Hydrology and Hydraulic Calculations

for

SLOPE STREET SUBDIVISION, TM 2020-01

Santee, California

Prepared for:

Vista South Melrose, LP, A California Limited Partnership
565 N. Magnolia Ave. El
Cajon, CA 92020

June 27, 2023

Prepared By:

Thomas H. Koerner
Koerner Engineering
7361 Mission Trails Drive, #114
Santee, CA 92071
RCE# 65317

DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THIS PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH THE CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF SANTEE IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

Koerner Engineering
7361 Mission Trails Drive, #114
Santee, CA 92071

_____ _____
Thomas H. Koerner, R.C.E. 65317 DATE
MY REGISTRATION EXPIRES 9/30/23

Contents

List of Appendices

Project Introduction and Summary

Existing Condition

The Project, Slope Street Subdivision, PA2015-6, is a 12-lot residential subdivision, with a public street, utilities, and a public storm drain system. The site is a nearly rectangular parcel, currently with one single-family residence and several sheds. The property is identified as Assessor's Parcel Number 384-232-03, and is bounded by Slope Street on the north, Weld Boulevard on the south, the old Buck Knife facilities on the east, and residential properties on the west. Topographically, the site slopes up gently from Slope Street, with on-site elevations varying from a low of 410 feet to a high of 435 feet. Along the southern boundary of the site, there is a fill slope up to forty feet in height that ascends from the property to Weld Boulevard at an inclination ranging from 1.5:1 (H:V) to 1.8:1 (H:V). An existing 48" RCP storm-drain pipe discharges at the base of this fill slope into a man-made earthen drainage swale. This drainage swale crosses the property from approximately the center of the south boundary to approximately the center of the east boundary, where it enters a 36" RCP on the old Buck Knife property (APN 384-232-04).

Proposed Condition

The offsite drainage that discharges from the existing storm-drain pipe at the southern portion of the property will connect to a proposed cleanout which then will drain through a new 48" RCP pipe north along Ella Way. This pipe will connect to a cleanout at the intersection of Slope Street and Ella Way. . From there, a proposed 48" RCP pipe will continue along the south side of Slope Street.

Two curb inlets are proposed on Slope Street, one west and one east of the intersection with Ella Way, which will collect the offsite drainage prior to the existing grate inlet at the corner of Slope Street and Rhone Road. The existing grate inlet and 42" pipe under Rhone Road are currently under capacity, and the system is inundated during larger storms. Installing the two curb inlets on Slope Street will provide an improved hydraulic capacity to the drainage system.

The proposed curb inlet west of Ella Way will be connected to the proposed cleanout at the end of Ella Way , which will then connect to the proposed curb inlet to the west of Ella Way, which will be a combination curb and grate inlet to increase capacity. From there, the system will cross Slope Street and connect to the existing curb inlet on the west side of Rhone Road.. (See Appendix 8 for proposed improvements)

To comply with water quality and hydromodification requirements, the project proposes a biofiltration basin at the northeast corner of the project boundary. The biofiltration basin will connect to the proposed 48" storm drain system through the back of the proposed Type C curb inlet along Slope Street. The proposed storm drain pipes and have been designed to allow the 100-year storm to drain through the site.

This study is to estimate the developed runoff from and across the site and the drainage features that have been proposed to safely convey runoff to the proposed offsite downstream

public drainage facilities.

Methodology

The Rational Method and Modified Rational Method were used for the hydrologic calculations for this project, in accordance with the County of San Diego Hydrology Manual (2003) (SDCHM). See the appendices for references noted below.

The Rational Method formula is expressed as follows:

$Q = C\ I\ A$

$I = 7.44 P_6 T_c^{-0.645}$

$T_c = T_t + T_i$

$T_t = D/V$

The Modified Rational Method formulas are expressed as follows:

$T_1 < T_2$

$Q_{T1} = Q_1 + (T_1/T_2)*Q_2$

$Q_{T2} = Q_2 + (I_2/I_1)*Q_1$

Where:

Q = Peak discharge, in cubic feet per second (cfs).
C = Runoff coefficient. See Table 3-1 in Appendix 2.
A = Drainage area contributing to the design location (ac). See Appendix 5.
I = Average rainfall intensity (in/hr).
P_6 =6-hour precipitation (in). See isopluvial maps in Appendix 3.
T_i = Time of concentration (min).

T_t = Travel time (min).
D = Longest flow path distance (ft).
S = Slope along the flow path (%).
V = Flow velocity (ft/sec). Based on methods in Chapter 3.1.4.2 of the SDCHM.

Time of concentration

- The initial time of concentration (Ti) is calculated using the formula in Figure 3-3 (Appendix 4) and the maximum overland flow length from Table 3-2 (Appendix 4). Calculations can be found in Appendix 6.
- Travel time (Tt) on natural surfaces is calculated using the formula in Figure 3-4 (Appendix 4). Calculations can be found in Appendix 6.

- Tt is curb and gutter is calculated by dividing the length of the flow by the velocity of the flow. The velocity is obtained from Figure 3-6 (Appendix 4). Values can be found in Appendix 6.

The hydraulic design is according to the San Diego County Hydraulic Design Manual (2014) (SDCHDM) which requires the following:

- The underground system to convey the 100-year frequency storm with the hydraulic grade line (HGL) maintaining a minimum freeboard of one foot below the ground surface or gutter flow line (Section 3.2.1).
- All road cross-sections that are not a prime arterial, major, collector, commercial, or industrial road must have the capacity to convey the peak discharge from a 100-year design event without causing damage to property adjacent to the right-of-way (Section 2.2.1).

Results and Conclusions

Drainage Pattern

The overall existing drainage pattern of the site will be maintained by the construction of the project as all drainage will be directed to the same system at the northeast corner of Slope Street and Rhone Road, as in the pre-development state.

Flow Rate

The hydrologic calculations included in Appendix 6 determine the peak Q100 flows from both the existing and proposed onsite conditions. In addition, the proposed condition model includes the determination of the offsite flowrates generated from areas upstream of the site through the existing 48" RCP storm drain via Weld Boulevard and from the areas tributary to Slope Street north of the project site.

The calculations determined that the development without detention would increase the existing condition peak by about 2.8 cfs from 3.97 cfs to 6.77 cfs. However, the proposed detention/biofiltration basin will mitigate this increase and reduce the onsite runoff to 2.47 cfs.

As mentioned above, the proposed condition hydrologic calculations included the offsite areas being routed through or in front of the site. These respective tributary areas are equal in both the existing and proposed conditions and were therefore not included in the existing condition model. (see calculations in Appendix 5).

Since the Project has been classified as a Priority Development Project (PDP) in terms of water quality, the proposed basin has been designed to comply with flow control hydromodification requirements per the City of Santee BMP Design Manual, (see SWQMP in Appendix 9).

Hydraulic Grade Line

The HGL of the proposed system maintains the required one foot of freeboard below the ground surface for the entire system. Appendix 7 includes a preliminary storm drain hydraulic model based on the proposed storm drain layout and determined hydrologic calculations as described in the preceding paragraph and Appendix 6.

Inlet and Street Flow Capacity

The proposed project will construct a total of two new inlets. It will also construct one curb cut along the east side of Ella Way which will drain the site's onsite runoff into the proposed detention basin. The peak flow into the basin was determined to be 6.77 cfs. Calculations indicate that a 3' wide curb cut can convey the onsite peak flow runoff. As it discharges into the basin, the curb cut will transition to a modified PCC spillway per D-22.

The 21' B-1 curb inlet is proposed along Slope Street west of the Ella Way. However, the capacity of this inlet will be exceeded allowing some flow to bypass (4.04 cfs) to the proposed downstream 15' combination grate inlet east of the Ella Way on Slope Street at the northeast

project boundary. See Appendix 7 for corresponding inlet calculations.

For reference and comparison with the existing condition street flows, Appendix 7 includes the peak flows draining along Slope Street and towards the existing grate inlet at the northeast corner of Slope Street and Rhone Road. This sole grate inlet was undersized with 25.6 cfs draining to it. Because of this, approximately 8.8 cfs was calculated to bypass and continues north on Rhone Road until reaching the existing curb inlet near Pryor Drive

Appendix 1 – Vicinity Map

VICINITY MAP

NO SCALE

Appendix 2 – Runoff Coefficients

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

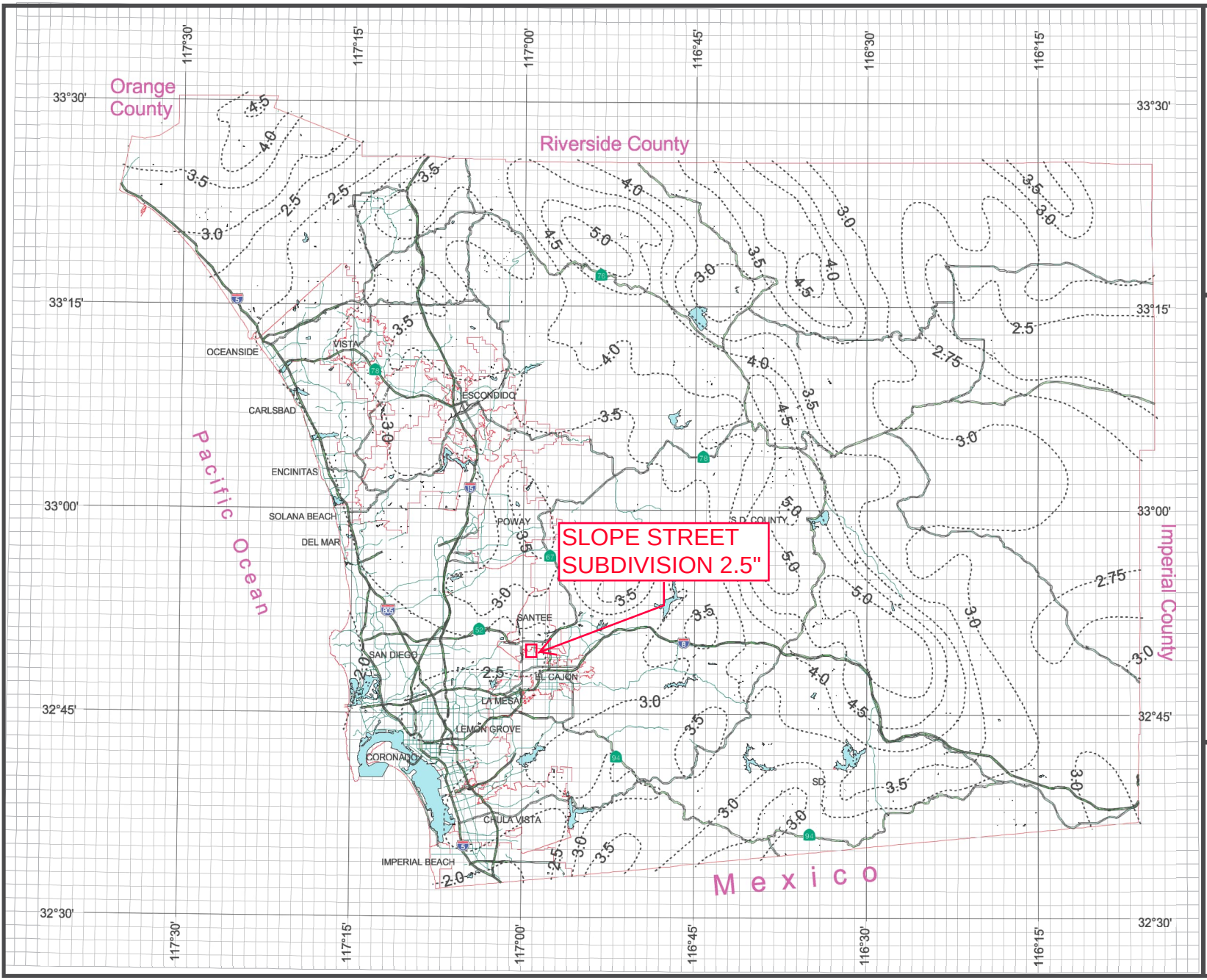
Appendix 3 – Rainfall Isopluvials

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

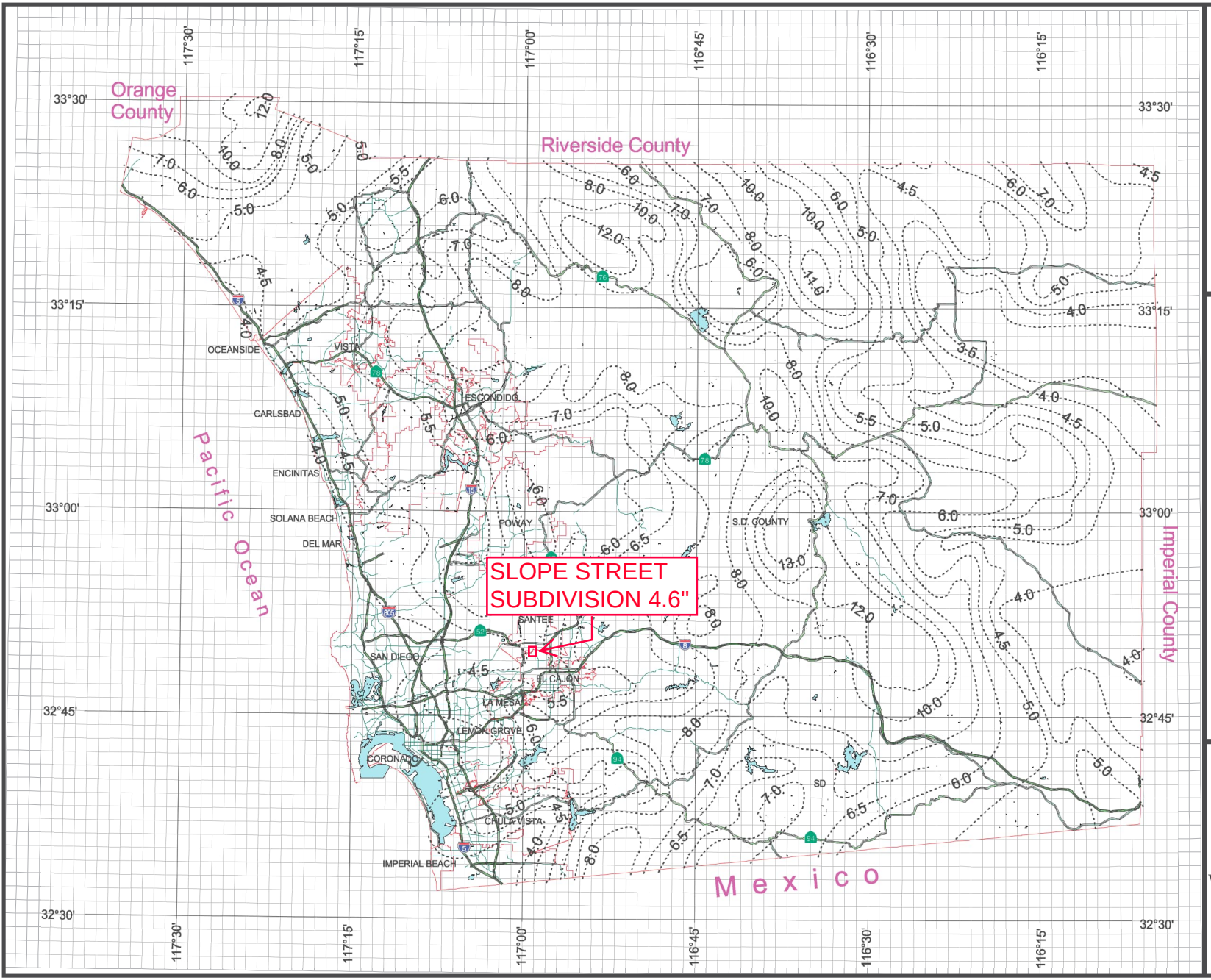


DPW GIS — Department of Public Works Geographic Information Services

SanGIS — We Have San Diego Covered!

N W E S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

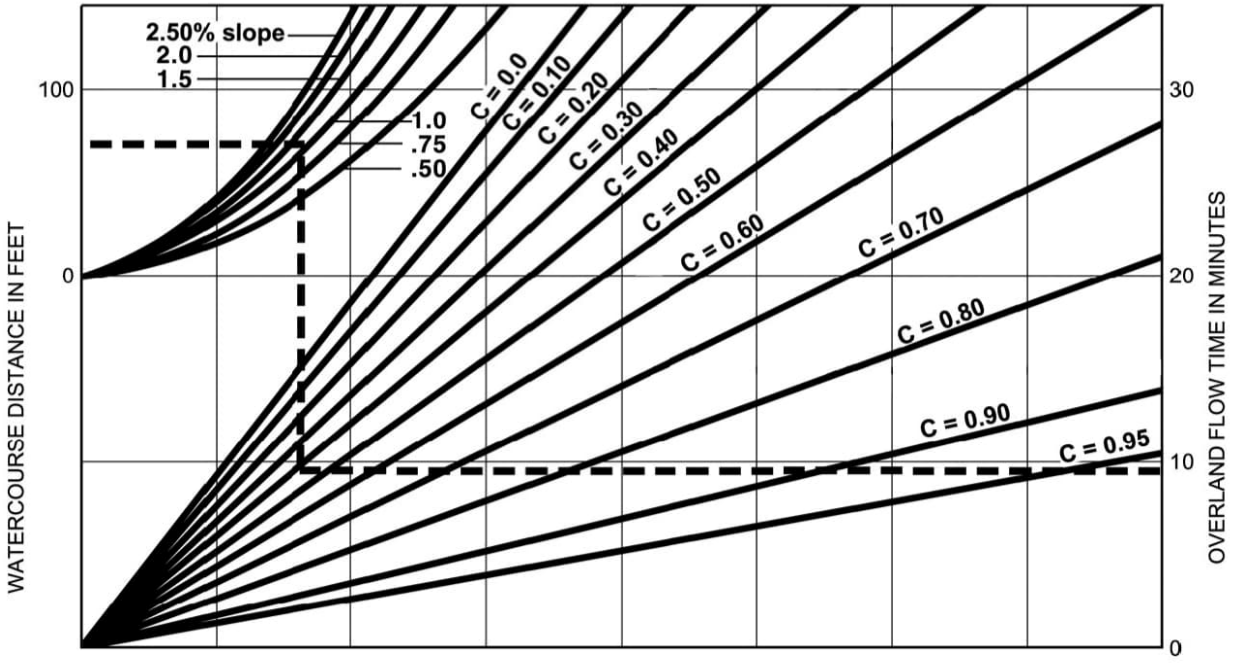
DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N
W E
S

3 0 3 Miles

Appendix 4 – Time of Concentration



EXAMPLE:

Given: Watercourse Distance (D) = 70 Feet
Slope (s) = 1.3%
Runoff Coefficient (C) = 0.41
Overland Flow Time (T) = 9.5 Minutes

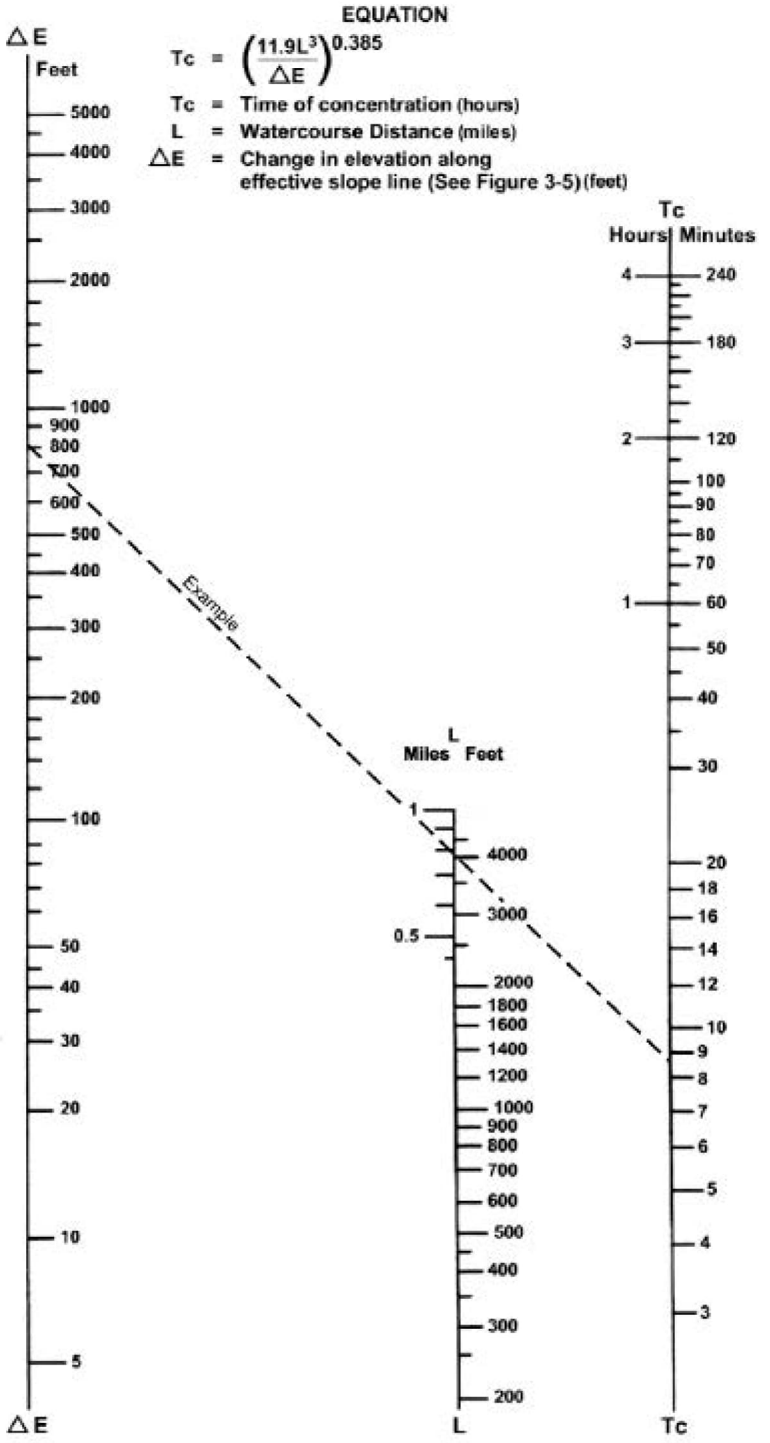
$$T = \frac{1.8\,(1.1-C)\sqrt{D}}{\sqrt[3]{s}}$$

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

FIGURE

Rational Formula - Overland Time of Flow Nomograph

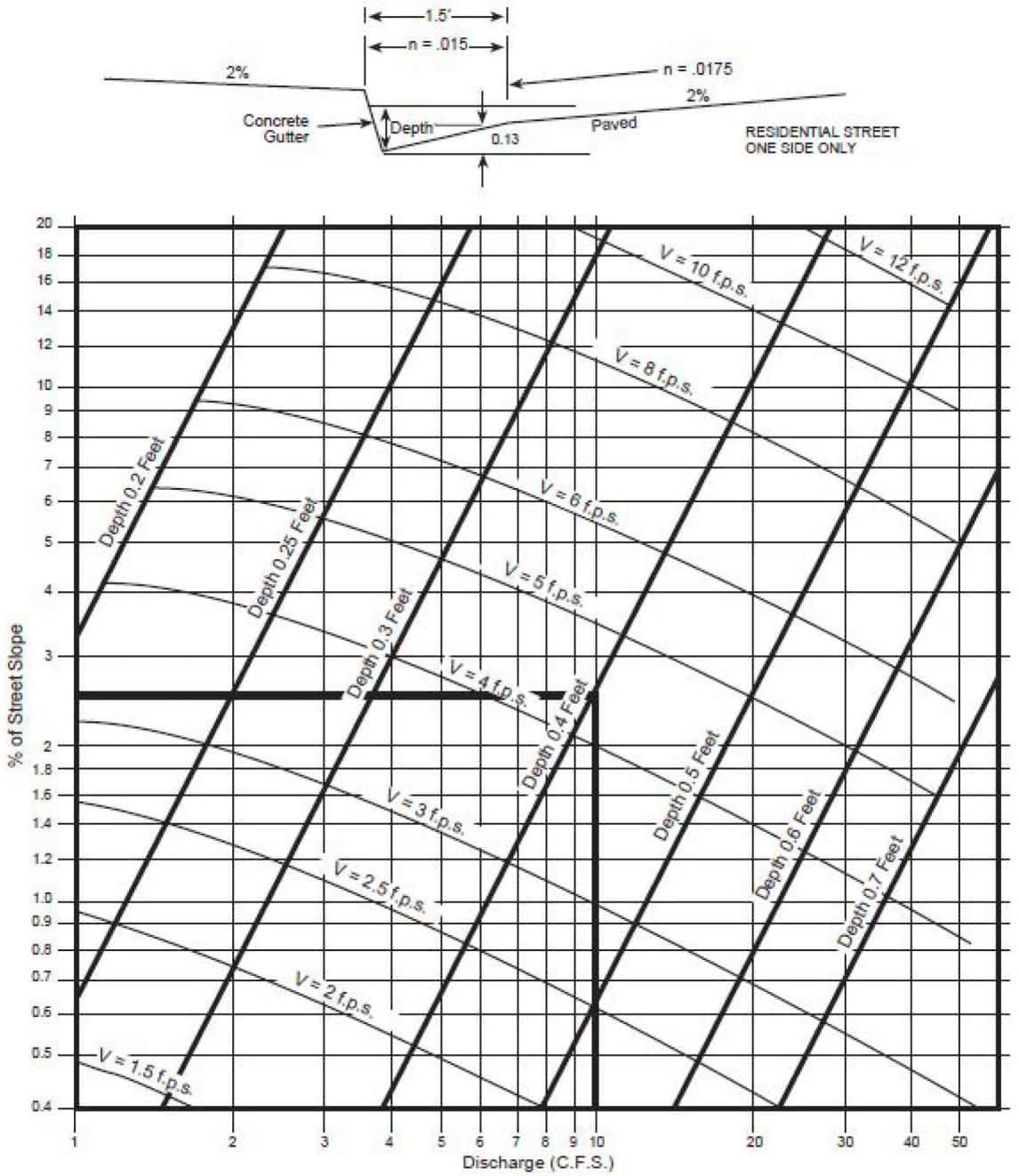
3-3



SOURCE: California Division of Highways (1941) and Kirpich (1940)

FIGURE 3-4

Nomograph for Determination of
Time of Concentration (Tc) or Travel Time (Tt) for Natural Watersheds



EXAMPLE:
Given: Q = 10 S = 2.5%
Chart gives: Depth = 0.4, Velocity = 4.4 f.p.s.

