCTURE. TREATED WATER FLOWS HORIZONTALLY IN SERIES THROUGH THE PRE-TREATMENT CHAMBER CARTRIDGES, BIOFILTRATION CHAMBER AND ORIFICE CONTROL STRUCTURE. DISCHARGES ARE CONVEYED VIA STORM DRAIN PIPE TO THE EXISTING STORM WATER CONVEYANCE SYSTEM.

BMP MODELING FOR WATER QUALITY PURPOSES

MODELING OF DUAL PURPOSE WATER QUALITY/HMP BMPS

ONE (1) BMP IS ARE PROPOSED FOR INTEGRATED HYDROMODIFICATION AND WATER QUALITY TREATMENT FOR THE PROJECT SITE. TABLE 2 ILLUSTRATES THE DIMENSIONS REQUIRED FOR HMP COMPLIANCE FOR THE PROPOSED 72-INCH CMP STORMWATER SYSTEM. TABLE 3 ILLUSTRATES THE DIMENSIONS REQUIRED FOR POLLUTANT CONTROL COMPLIANCE FOR THE PROPOSED MODULAR WETLANDS.

TABLE 2 - SUMMARY OF 72-INCH CMP STORMWATER SYSTEM:

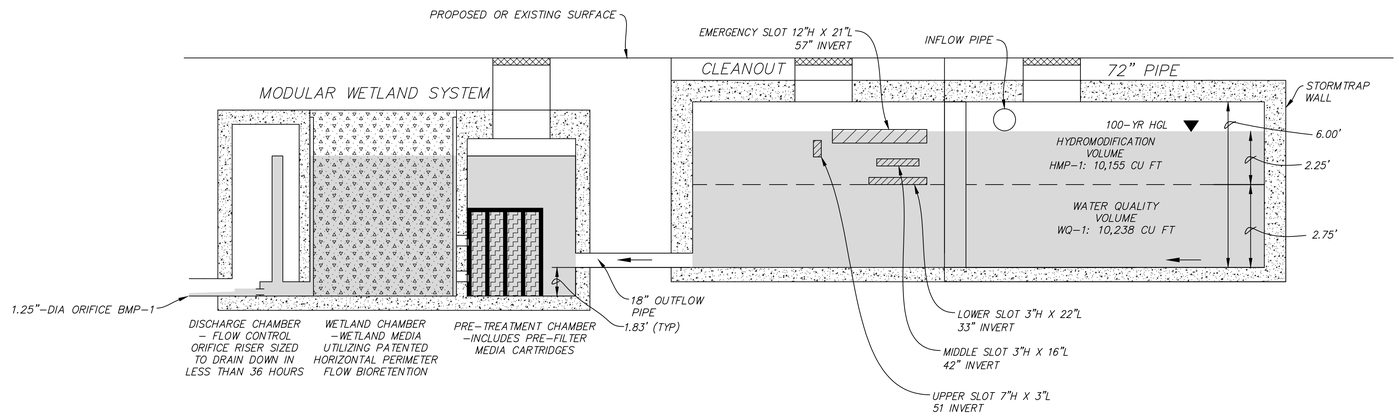
Underground Detention Facility	Tributary Area (Ac)	Pipe Dimensions		Lower Slot Dimensions			Middle Slot Dimensions			Upper Slot Dimensions			Emergency Slot Dimensions		
		Pipe Dia (in)	Pipe Length (ft)	Outlet Type[1]	Invert Elev, HL[2] (in)	(#) - Width x Height (in)[3]	Outlet Type[1]	Invert Elev, HL[2] (in)	(#) - Width x Height (in)[3]	Outlet Type[1]	Invert Elev, HL[2] (in)	(#) - Width x Height (in)[3]	Outlet Type[3]	Invert Elev, HL[2] (in)	(#) - Width x Height (in)[3]
BMP 1	3.238	72	810	Slot	33	(1) - 3 x 22	Slot	42	(1) - 3 x 16	Slot	51	(1) - 7 x 3	Slot	57	(1) - 12 x 21

Notes: (1): Shape of orifice opening in riser structure.
(2): Depth from bottom of pond to invert of lower slot or weir.
(3): Number of slots and slot dimensions.

TABLE 3 - SUMMARY OF TREATMENT CONTROL BMPS:

BMP	Tributary Area[1] (Ac)	DIMENSIONS	
		Volume Treated (cf)[2]	Model Number
BMP 1	DMA 1	10,238	MWS-L-6-8-8'-0"-V-UG
BMP 2	GS YD 1	264	Tree Wells 3 -15' Dia
BMP 3	GS DRWY	294	Tree Wells 3 -15' Dia
BMP 4	GS YD 2	232	Tree Wells 3 -15' Dia

Notes:
(1): BMP Areas are included in the overall DMA.
(2): For flow-based BMPs



72-INCH CMP STORMWATER SYSTEM & MWS DETAILS

NOT TO SCALE

bHA, Inc.
land planning, civil engineering, surveying
5115 AVENIDA ENCINAS
SUITE "L"
CARLSBAD, CA. 92008-4387
(760) 931-8700

HMP EXHIBIT
1822-1864 YORK DRIVE
PDS2021-MUP-21-008, PDS2021-ER-21-08-008

COUNTY OF SAN DIEGO, CALIFORNIA

SHEET 2 OF 2

K:\Civil 3D\1110\DWG\SWMD\SDP_1110_SDP_SWQMP_EXHIBITS.dwg, Mar 25, 2025 - 12:27pm

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	Carlsbad, Agua Hedionda, Buena, 904.32	POC 1 is located near the southeast corner of the property near the entrance of a 72-inch cmp that crosses underneath the Inland Rail Trail and North County Transit District Rail Road Tracks.

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.

HYDROMODIFICATION SCREENING

FOR

1822-1844-1864 YORK DRIVE

6:30 - 10

July 15, 2021

Wayne W. Chang, MS, PE 46548

ChangConsultants

Civil Engineering ◦ Hydrology ◦ Hydraulics ◦ Sedimentation

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Rancho Santa Fe, CA 92067
(858) 692-0760

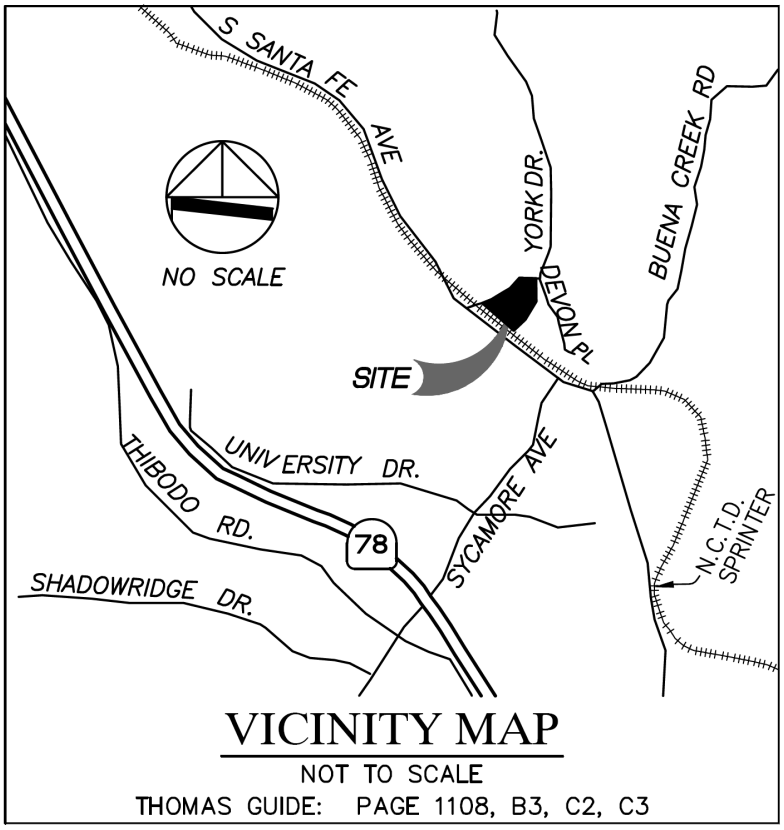
FOR REVIEW ONLY

-TABLE OF CONTENTS -

APPENDICES

INTRODUCTION

The County of San Diego's March 2011, *Final Hydromodification Management Plan;* January 8, 2011, *Standard Urban Stormwater Mitigation Plan* (SUSMP); and September 2020, *BMP Design Manual* outline low flow thresholds for hydromodification analyses. The thresholds are based on a percentage of the pre-project 2-year flow (Q_2), i.e., $0.1Q_2$ (low flow threshold and high susceptibility to erosion), $0.3Q_2$ (medium flow threshold and medium susceptibility to erosion), or $0.5Q_2$ (high flow threshold and low susceptibility to erosion). A flow threshold of $0.1Q_2$ represents a natural downstream receiving conveyance system with a high susceptibility to bed and/or bank erosion. This is the default value used for hydromodification analyses and will result in the most conservative (largest) on-site facility sizing. A flow threshold of $0.3Q_2$ or $0.5Q_2$ represents downstream receiving conveyance systems with a medium or low susceptibility to erosion, respectively. In order to qualify for a medium or low erosion susceptibility rating, a project must perform a channel screening analysis based on the March 2010, *Hydromodification Screening Tools: Field Manual for Assessing Channel Susceptibility,* developed by the Southern California Coastal Water Research Project (SCCWRP). The SCCWRP results are compared with the critical shear stress calculator results from the County of San Diego's Critical Flow Calculator spreadsheet to establish the appropriate erosion susceptibility threshold of low, medium, or high.



This report provides a hydromodification screening analysis for the 1822-1844-1864 York Drive redevelopment project being designed by BHA, Inc. The site previously contained primarily residential uses, which have been demolished. The project proposes a 183 unit senior apartment building on 4.27 acres east of the intersection of York Drive and South Santa Fe Avenue in the

county of San Diego (see the Vicinity Map). The apartment building will be within the central portion of the site and surrounded by a perimeter drive aisle with parking. The adjacent land uses include residential development to the north and west, senior living to the east, and commercial/industrial businesses to the south. A North County Transit District (NCTD) rail line is immediately along the southerly portion of the site.

Under pre-project conditions, storm runoff within the project footprint flows in southerly to southeasterly directions and is captured by an off-site concrete swale just beyond the southerly property boundary (see the Study Area Exhibit in Appendix A and Figures 1 and 2). The swale conveys the runoff southwesterly along the property boundary to a corrugated metal culvert that crosses under the NCTD rail line and outlets on the upstream (north) side of S. Santa Fe Avenue. The runoff continues a few feet over a concrete surface to triple culverts that cross S. Santa Fe Avenue. The runoff then continues downstream of S. Santa Fe Avenue southwesterly in a culvert through private property. The culvert outlets into an unnamed natural drainage course approximately 150 feet southwest of S. Santa Fe Avenue. The unnamed natural drainage course extends south approximately 1,600 feet towards State Route 78 and a confluence into Buena Creek.

Under post-project conditions, proposed private storm drain systems will capture and convey the project's storm runoff to a Modular Wetland System Linear for pollutant control and stormwater storage pipes for flow control. The runoff will then be conveyed from the BMPs in a storm drain pipe to the existing concrete swale beyond the southerly property boundary. From here, the runoff continues downstream similar to existing conditions.

The SCCWRP screening tool requires both office and field work to establish the vertical and lateral susceptibility of a downstream receiving channel to erosion. The vertical and lateral assessments are performed independently of each other although the lateral results can be affected by the vertical rating. A screening analysis was performed to assess the low flow threshold for the project's point of compliance, which is at its discharge point into the unnamed natural drainage course.

The initial step in performing the SCCWRP screening analysis is to establish the domain of analysis and the study reaches within the domain. This is followed by office and field components of the screening tool along with the associated analyses and results. The following sections cover these procedures in sequence.

DOMAIN OF ANALYSIS

SCCWRP defines an upstream and downstream domain of analysis, which establish the study limits. The County of San Diego's HMP specifies the downstream domain of analysis based on the SCCWRP criteria. The HMP indicates that the downstream domain is the first point where one of these is reached:

- at least one reach downstream of the first grade control point (or at second grade control)
- tidal backwater/lentic waterbody

- equal order tributary

- accumulation of 50 percent drainage area for stream systems or 100 percent drainage area for urban conveyance systems (storm drains, hardened channels, etc.).

The upstream limit is defined as:

- proceed upstream for 20 channel top widths or to the first grade control point, whichever comes first. Identify hard points that can check headward migration and evidence of active headcutting.

SCCWRP defines the maximum spatial unit, or reach (a reach is circa 20 channel widths), for assigning a susceptibility rating within the domain of analysis to be 200 meters (656 feet). If the domain of analysis is greater than 200 meters, the study area can be subdivided into smaller reaches of less than 200 meters for analysis. Most of the units in the HMP's SCCWRP analysis are metric. Metric units are used in this report only where given so in the HMP. Otherwise English units are used.

Downstream Domain of Analysis

The downstream domain of analysis location for the point of compliance (POC) was determined by assessing and comparing the four bullet items above. The POC represents the point below which a channel is natural and subject to hydromodification impacts. As discussed in the Introduction, storm runoff from the project will be treated and then conveyed below the site by a series of existing hardened, non-erodible drainage facilities to an unnamed natural drainage course. The outlet of the drainage facilities to the unnamed natural drainage course is the POC. The downstream domain of analysis location was selected below the POC as follows.

Per the first bullet item, the first permanent grade control below the POC was identified during a site visit. The first grade control occurs where the unnamed natural drainage course enters a culvert crossing under a driveway (see Figure 8 and the Study Area Exhibit), which is 354 feet downstream of the POC. The culvert is a non-erodible facility that provides a grade control for the upstream channel bed. i.e., it will prevent erosion of the upstream channel bed.

The second bullet item criteria is based on the lentic waterbody. The nearest lentic (standing or still water such as ponds, pools, marshes, lakes, lagoons, etc.) waterbody is Agua Hedionda Lagoon, which is over 5 miles downstream of the site. This lentic waterbody is further downstream from the POC than the first permanent grade control, so the second bullet item will not govern over the first bullet item in establishing the downstream domain of analysis location.

The third bullet item is met when the natural watercourse below a POC confluences with a stream with an equal order or larger tributary area. As mentioned in the Introduction, the unnamed natural drainage course confluences with Buena Creek approximately 1,600 feet downstream of the POC. The unnamed natural drainage course and Buena Creek watershed areas near their confluence were determined by the USGS Streamstats program (see Appendix A), which is based on a digital elevation model and digital representation of the stream network. Streamstats determined that the

unnamed natural drainage course watershed covers over 0.5 square miles while the Buena Creek watershed covers 3.7 square miles. Therefore, the third bullet item is met at the confluence since the unnamed natural drainage course confluences with the larger Buena Creek watershed. However, the confluence is further from the POC than the permanent grade control, so the third bullet item will not govern over the first in establishing the downstream domain of analysis location.

The fourth bullet item is met when the natural stream below a POC accumulates 50 or 100 percent drainage area for natural or urban drainage systems, respectively. The unnamed natural drainage course below the POC is a natural drainage system, so 50 percent applies. It is clear from the unnamed natural drainage course Streamstats analysis, that 50 percent additional drainage area will not be accumulated between the POC and permanent grade control. The majority of the watershed is above the POC and a small portion is below the POC. Therefore, the fourth bullet item will not govern over the first bullet item.

Based on the above information, the downstream domain of analysis location is established by the grade control criteria (bullet item 1) and occurs where the unnamed natural drainage course enters the driveway culvert below the POC. This is the first downstream domain of analysis point reached from the four bullet criteria. Per the first bullet item, the downstream domain of analysis location should be set at the next downstream grade control. The unnamed natural drainage course continues 120 feet before reaching another driveway culvert (see Figure 11). The downstream domain of analysis location is at this second downstream grade control.