SOURCE: San Diego County Department of Special District Services Design Manual

FIGURE

Gutter and Roadway Discharge - Velocity Chart

3-6

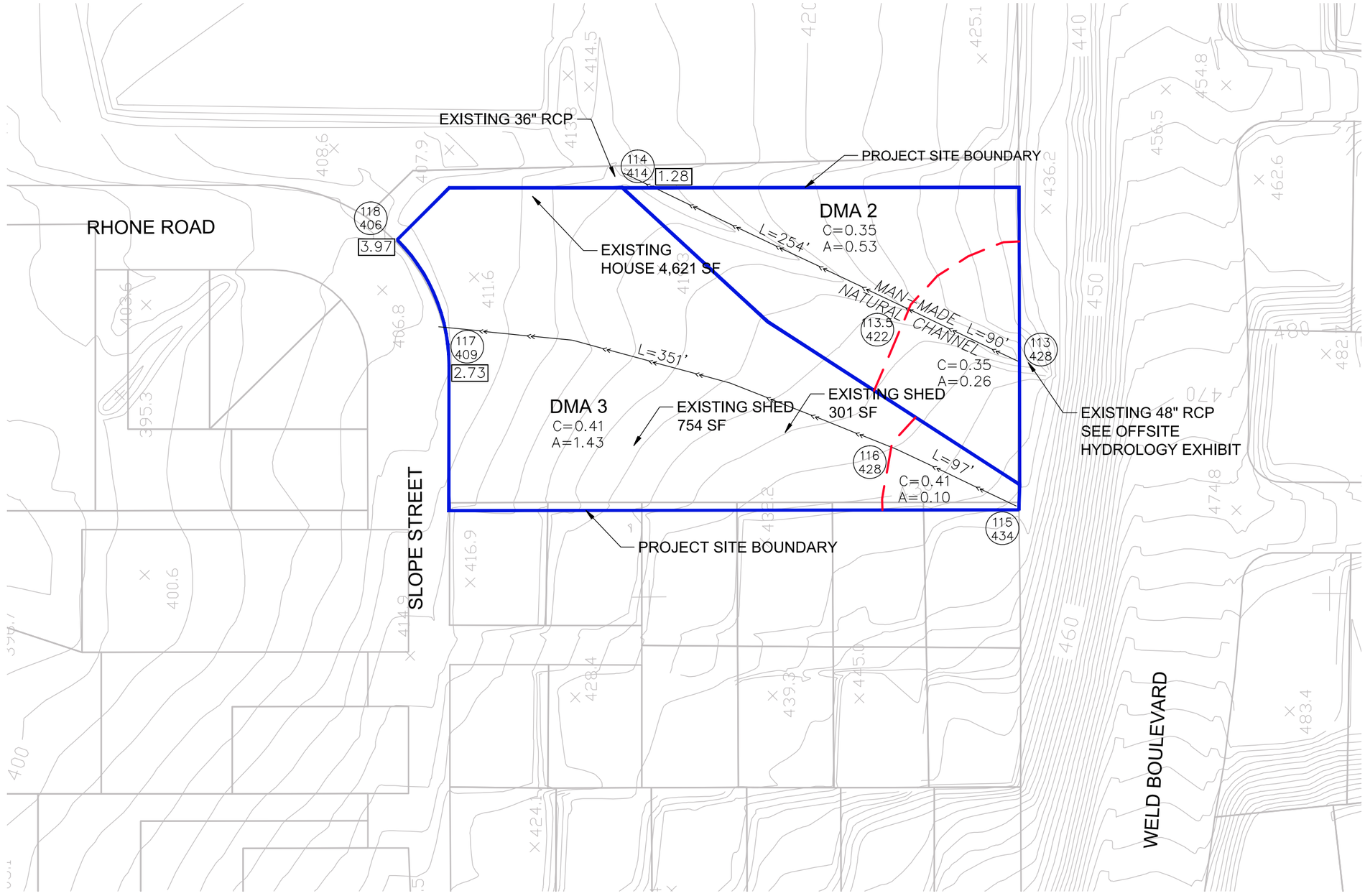
Table 3-2

MAXIMUM OVERLAND FLOW LENGTH (L_M) & INITIAL TIME OF CONCENTRATION (T_i)

Element*	DU/ Acre	.5%		1%		2%		3%		5%		10%	
		L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

*See Table 3-1 for more detailed description

Appendix 5 – Hydrology Exhibits



LEGEND

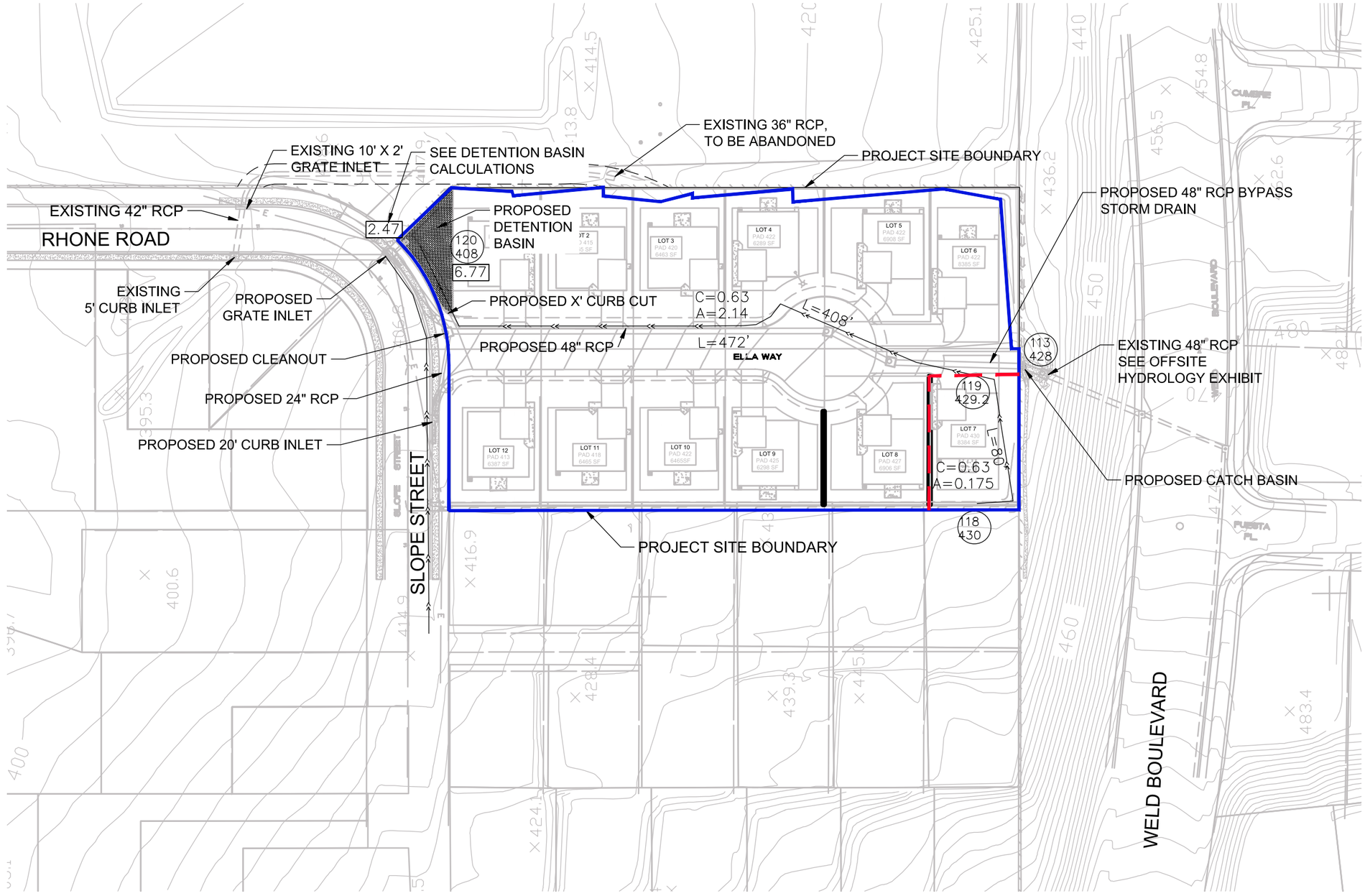
- SUBAREA BOUNDARY
- INITIAL SUBAREA BOUNDARY
- FLOW PATH
- (XXX / XXX) NODE NUMBER / NODE ELEVATION (FT)
- C=XX RUN-OFF COEFFICIENT
- A=XX AREA (AC)
- [XXX] Q100 (CFS)

N

40 0 40 80 120

GRAPHIC SCALE 1" = 40'

SLOPE STREET SUBDIVISION
EXISTING HYDROLOGY EXHIBIT



LEGEND

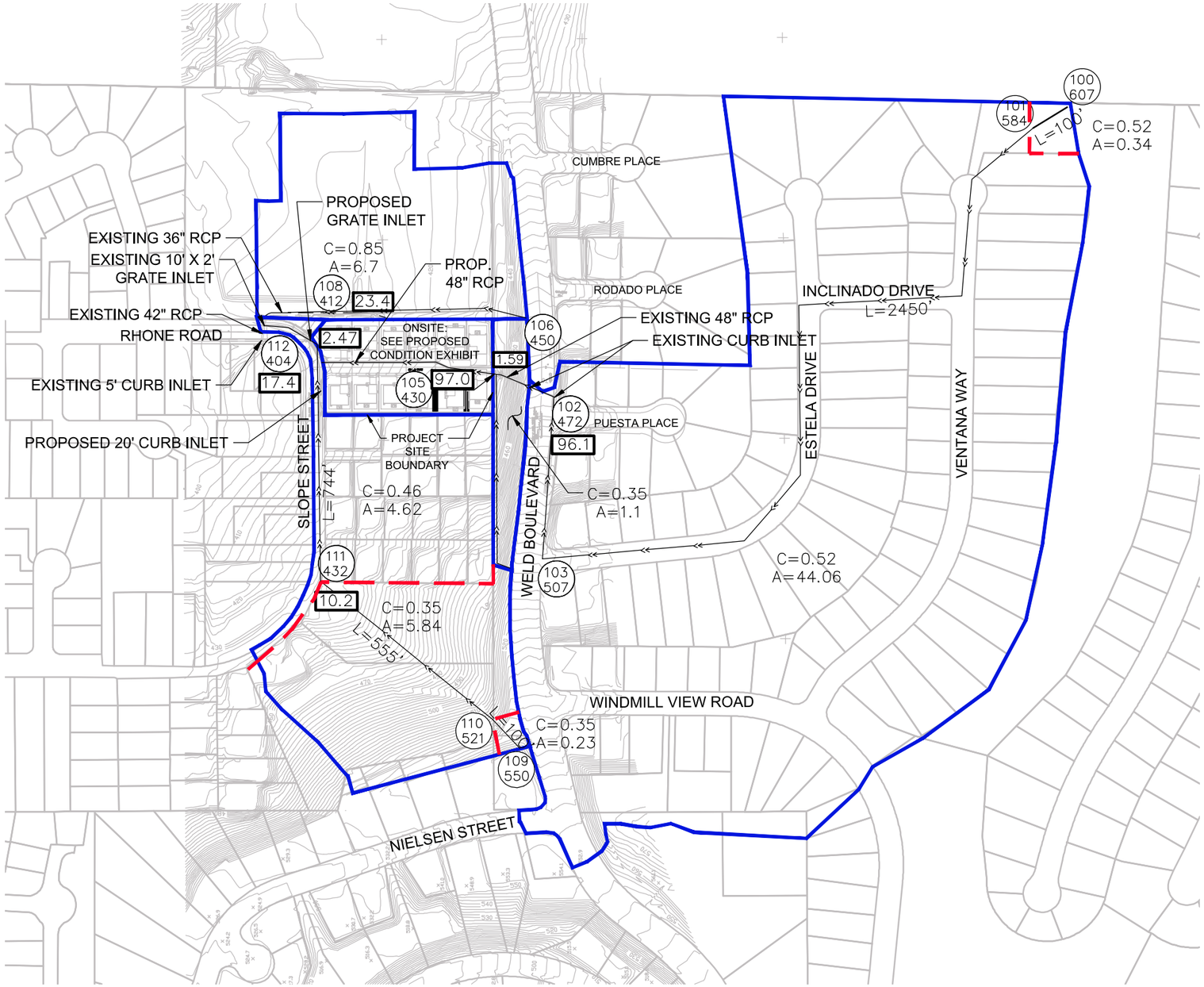
- SUBAREA BOUNDARY
- INITIAL SUBAREA BOUNDARY
- FLOW PATH
- XXX / XXX — NODE NUMBER / NODE ELEVATION (FT)
- C=XX RUN-OFF COEFFICIENT
- A=XX AREA (AC)
- XXX — Q100 (CFS)

N

40 0 40 80 120

GRAPHIC SCALE 1" = 40'

SLOPE STREET SUBDIVISION
PROPOSED HYDROLOGY EXHIBIT



LEGEND

- SUBAREA BOUNDARY
- INITIAL SUBAREA BOUNDARY
- FLOW PATH
- XXX / XXX — NODE NUMBER / NODE ELEVATION (FT)
- C=XX — RUN-OFF COEFFICIENT
- A=XX — AREA (AC)
- XXX — Q100 (CFS)

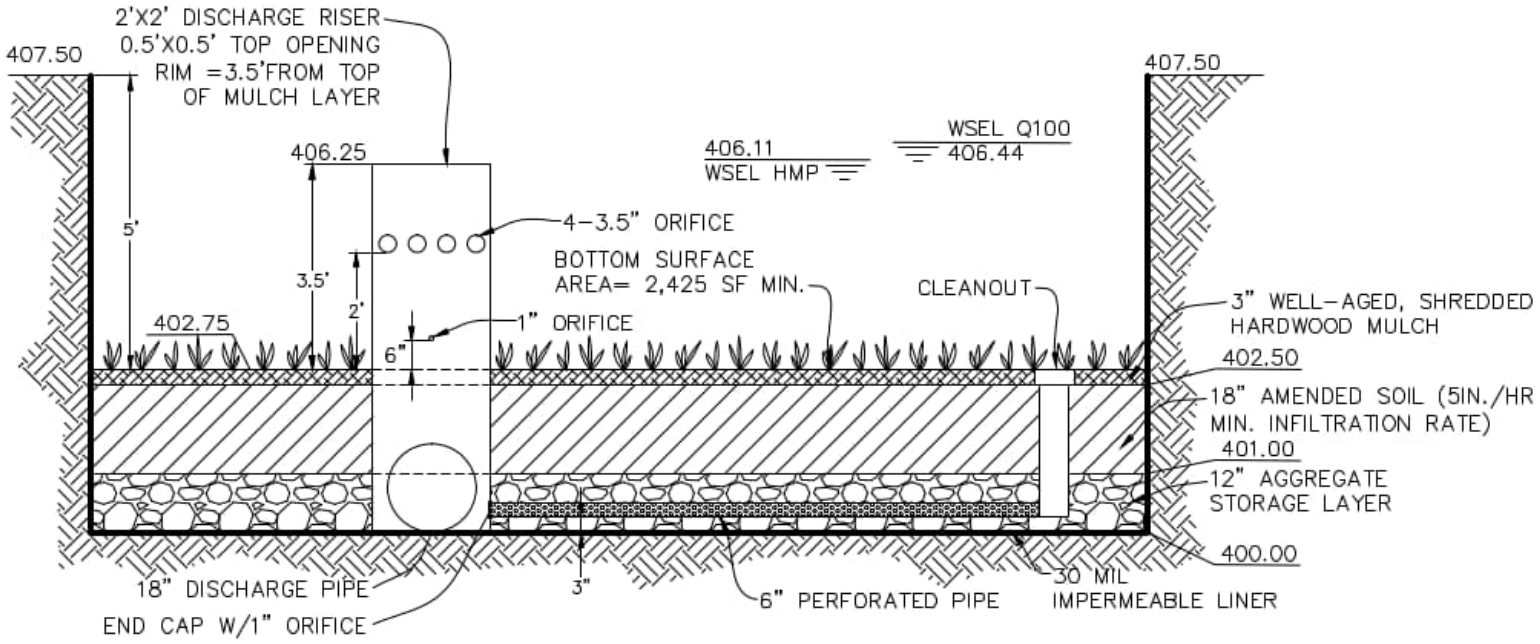
N

150 0 150 300 450

GRAPHIC SCALE 1" = 150'

SLOPE STREET SUBDIVISION
OFFSITE HYDROLOGY EXHIBIT

DETENTION BASIN



Appendix 6 – Hydrology Calculations

-EXISTING CONDITION
-PROPOSED CONDITION

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            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1690

                            Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* SLOPE STREET SUBDIVISION                                              *
* EXISTING CONDTION                                                     *
* Q100 RAINFALL EVENT                                                   *
 ************************************************************************

  FILE NAME: C:\AES\SLOPES\EX.DAT
  TIME/DATE OF STUDY: 22:43 06/24/2023
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     15.0    0.040/0.040/0.020   0.50    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.50 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    428.00
  DOWNSTREAM ELEVATION(FEET) =    422.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.805
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.399
  SUBAREA RUNOFF(CFS) =      0.49
  TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      0.49

**************************************************************************
```

```
 FLOW PROCESS FROM NODE    113.50 TO NODE    114.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    422.00  DOWNSTREAM(FEET) =    414.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   254.00   CHANNEL SLOPE =  0.0315
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   6.000
 MANNING'S FACTOR = 0.020   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.628
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.92
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.30
 AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   1.84
 Tc(MIN.) =    8.64
 SUBAREA AREA(ACRES) =     0.53       SUBAREA RUNOFF(CFS) =    0.86
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       1.28

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.43
 LONGEST FLOWPATH FROM NODE    113.00 TO NODE    114.00 =     344.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    118.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   414.00  DOWNSTREAM(FEET) =   406.00
 FLOW LENGTH(FEET) =   193.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.28
 PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    9.14
 LONGEST FLOWPATH FROM NODE    113.00 TO NODE    118.00 =     537.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.14
 RAINFALL INTENSITY(INCH/HR) =   4.46
 TOTAL STREAM AREA(ACRES) =     0.79
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.28

****************************************************************************
 FLOW PROCESS FROM NODE    115.00 TO NODE    116.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .4100
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    97.00
 UPSTREAM ELEVATION(FEET) =    434.00
 DOWNSTREAM ELEVATION(FEET) =    428.00
 ELEVATION DIFFERENCE(FEET) =      6.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.664
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.473
```

```
  SUBAREA RUNOFF(CFS) =      0.23
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.23

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    117.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    428.00  DOWNSTREAM(FEET) =    409.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   351.00   CHANNEL SLOPE =  0.0541
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   6.000
  MANNING'S FACTOR = 0.020   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.353
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4100
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.53
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.06
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   2.84
  Tc(MIN.) =    9.50
  SUBAREA AREA(ACRES) =     1.43       SUBAREA RUNOFF(CFS) =    2.55
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.410
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       2.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   2.77
  LONGEST FLOWPATH FROM NODE    115.00 TO NODE    117.00 =     448.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.50
  RAINFALL INTENSITY(INCH/HR) =   4.35
  TOTAL STREAM AREA(ACRES) =     1.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.73

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.28     9.14        4.462          0.79
      2        2.73     9.50        4.353          1.53

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        3.90     9.14       4.462
      2        3.97     9.50       4.353

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.97   Tc(MIN.) =    9.50
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE    113.00 TO NODE    118.00 =     537.00 FEET.

+----------------------------------------------------------------------------+
|                                                                            |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+
```

```
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.3  TC(MIN.) =      9.50
  PEAK FLOW RATE(CFS)   =       3.97
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1690

                            Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* SLOPE STREET SUBDIVISION                                              *
* PROPOSED CONDITION                                                    *
* Q100 RAINFALL EVENT                                                   *
 ************************************************************************

  FILE NAME: C:\AES\SLOPES\PR.DAT
  TIME/DATE OF STUDY: 22:47 06/24/2023
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     15.0    0.040/0.040/0.020   0.50    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    119.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6300
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    430.00
  DOWNSTREAM ELEVATION(FEET) =    429.20
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.078
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.264
```

```
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.58

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    120.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  429.20  DOWNSTREAM ELEVATION(FEET) =  408.00
  STREET LENGTH(FEET) =   472.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.040
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.040

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.72
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    5.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.65
  STREET FLOW TRAVEL TIME(MIN.) =   1.53   Tc(MIN.) =    8.61
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.640
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.630
  SUBAREA AREA(ACRES) =    2.14      SUBAREA RUNOFF(CFS) =    6.26
  TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       6.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =   7.23
  FLOW VELOCITY(FEET/SEC.) =  5.92   DEPTH*VELOCITY(FT*FT/SEC.) =   2.28
  LONGEST FLOWPATH FROM NODE    118.00 TO NODE    120.00 =     552.00 FEET.