Upstream Domain of Analysis

The hardened, non-erodible drainage facilities leading to the POC outlet into the uppermost end of the natural receiving drainage course. Since the natural drainage course does not extend upstream of the POC, the upstream domain of analysis location for the POC is at the POC.

Study Reaches within Domain of Analysis

After the upstream and downstream domain of analysis locations are established for the POC, the study reaches are identified (see the Study Area Exhibit in Appendix A). The entire domain of analysis extends from the upstream domain of analysis location at the POC to the downstream domain of analysis location at the second permanent grade control below the POC created by a driveway culvert. The domain of anlaysis was analyzed as two study reaches, Reach 1 and Reach 2. Reach 1 extends 354 feet from the upstream domain of analysis location to the first permanent grade control below the POC. Reach 2 extends 120 feet from the first permanent grade control to the second permanent grade control. Both permanent grade controls are associated with driveway culverts. Both study reaches are within the 656 foot (200 meters) maximum reach length recommended by SCCWRP.

INITIAL DESKTOP ANALYSIS

After the domain of analysis is established, SCCWRP requires an “initial desktop analysis” that involves office work. The initial desktop analysis establishes the watershed area, mean annual precipitation, valley slope, and valley width. These terms are defined in Form 1, which is included

in Appendix A. SCCWRP recommends the use of National Elevation Data (NED) to determine the watershed areas, valley slopes, and valley widths. NED data is similar to USGS quadrangle mapping.

The watershed areas associated with Reach 1 and 2 were delineated from the USGS' StreamStats program, which is based on their Digital Elevation Model and a digital representation of the stream network. The StreamStats results are included in Appendix A. The watershed delineations are consistent with current USGS quadrangle mapping. Since Reach 1 and 2 are in close proximity to each other, their watershed areas will be similar. The Reach 2 watershed area (0.5038 square miles) was used for Reach 1. The Reach 2 watershed area is slightly larger than the Reach 1 watershed area, so the results for Reach 1 will be slightly conservative, i.e., the Reach 1 results will predict more potential for erosion due to the slightly higher flow rate.

The mean annual precipitation was obtained from the rain gage closest to the site. This is the Western Regional Climate Center's Vista 2NNE gage (see Appendix A). The average annual rainfall measured at the Vista 2NNE gage for the period of record is 13.09 inches.

The valley slope and valley width for Reach 1 and Reach 2 were obtained from SANGIS' 2014 2-foot contour interval topographic mapping. NED data was not used because it is not very accurate for these parameters. The valley slope is the longitudinal slope of the channel bed along the flow line, so it is determined by dividing the elevation difference within a study reach by the length of the flow line. The valley width is the valley bottom width dictated by breaks in the hillslope. The valley slope and valley width within Reach 1 and 2 along with the watershed area are included in Table 1.

Reach	Tributary Watershed Area, sq. mi.	Valley Slope, m/m	Valley Width, m
1	0.5038	0.0141	0.91
2	0.5038	0.0042	0.91

Table 1. Summary of Drainage Area, Valley Slope, and Valley Width

The above described values were input to a spreadsheet to calculate the simulated peak flow, screening index, and valley width index outlined in Form 1. The input data and results are tabulated in Appendix A. This completes the initial desktop analysis.

FIELD SCREENING

After the initial desktop analysis is complete, a field assessment must be performed. The field assessment is used to establish a natural channel's vertical and lateral susceptibility to erosion. SCCWRP states that although they are admittedly linked, vertical and lateral susceptibility are assessed separately for several reasons. First, vertical and lateral responses are primarily controlled by different types of resistance, which, when assessed separately, may improve ease of use and lead to increased repeatability compared to an integrated, cross-dimensional assessment. Second,

the mechanistic differences between vertical and lateral responses point to different modeling tools and potentially different management strategies. Having separate screening ratings may better direct users and managers to the most appropriate tools for subsequent analyses.

The field screening tool uses combinations of decision trees and checklists. Decision trees are typically used when a question can be answered fairly definitively and/or quantitatively (e.g., d_{50} < 16 mm). Checklists are used where answers are relatively qualitative (e.g., the condition of a grade control). Low, medium, high, and very high ratings are applied separately to the vertical and lateral analyses. When the vertical and lateral analyses return divergent values, the most conservative value shall be selected as the flow threshold for the hydromodification analyses.

Vertical Stability

The purpose of the vertical stability decision tree (Figure 6-4 in the County of San Diego HMP) is to assess the state of the channel bed with a particular focus on the risk of incision (i.e., down cutting). The decision tree is included in Figure 12. The first step is to assess the channel bed resistance. There are three categories defined as follows:

1. Labile Bed – sand-dominated bed, little resistant substrate.

2. Transitional/Intermediate Bed – bed typically characterized by gravel/small cobble, Intermediate level of resistance of the substrate and uncertain potential for armoring.

3. Threshold Bed (Coarse/Armored Bed) – armored with large cobbles or larger bed material or highly-resistant bed substrate (i.e., bedrock).

Based on the photographs and site investigation, the bed material and resistance is generally within the transitional/intermediate bed category. There was no evidence of a threshold bed condition. However, some bed areas contained smaller grain sizes typically found in a labile bed.

In addition to the material size and compaction, there are several factors that establish the erodibility of a channel such as the flow rate (i.e., size of the tributary area), grade controls, channel slope, vegetative cover, channel planform, etc. The Introduction of the SCCWRP *Hydromodification Screening Tools: Field Manual* identifies several of these factors. When multiple factors influence erodibility, it is appropriate to perform the more detailed SCCWRP analysis, which is to analyze a channel according to SCCWRP's transitional/intermediate bed procedure. This requires the most rigorous steps and will generate the appropriate results given the range of factors that define erodibility. The transitional/intermediate bed procedure takes into account that bed material may fall within the labile category (the bed material size is used in SCCWRP's Form 3 Figure 4), but other factors may trend towards a less erodible condition. Dr. Eric Stein from SCCWRP, who co-authored the *Hydromodification Screening Tools: Field Manual* in the *Final Hydromodification Management Plan* (HMP), indicated that it would be appropriate to analyze channels with multiple factors that impact erodibility using the transitional/intermediate bed procedure. Consequently, this procedure was used to produce more accurate results.

Transitional/intermediate beds cover a wide susceptibility/potential response range and need to be assessed in greater detail to develop a weight of evidence for the appropriate screening rating. The three primary risk factors used to assess vertical susceptibility for channels with transitional/intermediate bed materials are:

1. Armoring potential – three states (Checklist 1)

2. Grade control – three states (Checklist 2)

3. Proximity to regionally-calibrated incision/braiding threshold (Mobility Index Threshold – Probability Diagram)

These three risk factors are assessed using checklists and a diagram (see Appendix B), and the results of each are combined to provide a final vertical susceptibility rating for the intermediate/transitional bed-material group. Each checklist and diagram contains a Category A, B, or C rating. Category A is the most resistant to vertical changes while Category C is the most susceptible.

Checklist 1 determines armoring potential of the channel bed. The channel bed along each of the two study reaches is within Category B, which represents intermediate bed material of unknown resistance or unknown armoring potential due to a surface veneer such as vegetation. The soil was probed and penetration was relatively difficult through the underlying layer. The vegetative growth along the channel of Reach 1 and 2 serve to armor the channel bed and resist vertical erosion.

Checklist 2 determines grade control characteristics of the channel bed. This is established by the spacing of the grade controls along the channel. Category B on Checklist 2 is based on a spacing of $2/S_v$ or $4/S_v$. S_v for Reach 1 and 2 is 0.0141 and 0.0042, respectively, from the Form 1 analysis in Appendix A. From this, $2/S_v$ is 465 and 1,575 feet for Reach 1 and 2, respectively, while $4/S_v$ is 929 feet and 3,150 feet, respectively. Reach 1 and 2 are 354 and 120 feet long, respectively, and each has a grade control at its lower end. Since Reach 1 and Reach 2 are both shorter than their $2/S_v$ values, each is in Category A on Checklist 2.

The Screening Index Threshold is a probability diagram that depicts the risk of incising or braiding based on the potential stream power of the valley relative to the median particle diameter. The threshold is based on regional data from Dr. Howard Chang of Chang Consultants and others. The probability diagram is based on d_{50} as well as the screening index (INDEX) value determined in the initial desktop analysis (see Appendix A). The Form 1 results in Appendix A determined an INDEX of 0.020 and 0.006 for Reach 1 and Reach 2, respectively. SCCWRP specifies use of a US SAH-97 half-phi template gravelometer to determine d_{50} in a natural channel. This gravelometer allows a minimum d_{50} measurement of 2 millimeters. The Screening Index Threshold diagram shows that the probability of incising or braiding is less than 50 percent for a d_{50} of 2 millimeters if the INDEX value is 0.022 or less. Since the Reach 1 and Reach 2 Screening Index values are both less than the 50 percent INDEX value, Reach 1 and Reach 2 are within Category A.

The overall vertical rating is determined from the Checklist 1, Checklist 2, and Mobility Index Threshold results. The scoring is based on the following values:

Category A = 3, Category B = 6, Category C = 9

The vertical rating score is based on these values and the equation (the Reach 1 and 2 Checklist 1, Checklist 2, and the Mobility Index Threshold values are identical):

$$\text{Vertical Rating} = [(\text{armoring} \times \text{grade control})^{1/2} \times \text{screening index score}]^{1/2}$$
$$= [(6 \times 3)^{1/2} \times 3]^{1/2}$$
$$= 3.6$$

Since the vertical rating is less than 4.5, the Reach 1 and Reach 2 both have a low threshold for vertical susceptibility.

Lateral Stability

The purpose of the lateral decision tree (Figure 6-5 from County of San Diego HMP included in Figure 13) is to assess the state of the channel banks with a focus on the risk of widening. Channels can widen from either bank failure or through fluvial processes such as chute cutoffs, avulsions, and braiding. Widening through fluvial avulsions/active braiding is a relatively straightforward observation. If braiding is not already occurring, the next logical step is to assess the condition of the banks. Banks fail through a variety of mechanisms; however, one of the most important distinctions is whether they fail in mass (as many particles) or by fluvial detachment of individual particles. Although much research is dedicated to the combined effects of weakening, fluvial erosion, and mass failure, SCCWRP found it valuable to segregate bank types based on the inference of the dominant failure mechanism (as the management approach may vary based on the dominant failure mechanism). A decision tree (Form 4 in Appendix B) is used in conducting the lateral susceptibility assessment. Definitions and photographic examples are also provided below for terms used in the lateral susceptibility assessment.

The first step in the decision tree is to determine if lateral adjustments are occurring. The adjustments can take the form of extensive mass wasting (greater than 50 percent of the banks are exhibiting planar, slab, or rotational failures and/or scalloping, undermining, and/or tension cracks). The adjustments can also involve extensive fluvial erosion (significant and frequent bank cuts on over 50 percent of the banks). Neither mass wasting nor extensive fluvial erosion was evident within either of the two reaches during a field investigation. As seen in the figures, the channel banks are stable confirming that mass wasting and extensive fluvial erosion has not occurred.

The next step in the Form 4 decision tree is to assess the consolidation of the bank material. The banks in Reach 1 and 2 were moderate to well-consolidated. This determination was made because the ground surface was difficult to penetrate with a probe. The banks were densely vegetated and/or relatively level and stable as seen in the figures. In addition, the banks showed little evidence of crumbling and were composed of relatively well-packed particles.

Form 6 (see Appendix B) is used to assess the probability of mass wasting. Form 6 identifies a 10, 50, and 90 percent probability based on the bank angle and bank height. From the topographic mapping and site investigation, the average bank angles in both reaches are 1.5:1 (33.7 degrees)

or flatter. Form 6 shows that the probably of mass wasting and bank failure has less than 10 percent risk for a 33.7 degree bank angle or less regardless of the bank height.

The final two steps in the Form 4 decision tree are based on the braiding risk determined from the vertical rating as well as the Valley Width Index (VWI) calculated in Appendix A. If the vertical rating is high, the braiding risk is considered to be greater than 50 percent. Excessive braiding can lead to lateral bank failure. For Reach 1 and 2 the vertical rating is low, so the braiding risk is less than 50 percent. Furthermore, a VWI greater than 2 represents channels unconfined by bedrock or hillslope and, hence, subject to lateral migration. The VWI calculations in the spreadsheet in Appendix A show that VWI for Reach 1 and 2 are both 0.10, which is much less than 2.

From the above steps, the lateral susceptibility rating is low for Reach 1 and 2 (colored circles are included on the Form 4: Lateral Susceptibility Field Sheet decision tree in Appendix B showing the decision path).

CONCLUSION

The SCCWRP channel screening tools were used to assess the downstream channel susceptibility for the 1822-1844-1864 York Drive redevelopment project being designed by BHA, Inc. Storm runoff from the project will be collected by proposed on-site drainage systems, treated by on-site BMPs, and conveyed off-site by a series of non-erodible drainage facilities to an outfall into an unnamed natural drainage course. A channel assessment was performed for the unnamed natural drainage course based on office analyses and field work. The results indicate a low threshold for vertical and lateral susceptibilities for Reach 1 and 2.

The HMP requires that these results be compared with the critical stress calculator results outlined in the County of San Diego HMP. The critical stress results are included in Appendix B for the study reach using the spreadsheet provided by the County. The channel dimensions were estimated from topographic mapping and Google Earth. Based on these values, the critical stress results returned a low threshold consistent with the SCCWRP channel screening results. Therefore, the SCCWRP analyses and critical stress calculator demonstrate that a low overall threshold is applicable to the project (i.e., $0.5Q_2$).

Figure 1. Concrete Swale that Collects Project Runoff (project is left of fence)

Figure 2. Looking Downstream towards Lower End of Swale and NCTD Culvert Entrance

Figure 3. Point of Compliance at Culvert Outlet into Unnamed Natural Drainage Course

Figure 4. Looking Downstream towards Reach 1 from Upper End at POC

Figure 5. Looking Upstream from Middle of Reach 1

Figure 6. Looking Downstream from Middle of Reach 1

Figure 7. Looking Upstream towards Reach 1 from Lower End

Figure 8. First Grade Control at Downstream End of Reach 1

Figure 9. Looking Downstream towards Reach 2 from Upper End

Figure 10. Looking Upstream towards Reach 2 from Lower End

Figure 11. Second Grade Control at Downstream End of Reach 2

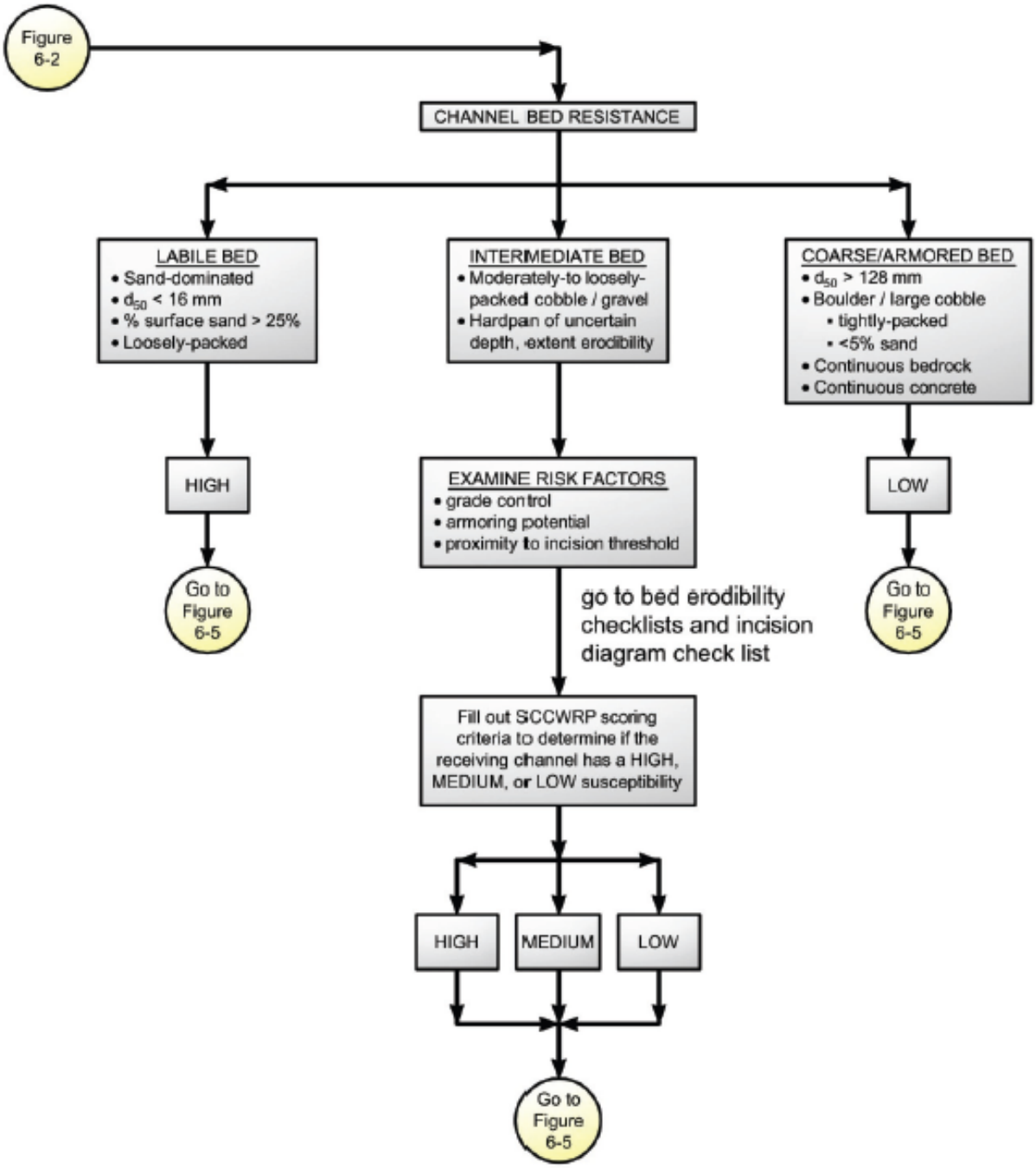


Figure 6-4. SCCWRP Vertical Susceptibility

Figure 12. SCCWRP Vertical Channel Susceptibility Matrix

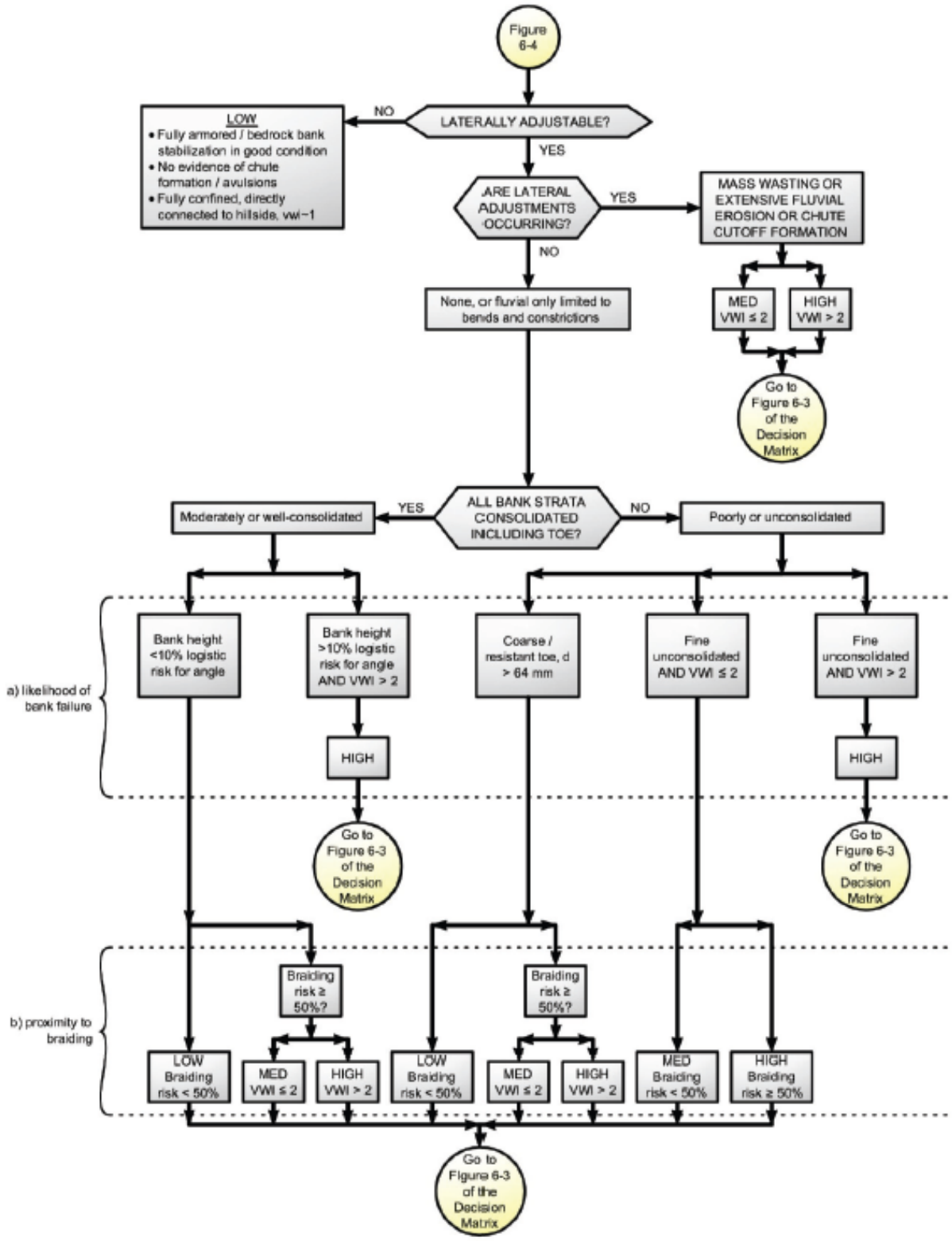
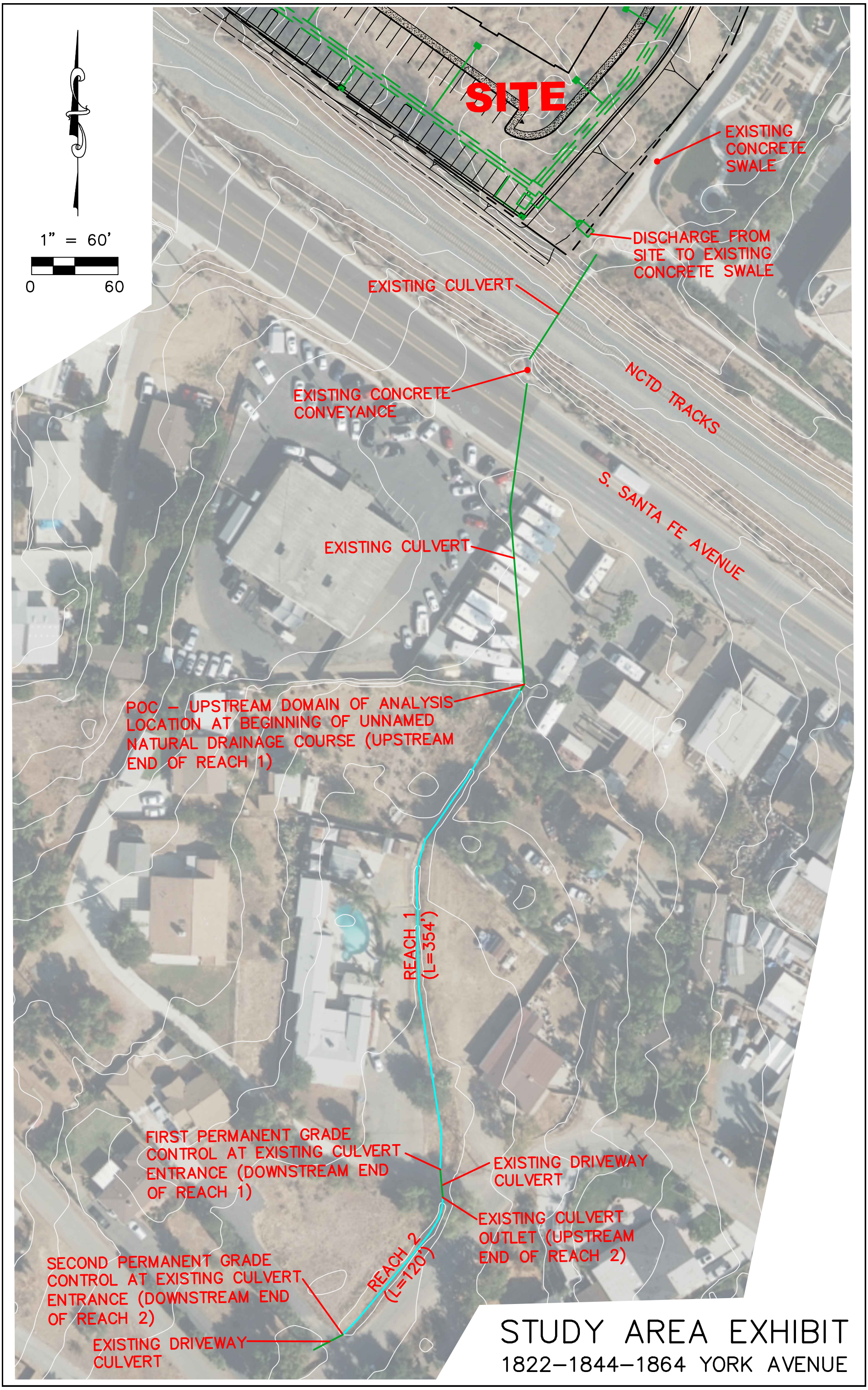


Figure 6-5. Lateral Channel Susceptibility

Figure 13. SCCWRP Lateral Channel Susceptibility Matrix

APPENDIX A

SCCWRP INITIAL DESKTOP ANALYSIS



STUDY AREA EXHIBIT

1822–1844–1864 YORK AVENUE

FORM 1: INITIAL DESKTOP ANALYSIS

Complete all shaded sections.

IF required at multiple locations, circle one of the following site types:

Applicant Site / Upstream Extent / Downstream Extent

Location: Latitude: 33.175992 Longitude: -117.212243

Description (river name, crossing streets, etc.): 1822-1844-1864 York Drive

Unnamed Natural Drainage Course that is tributary to Buena Creek

GIS Parameters: The International System of Units (SI) is used throughout the assessment as the field standard and for consistency with the broader scientific community. However, as the singular exception, US Customary units are used for contributing drainage area (A) and mean annual precipitation (P) to apply regional flow equations after the USGS. See SCCWRP Technical Report 607 for example measurements and "Screening Tool Data Entry.xls" for automated calculations.

Form 1 Table 1. Initial desktop analysis in GIS.

Symbol		Variable	Description and Source	Value
Watershed properties (English units)	**A**	Area (mi^2)	Contributing drainage area to screening location via published Hydrologic Unit Codes (HUCs) and/or ≤ 30 m National Elevation Data (NED), USGS seamless server	See attached Form 1 table on next page for calculated values for each reach.
	P	Mean annual precipitation (in)	Area-weighted annual precipitation via USGS delineated polygons using records from 1900 to 1960 (which was more significant in hydrologic models than polygons delineated from shorter record lengths)	
Site properties (SI units)	**S_v**	Valley slope (m/m)	Valley slope at site via NED, measured over a relatively homogenous valley segment as dictated by hillslope configuration, tributary confluences, etc., over a distance of up to ~500 m or 10% of the main-channel length from site to drainage divide	
	W_v	Valley width (m)	Valley bottom width at site between natural valley walls as dictated by clear breaks in hillslope on NED raster, irrespective of potential armoring from floodplain encroachment, levees, etc. (imprecise measurements have negligible effect on rating in wide valleys where VWI is >> 2, as defined in lateral decision tree)	

Form 1 Table 2. Simplified peak flow, screening index, and valley width index. Values for this table should be calculated in the sequence shown in this table, using values from Form 1 Table 1.

Symbol	Dependent Variable	Equation	Required Units	Value
Q_{10cfs}	10-yr peak flow (ft^3/s)	$Q_{10cfs} = 18.2 * A^{0.87} * P^{0.77}$	A (mi^2) P (in)	See attached Form 1 table on next page for calculated values for each reach.
Q_{10}	10-yr peak flow (m^3/s)	$Q_{10} = 0.0283 * Q_{10cfs}$	Q_{10cfs} (ft^3/s)	
INDEX	10-yr screening index ($m^{1.5}/s^{0.5}$)	$INDEX = S_v * Q_{10}^{0.5}$	Sv (m/m) Q_{10} (m^3/s)	
W_{ref}	Reference width (m)	$W_{ref} = 6.99 * Q_{10}^{0.438}$	Q_{10} (m^3/s)	
VWI	Valley width index (m/m)	$VWI = W_v/W_{ref}$	W_v (m) W_{ref} (m)	

(Sheet 1 of 1)

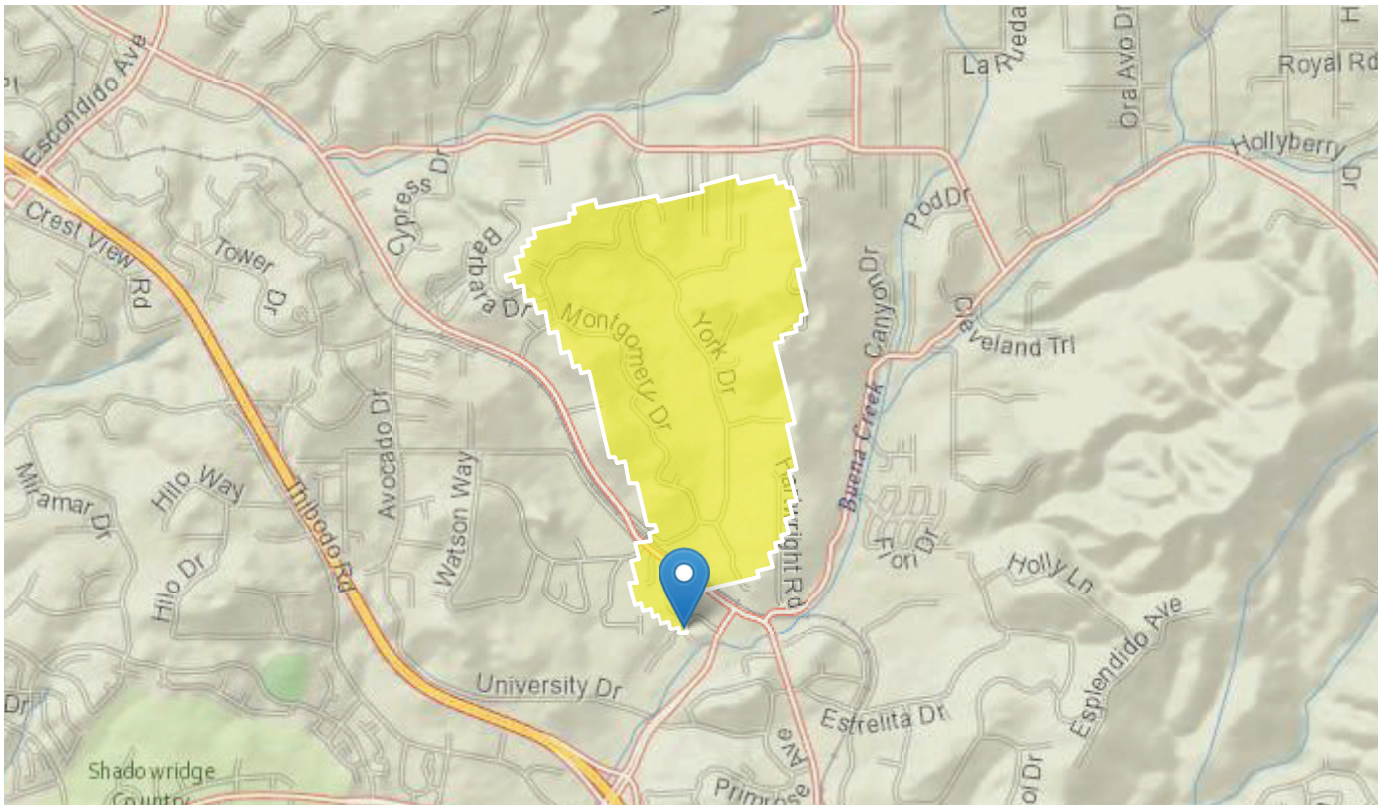
SCCWRP FORM 1 ANALYSES

Reach	Area A, sq. mi.	Mean Annual Precip. P, inches	Valley Slope Sv, m/m	Valley Width Wv, m	10-Year Flow Q10cfs, cfs	10-Year Flow Q10, cms
1	0.5038	13.09	0.0141	0.91	72.6	2.06
2	0.5038	13.09	0.0042	0.91	72.6	2.06