+--------------------------------------------------------------------------+
| SEE DETENTION BASIN CALCULATIONS AT END OF SECTION.                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  16.00   RAIN INTENSITY(INCH/HOUR) =  3.11
  TOTAL AREA(ACRES) =     2.31   TOTAL RUNOFF(CFS) =      2.47

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.00
  RAINFALL INTENSITY(INCH/HR) =   3.11
  TOTAL STREAM AREA(ACRES) =     2.31
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.47

+-------------------------------------------------------------------------+
|                                                                         |
|                                                                         |
|                                                                         |
+-------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    607.00
  DOWNSTREAM ELEVATION(FEET) =    584.00
  ELEVATION DIFFERENCE(FEET) =     23.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.846
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.16
  TOTAL AREA(ACRES) =      0.34   TOTAL RUNOFF(CFS) =      1.16

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    584.00  DOWNSTREAM(FEET) =    472.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2450.00   CHANNEL SLOPE =  0.0457
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.161
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5200
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      51.37
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.64
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   5.34
  Tc(MIN.) =   10.19
  SUBAREA AREA(ACRES) =    44.06       SUBAREA RUNOFF(CFS) =   95.34
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.520
  TOTAL AREA(ACRES) =       44.4         PEAK FLOW RATE(CFS) =      96.07

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   9.85
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =    2550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  34.20
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      96.07
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.31
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    2790.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.131
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5159
 SUBAREA AREA(ACRES) =    1.10   SUBAREA RUNOFF(CFS) =    1.59
 TOTAL AREA(ACRES) =       45.5   TOTAL RUNOFF(CFS) =      96.96
 TC(MIN.) =   10.31

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    120.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   426.00  DOWNSTREAM(FEET) =   401.00
 FLOW LENGTH(FEET) =   570.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.08
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      96.96
 PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   10.78
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    120.00 =    3360.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.78
 RAINFALL INTENSITY(INCH/HR) =   4.01
 TOTAL STREAM AREA(ACRES) =    45.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     96.96

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        2.47    16.00        3.111          2.31
     2       96.96    10.78        4.013         45.50

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       98.62    10.78       4.013
     2       77.63    16.00       3.111

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      98.62   Tc(MIN.) =   10.78
 TOTAL AREA(ACRES) =       47.8
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    120.00 =    3360.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    112.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   401.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.36
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      98.62
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.81
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    112.00 =    3390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.81
  RAINFALL INTENSITY(INCH/HR) =   4.01
  TOTAL STREAM AREA(ACRES) =    47.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     98.62

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    550.00
  DOWNSTREAM ELEVATION(FEET) =    521.00
  ELEVATION DIFFERENCE(FEET) =     29.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.694
  SUBAREA RUNOFF(CFS) =      0.46
  TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    432.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   555.00   CHANNEL SLOPE =  0.1604
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.46
  FLOW VELOCITY(FEET/SEC) =   4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.95   Tc(MIN.) =    8.22
  LONGEST FLOWPATH FROM NODE    109.00 TO NODE    111.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.781
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    5.84   SUBAREA RUNOFF(CFS) =    9.77
```

```
  TOTAL AREA(ACRES) =        6.1   TOTAL RUNOFF(CFS) =      10.16
  TC(MIN.) =    8.22

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  432.00  DOWNSTREAM ELEVATION(FEET) =  404.00
  STREET LENGTH(FEET) =   744.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.67
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.48
  STREET FLOW TRAVEL TIME(MIN.) =   2.20   Tc(MIN.) =   10.42
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.103
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.398
  SUBAREA AREA(ACRES) =    4.62      SUBAREA RUNOFF(CFS) =    8.72
  TOTAL AREA(ACRES) =       10.7        PEAK FLOW RATE(CFS) =      17.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.85
  FLOW VELOCITY(FEET/SEC.) =  5.90   DEPTH*VELOCITY(FT*FT/SEC.) =   2.73
  LONGEST FLOWPATH FROM NODE    109.00 TO NODE    112.00 =    1399.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.103
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5719
  SUBAREA AREA(ACRES) =    6.70   SUBAREA RUNOFF(CFS) =   23.37
  TOTAL AREA(ACRES) =       17.4   TOTAL RUNOFF(CFS) =      40.80
  TC(MIN.) =   10.42

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.42
  RAINFALL INTENSITY(INCH/HR) =   4.10
  TOTAL STREAM AREA(ACRES) =    17.39
```

```
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     40.80

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       98.62    10.81        4.006         47.81
     2       40.80    10.42        4.103         17.39

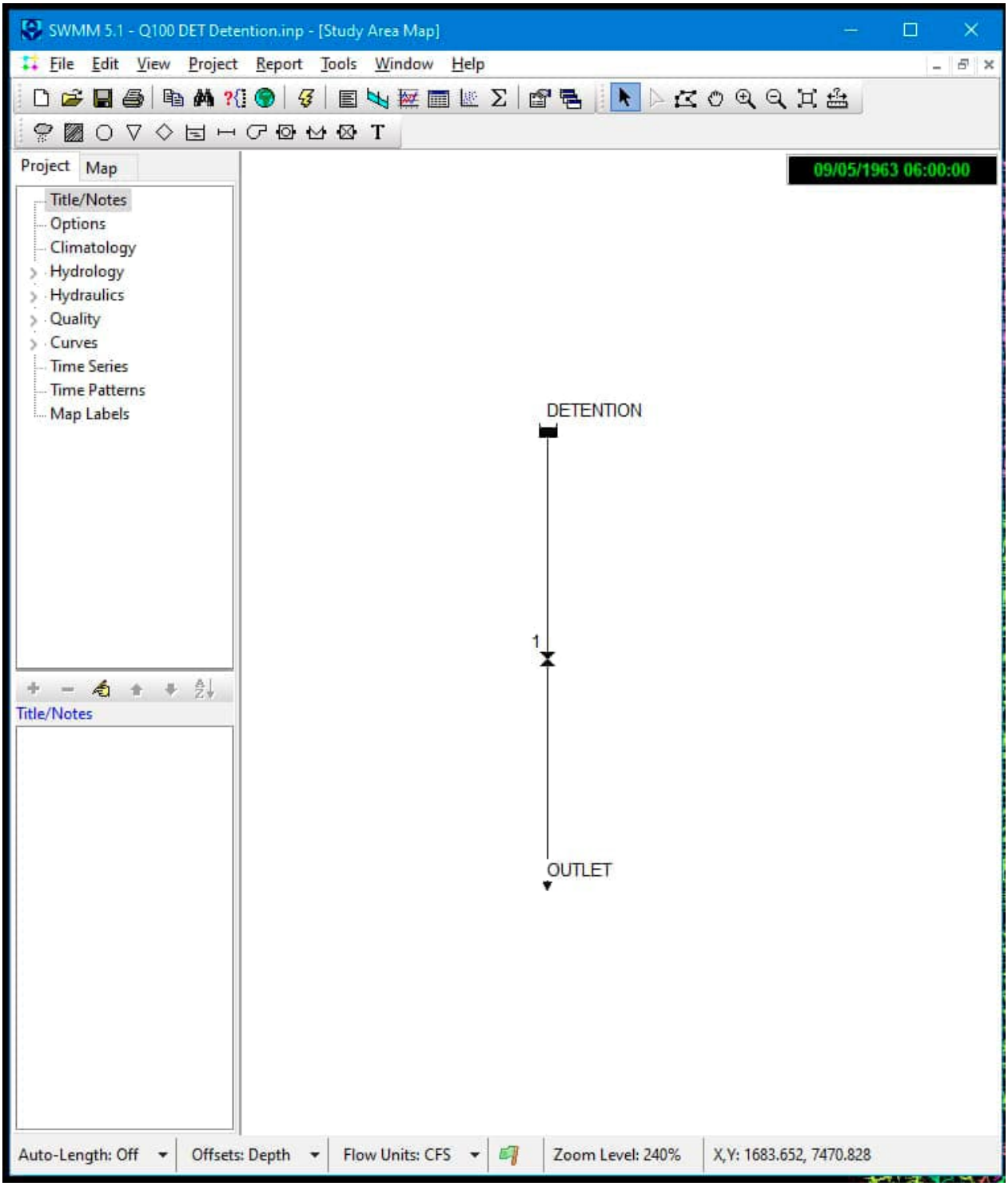
 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1      137.10    10.42       4.103
     2      138.46    10.81       4.006

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     138.46   Tc(MIN.) =   10.81
 TOTAL AREA(ACRES) =       65.2
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    112.00 =    3390.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       65.2  TC(MIN.) =     10.81
 PEAK FLOW RATE(CFS)   =     138.46
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

DETENTION MODEL RESULTS

SLOPE STREET SUBDIVISION DETENTION BASIN ANALYSIS



RATIONAL METHOD HYDROGRAPH PROGRAM
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Slope Street Subdivision (Hydrograph into detention basin)

RUN DATE 5/19/2023
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 9 MIN.
6 HOUR RAINFALL 2.5 INCHES
BASIN AREA 2.31 ACRES
RUNOFF COEFFICIENT 0.63
PEAK DISCHARGE 6.77 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 9	DISCHARGE (CFS) = 0
TIME (MIN) = 18	DISCHARGE (CFS) = 0.2
TIME (MIN) = 27	DISCHARGE (CFS) = 0.2
TIME (MIN) = 36	DISCHARGE (CFS) = 0.2
TIME (MIN) = 45	DISCHARGE (CFS) = 0.2
TIME (MIN) = 54	DISCHARGE (CFS) = 0.2
TIME (MIN) = 63	DISCHARGE (CFS) = 0.3
TIME (MIN) = 72	DISCHARGE (CFS) = 0.3
TIME (MIN) = 81	DISCHARGE (CFS) = 0.3
TIME (MIN) = 90	DISCHARGE (CFS) = 0.3
TIME (MIN) = 99	DISCHARGE (CFS) = 0.3
TIME (MIN) = 108	DISCHARGE (CFS) = 0.3
TIME (MIN) = 117	DISCHARGE (CFS) = 0.3
TIME (MIN) = 126	DISCHARGE (CFS) = 0.3
TIME (MIN) = 135	DISCHARGE (CFS) = 0.3
TIME (MIN) = 144	DISCHARGE (CFS) = 0.4
TIME (MIN) = 153	DISCHARGE (CFS) = 0.4
TIME (MIN) = 162	DISCHARGE (CFS) = 0.4
TIME (MIN) = 171	DISCHARGE (CFS) = 0.4
TIME (MIN) = 180	DISCHARGE (CFS) = 0.5
TIME (MIN) = 189	DISCHARGE (CFS) = 0.5
TIME (MIN) = 198	DISCHARGE (CFS) = 0.6
TIME (MIN) = 207	DISCHARGE (CFS) = 0.6
TIME (MIN) = 216	DISCHARGE (CFS) = 0.8
TIME (MIN) = 225	DISCHARGE (CFS) = 0.9
TIME (MIN) = 234	DISCHARGE (CFS) = 1.3
TIME (MIN) = 243	DISCHARGE (CFS) = 1.6
TIME (MIN) = 252	DISCHARGE (CFS) = 6.77
TIME (MIN) = 261	DISCHARGE (CFS) = 1
TIME (MIN) = 270	DISCHARGE (CFS) = 0.7
TIME (MIN) = 279	DISCHARGE (CFS) = 0.5
TIME (MIN) = 288	DISCHARGE (CFS) = 0.5
TIME (MIN) = 297	DISCHARGE (CFS) = 0.4
TIME (MIN) = 306	DISCHARGE (CFS) = 0.4
TIME (MIN) = 315	DISCHARGE (CFS) = 0.3
TIME (MIN) = 324	DISCHARGE (CFS) = 0.3
TIME (MIN) = 333	DISCHARGE (CFS) = 0.3
TIME (MIN) = 342	DISCHARGE (CFS) = 0.3
TIME (MIN) = 351	DISCHARGE (CFS) = 0.2
TIME (MIN) = 360	DISCHARGE (CFS) = 0.2
TIME (MIN) = 369	DISCHARGE (CFS) = 0

Time Series Editor

Time Series Name
SlopeStDetention

Description
Developed hydrograph

Use external data file named below

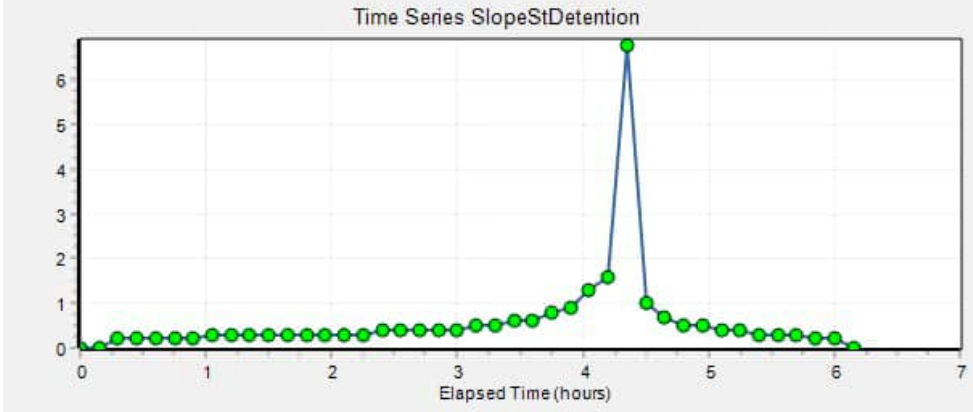
Enter time series data in the table below

No dates means times are relative to start of simulation.

Date (M/D/Y)	Time (H:M)	Value
	0:0	0
	0:9	0
	0:18	0.2
	0:27	0.2
	0:36	0.2
	0:45	0.2
	0:54	0.2
	1:3	0.3
	1:12	0.3
	1:21	0.3
	1:30	0.3

View
OK
Cancel
Help

Time Series Viewer



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Close

As this basin is serving a conjunctive use as a treatment and detention basin, the discharge values used in the detention basin analysis begin at the 0.5' elevation of the basin. This is consistent with requirements per the San Diego County Hydraulic Design Manual.

DETENTION Stage- Discharge

Discharge vs Elevation Table

Low orifice:	1 "	Top orifice:	5 "
Number:	1	Number:	0
Cg-low:	0.61	Cg-low:	0.61
invert elev:	0.50 ft	invert elev:	4.75 ft
Middle orifice:	3.5 "	Emergency inlet:	
number of orif:	4	Rim height	3.50 ft
Cg-middle:	0.61	Area	0.56 sq ft
invert elev:	2.00 ft	Circumfere	3.00 ft

Actual Stage														
h	H/D-low	H/D-mid	H/D-top	Qlow-orif	Qlow-weir	Qtot-low	Qmid-orif	Qmid-weir	Qtot-med	Qtop-orif	Qtop-weir	Qtot-top	Qemerg	Qtot
(ft)	-	-	-	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
0.0	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.1	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.2	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.30	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0000
0.4	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.5	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.6	1.20	0.00	0.00	0.006	0.007	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
0.70	2.40	0.00	0.00	0.011	0.014	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011
0.8	3.60	0.00	0.00	0.014	0.017	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014
0.9	4.80	0.00	0.00	0.016	0.072	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016
1.0	6.00	0.00	0.00	0.018	0.344	0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.018
1.1	7.20	0.00	0.00	0.020	1.154	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020
1.2	8.40	0.00	0.00	0.022	3.028	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022
1.30	9.60	0.00	0.00	0.023	6.743	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.023
1.4	10.80	0.00	0.00	0.025	13.377	0.025	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025
1.5	12.00	0.00	0.00	0.026	24.355	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.026
1.6	13.20	0.00	0.00	0.027	41.500	0.027	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.027
1.70	14.40	0.00	0.00	0.029	67.076	0.029	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.029
1.80	15.60	0.00	0.00	0.030	103.841	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.030
1.9	16.80	0.00	0.00	0.031	155.093	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.031
2.0	18.00	0.00	0.00	0.032	224.716	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.032
2.1	19.20	0.34	0.00	0.033	317.231	0.033	0.000	0.069	0.069	0.000	0.000	0.000	0.000	0.102
2.2	20.40	0.69	0.00	0.034	437.841	0.034	0.304	0.251	0.251	0.000	0.000	0.000	0.000	0.285
2.3	21.60	1.03	0.00	0.035	592.483	0.035	0.514	0.499	0.499	0.000	0.000	0.000	0.000	0.535
2.4	22.80	1.37	0.00	0.036	787.870	0.036	0.660	0.765	0.660	0.000	0.000	0.000	0.000	0.696
2.5	24.00	1.71	0.00	0.037	1031.545	0.037	0.779	1.001	0.779	0.000	0.000	0.000	0.000	0.816
2.6	25.20	2.06	0.00	0.038	1331.926	0.038	0.882	1.172	0.882	0.000	0.000	0.000	0.000	0.920
2.7	26.40	2.40	0.00	0.039	1698.353	0.039	0.974	1.264	0.974	0.000	0.000	0.000	0.000	1.013
2.8	27.60	2.74	0.00	0.040	2141.138	0.040	1.058	1.291	1.058	0.000	0.000	0.000	0.000	1.098
2.9	28.80	3.09	0.00	0.041	2671.612	0.041	1.136	1.303	1.136	0.000	0.000	0.000	0.000	1.177
3.0	30.00	3.43	0.00	0.042	3302.171	0.042	1.209	1.397	1.209	0.000	0.000	0.000	0.000	1.251
3.1	31.20	3.77	0.00	0.043	4046.330	0.043	1.278	1.722	1.278	0.000	0.000	0.000	0.000	1.321
3.2	32.40	4.11	0.00	0.044	4918.762	0.044	1.343	2.491	1.343	0.000	0.000	0.000	0.000	1.387
3.3	33.60	4.46	0.00	0.044	5935.356	0.044	1.405	3.985	1.405	0.000	0.000	0.000	0.000	1.450
3.4	34.80	4.80	0.00	0.045	7113.254	0.045	1.465	6.566	1.465	0.000	0.000	0.000	0.000	1.510
3.5	36.00	5.14	0.00	0.046	8470.909	0.046	1.522	10.682	1.522	0.000	0.000	0.000	0.000	1.568
3.6	37.20	5.49	0.00	0.047	10028.126	0.047	1.578	16.877	1.578	0.000	0.000	0.000	0.294	1.918
3.7	38.40	5.83	0.00	0.047	11806.115	0.047	1.631	25.797	1.631	0.000	0.000	0.000	0.832	2.510
3.8	39.00	6.00	0.00	0.048	12784.921	0.048	1.657	31.513	1.657	0.000	0.000	0.000	1.163	2.867
3.9	40.80	6.51	0.00	0.049	16116.538	0.049	1.733	54.976	1.733	0.000	0.000	0.000	2.353	4.134
4.0	42.00	6.86	0.00	0.050	18698.833	0.050	1.781	77.124	1.781	0.000	0.000	0.000	3.288	5.119
4.1	43.20	7.20	0.00	0.050	21601.716	0.050	1.829	105.795	1.829	0.000	0.000	0.000	4.322	6.201
4.2	44.40	7.54	0.00	0.051	24854.127	0.051	1.875	142.280	1.875	0.000	0.000	0.000	5.447	7.373
4.3	45.00	7.71	0.00	0.051	26620.909	0.051	1.898	163.898	1.898	0.000	0.000	0.000	6.041	7.990
4.4	46.80	8.23	0.00	0.052	32531.786	0.052	1.964	244.641	1.964	0.000	0.000	0.000	7.940	9.957
4.5	48.00	8.57	0.00	0.053	37023.556	0.053	2.007	313.906	2.007	0.000	0.000	0.000	9.300	11.360

Storage Curve Editor

Curve Name: Storage

Description: Storage

	Depth (ft)	Area (ft2)
1	0	2425
2	4.5	2425
3		
4		
5		
6		
7		
8		
9		
10		
11		

View... Load... Save... OK Cancel Help

Rating Curve Editor

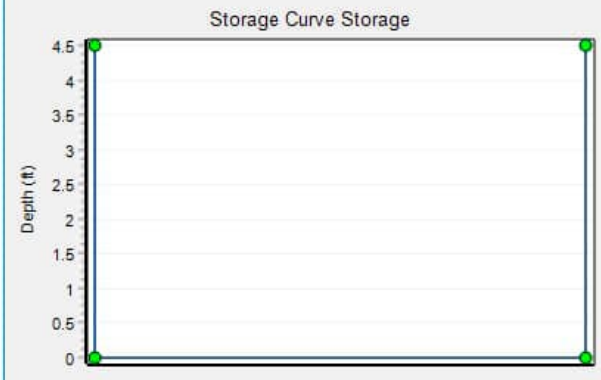
Curve Name: BasinOutlet

Description:

	Head (ft)	Outflow (CFS)
1	0.00	0.000
2	0.10	0.006
3	0.20	0.011
4	0.30	0.014
5	0.40	0.016
6	0.50	0.018
7	0.60	0.020
8	0.70	0.022
9	0.80	0.023
10	0.90	0.025
11	1.00	0.026

View... Load... Save... OK Cancel Help

Storage Curve Viewer



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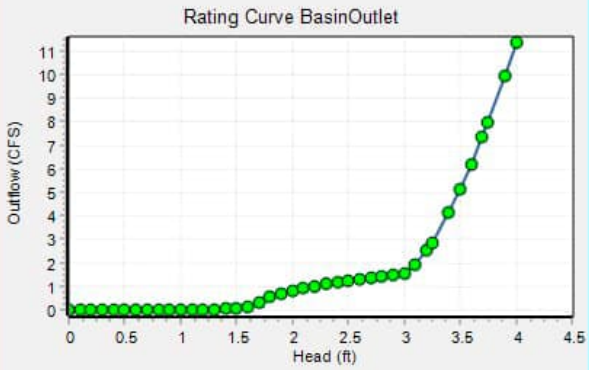
Curve Viewer



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DETENTION BASIN ANALYSIS RESULTS

Summary Results

Topic: Node Depth — Click a column header to sort the column.

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Day of Maximum Depth	Hour of Maximum Depth	Maximum Reported Depth Feet
OUTLET	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
DETENTION	STORAGE	0.00	3.19	3.19	0	04:29	2.53

Depth is relative to top of WQ treatment depth (0.5'). Therefore, WSEL100 depth = 3.19+0.5 = 3.69' from basin surface.

Summary Results

Topic: Node Inflow — Click a column header to sort the column.