Reach	10-Year Screening Index INDEX	Reference Width Wref, m	Valley Width Index VWI, m/m
1	0.020	9.58	0.10
2	0.006	9.58	0.10

StreamStats Report

Region ID: CA
Workspace ID: CA20210629223245046000
Clicked Point (Latitude, Longitude): 33.17307, -117.21174
Time: 2021-06-29 15:33:15 -0700



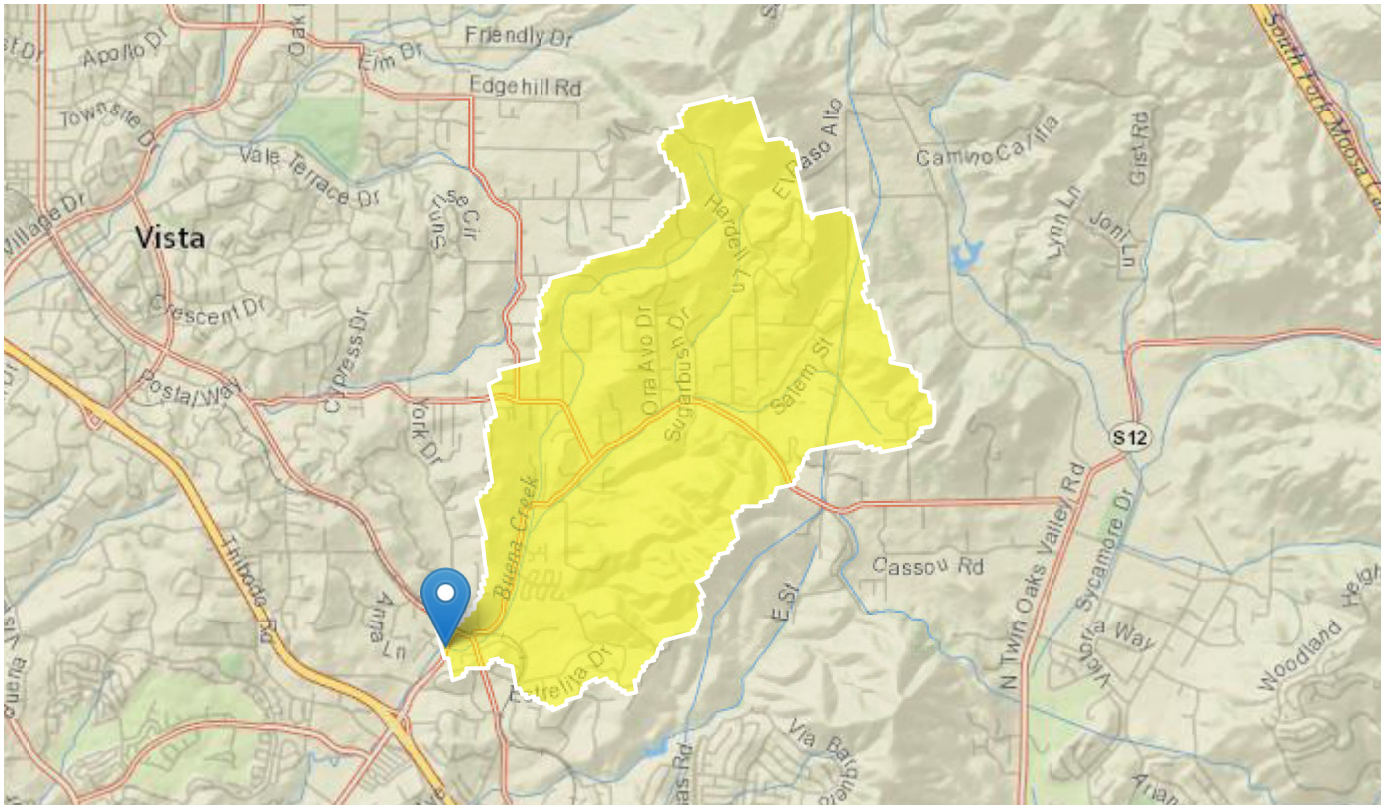
Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.5038	square miles

General Disclaimers

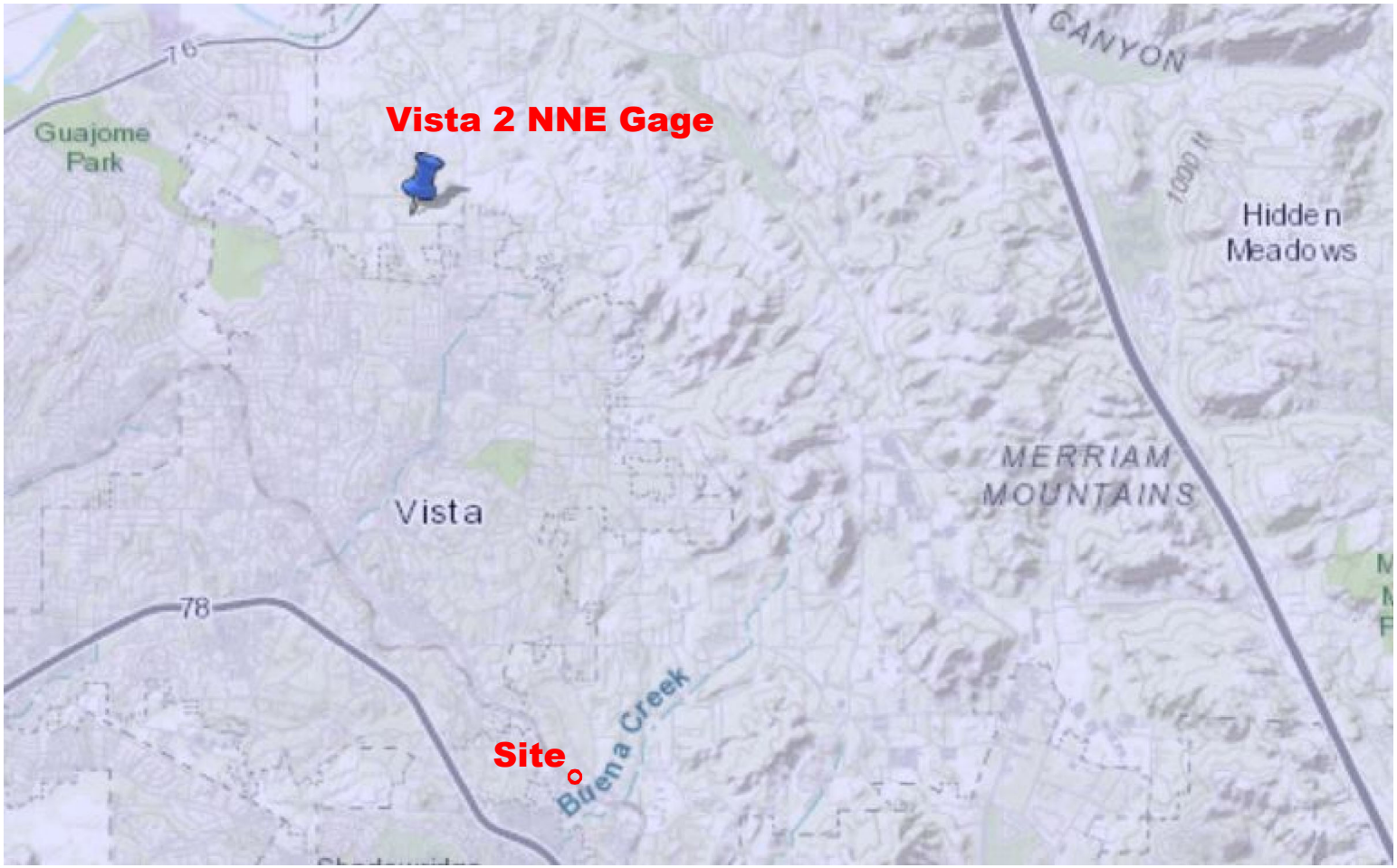
StreamStats Report

Region ID: CA
Workspace ID: CA20210716054904726000
Clicked Point (Latitude, Longitude): 33.17242, -117.21056
Time: 2021-07-15 22:49:31 -0700



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	3.7	square miles



Rain Gage Location

VISTA 2 NNE, CALIFORNIA (049378)

Period of Record Monthly Climate Summary

Period of Record : 08/01/1957 to 05/12/2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	67.4	67.8	68.2	70.8	72.9	76.3	81.3	83.0	82.2	77.9	72.3	67.4	74.0
Average Min. Temperature (F)	44.0	45.0	46.3	48.5	53.5	56.6	60.3	61.6	60.0	55.0	48.3	44.0	51.9
Average Total Precipitation (in.)	2.76	2.55	2.24	1.05	0.22	0.11	0.06	0.07	0.25	0.54	1.40	1.83	13.09
Average Total SnowFall (in.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
Max. Temp.: 86.6% Min. Temp.: 87% Precipitation: 87.6% Snowfall: 87.7% Snow Depth: 87.3%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

APPENDIX B

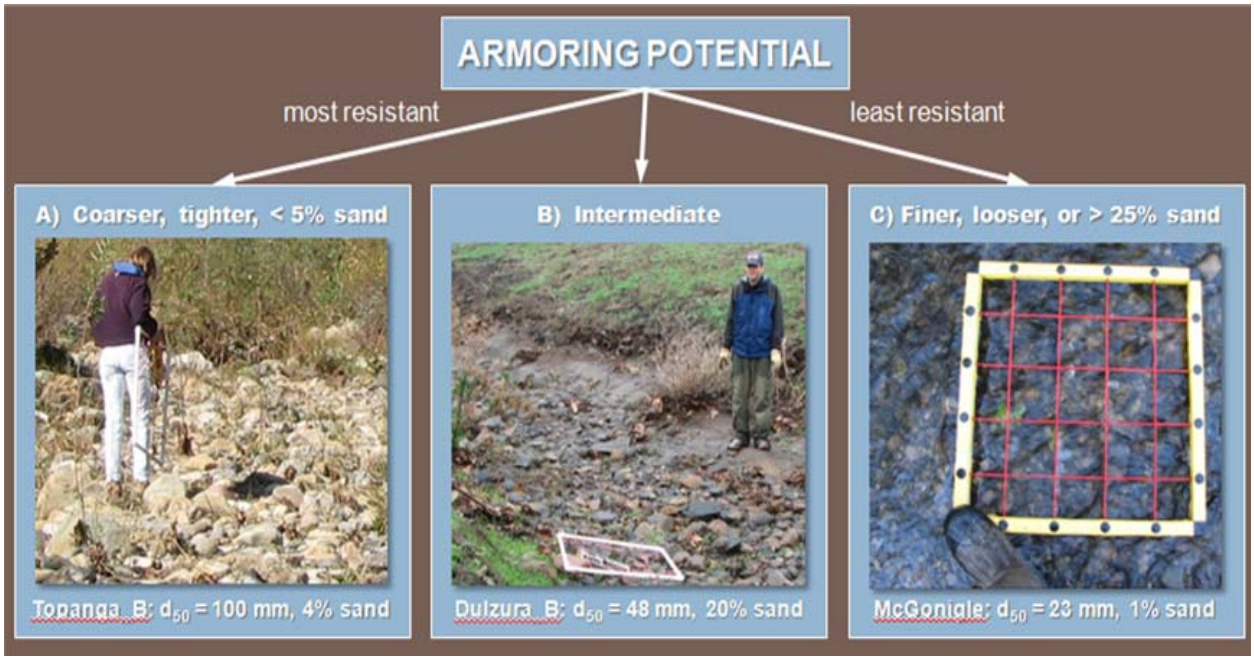
SCCWRP FIELD SCREENING DATA

Form 3 Support Materials

Form 3 Checklists 1 and 2, along with information recording in Form 3 Table 1, are intended to support the decisions pathways illustrated in Form 3 Overall Vertical Rating for Intermediate/Transitional Bed.

Form 3 Checklist 1: Armoring Potential

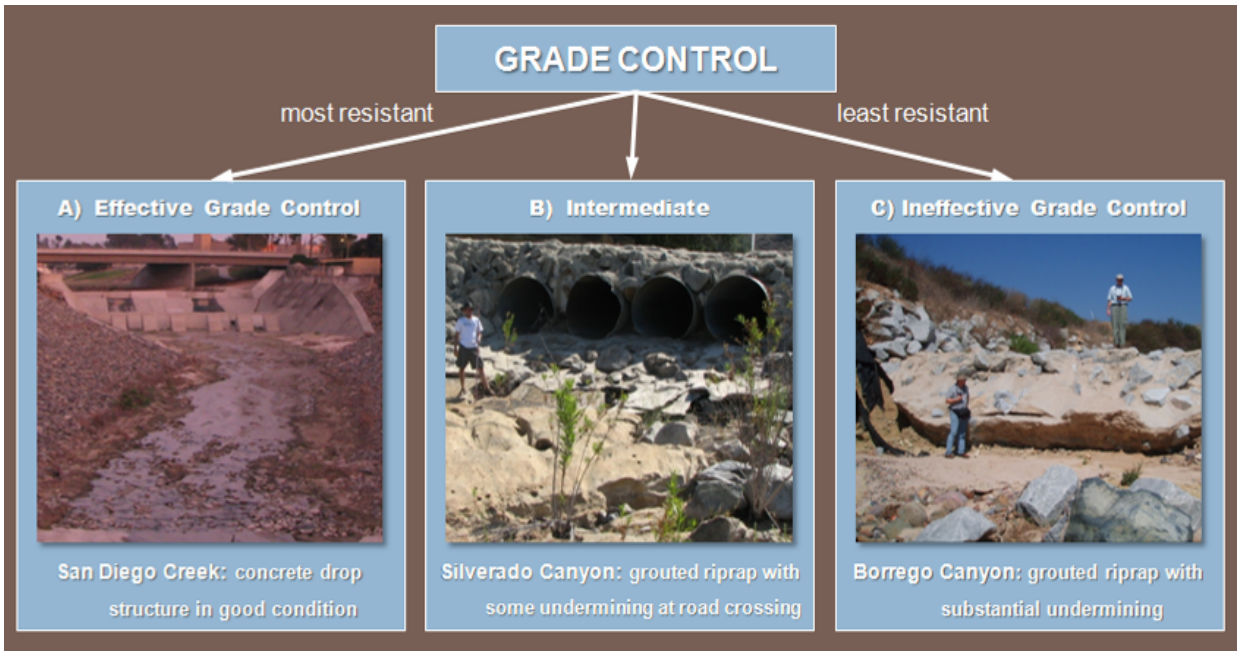
□	A	A mix of coarse gravels and cobbles that are tightly packed with <5% surface material of diameter <2 mm
X	B	Intermediate to A and C or hardpan of unknown resistance, spatial extent (longitudinal and depth), or unknown armoring potential due to surface veneer covering gravel or coarser layer encountered with probe
□	C	Gravels/cobbles that are loosely packed or >25% surface material of diameter <2 mm



Form 3 Figure 2. Armoring potential photographic supplement for assessing intermediate beds (16 < d_{50} < 128 mm) to be used i**n conjunction with Form 3 Checklist 1.**

Form 3 Checklist 2: Grade Control

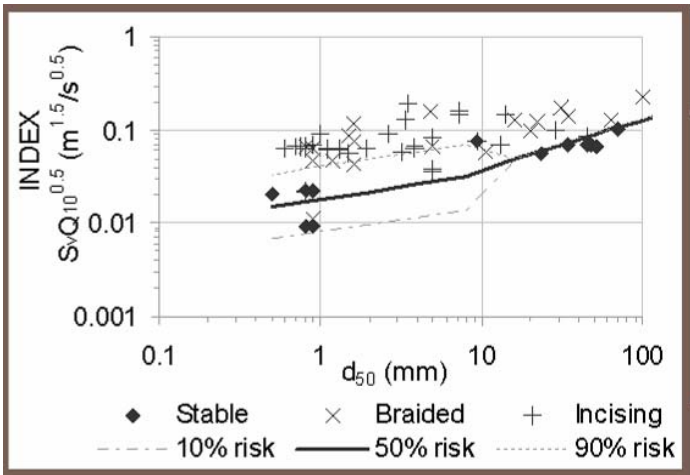
x	A	Grade control is present with spacing <50 m or $2/S_v$ m • No evidence of failure/ineffectiveness, e.g., no headcutting (>30 cm), no active mass wasting (analyst cannot say grade control sufficient if mass-wasting checklist indicates presence of bank failure), no exposed bridge pilings, no culverts/structures undermined • Hard points in serviceable condition at decadal time scale, e.g., no apparent undermining, flanking, failing grout • If geologic grade control, rock should be resistant igneous and/or metamorphic; For sedimentary/hardpan to be classified as 'grade control', it should be of demonstrable strength as indicated by field testing such as hammer test/borings and/or inspected by appropriate stakeholder
□	B	Intermediate to A and C – artificial or geologic grade control present but spaced 2/Sv m to 4/Sv m or potential evidence of failure or hardpan of uncertain resistance
□	C	Grade control absent, spaced >100 m or $>4/S_v$ m, or clear evidence of ineffectiveness



Form 3 Figure 3. Grade-control (condition) photographic supplement for assessing intermediate beds ($16 < d_{50} < 128$ mm) to be used in conjunction with Form 3 Checklist 2.

Regionally-Calibrated Screening Index Threshold for Incising/Braiding

For transitional bed channels (d_{50} between 16 and 128 mm) or labile beds (channel not incised past critical bank height), use Form 3 Figure 3 to determine Screening Index Score and complete Form 3 Table 1.



Model Type	d_{50} (mm)	50% Risk $S_vQ_{10}^{0.5}$ ($m^{1.5}/s^{0.5}$)
Logistic Regression $d_{50} \geq 16$ mm	128	0.145
	96	0.125
	80	0.114
	64	0.101
	48	0.087
	32	0.070
	16	0.049
Logistic Reg. $d_{50} < 16$ mm	8	0.031
	4	0.026
	2	0.022
	1	0.018
	0.5	0.015

Form 3 Figure 4. Probability of incising/braiding based on logistic regression of Screening Index and d_{50} to be used in conjunction with Form 3 Table 1.

Form 3 Table 1. Values for Screening Index Threshold (probability of incising/braiding) to be used in conjunction with Form 3 Figure 4 (above) to complete Form 3 Overall Vertical Rating for Intermediate/Transitional Bed (below).. Screening Index Score: A = <50% probability of incision for current Q_{10}, valley slope, and d_{50}; B = Hardpan/d_{50} indeterminate; and C = ≥50% probability of incising/braiding for current Q_{10}, valley slope, and d_{50}.

d_{50} (mm) *From Form 2*	**$S_v*Q_{10}^{0.5}$ ($m^{1.5}/s^{0.5}$)** *From Form 1*	**$S_v*Q_{10}^{0.5}$ ($m^{1.5}/s^{0.5}$)** *50% risk of incising/braiding from table in Form 3 Figure 3 above*	**Screening Index Score (A, B, C)**

Overall Vertical Rating for Intermediate/Transitional Bed

Calculate the overall Vertical Rating for Transitional Bed channels using the formula below. Numeric values for responses to Form 3 Checklists and Table 1 as follows: A = 3, B = 6, C = 9.

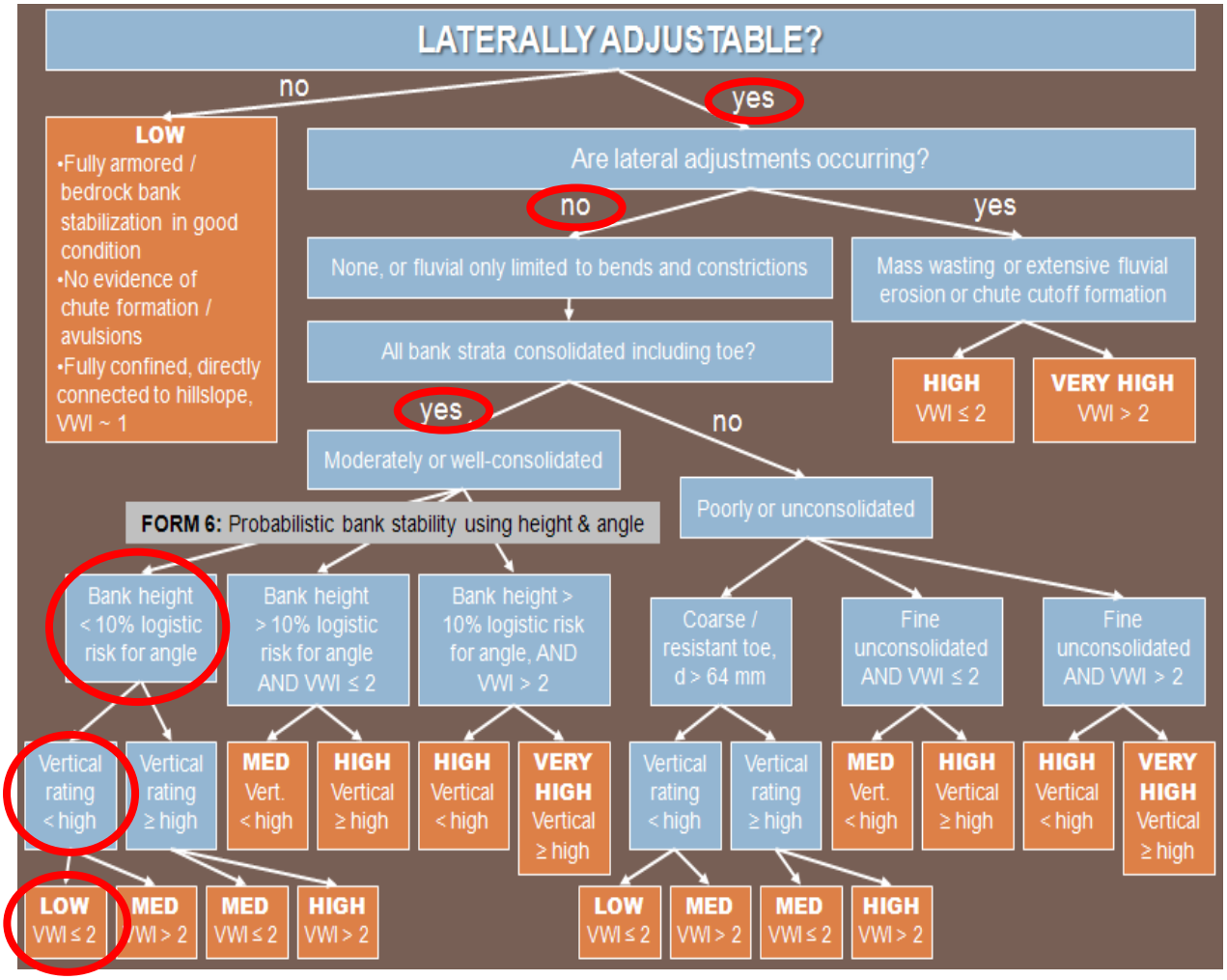
$$Vertical\ Rating = \sqrt{\{(\sqrt{armoring * grade\ control}) * screening\ index\ score\}}$$

6 x 3 x 3 = 3.6

Vertical Susceptibility based on Vertical Rating: <4.5 = LOW; 4.5 to 7 = MEDIUM; and >7 = HIGH.

FORM 4: LATERAL SUSCEPTIBILTY FIELD SHEET

Circle appropriate nodes/pathway for proposed site
OR use sequence of questions provided in Form 5.



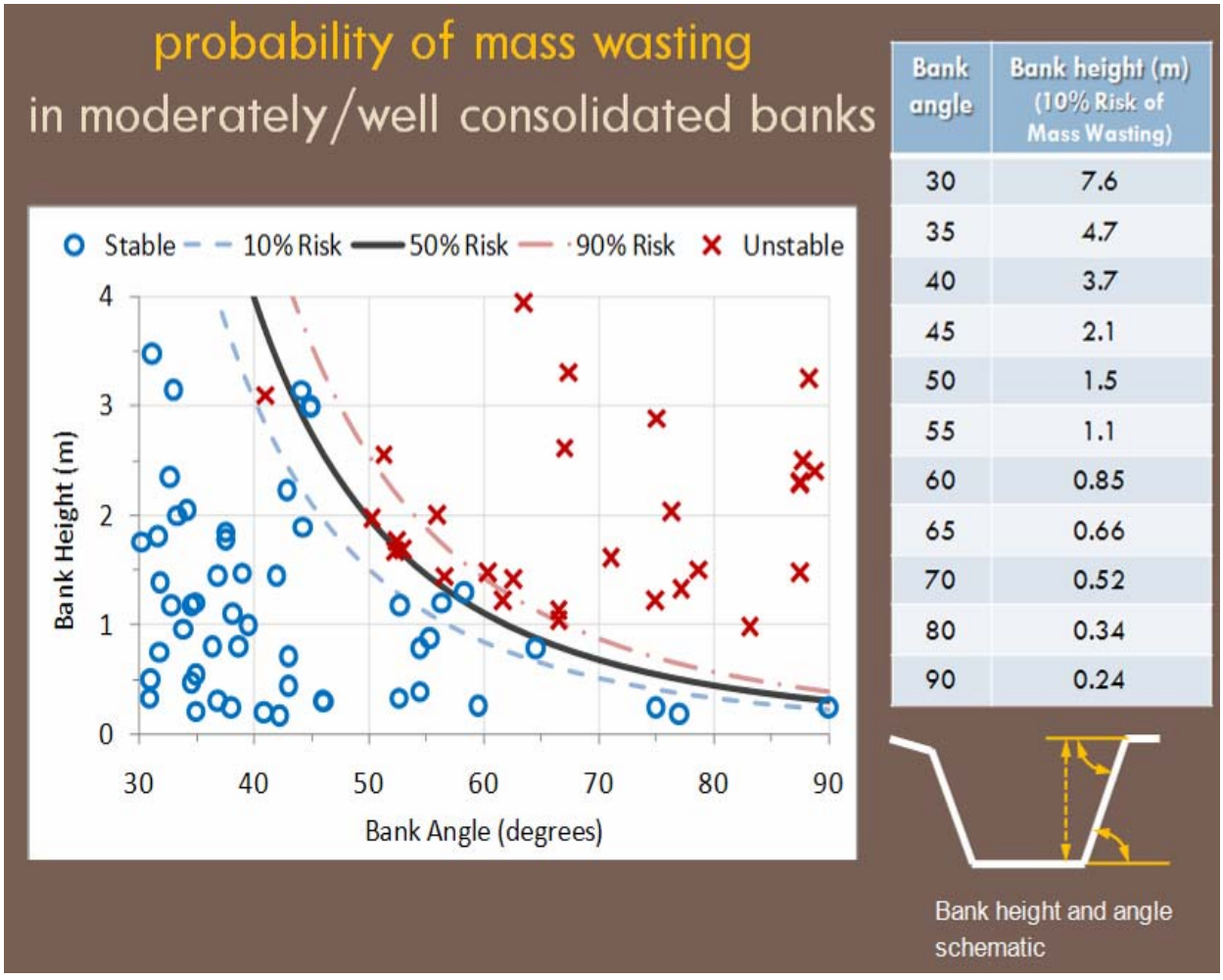
(Sheet 1 of 1)

REACH 1 AND 2 RESULTS

FORM 6: PROBABILITY OF MASS WASTING BANK FAILURE

If mass wasting is not currently extensive and the banks are moderately- to well-consolidated, measure bank height and angle at several locations (i.e., at least three locations that capture the range of conditions present in the study reach) to estimate representative values for the reach. Use Form 6 Figure 1 below to determine if risk of bank failure is >10% and complete Form 6 Table 1. Support your results with photographs that include a protractor/rod/tape/person for scale.

	Bank Angle (degrees) *(from Field)*	**Bank Height (m)** *(from Field)*	**Corresponding Bank Height for 10% Risk of Mass Wasting (m)** *(from Form 6 Figure 1 below)*	**Bank Failure Risk** *(<10% Risk)* *(>10% Risk)*
Left Bank	33.7 degrees (1.5:1)	---	---	<10%
Right Bank	33.7 degrees (1.5:1)	---	---	<10%

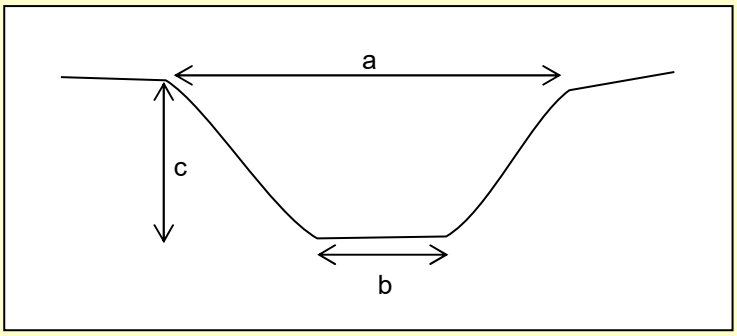


Form 6 Figure 1. Probability Mass Wasting diagram, Bank Angle:Height/% Risk table, and Band Height:Angle schematic.

Critical Flow Calculator

Reach 1

enter all values in green cells
and drop down boxes



Inputs

a) Receiving channel width at top of bank (ft) - see figure on right	9.0
b) Channel width at bed (ft)	3.0
c) Bank height at top of bank (ft)	2.0
Channel gradient (ft/ft)	0.0141
Receiving channel roughness	Same as above, but more stones and weeds n=0.035

Channel materials (use weakest of bed or banks). If materials are varied use weakest material covering more than 20% of channel.