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Day of Maximum Inflow	Hour of Maximum Inflow	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
OUTLET	OUTFALL	0.00	2.47	0	04:29	0	0.0971	0.000
DETENTION	STORAGE	6.77	6.77	0	04:22	0.0972	0.0972	0.080

Appendix 7 – Hydraulic Software Output and Calculations

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, Jun 25 2023

3 foot - Curb Cut

Rectangular

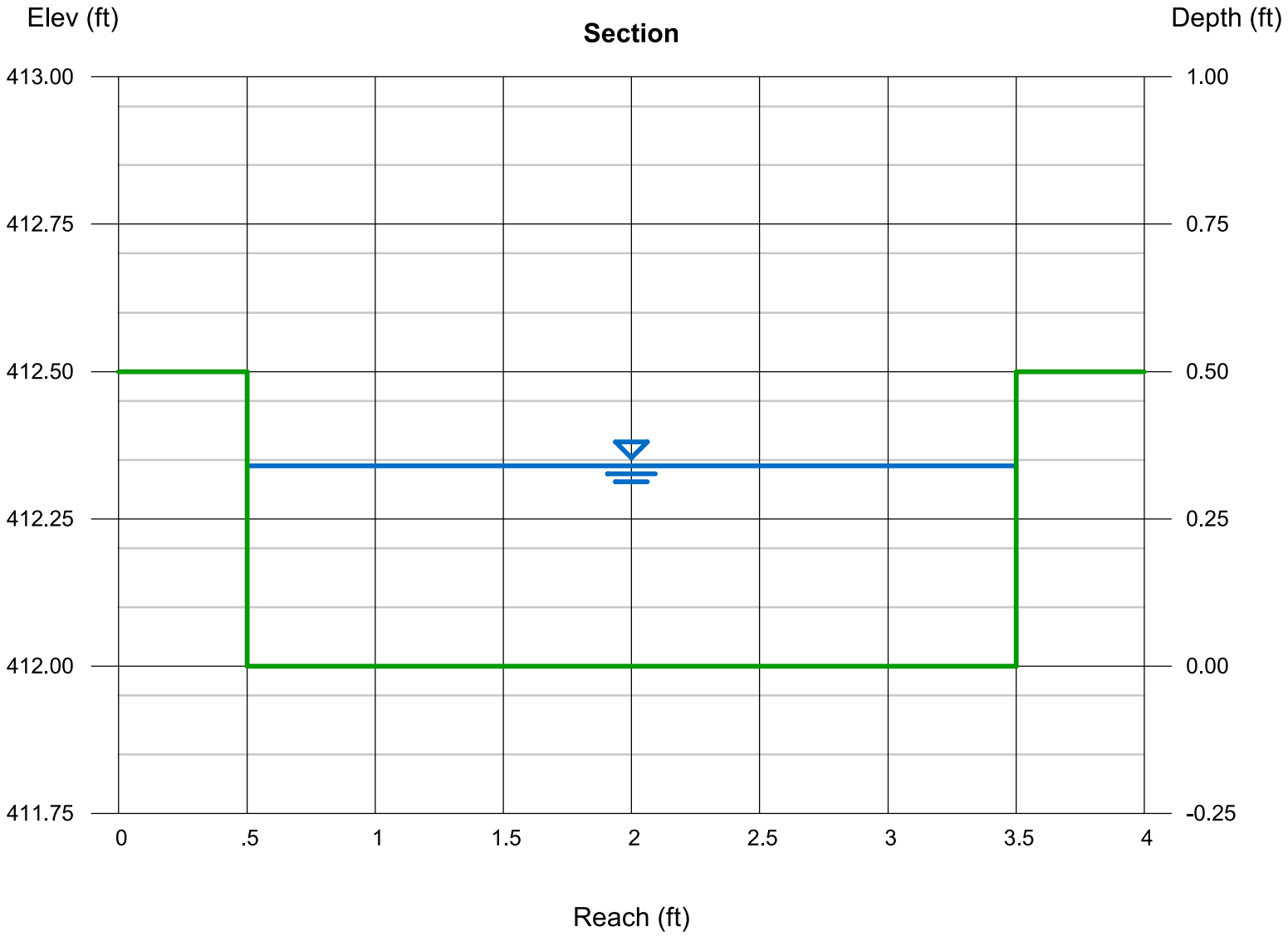
Bottom Width (ft)	= 3.00
Total Depth (ft)	= 0.50
Invert Elev (ft)	= 412.00
Slope (%)	= 2.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 6.77

Highlighted

Depth (ft)	= 0.34
Q (cfs)	= 6.770
Area (sqft)	= 1.02
Velocity (ft/s)	= 6.64
Wetted Perim (ft)	= 3.68
Crit Depth, Yc (ft)	= 0.50
Top Width (ft)	= 3.00
EGL (ft)	= 1.02



Inlet Report

20foot Curb Inlet- West of Ella Way

Curb Inlet

Location	=	On grade
Curb Length (ft)	=	20.00
Throat Height (in)	=	6.00
Grate Area (sqft)	=	-0-
Grate Width (ft)	=	-0-
Grate Length (ft)	=	-0-

Gutter

Slope, Sw (ft/ft)	=	0.063
Slope, Sx (ft/ft)	=	0.020
Local Depr (in)	=	4.00
Gutter Width (ft)	=	2.00
Gutter Slope (%)	=	3.30
Gutter n-value	=	0.016

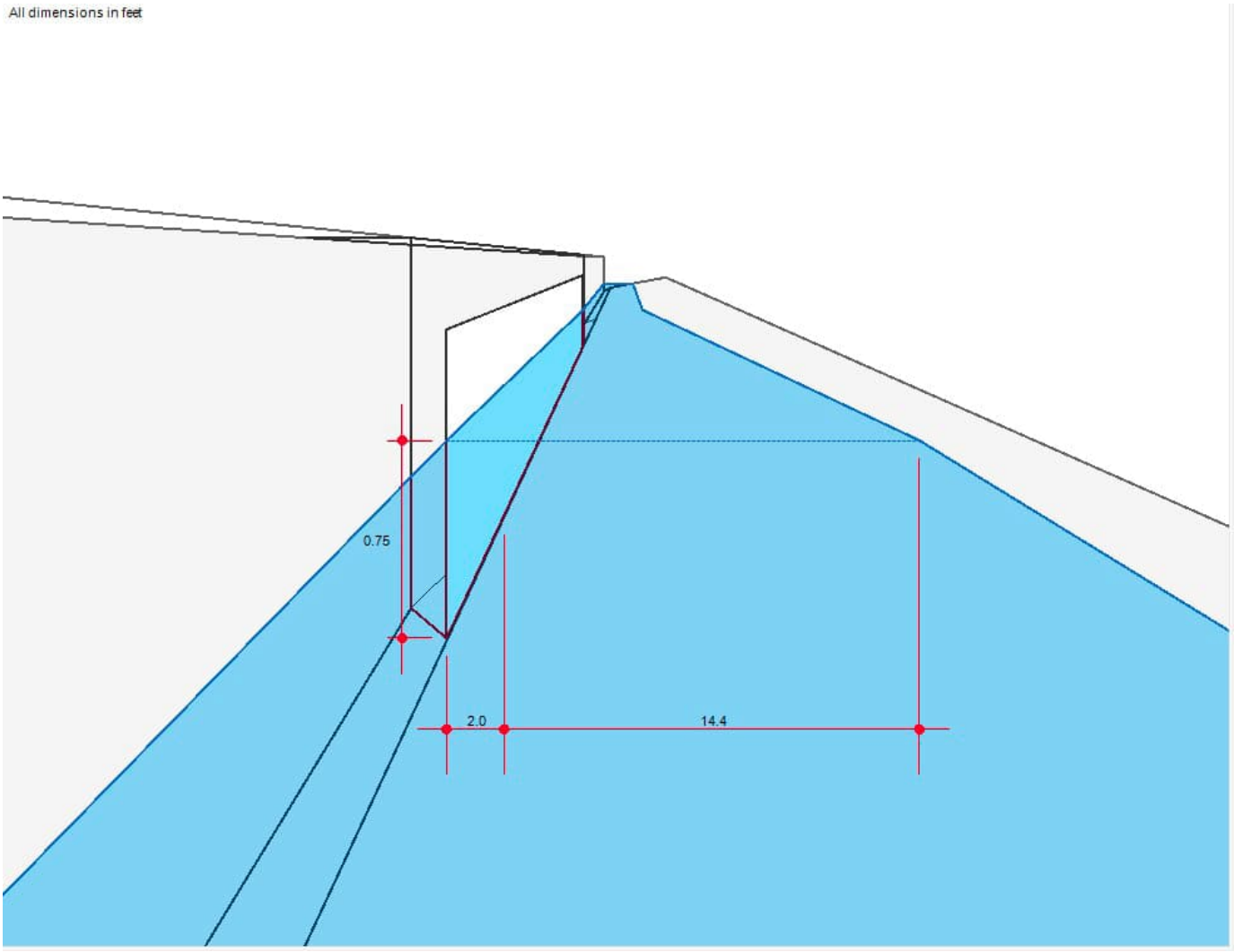
See Following Calculation for collection of bypass Q

Calculations

Compute by:		Known Q
Q (cfs)	=	17.44

Highlighted

Q Total (cfs)	=	17.44
Q Capt (cfs)	=	13.40
Q Bypass (cfs)	=	4.04
Depth at Inlet (in)	=	8.97
Efficiency (%)	=	77
Gutter Spread (ft)	=	16.40
Gutter Vel (ft/s)	=	6.29
Bypass Spread (ft)	=	8.94
Bypass Depth (in)	=	3.18



Inlet Report

15 foot Grated Curb Inlet- East of Ella Way

Combination Inlet

Location	= On grade
Curb Length (ft)	= 14.00
Throat Height (in)	= 6.00
Grate Area (sqft)	= -0-
Grate Width (ft)	= 1.97
Grate Length (ft)	= 3.33

Gutter

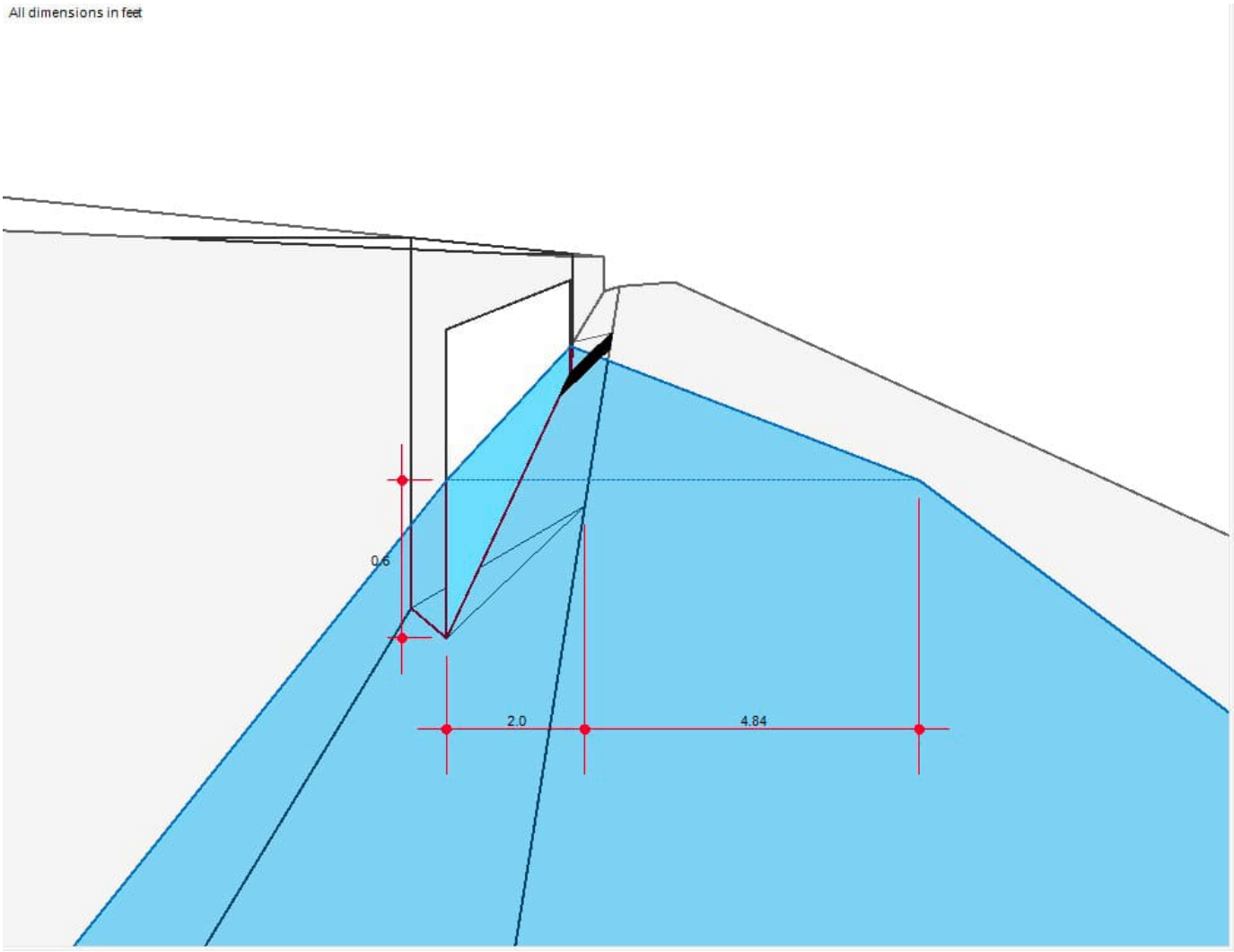
Slope, Sw (ft/ft)	= 0.083
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= 4.00
Gutter Width (ft)	= 2.00
Gutter Slope (%)	= 7.70
Gutter n-value	= 0.016

Calculations

Compute by:	Known Q
Q (cfs)	= 4.04

Highlighted

Q Total (cfs)	= 4.04
Q Capt (cfs)	= 4.04
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 7.15
Efficiency (%)	= 100
Gutter Spread (ft)	= 6.84
Gutter Vel (ft/s)	= 6.80
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Grate Inlet at northeast corner of
Slope Street and Rhone Road
Existing Condition

Inlets

General specifications

Inlet ID:	Inlet-02
Inlet manufacturer:	FHWA HEC-22 Generic
Manufacturer part number:	N/A
Number of inlets:	1
Inlet type:	Grate Inlet - Rectangular
Inlet location:	On Grade
Combination inlet type:	Curb Opening & Grate
Curb opening and grate type:	Equal Length Inlet

Description

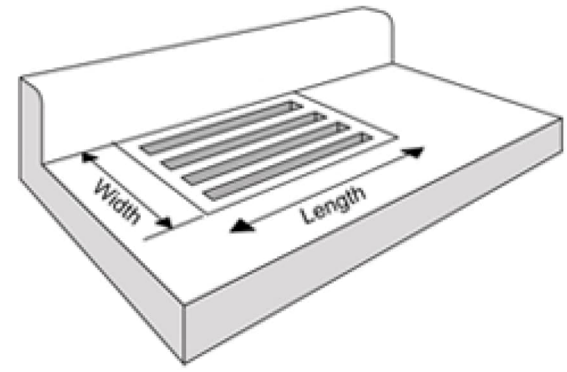
Grate specifications

Grate type:	Curved Vane	
Grate length:	120.00	in
Grate width:	24.00	in

Physical properties

Catchbasin invert elevation:	398.05	ft
Inlet rim elevation:	403.6	ft
Ponded area:		ft²
Initial water surface elevation:	0	ft
External inflows:	NO	...
Grate clogging factor:	0	%
Roadway/gutter bypass link:	Link-15	

Inlet illustration



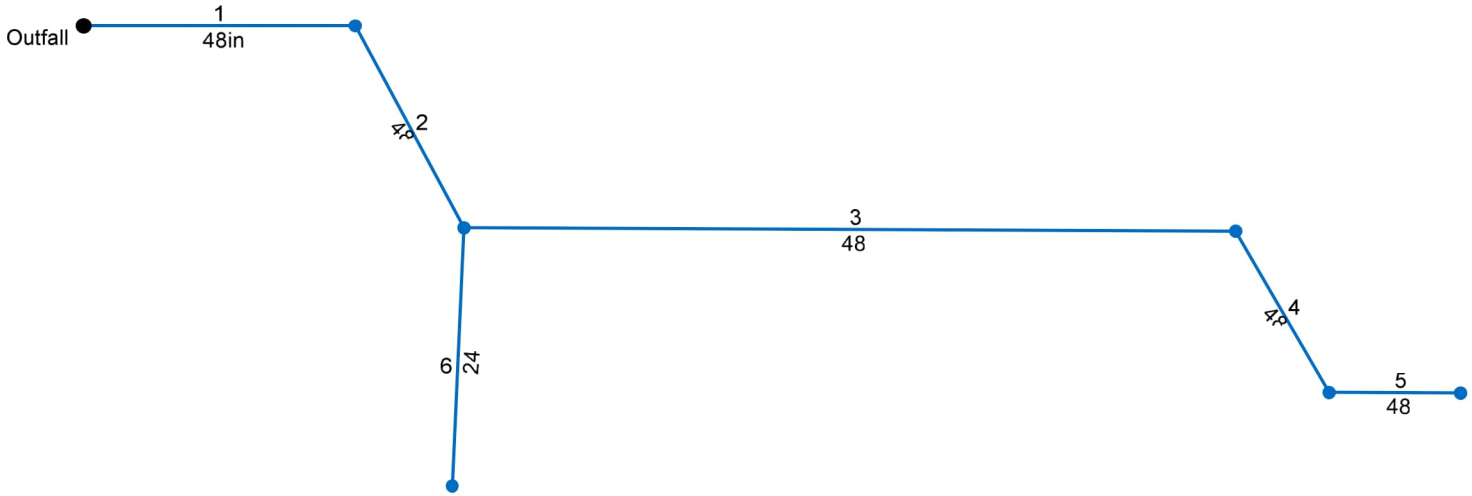
Roadway & gutter specifications

Roadway longitudinal slope:	.022	ft/ft
Roadway cross slope:	0.02	ft/ft
Roadway Manning's:	0.016	...
Gutter cross slope:	0.069	ft/ft
Gutter width:	2.00	ft
Gutter depression:	0.00	in
Upstream roadway links:		

Analysis summary

Peak flow during analysis:	25.58	cfs
Peak flow intercepted by inlet:	16.73	cfs
Peak flow bypassing inlet:	8.84	cfs
Inlet efficiency during peak flow:	65.43	%
Gutter spread during peak flow:	20.59	ft
Gutter flow depth during peak flow:	0.51	ft

Slope Street Subdivision



Project File: Slope Street SD.stm	Number of lines: 6	Date: 6/25/2023

MyReport

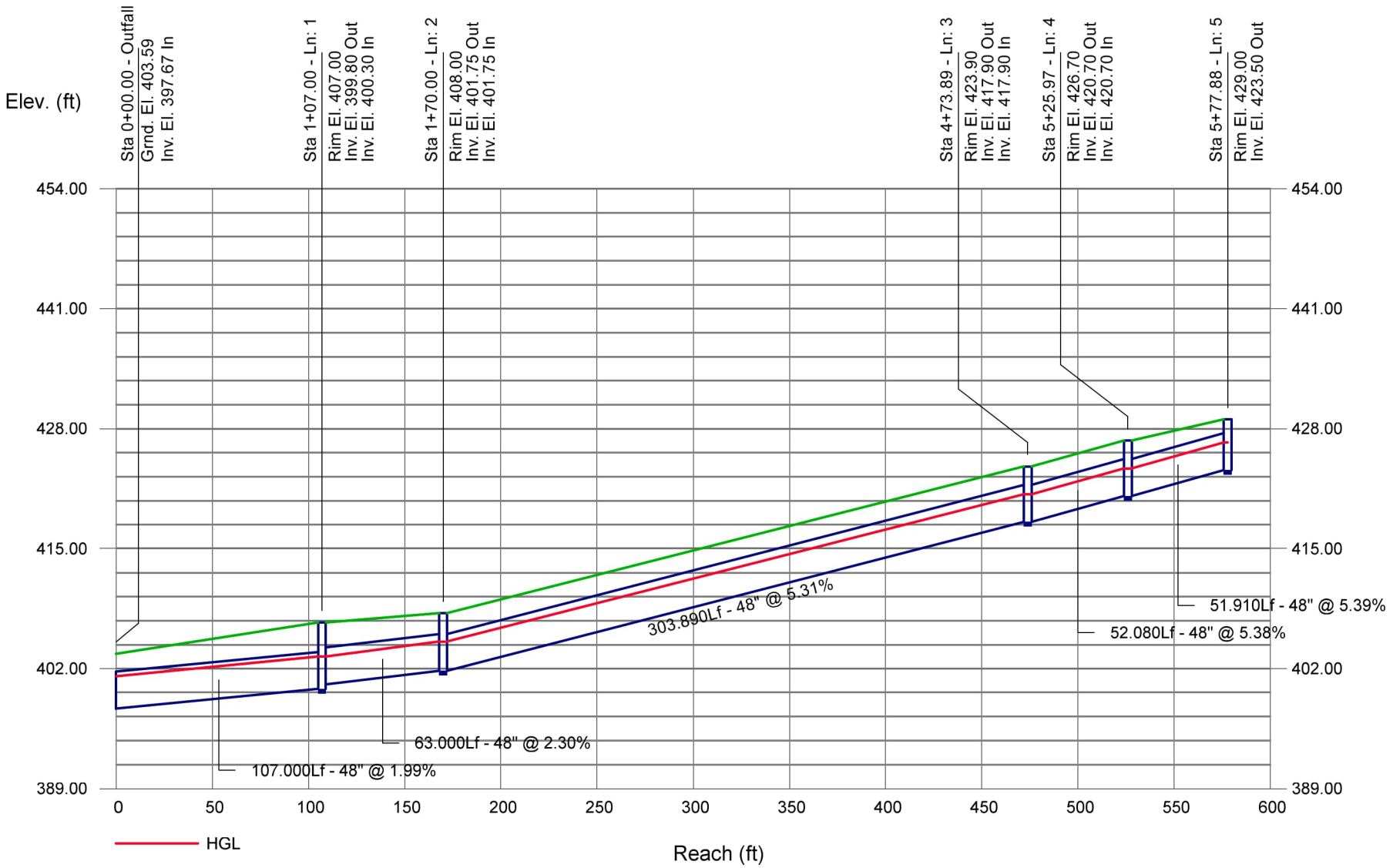
Line No.	Line ID	Known Q (cfs)	Line Length (ft)	Line Size (in)	Invert Dn (ft)	Line Slope (%)	Invert Up (ft)	HGL Dn (ft)	HGL Up (ft)	HGL Jmp Dn (ft)	HGL Jmp Up (ft)	Jump Len (ft)	Jump Loc (ft)	Vel Dn (ft/s)	Vel Dn (ft/s)	
1	48in	138.46	107.000	48	397.67	1.99	399.80	401.16	403.29	....	....	....	....	11.90	11.90	
2	48	110.40	63.000	48	400.30	2.30	401.75	403.29	404.92	....	....	....	....	10.94	10.94	
3	48	97.00	303.890	48	401.75	5.31	417.90	404.92	420.88	....	....	....	....	9.07	9.07	
4	48	97.00	52.080	48	417.90	5.38	420.70	420.88	423.68	....	....	....	....	9.65	9.65	
5	48	97.00	51.910	48	420.70	5.39	423.50	423.68	426.48	....	....	....	....	9.65	9.65	
6	24	13.40	59.260	24	403.75	0.51	404.05	405.14	405.45	....	....	....	....	5.73	5.73	

Slope Street Subdivision | Number of lines: 6 | Date: 6/25/2023

NOTES: ** Critical depth

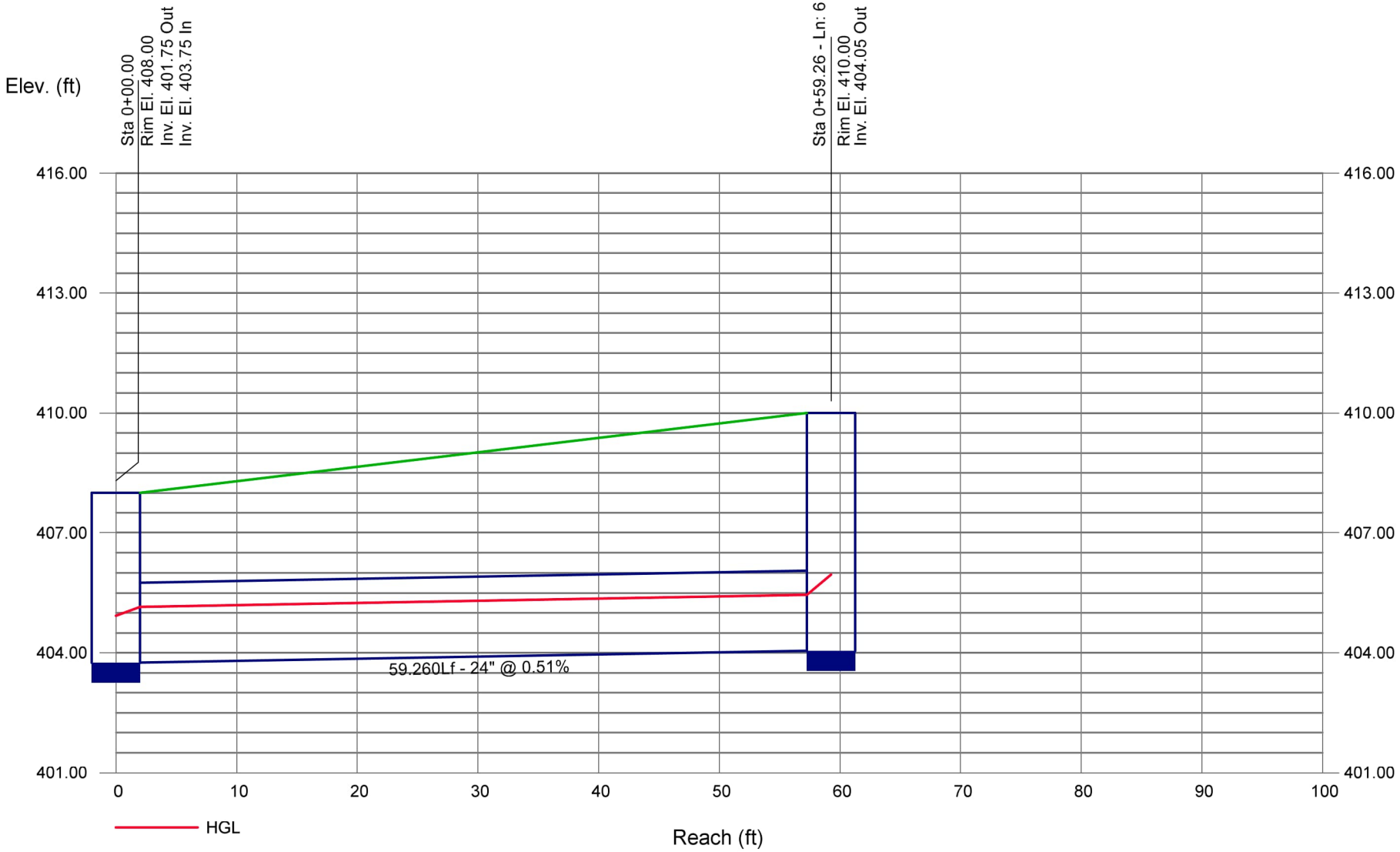
Storm Sewer Profile

Proj. file: Slope Street SD.stm



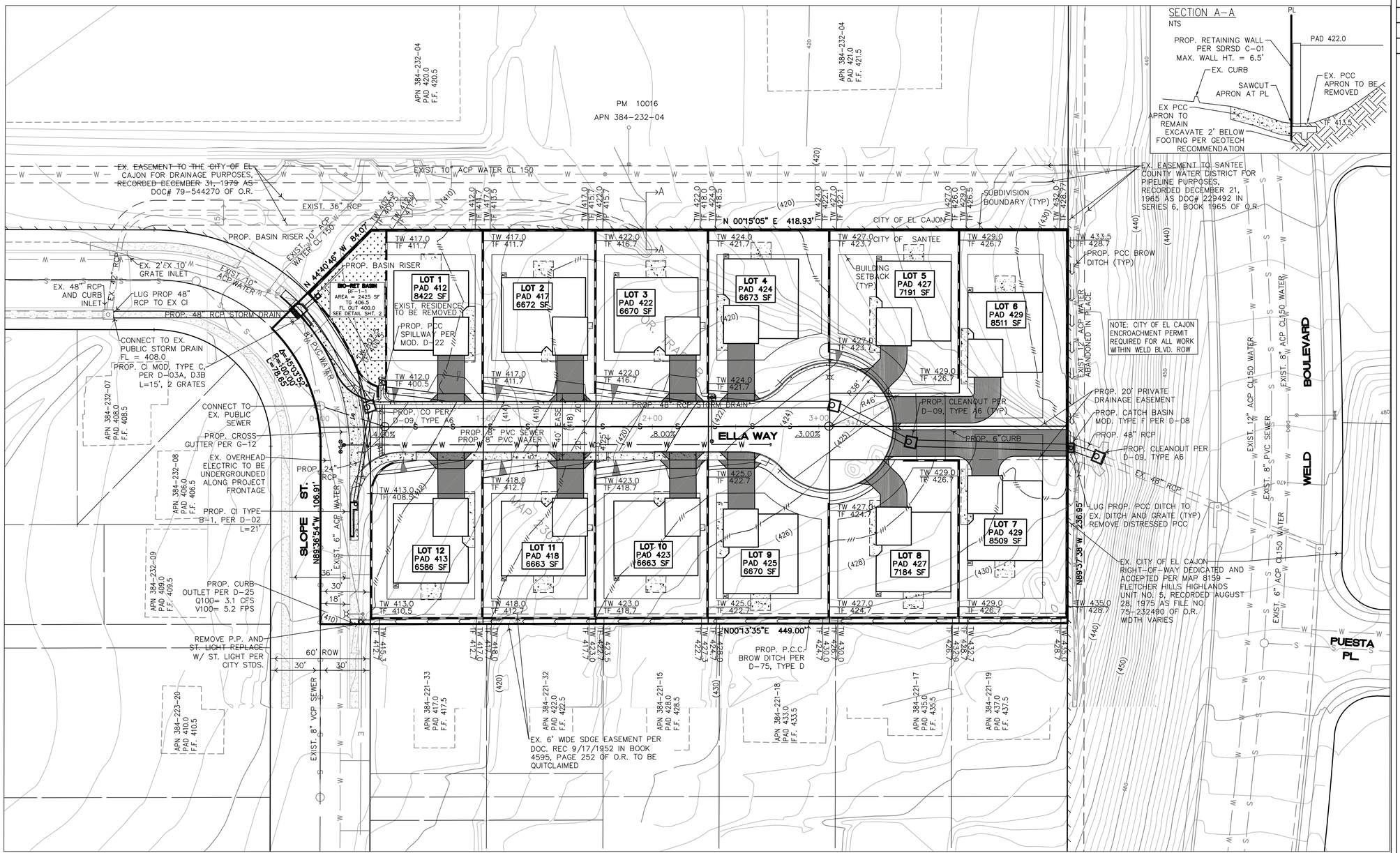
Storm Sewer Profile

Proj. file: Slope Street SD.stm



Appendix 8 – Preliminary Grading Plan

PRELIMINARY GRADING PLAN - SLOPE STREET SUBDIVISION



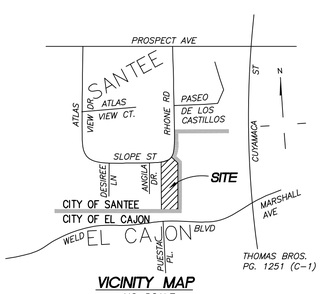
OWNER/ APPLICANT:

SLOPE INVESTMENTS, L.P.
1000 PIONEER WAY
EL CAJON, CA 92020
(619) 441-1463

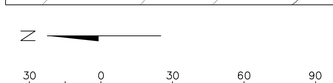
1. LEGAL DESCRIPTION:
   PORTION OF TRACT B OF GODBOLD'S SUBDIVISION, IN THE CITY OF SANTEE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 2303, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, FEBUARY 21, 1946.
2. ASSESSOR'S PARCEL NUMBER 384-232-03
3. TOTAL NUMBER OF LOTS PROPOSED 11 SINGLE FAMILY LOTS
4. TOTAL GROSS/NET ACREAGE = 2.46 ACRES
5. EXISTING ZONING R-2 (6,000 SF MIN.)
6. PROPOSED ZONING NO CHANGE
7. EXISTING ZONING OF ADJACENT PROPERTIES IS R-2
8. LAND USE DESIGNATION SINGLE FAMILY RESIDENTIAL
9. PRESENT USE OF PROPERTY IS SINGLE FAMILY RESIDENCE
10. PROPOSED USE OF PROPERTY IS AN 11 LOT SUBDIVISION.
11. FIRE PROTECTION: SANTEE FIRE PROTECTION DISTRICT
12. SEWER & WATER: PADRE DAM MUNICIPAL WATER DISTRICT
13. HIGH SCHOOL: GROSSMONT UNION HIGH SCHOOL DISTRICT
14. ELEMENTARY SCHOOL: SANTEE ELEMENTARY SCHOOL DISTRICT
15. STREET LIGHTING: CITY OF SANTEE
16. TOPOGRAPHIC DATA WAS PROVIDED BY SAN-LO AERIAL SURVEYS AND VERIFIED BY FIELD SURVEY BY IDY SURVEYING SEPT. 2018, HORIZONTAL AND VERTICAL CONTROL PER ROS 11252
17. FINISHED FLOOR ELEVATION SHALL BE 0.5' ABOVE PAD GRADE.

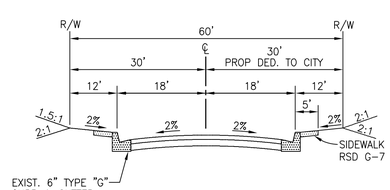
EARTHWORK QUANTITIES

EXCAVATION	3100 CY
EMBANKMENT	3100 CY
EXPORT	0 CY

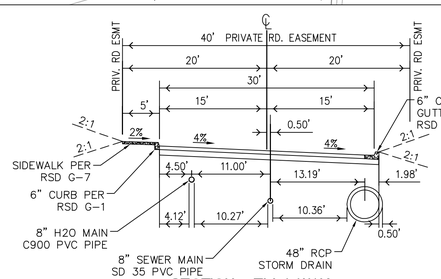


VICINITY MAP
NO SCALE

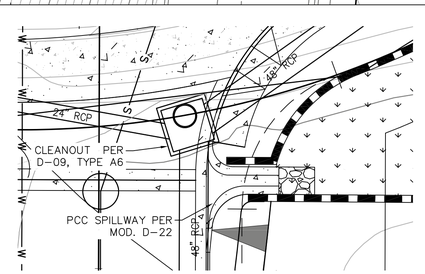




TYP. SECTION : SLOPE STREET
NTS



SECTION : ELLA WAY
SCALE: 1"=10'



DETAIL : STORM DRAIN CONNECTION
NO SCALE

REVISIONS	BY

CITY OF SANTEE
T.M. No: 2020-01

PRELIMINARY GRADING PLAN
SLOPE STREET SUBDIVISION

DATE	6-21-2023
SCALE	1"=30'
DRAWN	BCW
JOB	SLOPE
SHEET	1
OF	1 SHEETS

Appendix 9 – SWQMP

CITY OF SANTEE

PRIORITY DEVELOPMENT PROJECT (PDP)

STORM WATER QUALITY MANAGEMENT PLAN (SWQMP)

FOR

SLOPE STREET SUBDIVISION

TM 2020-01/ PA2015-6

9463 SLOPE STREE

SANTEE, CA 92071

ASSESSOR'S PARCEL NUMBER:

384-232-03

ENGINEER OF WORK:

THOMAS H KOERNER, RCE# 65317

PREPARED FOR:

VISTA SOUTH MELROSE, LP, A CALIFORNIA LIMITED PARTNERSHIP

565 MAGNOLIA AVENUE

EL CAJON, CA 92020

PDP SWQMP PREPARED BY:

THOMAS H. KOERNER

KOERNER ENGINEERING

7361 MISSION TRAILS DRIVE #114

SANTEE, CA 92071

DATE OF SWQMP:

06/ 06/ 2023

PLANS PREPARED BY:

THOMAS H. KOERNER

KOERNER ENGINEERING

7361 MISSION TRAILS DRIVE #114

SANTEE, CA 92071

PDP SWQMP Template Date: February 2016

PDP SWQMP Preparation Date: June 2023

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TABLE OF CONTENTS

ACRONYMS

APN	Assessor's Parcel Number
BMP	Best Management Practice
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NRCS	Natural Resources Conservation Service
PDP	Priority Development Project
PE	Professional Engineer
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWQMP	Storm Water Quality Management Plan

SWQMP PREPARER'S
CERTIFICATION PAGE

Project Name: Slope Street Subdivision
Permit Application Number: PA2015-6

PREPARER'S CERTIFICATION

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

I have read and understand that the City Engineer has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the BMP Design Manual. I certify that this 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 the City Engineer is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

_____RCE# 65317___
Engineer of Work's Signature, PE Number & Expiration Date

Thomas H. Koerner _____
Print Name

_____
Date

Engineer's Seal:

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SWQMP PROJECT OWNER'S
CERTIFICATION PAGE

Project Name: Slope Street Subdivision
Permit Application Number: PA2015-6

PROJECT OWNER'S CERTIFICATION

This PDP SWQMP has been prepared for VISTA SOUTH MELROSE, LP by THOMAS H KOERNER. The PDP SWQMP is intended to comply with the PDP requirements of the CITY OF SANTEE Design Manual, which is a design manual for compliance with local CITY OF SANTEE regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2015-0100) requirements for storm water management.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan. Once the undersigned transfers its interests in the property, its successor-in-interest shall bear the aforementioned responsibility to implement the best management practices (BMPs) described within this plan, including ensuring on-going operation and maintenance of structural BMPs. A signed copy of this document shall be available on the subject property into perpetuity.

_____
Project Owner's Signature

Greg Brown, Jr. _____
Print Name

Vista South Melrose, LP, A California Limited Partnership _____
Company

_____
Date

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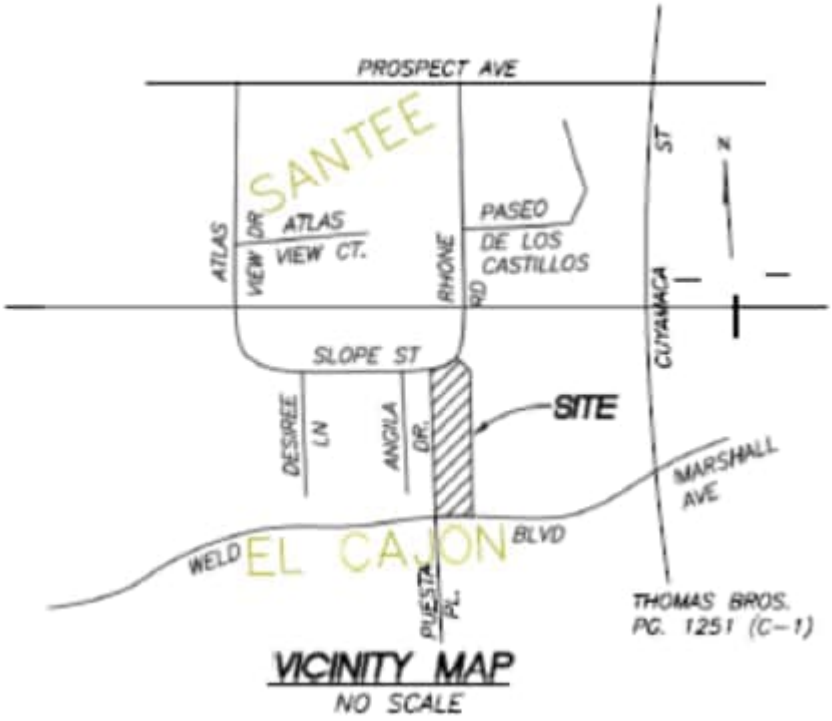
SUBMITTAL RECORD

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

Submittal Number	Date	Project Status	Summary of Changes
1	07/22/2020	☑ Preliminary Design / Planning/ CEQA ☐ Final Design	Initial Submittal
2	10/26/2020	☑ Preliminary Design / Planning/ CEQA ☐ Final Design	Address City of Santee's comments.
3	05/31/2022	☑ Preliminary Design / Planning/ CEQA ☐ Final Design	Address City of Santee's comments.
4	06/06/2023	☑ Preliminary Design / Planning/ CEQA ☐ Final Design	Revise Treatment method and add flow control (HMP) calculations.

PROJECT VICINITY MAP

Project Name: Slope Street Subdivision
Permit Application Number: PA2015-6



Applicability of Permanent, Post-Construction Storm Water BMP Requirements (Storm Water Intake Form for all Development Permit Applications)	Form I-1 Model BMP Design Manual [August 31, 2015]
Project Identification	
Project Name: Slope Street Subdivision	
Permit Application Number: PA2015-6	Date: 06/ 06/ 2023
Project Address: 9463 Slope Street, Santee, CA 92071	

Determination of Requirements

The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short summary of applicable requirements, in some cases referencing separate forms that will serve as the backup for the determination of requirements.

Answer each step below, starting with Step 1 and progressing through each step until reaching "Stop". Upon reaching a Stop, do not complete further Steps beyond the Stop.

Refer to BMP Design Manual sections and/or separate forms referenced in each step below.

Step	Answer	Progression
Step 1: Is the project a "development project"? See Section 1.3 of the BMP Design Manual for guidance.	☑ Yes	Go to Step 2.
	☐ No	Stop. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.
Discussion / justification if the project is not a "development project" (e.g., the project includes *only* interior remodels within an existing building):		
Step 2: Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? To answer this item, see Section 1.4 of the BMP Design Manual *in its entirety* for guidance, AND complete Form I-2, Project Type Determination.	☐ Standard Project	Stop. Only Standard Project requirements apply, including Standard Project SWQMP.
	☑ PDP	Standard and PDP requirements apply, including PDP SWQMP. Go to Step 3.
	☐ Exception to PDP definitions	Stop. Standard Project requirements apply, and any additional requirements specific to the type of project. Provide discussion and list any additional requirements below. Prepare Standard Project SWQMP.

Form I-1 Page 2, Form Template Date: August 31, 2015		
[Step 2 Continued from Page 1] Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:		
Step 3 (PDPs only). Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the BMP Design Manual for guidance.	☐ Yes	Consult the [City Engineer] to determine requirements. Provide discussion and identify requirements below. Go to Step 4.
	☑ No	BMP Design Manual PDP requirements apply. Go to Step 4.
Discussion / justification of prior lawful approval, and identify requirements (*not required if prior lawful approval does not apply*):		
Step 4 (PDPs only). Do hydromodification control requirements apply? See Section 1.6 of the BMP Design Manual for guidance.	☑ Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to Step 5.
	☐ No	Stop. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
Discussion / justification if hydromodification control requirements do <u>not</u> apply:		
Step 5 (PDPs subject to hydromodification control requirements only). Does protection of critical coarse sediment yield areas apply based on review of WMAA Potential Critical Coarse Sediment Yield Area Map? See Section 6.2 of the BMP Design Manual for guidance.	☐ Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). Stop.
	☑ No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. Stop.

Priority Determination Form	Form I-2 Model BMP Design Manual [August 31, 2015]
Project Information	
Project Name: Slope Street Subdivision	
Permit Application Number: PA2015-6	Date: 06/ 06/ 2023
Project Address: 9463 Slope Street, Santee, CA 92071	

Project Type Determination: Standard Project or Priority Development Project (PDP)			
The project is (select one): ☐ New Development ☑ Redevelopment			
The total proposed newly created or replaced impervious area is: _50,868_ ft^2 (__1.168__) acres			
Is the project in any of the following categories, (a) through (f)?			
Yes ☐	No ☑	(a)	New development projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☑	No ☐	(b)	Redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☐	No ☑	(c)	New and redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses: (i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (Standard Industrial Classification (SIC) code 5812). (ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater. (iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce. (iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.

Form I-2 Page 2, Form Template Date: August 31, 2015			
Yes ☐	No ☑	(d)	New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands). *Note: ESAs are areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees. See BMP Design Manual Section 1.4.2 for additional guidance.*
Yes ☐	No ☑	(e)	New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses: (i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539. (ii) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.
Yes ☑	No ☐	(f)	New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction. *Note: See BMP Design Manual Section 1.4.2 for additional guidance.*

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

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

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

The following is for redevelopment PDPs only:

The area of existing (pre-project) impervious area at the project site is: 6,822 ft^2 (A)
The total proposed newly created or replaced impervious area is 50,868 ft^2 (B)
Percent impervious surface created or replaced (B/A)*100: 745.6 %
The percent impervious surface created or replaced is (select one based on the above calculation):

☐ less than or equal to fifty percent (50%) – only new impervious areas are considered PDP

OR

☑ greater than fifty percent (50%) – the entire project site is a PDP

Site Design Checklist For PDPs	Form I-3B (PDPs) Model BMP Design Manual [August 31, 2015]
Project Summary Information	
Project Name:	Slope Street Subdivision
Project Address	9463 Slope Street Santee, CA 92071
Assessor's Parcel Number(s) (APN(s))	384-232-03
Permit Application Number:	PA2015-6
Project Hydrologic Unit	Select One: ☐ Santa Margarita 902 ☐ San Luis Rey 903 ☐ Carlsbad 904 ☐ San Dieguito 905 ☐ Penasquitos 906 ☑ San Diego 907 ☐ Pueblo San Diego 908 ☐ Sweetwater 909 ☐ Otay 910 ☐ Tijuana 911
Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	San Diego Hydrologic Unit, Lower San Diego Hydrologic Area, El Cajon Hydrologic Sub-Area (907.13)
Parcel Area (total area of Assessor's Parcel(s) associated with the project)	2.46 Acres (107,158 Square Feet)
Area to be Disturbed by the Project (Project Area)	2.32 Acres (101,137 Square Feet)
Project Proposed Impervious Area (subset of Project Area)	1.17 Acres (50,868 Square Feet)
Project Proposed Pervious Area (subset of Project Area)	1.15 Acres (50,269 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.	

Description of Existing Site Condition

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

☑ Existing development

☑ Previously graded but not built out

☐ Demolition completed without new construction

☐ Agricultural or other non-impervious use

☐ Vacant, undeveloped/natural

Description / Additional Information: The stie was partially developed with a home, shed and access driveway. The remainder of the lot experienced some grading in the past.

Existing Land Cover Includes (select all that apply):

☑ Vegetative Cover

☑ Non-Vegetated Pervious Areas

☑ Impervious Areas

Description / Additional Information: The site consists of some vegetation, dirt, and impervious surfaces.

Underlying Soil belongs to Hydrologic Soil Group (select all that apply):

☐ NRCS Type A

☐ NRCS Type B

☐ NRCS Type C

☑ NRCS Type D

Approximate Depth to Groundwater (GW):

☐ GW Depth < 5 feet

☐ 5 feet < GW Depth < 10 feet

☑ 10 feet < GW Depth < 20 feet

☐ GW Depth > 20 feet

Existing Natural Hydrologic Features (select all that apply):

☑ Watercourses

☐ Seeps

☐ Springs

☐ Wetlands

☐ None

Description / Additional Information: A man-made natural conveyance channel currently transects the site in the southeast corner of the project site. The channel carries offsite runoff from approximately 44.4 acres of developed areas.

Description of Existing Site Drainage Patterns

How is storm water runoff conveyed from the site? At a minimum, this description should answer:

(1) whether existing drainage conveyance is natural or urban;

(2) Is runoff from offsite conveyed through the site? if yes, quantify all offsite drainage areas, design flows, and locations where offsite flows enter the project site, and summarize how such flows are conveyed through the site;

(3)Provide details regarding existing project site drainage conveyance network, including any existing storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels; and

(4) Identify all discharge locations from the existing project site along with a summary of conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations.

Describe existing site drainage patterns:

The subject site is a nearly rectangular parcel of land bounded by Slope Street on the north, Weld Boulevard on the south, the old Buck Knife facilities on the east, and residential properties on the west. The 2.42-acre site is generally undeveloped, with one single-family residence and several sheds located at the northern end of the parcel. Topographically, the site slopes up gently from Slope Street, with on-site elevations varying from a low of about 410 feet to a high of 435 feet. Along the southern boundary of the site, there is a fill slope up to about 40 feet in height that ascends from the property to Weld Boulevard at an inclination ranging from 1.5:1 (H:V) to 1.8:1 (H:V). A 48" RCP (Tributary Area= 44.4 ac, Q=92.7 cfs) daylights from the base of this fill slope into a man-made natural drainage channel. This drainage channel crosses the property from about the center of the south boundary to approximately the center of the eastern boundary, where it empties into a 36" RCP on the Buck Knife property. The northern half of the parcel drains directly to the paved Slope Street (Tributary Area=1.5 ac, Q=2.73 cfs), and is collected by a 10' X 2' grate inlet on the east side of Rhone Road. The total confluenced onsite flow from both the northern and southern portions of the lot is about 3.97 cfs

Description of Proposed Site Development

Project Description / Proposed Land Use and/or Activities:
The project proposes to develop the site with 12-single family lots, access road (cul-de-sac), and open space for a stormwater treatment and detention facility.

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):
The proposed impervious features will consist of the homes, driveways, patios, and roadway with curb and gutter.

List/describe proposed pervious features of the project (e.g., landscape areas):
Landscaping within the pads and the biofiltration facility will make up the site's pervious areas.

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

Description / Additional Information:
The project will excavate and place 3100 CY of soil within the site; there will not be any soil export. The home pads will be stepped up towards the south from Slope Street. Each pad will have an elevation difference of approximately four feet from the adjacent pad. To create these pads, the proposed grading will consist of 'cut and fills' of less than about 10 feet from existing grades. In addition, approximately four-foot-high retaining walls will be constructed between the pads and a perimeter retaining wall up to about 10 feet in height will be constructed around much of the site.

Description of Proposed Site Drainage Patterns

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

☑ Yes
☐ No

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

Describe proposed site drainage patterns: The project will change the existing condition drainage condition relative to both onsite and offsite runoff. The offsite runoff which previously discharged into the constructed man-made channel at the southern portion of the site will now be routed through the site underneath the proposed street and bypass any proposed onsite stormwater treatment features. The proposed 48" RCP pipe will connect to a proposed junction at the downstream end of the project improvements along Slope Street.

Onsite runoff from the developed lots will surface drain towards the new street. The street will be sloped to drain towards the eastern gutter where it will continue to drain north. A curb cut along the east curb will allow runoff to be redirected towards the proposed biofiltration basin prior to reaching Slope Street and exiting the site. The biofiltration basin will serve the conjunctive uses of treatment and detention (Q100 and hydromodification). A discharge structure within the basin will mitigate flowrates prior to discharging from the site. Refer to Attachment 2d for calculations relative to the flow control (HMP) design pertaining to the basin. Refer to the *Hydrology and Hydraulic Calculations for Slope Street Subdivision, TM 2020-01* (June 2023) for peak flow design calculations. The table below summarizes the existing and proposed peak flows from the site.