- unconsolidated sandy loam 0.035 lb/sq ft
- alluvial silt (non coloidal) 0.045 lb/sq ft
- medium gravel 0.12 lb/sq ft
- alluvial silt/clay 0.26 lb/sq ft
- 2.5 inch cobble 1.1 lb/sq ft
- enter own d50 (variable)
- vegetation (bed and banks) 0.6 lb/sq ft

Select method of calculating Q2

- Input own Q2
- Calculate Q2 using USGS regression

Receiving water watershed annual precip (inches)	13.09	Receiving water watershed area at PoC (sq mi)	0.5038
Project watershed annual precipitation (inches)	13.09	Project watershed area draining to PoC (sq mi)	0.5038

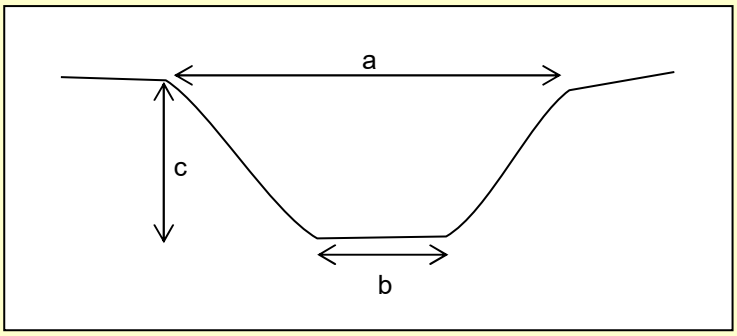
Outputs - Flow control range

Receiving water Q2	5.5	**Point of Compliance low flow rate (cfs)**	**2.8**
Project site Q2	5.5	**Low flow class**	**0.5Q2**
		Channel vulnerability	**Low**

Critical Flow Calculator

Reach 2

enter all values in green cells
and drop down boxes



Inputs

a) Receiving channel width at top of bank (ft) - see figure on right	9.0
b) Channel width at bed (ft)	3.0
c) Bank height at top of bank (ft)	2.0
Channel gradient (ft/ft)	0.0042
Receiving channel roughness	Same as above, but more stones and weeds n=0.035

Channel materials (use weakest of bed or banks). If materials are varied use weakest material covering more than 20% of channel.

- unconsolidated sandy loam 0.035 lb/sq ft
- alluvial silt (non coloidal) 0.045 lb/sq ft
- medium gravel 0.12 lb/sq ft
- alluvial silt/clay 0.26 lb/sq ft
- 2.5 inch cobble 1.1 lb/sq ft
- enter own d50 (variable)
- vegetation (bed and banks) 0.6 lb/sq ft

Select method of calculating Q2

- Input own Q2
- Calculate Q2 using USGS regression

Receiving water watershed annual precip (inches)	13.09	Receiving water watershed area at PoC (sq mi)	0.5038
Project watershed annual precipitation (inches)	13.09	Project watershed area draining to PoC (sq mi)	0.5038

Outputs - Flow control range

Receiving water Q2	5.5	**Point of Compliance low flow rate (cfs)**	**2.8**
Project site Q2	5.5	**Low flow class**	**0.5Q2**
		Channel vulnerability	**Low**

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.

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.

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.

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

- Either of two Resource Protection Ordinance (RPO) methods may also be used to demonstrate compliance with CCSYA requirements. Select either option and document the selection below:

  ☒ **RPO Scenario 1: PDP is subject to and in compliance with RPO requirements**[5]

  - **Select** if the project requires one or more discretionary permits;
  - **Demonstrate** that onsite AND upstream offsite CCSYAs will be avoided and/or bypassed.

  ☐ **RPO Scenario 2: PDP is entirely exempt/not subject to RPO requirements**[6]

  - **Select** if the project does not require discretionary permits;
  - **Demonstrate** that all upstream offsite CCSYAs will be bypassed[7].

A. Mapping Results -- At a minimum, show as applicable: (1) the project footprint, (2) areas of proposed development, (3) locations of onsite and upstream offsite CCSYAs, and (4) bypass of all identified CCSYAs.

There are no onsite CCYSAs and all upstream offsite PCCYSAs will be bypassed through an existing channel with a concrete bottom on the westerly edge of the project at velocities greater than 2 feet per second.

[5] RPO applicability is normally confirmed during discretionary review. Check with your project manager if you're not sure of your status.
[6] Does not include PDPs utilizing exemption(s) via RPO Section 86.604(e)(2)(cc) or 86.604(e)(3).
[7] This scenario does not impose requirements for onsite CCSYAs.

B. Explanation -- Provide documentation as needed to demonstrate that (1) onsite CCSYAs are avoided and bypassed [if applicable], and (2) upstream offsite CCYSAs 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)

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.

PART 1 PROJECT INFORMATION

A. Project Summary Information	
Project Name	
Record ID (e.g. grading/improvement plan number, building permit)	
Project Address	
Assessor's Parcel Number(s) APN(s)	
Project Watershed (Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	
B. Owner Information	
Name	
Address	
Email Address	
Phone Number	

COUNTY – OFFICIAL USE ONLY	
INTAKE ID#	
ACCEPTANCE ID#	

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

If final grade release or granting of occupancy is being requested for only a portion of the Priority Development Project (PDP) please fill out the table below. Include ALL of the Structural BMPs and/or Significant Site Design BMPs for the entire project in the table. **Include a mark-up of the DMA map from the approved SWQMP with this Verification package that clearly shows which DMAs you are submitting for approval and which DMAs have already been accepted (if any).**

DMA #	APN or Lot #	BMP ID #	WPP Acceptance Date (If applicable)	WPP Acceptance ID# (If applicable, e.g. 20/21-001)

PART 2 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.
- 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.

DMA #	BMP Information			Maintenance Category (1, 2, 3, or 4)	Maintenance Agreement Recorded DOC #	Construction Plan Sheet #	Landscape Plan Sheet #	FOR DPW-WPP USE ONLY
	Quantity	Description/Type of Structural BMP	BMP ID #					
A. Structural BMPs (S-BMPs)								
Add rows as needed. Click into the last column in the row below this, then press TAB to add a new row.								
B. Significant Site Design BMPs (SSD-BMPs)								
		Choose an item.		Choose				
		Choose an item.		Choose				
		Choose an item.		Choose				
		Choose an item.		Choose				
		Choose an item.		Choose				
		Choose an item.		Choose				
Add rows as needed. Click into the last column in the row below this, then press TAB to add a new row.								

PART 3 REQUIRED ATTACHMENTS

For the permanent BMPs listed in Part 2, submit the following to the County inspector along with this Verification form as a package (check all that are attached):

☐ **PHOTOGRAPHS:** Final construction photos of every permanent BMP listed in Part 2 are required. Final photos must be recent and be labeled with the date and a BMP Identifier. Additional photographs illustrating proper construction of the BMPs are recommended to be included and may be requested by WPP prior to acceptance of this Verification (e.g. excavation depths, liners, hydromodification orifices, Biofiltration Soil Media (BSM), vegetation, mulch).

☐ **MAINTENANCE AGREEMENTS:** Copies of approved and recorded Storm Water Maintenance Agreements (SWMA), Category 1 Maintenance Notification Agreements (MN), or Encroachment Maintenance and Removal Agreements (EMRA) for all S-BMPs.

Note: Significant Site Design (SSD) BMPs and most Category 4 BMPs do not require recorded maintenance agreements.

☐ **CONSTRUCTION PLANS:** Submit electronic and/or 11" X 17" hard copies of the current approved Construction Plan sheets for the Record ID(s) listed on Page 1:

- ☐ Grading Plans
- ☐ Improvement Plans
- ☐ Precise Grading Plan
- ☐ Building Plan (Applicable BMP Sheets only)
- ☐ Other (Please specify) _____

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

- A BMP Table on Sheet 1, AND
- A plan detail cross-section of each verified as-built BMP, AND
- The location of each verified as-built BMP

☐ **LANDSCAPE PLANS**: If the PDP includes vegetated BMPs and has a Landscape Plan, submit the following:

- ☐ Final Landscape Plans
- ☐ Proof of Irrigation Installed (if applicable)

PART 4 PREPARER'S CERTIFICATION

By signing below, I certify that the BMP(s) listed in Part 2 of this Verification Form have been constructed and 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 must be certified by a licensed professional engineer.

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

Preparer's Name:	
Email Address:	
Phone Number:	
Preparer's Signature:	
Date:	

[SEAL]

PROJECT RECORD ID: _____

COUNTY - OFFICIAL USE ONLY

County Inspector Approval:

***NOTE: The County approved SWQMP document and any Addendums or Revisions must be included with this BMP Installation Verification submittal package.**

- ☐ DPW Private Development Construction Inspection (PDCI)
- ☐ PDS Building
- ☐ DGS
- ☐ DPR

By signing below, the County Inspector concurs that every BMP listed in Part 2 of this BMP Installation Verification form has been installed per plan.

Inspector Name: _____

Inspector's Signature: _____ Date: _____

DPW Watershed Protection Program (WPP) Acceptance:

Date Received: _____

WPP Reviewer: _____

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

WPP Reviewer's Signature: _____ Date: _____

Enter Acceptance ID# on page 1.

NOTES:

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.

SITE SPECIFIC DATA			
PROJECT NUMBER		13317	
PROJECT NAME		YORK DRIVE ACTIVE SENIORS SITE	
PROJECT LOCATION		VISTA, CA	
STRUCTURE ID		BMP 1	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
8,800		N/A	
TREATMENT HGL AVAILABLE (FT)			N/K
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			TBD
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	433.00	TBD	TBD
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	432.50	TBD	TBD
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	441.25	441.25	441.25
SURFACE LOAD	HS20	HS20	HS20
FRAME & COVER	ø30"	30" X 48"	N/A
WETLANDMEDIA VOLUME (CY)			4.85
ORIFICE SIZE (DIA. INCHES)			5EA ø0.61"

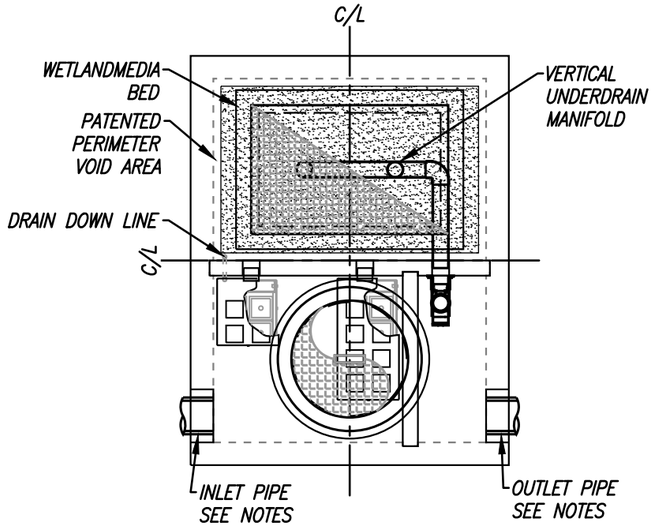
NOTES: PRELIMINARY NOT FOR CONSTRUCTION. MWS CONTROLS THE HGL IN UPSTREAM DETENTION AND FACILITATES BYPASS OF PEAK FLOWS TO BOTH DETENTION AND MWS. EOR TO PROVIDE PEAK FLOW RATE AND INLET/OUTLET PIPE SIZES.

INSTALLATION NOTES

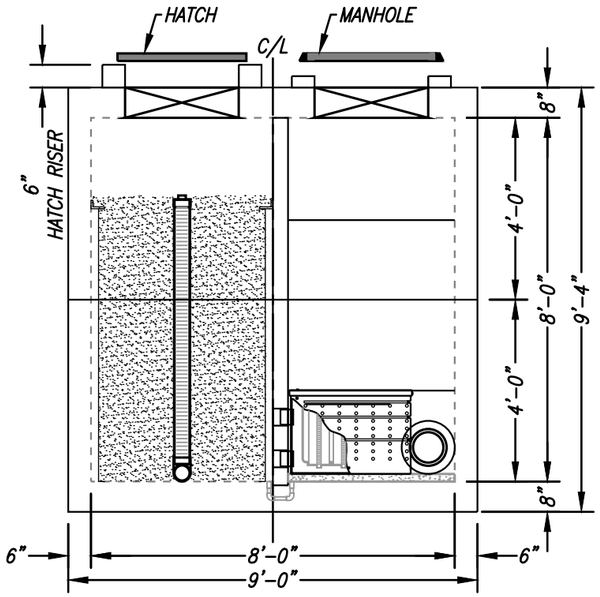
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS' SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATERTIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL PIPES, RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

GENERAL NOTES

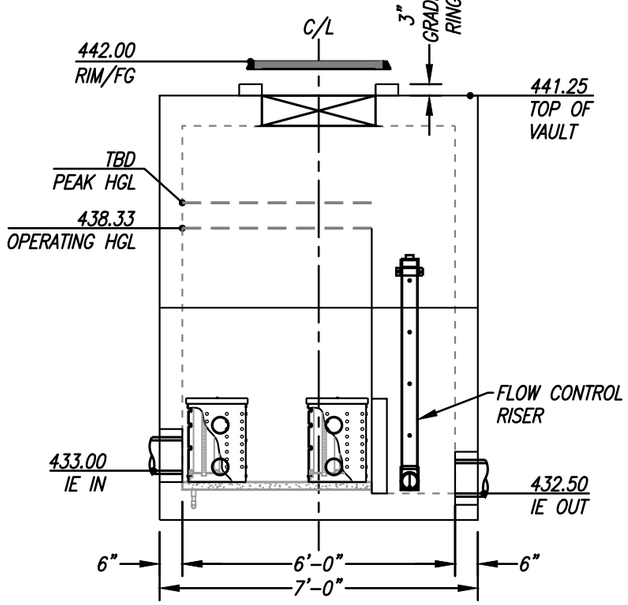
1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.



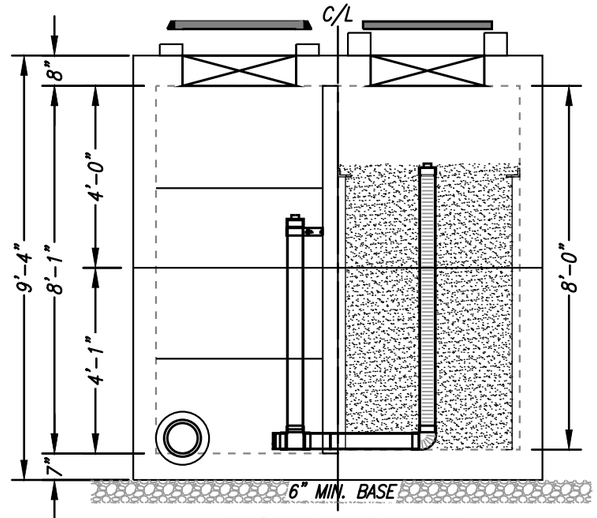
PLAN VIEW



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

INTERNAL BYPASS DISCLOSURE:

THE DESIGN AND CAPACITY OF THE PEAK CONVEYANCE METHOD TO BE REVIEWED AND APPROVED BY THE ENGINEER OF RECORD. HGL(S) AT PEAK FLOW SHALL BE ASSESSED TO ENSURE NO UPSTREAM FLOODING. PEAK HGL AND BYPASS CAPACITY SHOWN ON DRAWING ARE USED FOR GUIDANCE ONLY.

LOW INFLOW PIPE DISCLOSURE:

IT IS RECOMMENDED THAT A SUFFICIENT VARIATION IN ELEVATION BETWEEN THE INLET AND OUTLET BE PROVIDED TO ALLOW FOR ACCUMULATION OF SEDIMENT IN THE PRE–TREATMENT CHAMBER. FAILURE TO DO SO MAY RESULT IN BLOCKAGE AT INFLOW POINT(S) WHICH MAY CAUSE UPSTREAM FLOODING.