Discharge Location	Area (ac)	Existing Q100 (cfs)	Proposed Q100		Difference (cfs)
			Unmitigated (cfs)	Detained (cfs)	
Slope Street	2.32	3.97	6.77	2.47	-1.5

Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply):

- ☑ On-site storm drain inlets
- ☐ Interior floor drains and elevator shaft sump pumps
- ☐ Interior parking garages
- ☑ Need for future indoor & structural pest control
- ☑ Landscape/Outdoor Pesticide Use
- ☐ Pools, spas, ponds, decorative fountains, and other water features
- ☐ Food service
- ☐ Refuse areas
- ☐ Industrial processes
- ☐ Outdoor storage of equipment or materials
- ☐ Vehicle and Equipment Cleaning
- ☐ Vehicle/Equipment Repair and Maintenance
- ☐ Fuel Dispensing Areas
- ☐ Loading Docks
- ☐ Fire Sprinkler Test Water
- ☑ Miscellaneous Drain or Wash Water
- ☑ Plazas, sidewalks, and parking lots

Description / Additional Information:

Identification and Narrative of Receiving Water and Pollutants of Concern

Describe flow path of storm water from the project site discharge location(s), through urban storm conveyance systems as applicable, to receiving creeks, rivers, and lagoons as applicable, and ultimate discharge to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable): Flow is collected in a proposed 48" RCP pipe which is connected to an existing system at a grate inlet on the northeast corner of Slope Street and Rhone Road. The flow continues underground flowing east across Rhone Road, north along Rhone Road, turning left at Even Seth Circle, then north on Even Seth Circle, connecting to an underground system in Shanes Way, to Willow Terrace and outlets to rip rap. It then flows in a natural channel northward towards Prospect Avenue, is picked up into a concrete channel, and is conveyed to Forester Creek under Prospect Avenue. Forester Creek flows into San Diego River, which then empties into the Pacific Ocean.

List any 303(d) impaired water bodies within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs 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
Forrester Creek	Benthic Community Effects, Indicator Bacteria, Nitrogen, Phosphorous, Selenium, Total Dissolved Solids	Indicator Bacteria
San Diego River	Benthic Community Effects, Cadmium, Indicator Bacteria, Nitrogen, Oxygen (Dissolved), Phosphorous, Total Dissolved Solids, Toxicity	Indicator Bacteria

Identification of Project Site Pollutants*

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

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

Pollutant	Not Applicable to the Project Site	Expected 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			

Hydromodification Management Requirements

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

☑ Yes, hydromodification management flow control structural BMPs required.

☐ No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

☐ No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

☐ No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides.

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

Critical Coarse Sediment Yield Areas*

*This Section only required if hydromodification management requirements apply

Based on the maps provided within the WMAA, do potential critical coarse sediment yield areas exist within the project drainage boundaries?

☐ Yes

☑ No, No critical coarse sediment yield areas to be protected based on WMAA maps

If yes, have any of the optional analyses presented in Section 6.2 of the BMP Design Manual been performed?

☐ 6.2.1 Verification of Geomorphic Landscape Units (GLUs) Onsite

☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment

☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite

☐ No optional analyses performed, the project will avoid critical coarse sediment yield areas identified based on WMAA maps

If optional analyses were performed, what is the final result?

☐ No critical coarse sediment yield areas to be protected based on verification of GLUs onsite

☐ Critical coarse sediment yield areas exist but additional analysis has determined that protection is not required. Documentation attached in Attachment 2.b of the SWQMP.

☐ Critical coarse sediment yield areas exist and require protection. The project will implement management measures described in Sections 6.2.4 and 6.2.5 as applicable, and the areas are identified on the SWQMP Exhibit.

Discussion / Additional Information:

Flow Control for Post-Project Runoff*

*This Section only required if hydromodification management requirements apply

List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit.

The project has one POC located at the northeast corner of the project boundary. The POC is designated as POC1 on the calculations and exhibits. The location coincides with the site's most downstream point where compliance can be effectively determined between existing and proposed development discharges.

Has a geomorphic assessment been performed for the receiving channel(s)?

☑ No, the low flow threshold is 0.1Q2 (default low flow threshold)

☐ Yes, the result is the low flow threshold is 0.1Q2

☐ Yes, the result is the low flow threshold is 0.3Q2

☐ Yes, the result is the low flow threshold is 0.5Q2

If a geomorphic assessment has been performed, provide title, date, and preparer:

Discussion / Additional Information: (optional)

Other Site Requirements and Constraints

When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.

The site will be required to address the large offsite runoff which drains through the site in existing condition. This flow will need to avoid comingling with onsite flows so that it does not require treatment.

The storm drain system for onsite flows will likely need to be shallow to avoid potential vertical constraints of tying into the downstream storm drain system.

Optional Additional Information or Continuation of Previous Sections As Needed

This space provided for additional information or continuation of information from previous sections as needed.

Source Control BMP Checklist for All Development Projects (Standard Projects and Priority Development Projects)	Form I-4 Model BMP Design Manual [August 31, 2015]

Project Identification

Project Name: Slope Street Subdivision

Permit Application Number: PA2015-6

Source Control BMPs

All development projects must implement source control BMPs SC-1 through SC-6 where applicable and feasible. See Chapter 4 and Appendix E of the Model BMP Design Manual for information to implement source control BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the Model BMP Design Manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided.

Source Control Requirement	Applied?		
SC-1 Prevention of Illicit Discharges into the MS4	☑ Yes	☐ No	☐ N/A
Discussion / justification if SC-1 not implemented:			
SC-2 Storm Drain Stenciling or Signage	☑ Yes	☐ No	☐ N/A
Discussion / justification if SC-2 not implemented:			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☑ N/A
Discussion / justification if SC-3 not implemented:			
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☑ N/A
Discussion / justification if SC-4 not implemented:			

Form I-4 Page 2 of 2, Form Template Date: August 31, 2015			
Source Control Requirement	Applied?		
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☑ N/A
Discussion / justification if SC-5 not implemented:			
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)			
☐ On-site storm drain inlets	☑Yes	☐ No	☐ N/A
☐ Interior floor drains and elevator shaft sump pumps	☐ Yes	☐ No	☑ N/A
☐ Interior parking garages	☐ Yes	☐ No	☑ N/A
☐ Need for future indoor & structural pest control	☑ Yes	☐ No	☐ N/A
☐ Landscape/Outdoor Pesticide Use	☑ Yes	☐ No	☐ N/A
☐ Pools, spas, ponds, decorative fountains, and other water features	☐ Yes	☐ No	☑ N/A
☐ Food service	☐ Yes	☐ No	☑N/A
☐ Refuse areas	☐ Yes	☐ No	☑ N/A
☐ Industrial processes	☐ Yes	☐ No	☑ N/A
☐ Outdoor storage of equipment or materials	☐ Yes	☐ No	☑ N/A
☐ Vehicle and Equipment Cleaning	☐ Yes	☐ No	☑ N/A
☐ Vehicle/Equipment Repair and Maintenance	☐ Yes	☐ No	☑ N/A
☐ Fuel Dispensing Areas	☐ Yes	☐ No	☑ N/A
☐ Loading Docks	☐ Yes	☐ No	☑ N/A
☐ Fire Sprinkler Test Water	☐ Yes	☐ No	☑ N/A
☐ Miscellaneous Drain or Wash Water	☑ Yes	☐ No	☐ N/A
☐ Plazas, sidewalks, and parking lots	☑ Yes	☐ No	☐ N/A
Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above.			

Site Design BMP Checklist for All Development Projects (Standard Projects and Priority Development Projects)	Form I-5 Model BMP Design Manual [August 31, 2015]

Project Identification

Project Name: Slope Street Subdivision

Permit Application Number: PA2015-6

Site Design BMPs

All development projects must implement site design BMPs SD-1 through SD-8 where applicable and feasible. See Chapter 4 and Appendix E of the Model BMP Design Manual for information to implement site design BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the Model BMP Design Manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided.

Site Design Requirement	Applied?		
SD-1 Maintain Natural Drainage Pathways and Hydrologic Features	☐ Yes	☑ No	☐ N/A
Discussion / justification if SD-1 not implemented: A man-made natural channel conveys storm water flow from existing 48" RCP at the south side of property, to a 36" RCP on the east side of the property. The project proposes to convey this offsite drainage in a new 48" RCP from the existing 48" RCP to a junction at the northeast corner of the site along Slope Street.			
SD-2 Conserve Natural Areas, Soils, and Vegetation	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-2 not implemented: The project will not export any existing soil from the site.			
SD-3 Minimize Impervious Area	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-3 not implemented: The minimum widths of streets are being proposed for this site.			
SD-4 Minimize Soil Compaction	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-4 not implemented: The biofiltration basin soil surface will be loosely compacted. It is infeasible to loosely compact all other areas onsite which are landscaped due to compaction requirements such as for the buildings and walls.			
SD-5 Impervious Area Dispersion	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-5 not implemented: Roof downspouts shall be dispersed to adjacent landscaped areas wherever feasible.			

Form I-5 Page 2 of 2, Form Template Date: August 31, 2015			
Site Design Requirement	Applied?		
SD-6 Runoff Collection	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-6 not implemented: The on-lot drainage will typically consist of localized runoff collection points at low points within the landscaping. Area drain systems will aid in sending excess ponded runoff off the lot.			
SD-7 Landscaping with Native or Drought Tolerant Species	☑ Yes	☐ No	☐ N/A
Discussion / justification if SD-7 not implemented:			
SD-8 Harvesting and Using Precipitation	☐ Yes	☐ No	☑ N/A
Discussion / justification if SD-8 not implemented:			

Summary of PDP Structural BMPs	Form I-6 (PDPs) Model BMP Design Manual [August 31, 2015]
Project Identification	
Project Name: Slope Street Subdivision	
Permit Application Number: PA2015-6	
PDP Structural BMPs	
All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s). PDP structural BMPs must be verified by the local jurisdiction at the completion of construction. This may include requiring the project owner or project owner's representative and engineer of record to certify construction of the structural BMPs (see Section 1.12 of the BMP Design Manual). PDP structural BMPs must be maintained into perpetuity, and the local jurisdiction must confirm the maintenance (see Section 7 of the BMP Design Manual). Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).	
Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the BMP Design Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate. Step 1: The initial site design was evaluated defining the site's drainage subareas into DMAs. The area which could be considered de minimis was identified. The impervious and pervious areas for the remaining DMA were then determined to calculate its respective Design Capture Volume (DCVs) based on the surface runoff factor. Step 2: The project was then evaluated to determine whether Harvest and Use would be feasible to be implemented at the site. It was determined Harvest and Use was not feasible. (Continue on page 2 as necessary.)	

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

(Continued from page 1)

Step 3: The NRCS Websoil Survey website was initially referenced and found the site to consist of Group D soils. These types of soils indicate that a very slow amount of infiltration may be possible. However, the project's geotechnical study found the soils to consist of Artificial Fill, Colluvium, landslide material and weathered granitic. The study further states 'that storm water systems incorporating infiltration ae not appropriate for the site due to the potential for hydro-consolidation and /or expansion of the site soil. Therefore, it was determined that the site is in a 'No Infiltration' condition.

Step 4: The remaining DMA which requires treatment was then evaluated to determine the sizing needed to comply with City of Santee BMP Manual requirements. Due to the available area and in consideration of the vertical constraints mentioned in Form I-3B above, it was determined that the treatment for the site could be accomplished by one biofiltration basin designed per the City's BF-1 BMP Fact Sheet. The basin is also proposed to be utilized for storage volume needed in addressing flow-control hydromodification.

The structural BMPs listed on the following sheets are proposed for the site's compliance to the City of Santee treatment and hydromodification requirements.

Form I-6 Page 3 of 4 (Copy as many as needed) , Form Template Date: August 31, 2015	
Structural BMP Summary Information (Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No.: BF-1-1	
Construction Plan Sheet No.	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☑ Biofiltration (BF-1) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☐ Pollutant control only ☐ Hydromodification control only ☑ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	Engineer of Work (EOW) at time of construction.
Who will be the final owner of this BMP?	HOA to be determined during later phase
Who will maintain this BMP into perpetuity?	HOA to be determined during later phase
What is the funding mechanism for maintenance?	Funds collected via HOA to be determined during later phase

Form I-6 Page 4 of 4 (Copy as many as needed) , Form Template Date: August 31, 2015
Structural BMP ID No. BF-1-1
Construction Plan Sheet No.
Discussion (as needed):

ATTACHMENT 1
BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 1a	DMA Exhibit (Required) See DMA Exhibit Checklist on the back of this Attachment cover sheet.	☑ Included
Attachment 1b	Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1a	☑ Included on DMA Exhibit in Attachment 1a ☐ Included as Attachment 1b, separate from DMA Exhibit
Attachment 1c	Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs) Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7.	☑ Included ☐ Not included because the entire project will use infiltration BMPs
Attachment 1d	Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP Design Manual to complete Form I-8.	☑ Included ☐ Not included because the entire project will use harvest and use BMPs
Attachment 1e	Pollutant Control BMP Design Worksheets / Calculations (Required) Refer to Appendices B and E of the BMP Design Manual for structural pollutant control BMP design guidelines	☑ Included

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

The DMA Exhibit must identify:

☑ Underlying hydrologic soil group

☑ Approximate depth to groundwater

☑ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)

☑ Critical coarse sediment yield areas to be protected

☑ Existing topography and impervious areas

☑ Existing and proposed site drainage network and connections to drainage offsite

☐ Proposed demolition

☑ Proposed grading

☑ Proposed impervious features

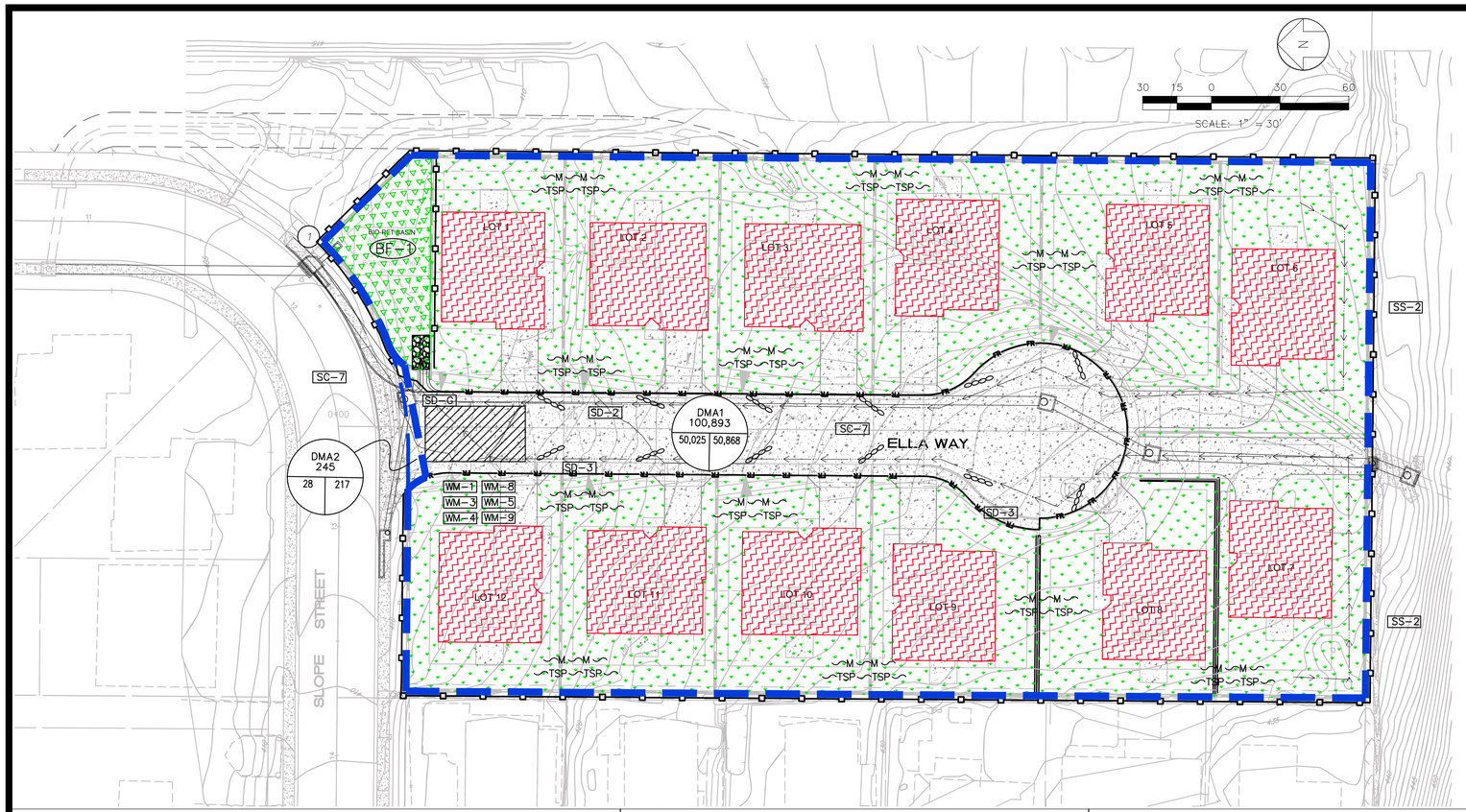
☑ Proposed design features and surface treatments used to minimize imperviousness

☑ Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)

☑ Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Form I-3B)

☑ Structural BMPs (identify location, type of BMP, and size/detail)

ATTACHMENT 1a
DMA EXHIBIT



DMA LEGEND

- DMA BOUNDARY
- DRAINAGE FLOW DIRECTION
- LANDSCAPING (PERVIOUS)
- ROOFS (IMPERVIOUS)
- SIDEWALKS, PATIOS, ETC. (IMPERVIOUS)
- BIOFILTRATION BASIN SURFACE AREA
- DMA ID NUMBER — DMA ID / TOTAL AREA / PERV / IMPRV — PERVIOUS AREA / IMPERVIOUS AREA
- POC # — X

GROUNDWATER STATEMENT:

THE DEPTH TO GROUNDWATER IS BETWEEN 10 AND 20 FEET.

HYDROLOGIC FEATURES:

THE FOLLOWING NATURAL HYDROLOGIC FEATURES ARE PRESENT, EXISTING, OR PROPOSED ON THE PROJECT SITE:

1. NATURAL WATERCOURSES: MAN-MADE NATURAL CHANNEL TRANSECTS SOUTHEAST PROJECT AREA
2. NATURAL SEEPS: NONE
3. NATURAL SPRINGS: NONE
4. NATURAL WETLANDS: NONE
5. MAN-MADE WETLANDS: NONE

POTENTIAL CRITICAL COARSE SEDIMENT YIELD NOTE:

THE PROJECT SITE WILL NOT ENCROUCH ON ANY MAPPED POTENTIAL CRITICAL COURSE SEDIMENT YIELD AREA PER THE WMAA EXHIBIT PROVIDED IN ATTACHMENT 2b.

INFILTRATION FEASIBILITY:

THE PROJECT SITE CLASSIFIED AS: 'NO INFILTRATION'.

SOILS NOTE:

THE PROJECT SITE HAS TYPE D SOILS PER SOILS REPORT.

CONSTRUCTION PHASE BMPS

MATERIALS & WASTE MANAGEMENT CONTROL BMPs

- WM-1 MATERIAL DELIVERY & STORAGE
- WM-3 STOCKPILE MANAGEMENT
- WM-4 SPILL PREVENTION AND CONTROL
- WM-8 CONCRETE WASTE MANAGEMENT
- WM-5 SOLID WASTE MANAGEMENT
- WM-9 SANITARY WASTE MANAGEMENT

TEMPORARY RUNOFF CONTROL BMPs

- SS-2 PRESERVATION OF EXISTING VEGETATION
- SS-3 BONDED OR STABILIZED FIBER MATRIX (WINTER) (PROJECT WIDE) M M
- SS-4 HYDROSEEDING (SUMMER) (PROJECT WIDE) TSP TSP
- SS-10 ENERGY DISSIPATOR
- SC-1 SILT FENCE
- SC-5 FIBER ROLLS
- SC-6 / SC-8 GRAVEL OR SAND BAGS
- SC-7 STREET SWEEPING AND VACUUMING
- TC-1 STABILIZED CONSTRUCTION ENTRANCE

STORM WATER NOTES

THIS PROJECT SHALL COMPLY WITH ALL REQUIREMENTS OF THE CITY OF SANTEE AND STATE OF CALIFORNIA WATER QUALITY CONTROL BOARD, SAN DIEGO REGION.

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES (BMPS) DURING ALL PHASES OF CONSTRUCTION.
2. SUFFICIENT BMPS MUST BE INSTALLED TO PREVENT SILT, MUD, OR OTHER CONSTRUCTION DEBRIS FROM BEING TRACKED INTO THE ADJACENT STREET(S) OR STORM WATER CONVEYANCE SYSTEMS DUE TO CONSTRUCTION VEHICLES OR ANY OTHER CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING ANY SUCH DEBRIS THAT MAY BE IN THE STREET OR CONVEYANCE SYSTEM AT THE END OF EACH WORK DAY OR AFTER A STORM EVENT THAT CAUSES A BREECH IN THE INSTALLED CONSTRUCTION BMPS.
3. STORM WATER POLLUTION PREVENTION DEVICES AND OR PRACTICES SHALL BE MODIFIED AS NEEDED AS THE PROJECT PROGRESSES TO ENSURE EFFECTIVENESS. IF AT ANY TIME, BMPS ARE FOUND TO BE INTENTIONALLY DISABLED, RUN-OVER, REMOVED, OR OTHERWISE INEFFECTIVE, THEY SHALL BE MODIFIED AND REPLACED IMMEDIATELY.
4. TRASH AND CONSTRUCTION SOLID WASTES SHALL BE DEPOSITED INTO A COVERED RECEPTACLE TO PREVENT CONTAMINATION OF RAINWATER AND DISPERSAL BY WIND. THE STORAGE OF ALL CONSTRUCTION MATERIALS AND CONSTRUCTION WASTES MUST BE PROTECTED AGAINST THE POTENTIAL RELEASE OF POLLUTANTS INTO THE ENVIRONMENT.
5. A CONCRETE WASHOUT SHALL BE PROVIDED ON ALL PROJECTS WHICH PROPOSE THE CONSTRUCTION OF ANY CONCRETE IMPROVEMENTS THAT ARE TO BE POURED IN PLACE ON THE SITE.
6. ALL BMPS SHALL BE MAINTAINED IN WORKING ORDER AT ALL TIMES. ALL SLOPES THAT ARE CREATED OR DISTURBED BY CONSTRUCTION ACTIVITY MUST BE PROTECTED AGAINST EROSION AND SEDIMENT TRANSPORT AT ALL TIMES.
7. IF TRENCHING/DIGGING ACTIVITIES ARE NOT COMPLETED WITHIN ONE DAY, PROPER BMPS WILL BE IMPLEMENTED.
8. IF DEBRIS OR MATERIALS WILL BE STORED FOR LONGER THAN ONE DAY, PROPER BMPS WILL BE IMPLEMENTED.

SOURCE CONTROL BMP LEGEND

BMP	BMP DESCRIPTION	SYMBOL/LOCATION
SC-1	PREVENTION OF ILLICIT DISCHARGES; OWNERS SHALL USE SMART IRRIGATION	
SC-2	STORM DRAIN STENCILING AT CURB CUT TO BASIN	SD-G
SC-6D1	NEED FOR FUTURE INDOOR PEST CONTROL– PROVIDE IPM INFO TO OWNERS	
SC-6D2	MAINTAIN LANDSCAPING WITH MINIMAL OR NO PESTICIDES	
SC-6O	DRAIN CONDENSATE LINES TO LANDSCAPED AREAS	
SC-6P	STREETS AND SIDEWALKS SHALL BE SWEPT REGULARLY	

SITE DESIGN BMP LEGEND

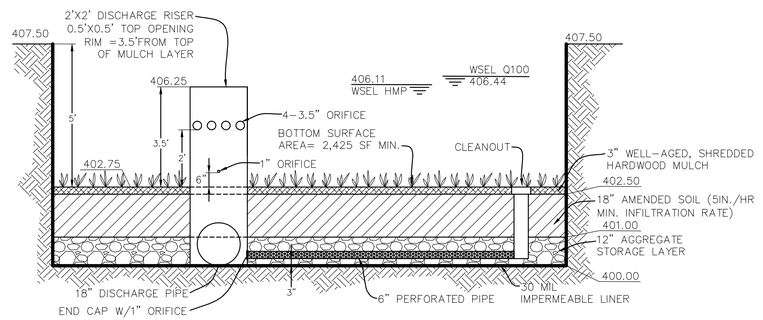
BMP ID	BMP DESCRIPTION	SYMBOL/LOCATION
SD-2	PROJECT SHALL CONSERVE AND UTILIZE EXISTING SOIL WHERE FEASIBLE	SD-2
SD-3	MINIMIZE IMPERVIOUS AREAS WITH SIDEWALK ON ONE SIDE OF STREET.	SD-3
SD-4	LOOSELY COMPACT THE BIOFILTRATION BASIN'S BIOSOIL LAYER	
SD-5	DISPERSE ROOF DOWNDRAINS TO LANDSCAPED AREAS	
SD-6	IMPLEMENT GRADING AND RUNOFF COLLECTION TECHNIQUES WHICH ALLOW MINIMAL LOCALIZED RETENTION VIA PONDING.	
SD-7	LANDSCAPE WITH NATIVE OR DROUGHT TOLERANT SPECIES.	