REQUIRED TREATMENT VOLUME (CF)		8,800
DRAINDOWN DURATION (HOURS)		36
AVERAGE DISCHARGE RATE PER MWS UNIT(GPM)		30.69
OPERATING HEAD (FT)		5.83
WETLANDMEDIA INFILTRATION RATE (IN/HR)	OR	28
WETLANDMEDIA LOADING RATE (GPM/SF)		0.28

MWS-L-6-8-8'-0"-V-UG-HC
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

6/17/21SCHIPPER

HU-1
Cistern

BMP MAINTENANCE FACT SHEET
FOR
STRUCTURAL BMP HU-1 CISTERN

Cisterns are containers that capture runoff (typically rooftop runoff) and store it for future use such as irrigation or alternative grey water between storm events. Cisterns can be aboveground or below ground systems. Typical cistern components include:

- Storage container, barrel or tank for holding captured flows
- Inlet and associated valves and piping
- Outlet and associated valves and piping
- Overflow outlet
- Access riser or tank serviceway (i.e., access for underground and above-ground cisterns)
- Optional pump
- Optional first flush diverters
- Optional debris screen or pretreatment BMP (e.g., roof drain filter, drainage inlet insert)
- Optional roof, supports, foundation, level indicator, and other accessories

Normal Expected Maintenance

Cisterns can be expected to accumulate sediment and debris that is small enough to pass through the inlet into the storage container. Larger debris such as leaves or trash may accumulate at the inlet. While the storage container is generally a permanent structure, ancillary parts including valves, piping, screens, level indicators, and other accessories will wear and require occasional replacement. Maintenance of a cistern generally involves: removing accumulated sediment and debris from the inlet and storage container on a routine basis; and replacement of ancillary parts on an as-needed basis. A summary table of standard inspection and maintenance indicators is provided within this Fact Sheet. If the system as a whole includes a pump or other electrical equipment, maintenance of the equipment shall be based on the manufacturer's recommended maintenance plan.

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 inlet is found to be obstructed at every inspection such that storm water bypasses the cistern. The cistern is not functioning properly if it is not capturing storm water. This would require addition of ancillary features to protect the inlet, or pretreatment measures within the watershed draining to the cistern to intercept larger debris, such as screens on roof gutters, or drainage inserts within catch basins. Increase the frequency of inspection until the issue is resolved.
- Accumulation of sediment within one year is greater than 25% of the volume of the cistern. This means the sediment load from the tributary drainage area has diminished the storage volume of the cistern and the cistern will not capture the required volume of storm water. This would require pretreatment measures within the tributary area draining to the cistern to intercept sediment.
- The cistern is not drained between storm events. If the cistern is not drained between storm events, the storage volume will be diminished and the cistern will not capture the required volume of storm water from subsequent storms. This would require implementation of practices onsite to drain and use the stored water, or a different BMP if onsite use cannot be reliably sustained.

HU-1
Cistern

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR HU-1 CISTERN		
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 Inspection and Maintenance Frequency**
Accumulation of sediment, litter, or debris at the inlet	Remove and properly dispose of accumulated materials.	• Inspect monthly and after every 0.5-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Outlet blocked	Clear blockage.	• Inspect monthly and after every 0.5-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Accumulation of sediment, litter, or debris in the storage container	Remove and properly dispose of accumulated materials.	• 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 materials annually (minimum), or more frequently when BMP is 25% full* (or at manufacturer threshold if manufacturer threshold is less than 25% full*) in less than one year, or if accumulation blocks outlet
Standing water in storage container between storm events outside of normal use timeframe for the stored water. Normal use timeframe is 36 to 96 hours following a storm event depending on the purpose and design of the cistern.	Use the water as intended, or disperse to landscaping. Implement practices onsite to drain and use the stored water. Contact the [City Engineer] to determine a solution if onsite use cannot be reliably sustained.	• 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.

*"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 HU-1 CISTERN (Continued from previous page)		
Threshold/Indicator	**Maintenance Action**	**Typical Inspection and Maintenance Frequency**
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 using the water as intended for irrigation or alternative grey water, or by dispersing to landscaping; second, check cistern outlet for blockage and clear blockage if applicable to restore drainage; third, install barriers such as screens that prevent mosquito access to the storage container.	• 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.
Leaks or other damage to ancillary parts including valves, piping, screens, level indicators, and other accessories	Repair or replace as applicable.	• Inspect twice per year. • Maintenance when needed.
Leaks or other damage to storage container	Repair or replace as applicable.	• Inspect twice per year. • Maintenance when needed.
Cistern leaning or unstable, damage to roof, supports, anchors, or foundation	Make repairs as appropriate to correct the problem and stabilize the system.	• Inspect twice per year. • 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 HU-1.
http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=250&Itemid=220

HU-1
Cistern

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HU-1
Cistern

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 HU-1 CISTERN PAGE 1 of 4			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Accumulation of sediment, litter, or debris at the inlet Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove and properly dispose of accumulated materials ☐ If the inlet is found to be obstructed at every inspection, add features to protect the inlet, or pretreatment measures within the watershed ☐ Other / Comments:		
Outlet blocked Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Clear blockage ☐ Other / Comments:		

HU-1
Cistern

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

INSPECTION AND MAINTENANCE CHECKLIST FOR HU-1 CISTERN PAGE 2 of 4			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Standing water in storage container between storm events outside of normal use timeframe for the stored water. Normal use timeframe is 36 to 96 hours following a storm event depending on the purpose and design of the cistern. Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Use the water as intended, or disperse to landscaping ☐ Implement practices onsite to drain and use the stored water ☐ Contact the [City Engineer] to determine a solution if onsite use cannot be reliably sustained ☐ 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	☐ Use the water as intended, or disperse to landscaping ☐ Install barriers such as screens that prevent mosquito access to the storage container ☐ Other / Comments:		

HU-1
Cistern

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

INSPECTION AND MAINTENANCE CHECKLIST FOR HU-1 CISTERN PAGE 3 of 4			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Accumulation of sediment, litter, or debris in the storage container – to be cleared once per year or when debris accumulation is 25% of the total container volume, or accumulation blocks outlet, whichever is more frequent Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove and properly dispose of accumulated materials ☐ If accumulation of sediment within one year is >25% of the volume of the cistern, add pretreatment measures within the watershed ☐ Other / Comments:		
Leaks or other damage to storage container Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Repair or replace as applicable ☐ Other / Comments:		

HU-1
Cistern

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

INSPECTION AND MAINTENANCE CHECKLIST FOR HU-1 CISTERN PAGE 4 of 4			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Leaks or other damage to ancillary parts including valves, piping, screens, level indicators, and other accessories Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Repair or replace as applicable ☐ Other / Comments:		
Cistern leaning or unstable, damage to roof, supports, anchors, or foundation Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Make repairs as appropriate to correct the problem and stabilize the system ☐ Other / Comments:		

SD-1
Tree Wells

BMP MAINTENANCE FACT SHEET
FOR
SITE DESIGN BMP SD-1 TREE WELLS

Tree wells as site design BMPs are trees planted in configurations that allow storm water runoff to be directed into the soil immediately surrounding the tree. The tree may be contained within a planter box or structural cells. The surrounding area will be graded to direct runoff to the tree well. There may be features such as tree grates, suspended pavement design, or shallow surface depressions designed to allow runoff into the tree well. Typical tree well components include:

- Trees of the appropriate species for site conditions and constraints
- Available growing space based on tree species, soil type, water availability, surrounding land uses, and project goals
- Entrance/opening that allows storm water runoff to flow into the tree well (e.g., a curb opening, tree grate, or surface depression)
- Optional suspended pavement design to provide structural support for adjacent pavement without requiring compaction of underlying layers
- Optional root barrier devices as needed; a root barrier is a device installed in the ground, between a tree and the sidewalk, intended to guide roots down and away from the sidewalk in order to prevent sidewalk lifting from tree roots
- Optional tree grates; to be considered to maximize available space for pedestrian circulation and to protect tree roots from compaction related to pedestrian circulation; tree grates are typically made up of porous material that will allow the runoff to soak through
- Optional shallow surface depression for ponding of excess runoff
- Optional planter box drain

Normal Expected Maintenance

Tree health shall be maintained as part of normal landscape maintenance. Additionally, ensure that storm water runoff can be conveyed into the tree well as designed. That is, the opening that allows storm water runoff to flow into the tree well (e.g., a curb opening, tree grate, or surface depression) shall not be blocked, filled, re-graded, or otherwise changed in a manner that prevents storm water from draining into the tree well. A summary table of standard inspection and maintenance indicators is provided within this Fact Sheet.

Non-Standard Maintenance or BMP Failure

Tree wells are site design BMPs that normally do not require maintenance actions beyond routine landscape maintenance. The normal expected maintenance described above ensures the BMP functionality. If changes have been made to the tree well entrance / opening such that runoff is prevented from draining into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well, or a surface depression has been filled so runoff flows away from the tree well), the BMP is not performing as intended to protect downstream waterways from pollution and/or erosion. Corrective maintenance will be required to restore drainage into the tree well as designed.

Surface ponding of runoff directed into tree wells is expected to infiltrate/evapotranspirate within 24-96 hours following a storm event. 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 or compaction of the soils surrounding the tree. Loosen or replace the soils to restore drainage.

Other Special Considerations

Site design BMPs, such as tree wells, installed within a new development or redevelopment project are components of an overall storm water management strategy for the project. The presence of site design BMPs within a project is usually a factor in the determination of the amount of runoff to be managed with structural BMPs (i.e., the amount of runoff expected to reach downstream retention or biofiltration basins that process storm water runoff from the project as a whole). When site design BMPs are not maintained or are removed, this can lead to clogging or failure of downstream structural BMPs due to greater delivery of runoff and pollutants than intended for the structural BMP. Therefore, the [City Engineer] may require confirmation of maintenance of site design BMPs as part of their structural BMP maintenance documentation requirements. Site design BMPs that have been installed as part of the project should not be removed, nor should they be bypassed by re-routing roof drains or re-grading surfaces within the project. If changes are necessary, consult the [City Engineer] to determine requirements.

SD-1
Tree Wells

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR SD-1 TREE WELLS		
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**
Tree health	Routine actions as necessary to maintain tree health.	• Inspect monthly. • Maintenance when needed.
Dead or diseased tree	Remove dead or diseased tree. Replace per original plans.	• Inspect monthly. • Maintenance when needed.
Standing water in tree well for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to tree health	Loosen or replace soils surrounding the tree to restore drainage.	• 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	Disperse any standing water from the tree well to nearby landscaping. Loosen or replace soils surrounding the tree to restore drainage (and prevent standing water).	• 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
Entrance / opening to the tree well is blocked such that storm water will not drain into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well; or a surface depression is filled such that runoff drains away from the tree well)	Make repairs as appropriate to restore drainage into the tree well.	• Inspect monthly. • Maintenance when needed.

References

American Mosquito Control Association.
http://www.mosquito.org/
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 SD-1.
http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=250&Itemid=220

SD-1
Tree Wells

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 SD-1 TREE WELLS PAGE 1 of 2			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Dead or diseased tree Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove dead or diseased tree ☐ Replace per original plans ☐ Other / Comments:		
Standing water in tree well for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to tree health Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Loosen or replace soils surrounding the tree to restore drainage ☐ Other / Comments:		

SD-1
Tree Wells

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

INSPECTION AND MAINTENANCE CHECKLIST FOR SD-1 TREE WELLS PAGE 2 of 2			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
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	☐ Disperse any standing water from the tree well to nearby landscaping ☐ Loosen or replace soils surrounding the tree to restore drainage (and prevent standing water) ☐ Other / Comments:		
Entrance / opening to the tree well is blocked such that storm water will not drain into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well; or a surface depression is filled such that runoff drains away from the tree well) Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Make repairs as appropriate to restore drainage into the tree well ☐ Other / Comments:		

PROJECT CHARACTERISTICS	
SOIL TYPE	D
PARCEL AREA	4.272 ACRES
DISTURBED AREA	4.387 ACRES
PROPOSED IMPERVIOUS AREA	2.873 ACRES
PROPOSED PERVIOUS AREA	1.514 ACRES
DEPTH TO GROUNDWATER	> 20 FEET

LEGEND	SYMBOL
DMA NAME DMA AREA (SF)	DMA 1 141,027 SF
SELF-MITIGATING DMA	SM 1
DE MINIMIS AREA	DMIN 1
POINT OF CONCENTRATION	POC 1
DMA BOUNDARY	
PROJECT BOUDNARY	
FLOW PATH	
CATCH BASIN	
RIP RAP ENERGY DISSIPATER PER D40	
72" CMP STORMWATER SYSTEM	
ASPHALT PVMT	
MODULAR WETLAND SYSTEM	MWS
GREEN STREET TREE WELL	
STORM DRAIN	SD

30' 15 0' 30' 60' 90'

SCALE: 1" = 30'

DATE OF PREPARATION:		
REVISIONS	DESCRIPTION	DATE

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COUNTY OF SAN DIEGO, CALIFORNIA

SHEET 1 OF 3

HYDROMODIFICATION & TREATMENT CONTROL BMPS

DEVELOPED CONDITIONS

STORMWATER RUNOFF FROM THE PROPOSED PROJECT SITE IS ROUTED TO ONE (1) POINTS OF COMPLIANCE, POC-1 LOCATED NEAR THE SOUTHWEST CORNER OF THE PROJECT SITE. POC-1 COLLECTS RUNOFF FROM DMA 1, DMA GS YD1, DMA GS DRWY, DMA GA YD2 AND SM-1.

PRIOR TO DISCHARGING FROM THE PROJECT SITE, DEVELOPED ON-SITE RUNOFF FROM DMA-1 IS DRAINED TO A ONSITE RECEIVING 72-INCH CMP STORMWATER SYSTEM (HYDROMODIFICATION-BMPS OR HMP-BMPS) BEFORE FLOWS ARE TREATED IN MODULAR WETLAND SYSTEMS (PROPRIETARY BIOFILTRATION BMPS) FOR WATER QUALITY PURPOSES.

DMA GS YD1 INCLUDES A PORTION OF THE FRONTAGE STREET IMPROVEMENTS FOR YORK DRIVE WILL DRAIN INTO THREE (3) TREE WELLS FOR POLLUTANT CONTROL. FOR THE STORMWATER ANALYSIS, THIS STREET FRONTAGE IS CONSIDERED "GREEN STREETS".

DMA GS DRWY INCLUDES A PORTION OF THE ONSITE DRIVEWAY IMPROVEMENTS AND WILL BE TREATED BY THREE (3) TREE WELLS.

DMA GS YD2 INCLUDES A PORTION OF THE ONSITE DRIVEWAY IMPROVEMENTS AND YORK DRIVE IMPROVEMENTS.

HYDROMODIFICATION WILL BE COMPENSATED BY THE 72-INCH CMP STORMWATER SYSTEM IN DMA 1 THAT ALSO DRAINS TO POC 1.

DMA	Tributary Area, A (Ac)	Impervious Percentage, Ip
DMA 1	3.238	78.51%
GS DRWY	0.152	82.09%
SM 1	0.700	0.00%
GS YD2	0.120	82.06%
TOTAL	4.090	-

HYDROMODIFICATION VOLUME IS PROPOSED FOR HYDROMODIFICATION CONFORMANCE AND FLOOD CONTROL FOR THE PROJECT'S POCS. THE DIMENSIONS REQUIRED FOR HMP CONFORMANCE IS BASED ON THE SWMM MODEL THAT WAS UNDERTAKEN FOR THE PROJECT. HMP CONFORMANCE IS DISCUSSED WITHIN THE HYDROMODIFICATION MANAGEMENT PLAN PREPARED BY BHA INC. FOR THIS PROJECT .

STORM WATER WILL ENTER THE WATER QUALITY PORTION OF THE 72-INCH CMP STORMWATER SYSTEM THROUGH INFLOW PIPES. FLOWS WILL DISCHARGE FROM THE STORMDRAIN CLEANOUT AND THE DOWNSTREAM MODULAR WETLAND SYSTEM (MWS). THE 72-INCH CMP STORMWATER SYSTEM (BMP 1) WAS MODELED WITH THE STORAGE UNIT MODULE WITHIN SWMM. THE STORAGE UNIT CAN MODEL THE UNDERDRAIN WITH ORIFICE PLATE AND VAULT STORAGE POND UP TO THE ELEVATION OF THE REQUIRED DESIGN CAPTURE VOLUME (DCV) FOR THE 72-INCH CMP STORMWATER SYSTEM. PONDING ABOVE THE REQUIRED DCV IS MODELED AS A DETENTION BASIN: ELEVATION VS. AREA, AND ELEVATION VS. DISCHARGE TABLES, ARE NEEDED BY SWMM FOR MODIFIED PULS ROUTING PURPOSES. DETAILED OUTLET STRUCTURE LOCATION AND ELEVATIONS SHOULD BE SHOWN ON THE CONSTRUCTION PLANS BASED ON THE RECOMMENDATIONS OF THIS STUDY.

ONE (1) PROPRIETARY MODULAR WETLAND SYSTEM IS LOCATED DOWNSTREAM OF THE UNDERGROUND DETENTION FACILITIY AND IS RESPONSIBLE FOR HANDLING WATER QUALITY REQUIREMENTS FOR POC-1. THE TYPE OF PROPRIETARY BIOFILTRATION BMPS ARE MODULAR WETLAND SYSTEMS (MWS) OR EQUIVALENT.

SINCE THERE IS UPSTREAM DETENTION STORAGE, THE MODULAR WETLANDS SYSTEM CAN BE SIZED BASED ON THE REQUIRED POLLUTANT CONTROL TREATMENT VOLUME. THE REQUIRED TREATMENT VOLUME IS 1.5 TIMES THE DCV, PER THE COUNTY OF SAN DIEGO BMP DESIGN MANUAL.

THE BENEFIT OF THE MWS IS THAT ONE UNIT CAN BE INSTALLED BELOW GRADE OF THE PROPOSED SURFACE AND DOWNSTREAM OF THE UNDERGROUND STORAGE VAULT USED FOR HYDROMODIFICATION AND DETENTION STORAGE. THE MWS UNITS WILL ALSO BE CONFIGURED AS A VAULT, AND WILL ACCEPT FLOWS DIRECTLY INTO THE PRE-TREATMENT CHAMBER. THIS END-OF-THE-LINE INSTALLATION ENSURES THAT ALL DRAINAGE WILL BE TREATED BY THE BIOFILTRATION SYSTEM FOR MAXIMUM FEASIBILITY. THE MWS IS A PRE-ENGINEERED BIOFILTRATION SYSTEM COMPOSED OF A PRE-TREATMENT CHAMBER CONTAINING FILTRATION CARTRIDGES, A HORIZONTAL FLOW BIOFILTRATION CHAMBER WITH A PERIPHERAL VOID AREA AND A CENTRALIZED AND VERTICALLY EXTENDING UNDERDRAIN, THE BIOFILTER CHAMBER CONTAINING A SORPTIVE MEDIA MIX, AND A DISCHARGE CHAMBER CONTAINING AN ORIFICE CONTROL STRUCTURE. TREATED WATER FLOWS HORIZONTALLY IN SERIES THROUGH THE PRE-TREATMENT CHAMBER CARTRIDGES, BIOFILTRATION CHAMBER AND ORIFICE CONTROL STRUCTURE. DISCHARGES ARE CONVEYED VIA STORM DRAIN PIPE TO THE EXISTING STORM WATER CONVEYANCE SYSTEM.

BMP MODELING FOR WATER QUALITY PURPOSES

MODELING OF DUAL PURPOSE WATER QUALITY/HMP BMPS

ONE (1) BMP IS ARE PROPOSED FOR INTEGRATED HYDROMODIFICATION AND WATER QUALITY TREATMENT FOR THE PROJECT SITE. TABLE 2 ILLUSTRATES THE DIMENSIONS REQUIRED FOR HMP COMPLIANCE FOR THE PROPOSED 72-INCH CMP STORMWATER SYSTEM. TABLE 3 ILLUSTRATES THE DIMENSIONS REQUIRED FOR POLLUTANT CONTROL COMPLIANCE FOR THE PROPOSED MODULAR WETLANDS.

TABLE 2 - SUMMARY OF 72-INCH CMP STORMWATER SYSTEM:

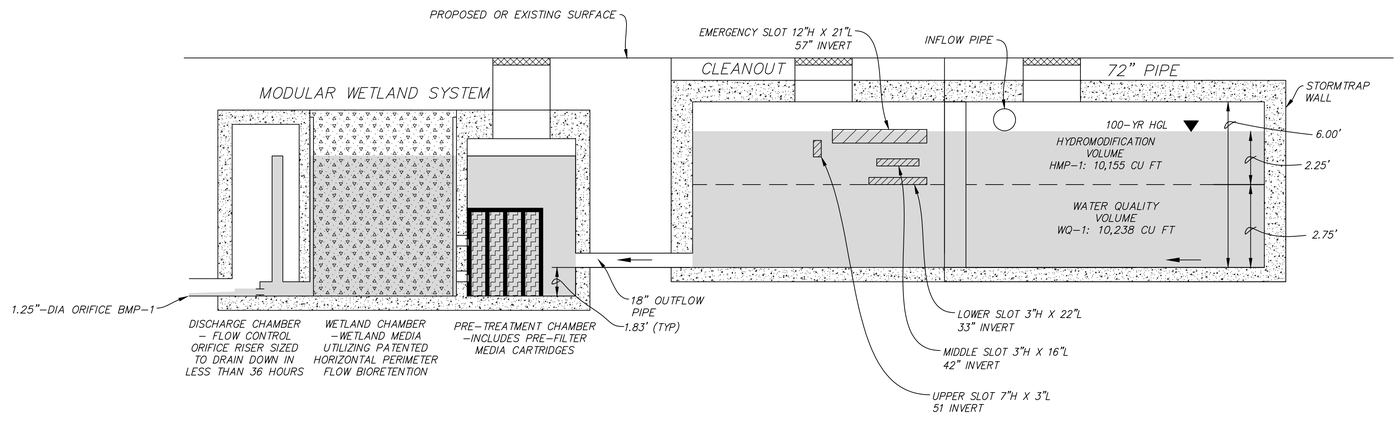
Underground Detention Facility	Tributary Area (Ac)	Pipe Dimensions		Lower Slot Dimensions			Middle Slot Dimensions			Upper Slot Dimensions			Emergency Slot Dimensions		
		Pipe Dia (in)	Pipe Length (ft)	Outlet Type[1]	Invert Elev, HL[2] (in)	(#) - Width x Height (in)[3]	Outlet Type[1]	Invert Elev, HL[2] (in)	(#) - Width x Height (in)[3]	Outlet Type[1]	Invert Elev, HL[2] (in)	(#) - Width x Height (in)[3]	Outlet Type[3]	Invert Elev, HL[2] (in)	(#) - Width x Height (in)[3]
BMP 1	3.238	72	810	Slot	33	(1) - 3 x 22	Slot	42	(1) - 3 x 16	Slot	51	(1) - 7 x 3	Slot	57	(1) - 12 x 21

Notes: (1): Shape of orifice opening in riser structure.
(2): Depth from bottom of pond to invert of lower slot or weir.
(3): Number of slots and slot dimensions.

TABLE 3 - SUMMARY OF TREATMENT CONTROL BMPS:

BMP	Tributary Area[1] (Ac)	DIMENSIONS	
		Volume Treated (cf)[2]	Model Number
BMP 1	DMA 1	10,238	MWS-L-6-8-8'-0"-V-UG
BMP 2	GS YD 1	264	Tree Wells 3 -15' Dia
BMP 3	GS DRWY	294	Tree Wells 3 -15' Dia
BMP 4	GS YD 2	232	Tree Wells 3 -15' Dia

Notes:
(1): BMP Areas are included in the overall DMA.
(2): For flow-based BMPs



72-INCH CMP STORMWATER SYSTEM & MWS DETAILS

NOT TO SCALE

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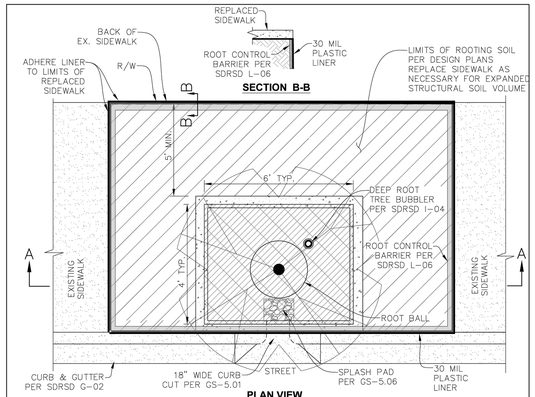
COUNTY OF SAN DIEGO, CALIFORNIA



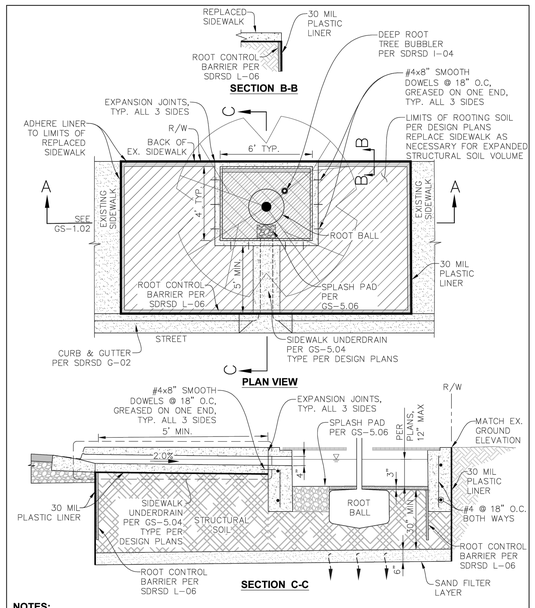
NOTES:

1. REFER TO GS-1.00 FOR ALL DETAILS NOT SHOWN HERE.
2. TREE SIZE & TYPE PER DESIGN PLANS.

DRAWING NOT TO SCALE

DRAWN BY: AOB	CHECKED BY: RP	SAN DIEGO COUNTY DESIGN STANDARD	
RECOMMENDED BY: CHARLES MOHRLOCK, P.E.		LARGE TREE WELL	
APPROVED BY COUNTY ENGINEER			
WILLIAM P. MORGAN, P.E. R.C.E. NO. 49452, EXP. 9/30/2020 DATE: 10/29/19			DRAWING NUMBER GS-1.02

REVISIONS	APPROVED	DATE
ORIGINAL		10-01-2019



NOTES:

1. REFER TO GS-1.00 FOR ALL DETAILS NOT SHOWN HERE.
2. TREE SIZE & TYPE PER DESIGN PLANS.

DRAWING NOT TO SCALE

DRAWN BY: AOB	CHECKED BY: RP	SAN DIEGO COUNTY DESIGN STANDARD	
RECOMMENDED BY: CHARLES MOHRLOCK, P.E.		TREE WELL ADJACENT TO RIGHT-OF-WAY	
APPROVED BY COUNTY ENGINEER			
WILLIAM P. MORGAN, P.E. R.C.E. NO. 49452, EXP. 9/30/2020 DATE: 10/29/19			DRAWING NUMBER GS-1.03

REVISIONS	APPROVED	DATE
ORIGINAL		10-01-2019

BF-3 PROPRIETARY BIOFILTRATION MAINTENANCE ACTIVIEIES

ROUTINE ACTION	MAINTENANCE INDICATOR	FIELD MEASUREMENT	MEASUREMENT FREQUENCY	MAINTENANCE ACTIVITY
SEDIMENT MANAGEMENT	ACCUMULATION OF SEDIMENT, LITTER OR DEBRIS	VISUAL OBSERVATION	MONTHLY	REMOVE AND PROPERLY DISPOSE OF ACCUMULATED MATERIALS, WITHOUT DAMAGE TO THE VEGETATION OR COMPACTION OF THE MEDIA LAYER
VEGETATION MANAGEMENT	POOR VEGETATION ESTABLISHMENT DEAD OR DISEASED VEGETATION	VISUAL OBSERVATION	ANNUALLY, PRIOR TO START OF WET SEASON	RE-SEED, RE-PLANT, OR RE-ESTABLISH VEGETATION PER ORIGINAL PLANS REMOVE DEAD OR DISEASED VEGETATION, RE-SEED, RE-PLANT OR RE-ESTABLISH VEGETATION PER ORIGINAL PLANS (EXPECTED EVERY 5 YEARS)
VEGETATION MANAGEMENT FOR AESTHETICS (OPTIONAL)	OVERGROWN VEGETATION	VISUAL OBSERVATION	MONTHLY, AND AS NEEDED	MOW OR TRIM AS APPROPRIATE
SOIL REPAIR	2/3 OF MULCH HAS DECOMPOSED, OR MULCH HAS BEEN REMOVED	VISUAL OBSERVATION	ANNUALLY, AND AS NEEDED	REMOVE DECOMPOSED FRACTION AND TOP OFF WITH FRESH MULCH TO A TOTAL DEPTH OF 3 INCHES
SOIL REPAIR	EVIDENCE OF EROSION DUE TO CONCENTRATED IRRIGATION FLOW EVIDENCE OF EROSION DUE TO CONCENTRATED STORM WATER RUNOFF FLOW	VISUAL OBSERVATION	ANNUALLY, PRIOR TO START OF WET SEASON	REPAIR/RE-SEED/RE-PLANT ERODED AREAS AND ADJUST THE IRRIGATION SYSTEM REPAIR/RE-SEED/RE-PLANT ERODED AREAS, AND MAKE 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.(EXPECTED EVERY 10 YEARS)
STANDING WATER	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	VISUAL OBSERVATION	ANNUALLY, 24 HOURS AFTER A TARGET STORM EVENT	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. (EXPECTED EVERY 10 YEARS)
GENERAL MAINTENANCE INSPECTION	UNDERDRAIN CLOGGED	VISUAL OBSERVATION	ANNUALLY, PRIOR TO START OF WET SEASON	CLEAR BLOCKAGE (EXPECTED EVERY 5 YEARS)
GENERAL MAINTENANCE INSPECTION	OBSTRUCTION OF INLET OR OUTLET STRUCTURE	VISUAL OBSERVATION	ANNUALLY, PRIOR TO START OF WET SEASON	CLEAR BLOCKAGE
GENERAL MAINTENANCE INSPECTION	DAMAGE TO STRUCTURAL COMPONENTS SUCH AS WEIRS, INLET OR OUTLET STRUCTURES	VISUAL OBSERVATION	ANNUALLY, PRIOR TO START OF WET SEASON	CORRECTIVE ACTION PRIOR TO WET SEASON. CONSULT ENGINEERS IF IMMEDIATE SOLUTION IS NOT EVIDENT.
VECTOR CONTROL	PRESENCE OF MOSQUITOS/LARVAE	VISUAL OBSERVATION	ANNUALLY	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.(INCLUDED IN STANDING WATER MAINTENANCE ACTIVITY)

SD-1
Tree Wells

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR SD-1 TREE WELLS

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
Tree health	Routine actions as necessary to maintain tree health.	• Inspect monthly. • Maintenance when needed.
Dead or diseased tree	Remove dead or diseased tree. Replace per original plans.	• Inspect monthly. • Maintenance when needed.
Standing water in tree well for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to tree health	Loosen or replace soils surrounding the tree to restore drainage.	• 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	Disperse any standing water from the tree well to nearby landscaping. Loosen or replace soils surrounding the tree to restore drainage (and prevent standing water).	• 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
Entrance / opening to the tree well is blocked such that storm water will not drain into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well; or a surface depression is filled such that runoff drains away from the tree well)	Make repairs as appropriate to restore drainage into the tree well.	• Inspect monthly. • Maintenance when needed.

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SHEET 3 OF 3