BMP NOTES

1. THESE BMPS ARE MANDATORY TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS OR THESE PLANS.
2. NO CHANGES TO THE PROPOSED BMPS ON THIS SHEET WITHOUT PRIOR APPROVAL FROM THE COUNTY.
3. NO SUBSTITUTIONS TO THE MATERIAL, TYPES, OR PLANTING TYPES WITHOUT PRIOR APPROVAL FROM THE COUNTY ENGINEER.
4. NO OCCUPANCY WILL BE GRANTED UNTIL THE COUNTY STAFF HAS INSPECTED THIS PROJECT FOR APPROPRIATE BMP CONSTRUCTION AND INSTALLATION.
5. ALL VEGETATED BMPS SHALL BE SHOWN ON LANDSCAPE PLANS PER PERMIT #_____.
6. REFER TO THE MAINTENANCE PLAN IN ATTACHMENT 3 OF SWQMP FOR ACCESS TO STRUCTURAL BMPS TO INSPECT AND PERFORM MAINTENANCE, FEATURES PROVIDED TO FACILITATE INSPECTION, MAINTENANCE THRESHOLDS, RECOMMENDED EQUIPMENT TO PERFORM MAINTENANCE, AND SPECIAL TRAINING OR CERTIFICATION REQUIREMENTS FOR INSPECTION AND MAINTENANCE PERSONNEL.
7. ALL GRADING CONTOURS SHALL BE CONSISTENT WITH DMA EXHIBIT.
8. SEE PROJECT SWQMP FOR ADDITIONAL INFORMATION.

STRUCTURAL BMP: BIOFILTRATION BASIN (BF-1-1) BF-1

NOT TO SCALE



STRUCTURAL BMPS

SYMBOL	DMA #	BMP INFORMATION: QUANTITY	BMP INFORMATION: DESCRIPTION / TYPE OF STRUCTURAL BMP	BMP INFORMATION: BMP ID #(S)	MAINTENANCE CATEGORY	MAINTENANCE AGREEMENT OR MAINTENANCE NOTIFICATION RECORD DOC. #	CONSTRUCTION PLAN SHEET # [1]	LANDSCAPE PLAN # ----- & SHEET # (FOR VEGETATED BMPS ONLY)
BF-1	1	1	BIOFILTRATION BASIN	BF-1-1	2			
SIGNIFICANT SITE DESIGN BMPS (IN DMA'S WITHOUT STRUCTURAL BMPS)								

DMA	BMP TYPE	SURFACE TYPE: SIDEWALKS, PATIOS, DRVWY, ETC (SQFT)	SURFACE TYPE: ROOF (SQFT)	SURFACE TYPE: LANDSCAPE (SQFT)	TOTAL AREA (SQFT)
1	BIOFILTRATION (BF-1)	24,011	26,857	50,025	100,893
2	N/A, DE MINIMIS AREA	217	0	28	245
3		0	0	0	0

CITY APPROVED CHANGES

DESCRIPTION:	APPROVED BY:	DATE:

PRIVATE CONTRACT

SHEET X | CITY OF SANTEE | XX SHEETS

PRIORITY DEVELOPMENT PROJECT BMP PLAN SHEET FOR:

SLOPE STREET SUBDIVISION

CALIFORNIA COORDINATE INDEX _____

ENGINEER OF WORK

R.C.E.

GRADING PERMIT NO:

PDS20XX-LDXXXX-XXXXX

ENGINEER'S NAME: XXXXX // EMAIL: xxxxxxxx
PHONE NO. (xxx)xxx-xxxx

ATTACHMENT 1b
TABULAR SUMMARY OF DMAs

(SEE ATTACHMENT 1a)

ATTACHMENT 1c

FORM I-7, HARVEST AND USE FEASIBLITY SCREENING CHECKLIST

Harvest and Use Feasibility Checklist	Form I-7

1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?

☒ Toilet and urinal flushing
☒ Landscape irrigation
☐ Other:_____

2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2.

[Provide a summary of calculations here]

Toilet = 12 lots x 4 residents per lot x 9.3 gls = 446.4 gls
Landscape Irrig => ETWU = ET x [(PF x HA)/IE] x 0.015 = 2.8 x [(0.5 x 50,025)/0.90] x 0.015= 1,167 gls
Total = 1,614 gls per day => for 36 hour demand = 2,420 gls = 324 cf

3. Calculate the DCV using worksheet B-2.1.

DCV = 2,031 (cubic feet)

3a. Is the 36 hour demand greater than or equal to the DCV?	3b. Is the 36 hour demand greater than 0.25DCV but less than the full DCV?	3c. Is the 36 hour demand less than 0.25DCV?
☐ Yes / ☒ No ⇨ ⇩	☐ Yes / ☒ No ⇨ ⇩	☒ Yes ⇩
Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.	Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.	Harvest and use is considered to be infeasible.

Is harvest and use feasible based on further evaluation?

☐ Yes, refer to Appendix E to select and size harvest and use BMPs.

☒ No, select alternate BMPs.

ATTACHMENT 1d

FORM I-8, CATEGORIZATION OF INFILTRATION FEASIBILITY CONDITION

Attachment 1d

Categorization of Infiltration Feasibility Condition	Form I-8

Part 1 - Full Infiltration Feasibility Screening Criteria

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

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

Provide basis:

The project is underlain by Type D soil.

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

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

Provide basis:

The project is adjacent to a clay formation that is susceptible to land slides, therefore infiltration is not feasible.

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

Form I-8 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Ground water was discovered in the site at 25' below existing grade. There is no evidence of pollutants present. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: N/A Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result *	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		

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

Form I-8 Page 3 of 4

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

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

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

Provide basis:

Type D soil is present, ground water was discovered in the site at 25' below existing grade.

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

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

Provide basis:

The project is adjacent to a clay formation that is susceptible to land slides, therefore infiltration is not feasible.

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

Form I-8 Page 4 of 4			
Criteria	Screening Question	Yes	No
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Ground water was discovered in the site at 28' below existing grade. There is no evidence of pollutants present. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: N/A Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**	No Infiltration	

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

ATTACHMENT 1e

POLLUTION CONTROL BMP DESIGN WORKSHEETS

RUNOFF FACTOR DETERMINATION		Area	Runoff	Area x RF
DMA: 1		(sf)	Factor (RF)	(sf)
Impervious Surfaces	Roofs	50868	0.9	45781.2
	Concrete or Asphalt			
	Unit Pavers (Grouted)			
Decomposed Granite		0	0.3	0
Cobbles or Crushed Aggregate		0	0.3	0
Amended, Mulched Soils or Landscape		50025	0.1	5002.5
Compacted Soil (e.g., unpaved parking)		0	0.3	0
Totals=		100893		50783.7
			Weighted Runoff Factor =	0.50

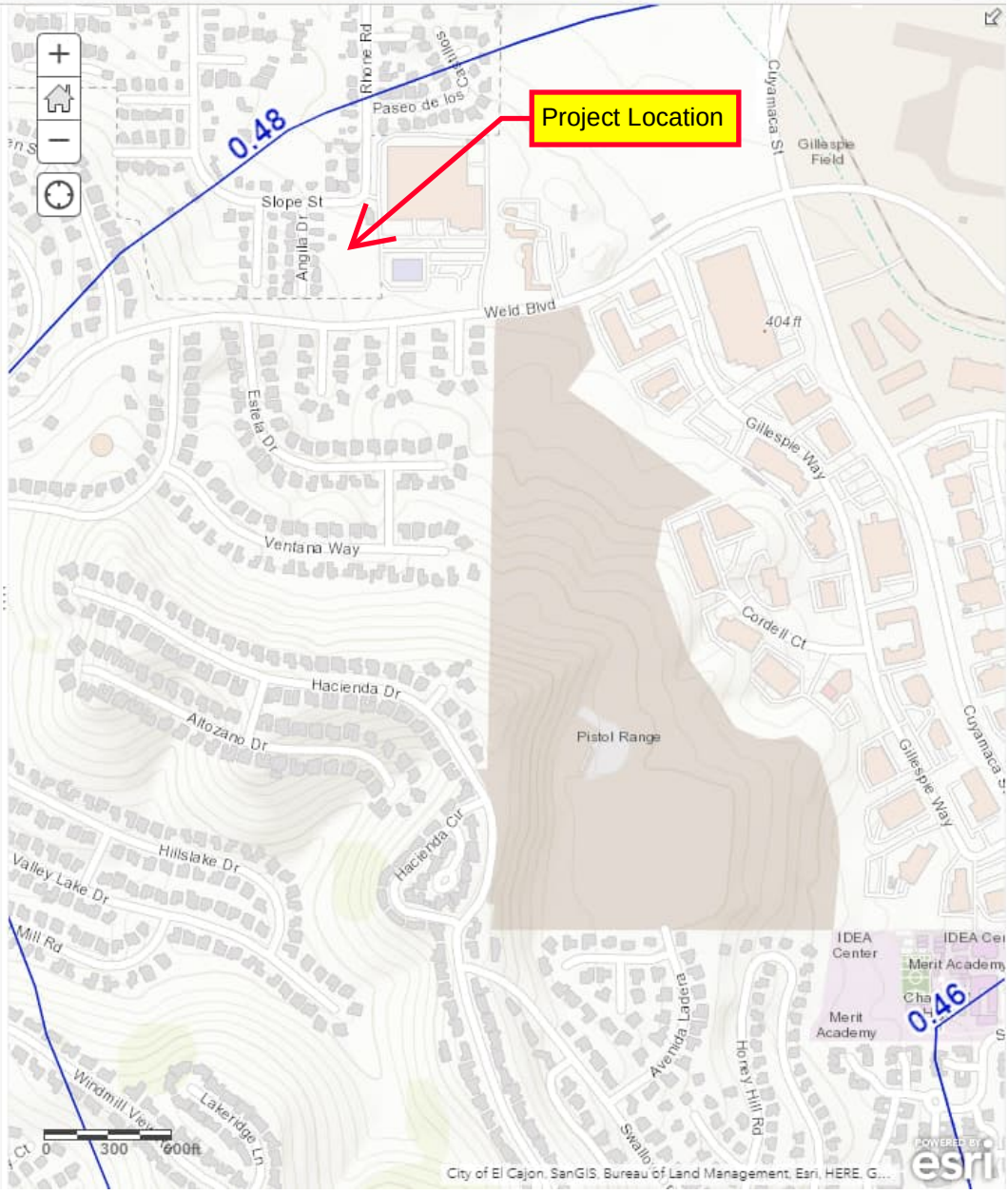
Home 85th Percentile Rainfall

Open in new Map Viewer Sign In

Details | Basemap | Share Print Measure | Slope St, Santee, CA, 92071, USA

Legend

85th Percentile Rainfall



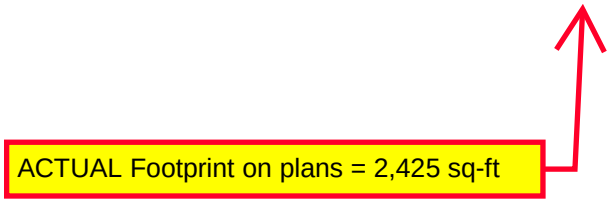
Contact Us

SLOPE STREET SUBDIVISION
BIOFILTRATION BMP DCV CALCULATIONS

DMA BF-3-1: Design Capture Volume		Worksheet B-2.1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.48	inches
2	Area tributary to BMP (s)	A=	2.316	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.50	unitless
4	Street trees volume reduction	TCV=	0.00	cubic-feet
5	Rain barrels volume reduction	RCV=	0.00	cubic-feet
6	Calculate DCV= (3630 x C x d x A) - TCV - RCV	DCV=	2,031	cubic-feet

SLOPE STREET SUBDIVISION
BIOFILTRATION BMP SIZING CALCULATION

	DMA 1 BASIN 1: Simple Sizing Method for Biofiltration BMPs	Worksheet B.5-1	
1	Remaining DCV after implementing retention BMP's	2,031	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.00	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36.00	hours
4	Depth of runoff that can be infiltrated (Line 2 x Line 3)	0.00	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain (Line 4/ Line 5)	0.00	inches
7	Assumed surface area of the biofiltration BMP	2,425.00	sq-ft
8	Media retained pore storage	0.10	in/in
9	Volume retained by BMP (Line 4+(Line 12 x Line 8)/12) x Line 7	363.75	cubic-feet
10	DCV that requires biofiltration (Line 1 - Line 9)	1,667.60	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6.00	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	18.00	inches
13	Aggregate Storage above underdrain invert (12 inches typical) - use 0 inches for sizing if the agreagate is not over the entire bottom surface area	12.00	inches
14	Freely drained pore storage	0.20	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate)	5.00	in/hr.
Baseline Calculations			
16	Allowable Routing Time for sizing	6.00	hours
17	Depth filtered during storm (Line 15 x Line 16)	30.00	inches
18	Depth of Detention Storage (Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5))	14.40	inches
19	Total Depth Treated (Line 17 + Line 18)	44.40	inches
Option 1 - Biofilter 1.5 times the DCV			
20	Required biofiltered volume (1.5 x Line 10)	2,501.40	cubic-feet
21	Required Footprint (Line 20/ Line 19) x 12	676	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume (0.75 x Line 10)	1,250.70	cubic-feet
23	Required Footprint (Line 22/ Line 18) x 12	1,042	sq-ft
Footprint of the BMP			
24	Area draining to the BMP	100,893.00	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.50	unitless
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03000	unitless
27	Minimum BMP Footprint (Line 24 x Line 25 x Line 26)	1,524	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	1,524	sq-ft



ATTACHMENT 2
BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

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

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 2a	Hydromodification Management Exhibit (Required)	☑ Included See Hydromodification Management Exhibit Checklist on the back of this Attachment cover sheet.
Attachment 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	☑ Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) Optional analyses for Critical Coarse Sediment Yield Area Determination ☐ 6.2.1 Verification of Geomorphic Landscape Units Onsite ☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment ☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
Attachment 2c	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	☑ Not performed ☐ Included ☐ Submitted as separate stand-alone document
Attachment 2d	Flow Control Facility Design, including Structural BMP Drawdown Calculations and Overflow Design Summary (Required) See Chapter 6 and Appendix G of the BMP Design Manual	☑ Included ☐ Submitted as separate stand-alone document
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	☐ Included ☑ Not required because BMPs will drain in less than 96 hours

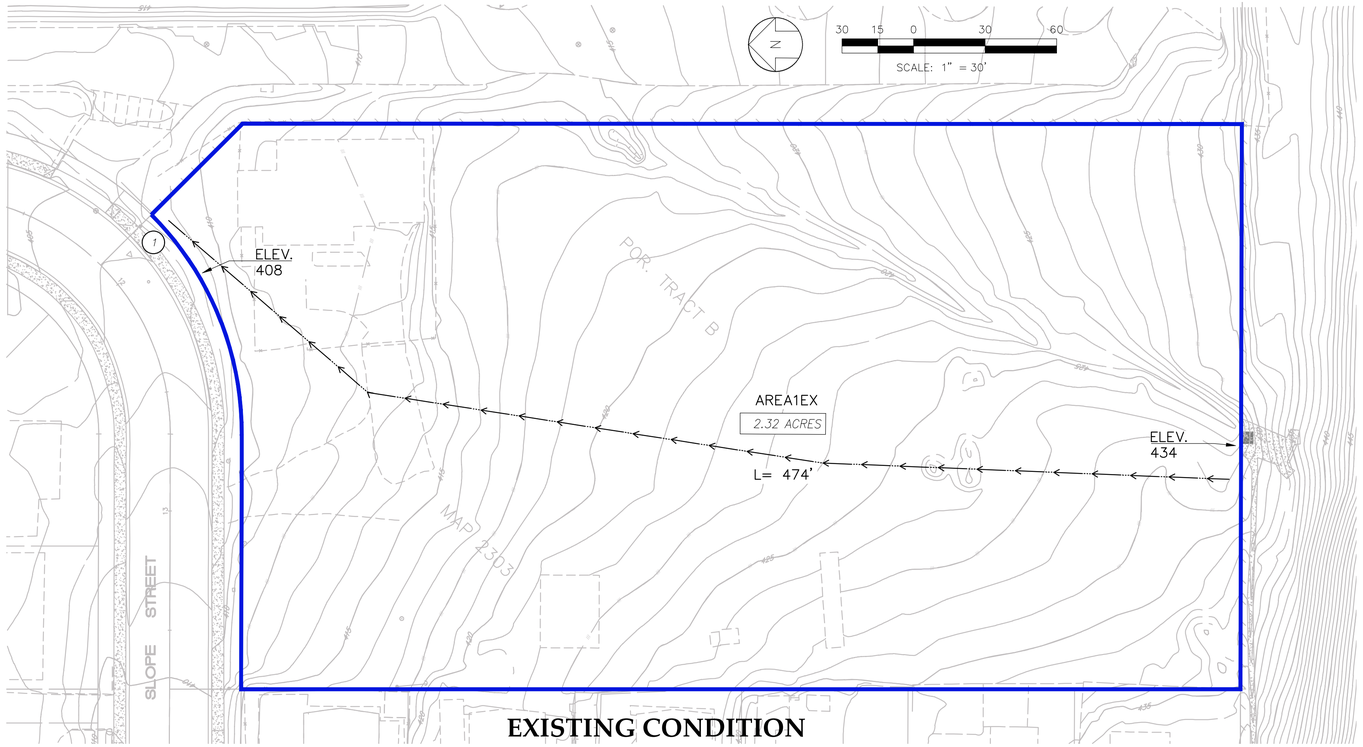
Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

The Hydromodification Management Exhibit must identify:

☑ Underlying hydrologic soil group
☑ Approximate depth to groundwater
☑ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
☑ Critical coarse sediment yield areas to be protected
☑ Existing topography
☑ Existing and proposed site drainage network and connections to drainage offsite
☑ Proposed grading
☑ Proposed impervious features
☑ Proposed design features and surface treatments used to minimize imperviousness
☑ Point(s) of Compliance (POC) for Hydromodification Management
☑ Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
☑ Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail)

ATTACHMENT 2a

HYDROMODIFICATION MANAGEMENT EXHIBITS



EXISTING CONDITION

GROUNDWATER STATEMENT:

THE DEPTH TO GROUNDWATER IS BETWEEN 10 AND 20 FEET.

HYDROLOGIC FEATURES:

THE FOLLOWING NATURAL HYDROLOGIC FEATURES ARE PRESENT, EXISTING, OR PROPOSED ON THE PROJECT SITE:

1. NATURAL WATERCOURSES: MAN-MADE NATURAL CHANNEL TRANSECTS SOUTHEAST PROJECT AREA
2. NATURAL SEEPS: NONE
3. NATURAL SPRINGS: NONE
4. NATURAL WETLANDS: NONE
5. MAN-MADE WETLANDS: NONE

POTENTIAL CRITICAL COARSE SEDIMENT YIELD NOTE:

THE PROJECT SITE WILL NOT ENCROUCH ON ANY MAPPED POTENTIAL CRITICAL COURSE SEDIMENT YIELD AREA PER THE WMAA EXHIBIT PROVIDED IN ATTACHMENT 2b.

INFILTRATION FEASIBILITY:

THE PROJECT SITE CLASSIFIED AS: 'NO INFILTRATION'.

SOILS NOTE:

THE PROJECT SITE HAS TYPE D SOILS PER SOILS REPORT.

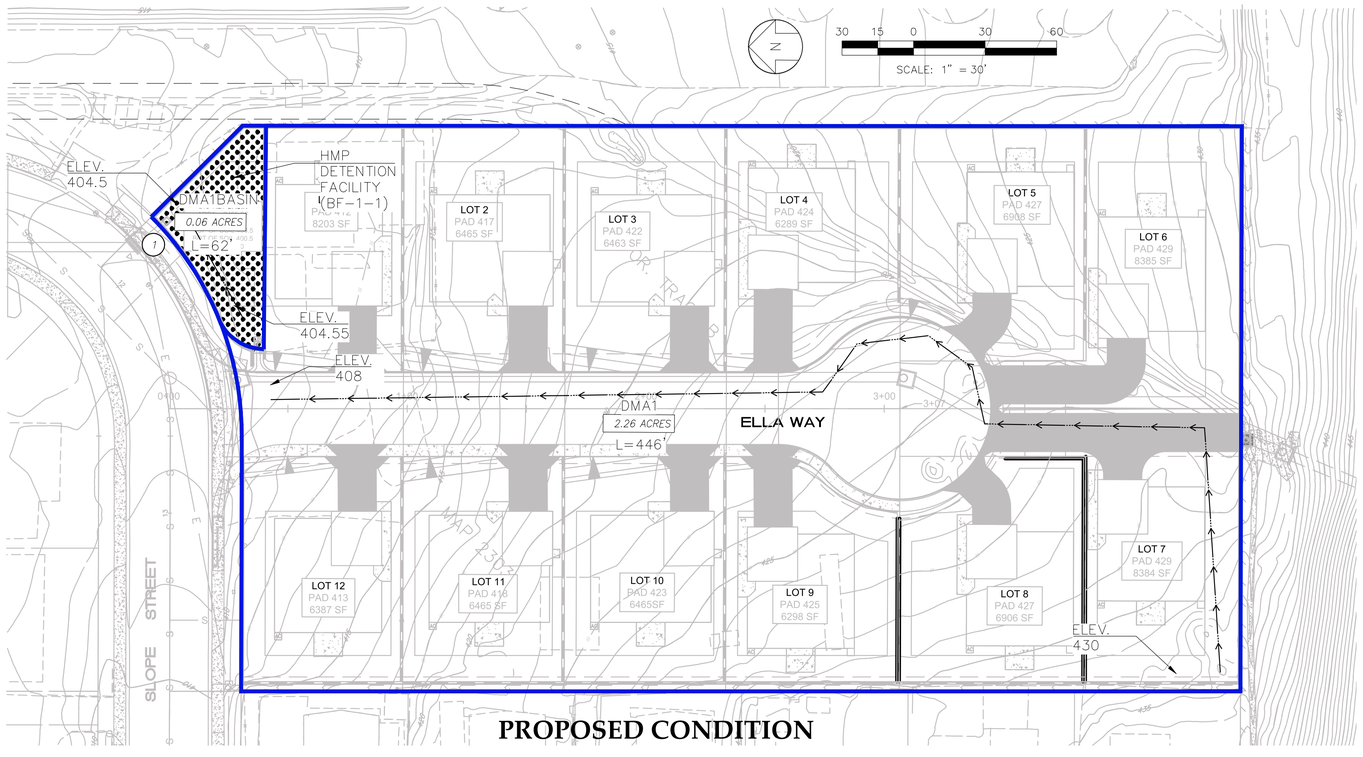
LEGEND

POC BOUNDARY

DRAINAGE FLOWPATH

POC # (X)

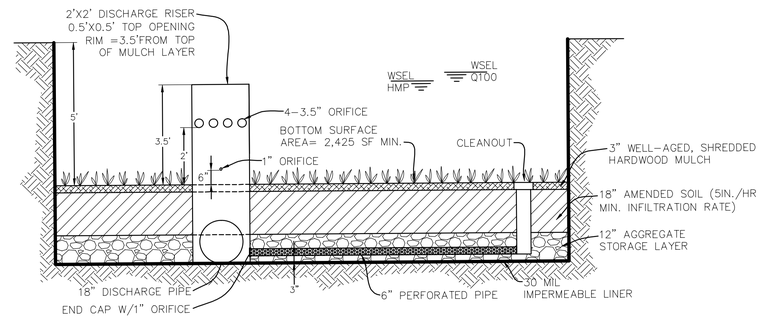
POC SUBAREA ACREAGE [X ACRES]



PROPOSED CONDITION

STRUCTURAL BMP: BIOFILTRATION BASIN (BF-1-1) (BF-1)

NOT TO SCALE



ATTACHMENT 2a
HYDROMODIFICATION MANAGEMENT EXHIBITS
SLOPE STREET SUBDIVISION

ATTACHMENT 2b

MANAGEMENT OF CRITICAL COARSE SEDIMENT YIELD AREAS


CCYSA
EXHIBIT
FORESTER
CREEK
CCSYA
PROJECT
LOCATION
TRIBUTARY AREA
CCSYA
Slope St
Weld Blvd
Venture Business Par
Maccool Ln
Olive Ln
Granite House Ln
Willow Terrace
Pathway St
Rhone Rd
Atlas View Dr
North View Ln
Ellsworth Ln
Massey Ln
Paseo Ladera
Watson Pl
Lund Ct
Todos Santos Dr
Fanita Rancho Rd
Nielsen St
Estela Dr
Ventana Way
Windmill View Rd
Briarwood St
Altozano Dr
Valley Lake Dr
Hills Lake Dr
Fanita Dr
Friendship Dr
John Towers Ave
Billy Mitchell Dr
Cordell Ct
Reuben Fleet Dr
Gillespie Way
Cuyamaca St
Blue Boy Ln
Rhodes Ct
Kings Trail
Braes Dr
52
125
© 2020 INEGI
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ATTACHMENT 2c

GEOMORPHIC ASSESSMENT OF RECEIVING CHANNELS

-GEOMORPHIC ASSESSMENT NOT PERFORMED FOR THIS PROJECT-

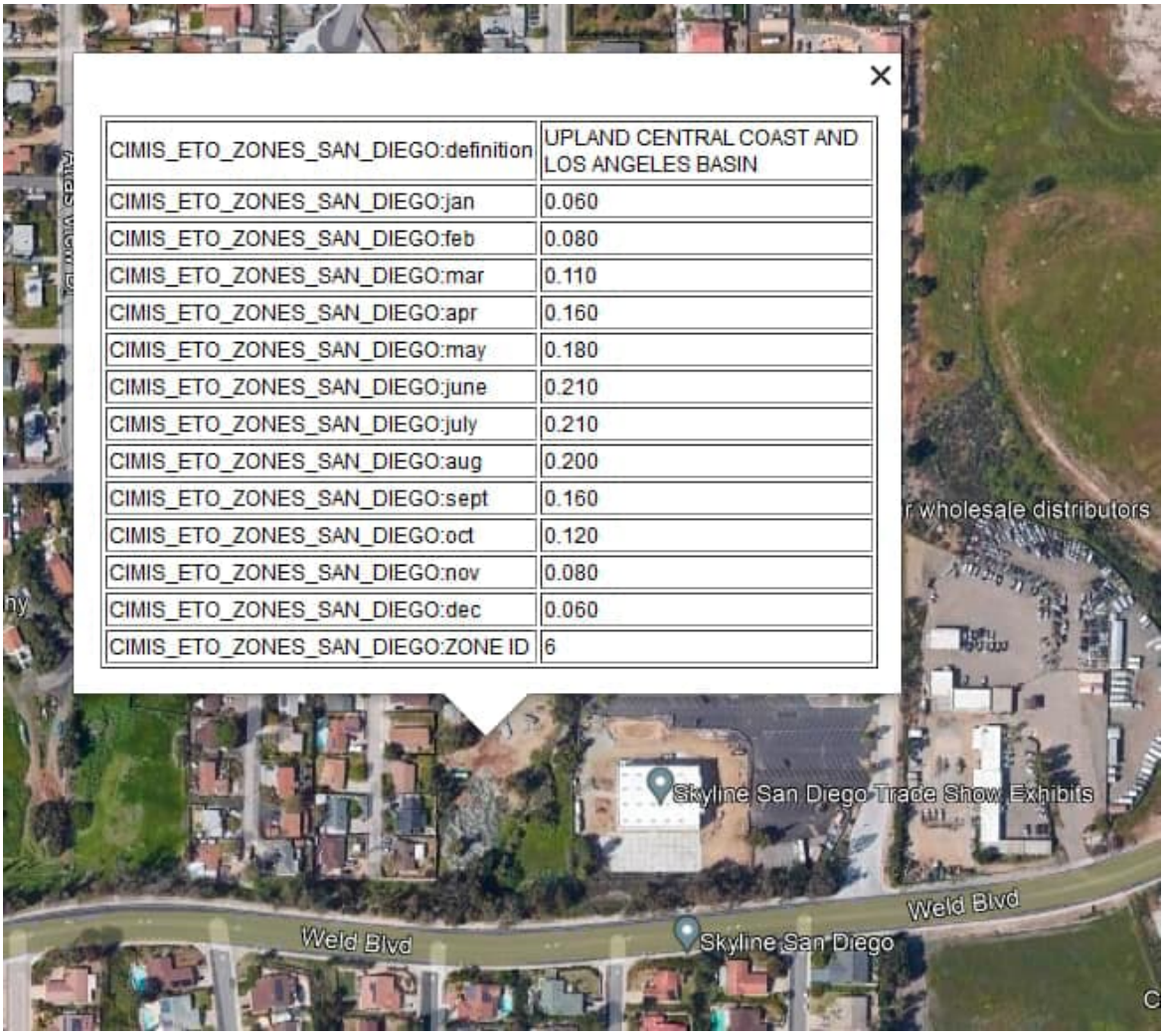
ATTACHMENT 2d
FLOW CONTROL FACILITY DESIGN

Hydromodification Management Plan
FLOW CONTROL DESIGN

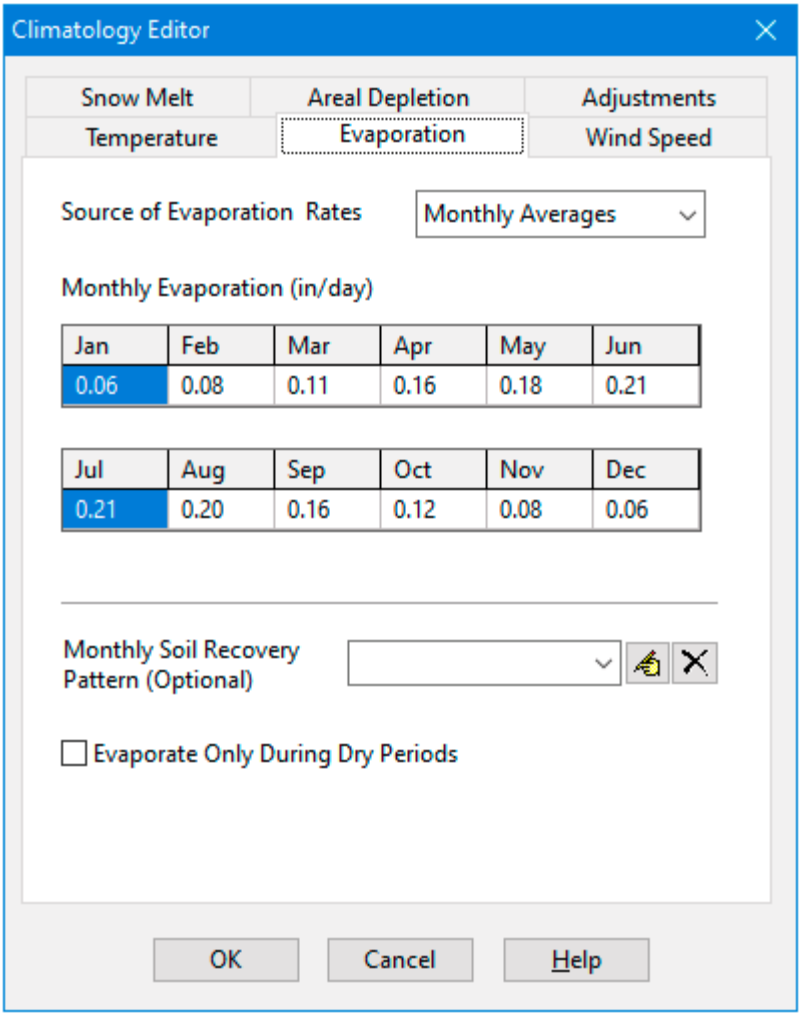
POC 1

POC1
SWMM Model input

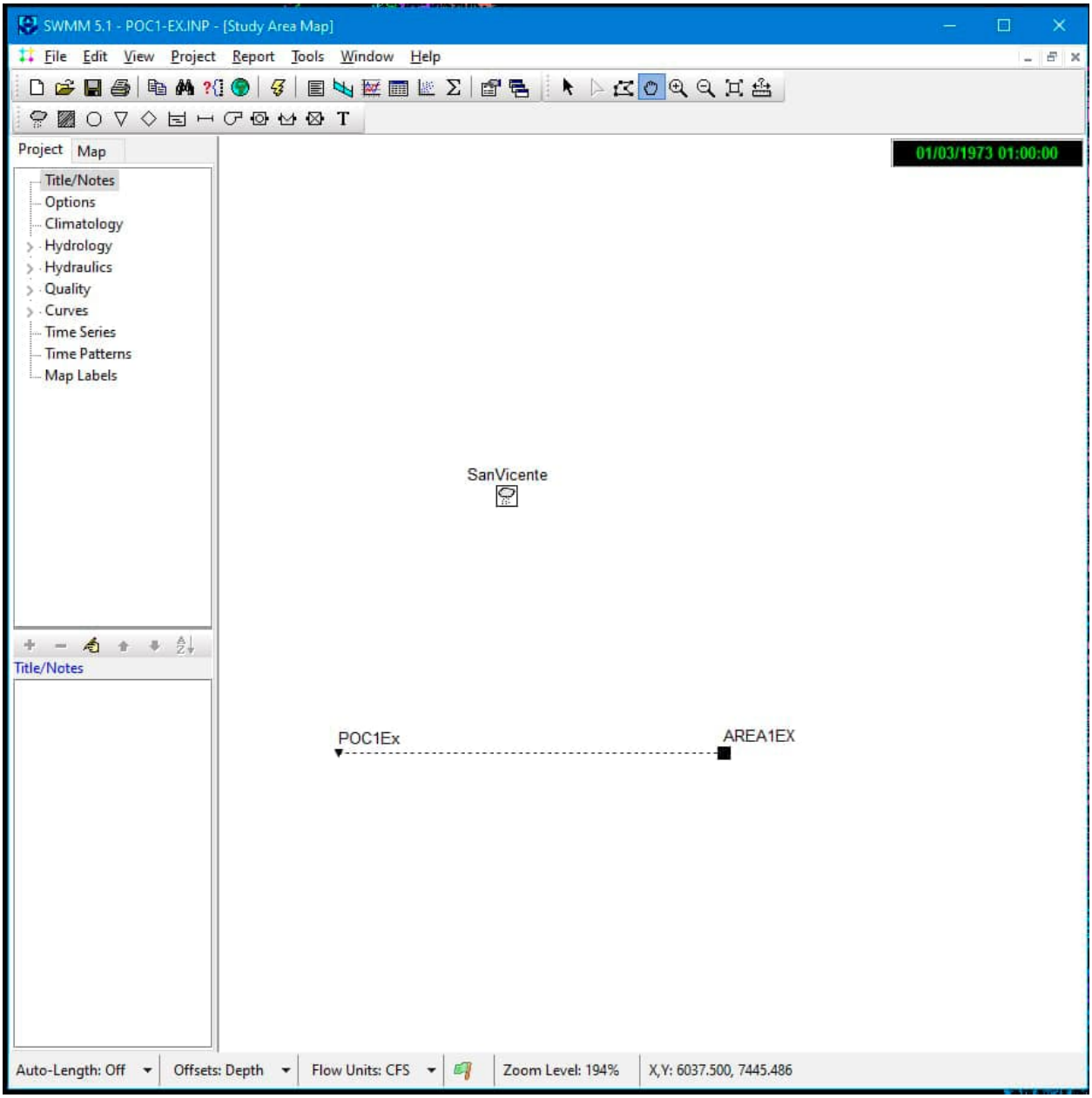
Evapotranspiration Info



CIMIS_ETO_ZONES_SAN_DIEGO:definition	UPLAND CENTRAL COAST AND LOS ANGELES BASIN
CIMIS_ETO_ZONES_SAN_DIEGO:jan	0.060
CIMIS_ETO_ZONES_SAN_DIEGO:feb	0.080
CIMIS_ETO_ZONES_SAN_DIEGO:mar	0.110
CIMIS_ETO_ZONES_SAN_DIEGO:apr	0.160
CIMIS_ETO_ZONES_SAN_DIEGO:may	0.180
CIMIS_ETO_ZONES_SAN_DIEGO:june	0.210
CIMIS_ETO_ZONES_SAN_DIEGO:july	0.210
CIMIS_ETO_ZONES_SAN_DIEGO:aug	0.200
CIMIS_ETO_ZONES_SAN_DIEGO:sept	0.160
CIMIS_ETO_ZONES_SAN_DIEGO:oct	0.120
CIMIS_ETO_ZONES_SAN_DIEGO:nov	0.080
CIMIS_ETO_ZONES_SAN_DIEGO:dec	0.060
CIMIS_ETO_ZONES_SAN_DIEGO:ZONE ID	6


Climatology Editor
Snow Melt
Areal Depletion
Adjustments
Temperature
Evaporation
Wind Speed
Source of Evaporation Rates
Monthly Averages
Monthly Evaporation (in/day)
Jan
Feb
Mar
Apr
May
Jun
0.06
0.08
0.11
0.16
0.18
0.21
Jul
Aug
Sep
Oct
Nov
Dec
0.21
0.20
0.16
0.12
0.08
0.06
Monthly Soil Recovery Pattern (Optional)
Evaporate Only During Dry Periods
OK
Cancel
Help

EXISTING CONDITION



Slope Street Subdivsion POC 1 DMA Calculations					
Pre-Developed Condition					
POC	Neighborhood	% Imperviousness	Total Area	Pervious Area	Impervious Area
1	AREA1EX	0.00%	2.32	2.32	0.00
1	Total	0.00%	2.32	2.32	0.00

Slope Street Subdivision: POC 1 Watershed Parameters

POC 1	Area (acres)	Length (ft)	Width (ft)	Impervious %	US Elev (ft)	DS Elev (ft)	Slope %
AREA1EX	2.32	474	213	0.0%	434	408	5.5%

Subcatchment AREA1EX

Property	Value
Name	AREA1EX
X-Coordinate	4000.000
Y-Coordinate	5500.000
Description	Existing Area
Tag	
Rain Gage	SanVicente
Outlet	POC1Ex
Area	2.32
Width	213
% Slope	5.5
% Imperv	0
N-Imperv	.012
N-Perv	0.05
Dstore-Imperv	0.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration Data	GREEN_AMPT ...
Groundwater	NO
Snow Pack	

Infiltration parameters (click to edit)

from SD County Supplemental Handout for Manning's n Values for Overland Flow

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	0.025
Initial Deficit	0.33

Soil capillary suction head (inches or mm)

OK Cancel Help

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

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

START_DATE           01/03/1973
START_TIME           00:00:00
REPORT_START_DATE    01/03/1973
REPORT_START_TIME    00:00:00
END_DATE             05/23/2008
END_TIME             22:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
```

```
RULE_STEP            00:00:00

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

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          0.06   0.08   0.11   0.16   0.18   0.21   0.21   0.20   0.16   0.12   0.08   0.06
DRY_ONLY         NO

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

```
[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
;Existing Area
AREA1EX          SanVicente       POC1Ex           2.32     0        213      5.5      0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
AREA1EX          .012       0.05       0.05       .1         25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
AREA1EX          9          0.025      0.33

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC1Ex           0          FREE                        NO

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;San Vicente Rain Gauge
SanVicente       FILE "F:\ESCOBAR External HD\BUSINESS\COMPANY NEW WEST\Slope Street\CALCS\SWMM5.1\rainfall_sanvicente.dat"
```

```
[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None

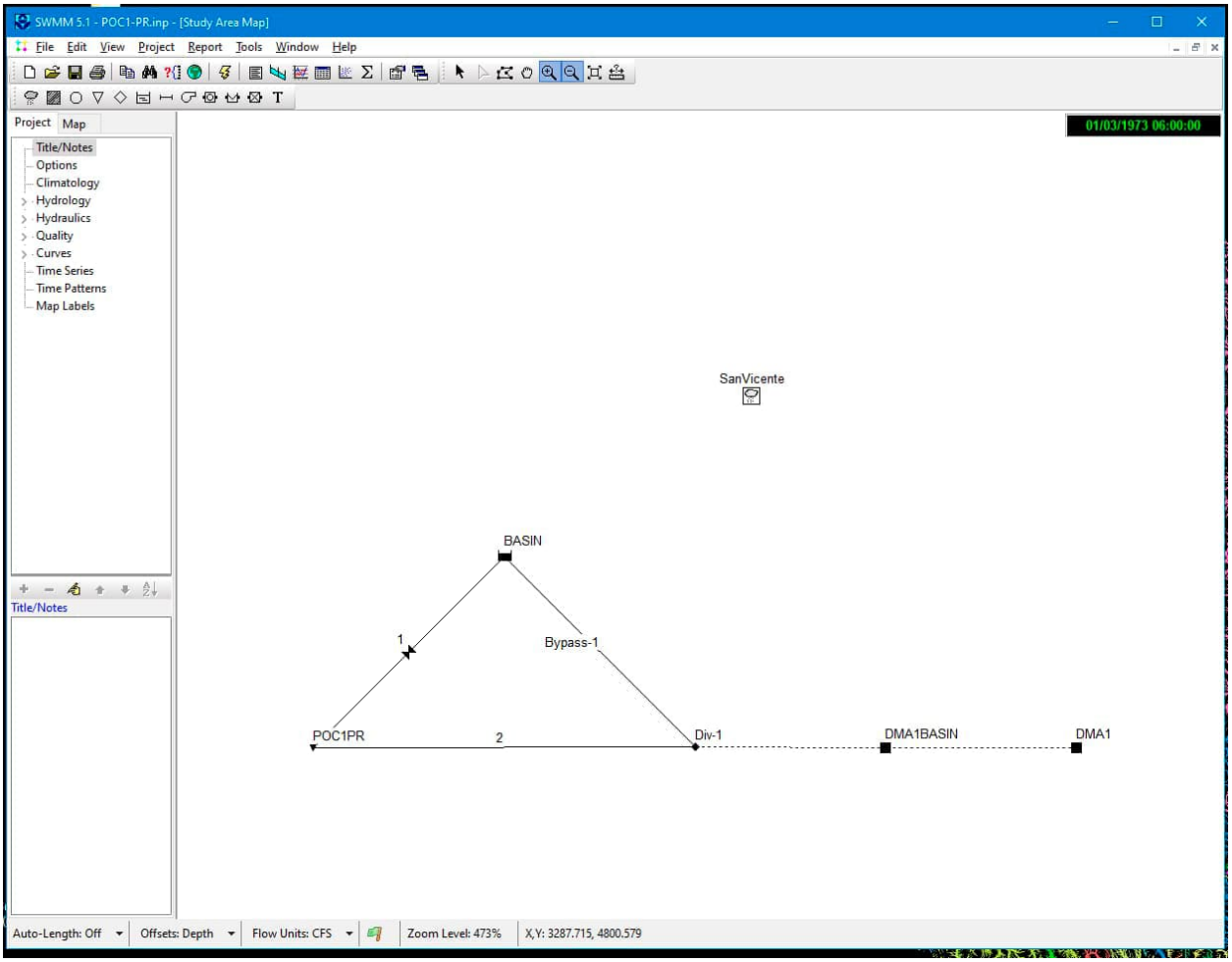
[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC1Ex           1700.000           5500.000

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
AREA1EX          4000.000           5500.000
```

```
[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
SanVicente       2716.049           7023.320
```

PROPOSED CONDITION



Slope Street Subdivsion POC 1 DMA Calculations					
Post-Developed Condition					
POC	Neighborhood	% Imperviousness	Total Area	Pervious Area	Impervious Area
1-via Basin	DMA1	51.7%	2.26	1.09	1.17
1-via Basin	DMA1BASIN	0.0%	0.06	0.06	0.00
1-via Basin	1-Basin-Total	50.4%	2.32	1.15	1.17

Slope Street Subdivision: POC 1 Watershed Parameters

POC 1	Area (acres)	Length (ft)	Width (ft)	Impervious %	US Elev (ft)	DS Elev (ft)	Slope %
DMA1	2.26	446	221	51.7%	430	408	4.9%
DMA1BASIN	0.06	62	39	0.0%	404.55	404.5	0.1%

Subcatchment DMA1

Property	Value
Name	DMA1
X-Coordinate	3500.000
Y-Coordinate	3500.000
Description	Area Tributary to Basin
Tag	
Rain Gage	SanVicente
Outlet	DMA1BASIN
Area	2.26
Width	221
% Slope	4.9
% Imperv	51.7
N-Imperv	.012
N-Perv	0.05
Dstore-Imperv	0.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration Data	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0
N-Perv Pattern	
Dstore Pattern	
Infil. Pattern	

Subcatchment DMA1BASIN

Property	Value
Name	DMA1BASIN
X-Coordinate	3000.000
Y-Coordinate	3500.000
Description	
Tag	
Rain Gage	SanVicente
Outlet	Div-1
Area	0.06
Width	39
% Slope	0.1
% Imperv	0
N-Imperv	0.012
N-Perv	0.1
Dstore-Imperv	0.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration Data	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	1
Land Uses	0
Initial Buildup	NONE
Curb Length	0
N-Perv Pattern	
Dstore Pattern	
Infil. Pattern	

from SD County Supplemental Handout for Manning's n Values for Overland Flow

Infiltration parameters (click to edit)

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	0.01875
Initial Deficit	0.33

Soil capillary suction head (inches or mm)

OK Cancel Help

Infiltration parameters (click to edit)

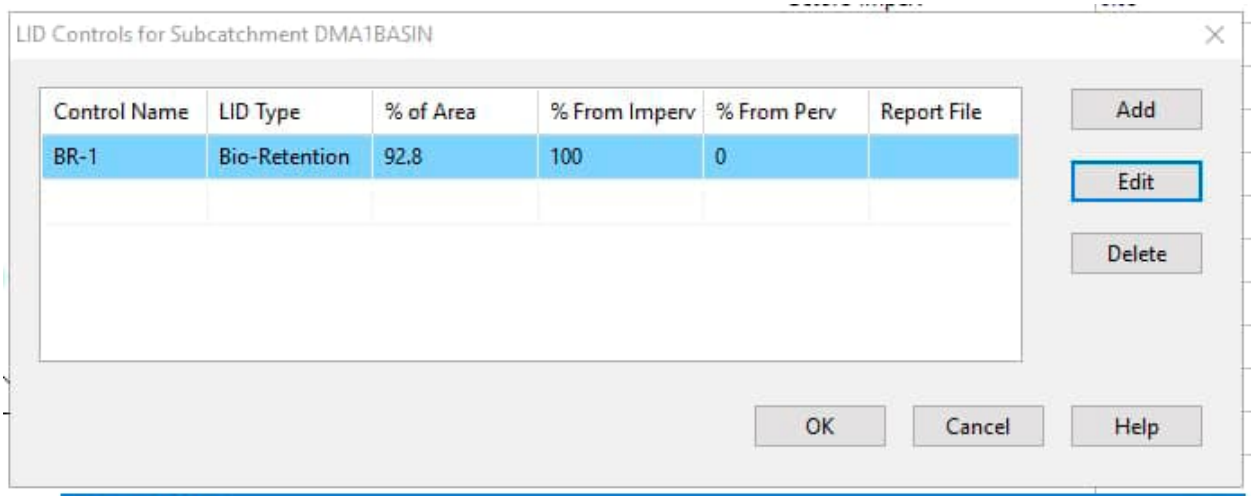
Infiltration Editor

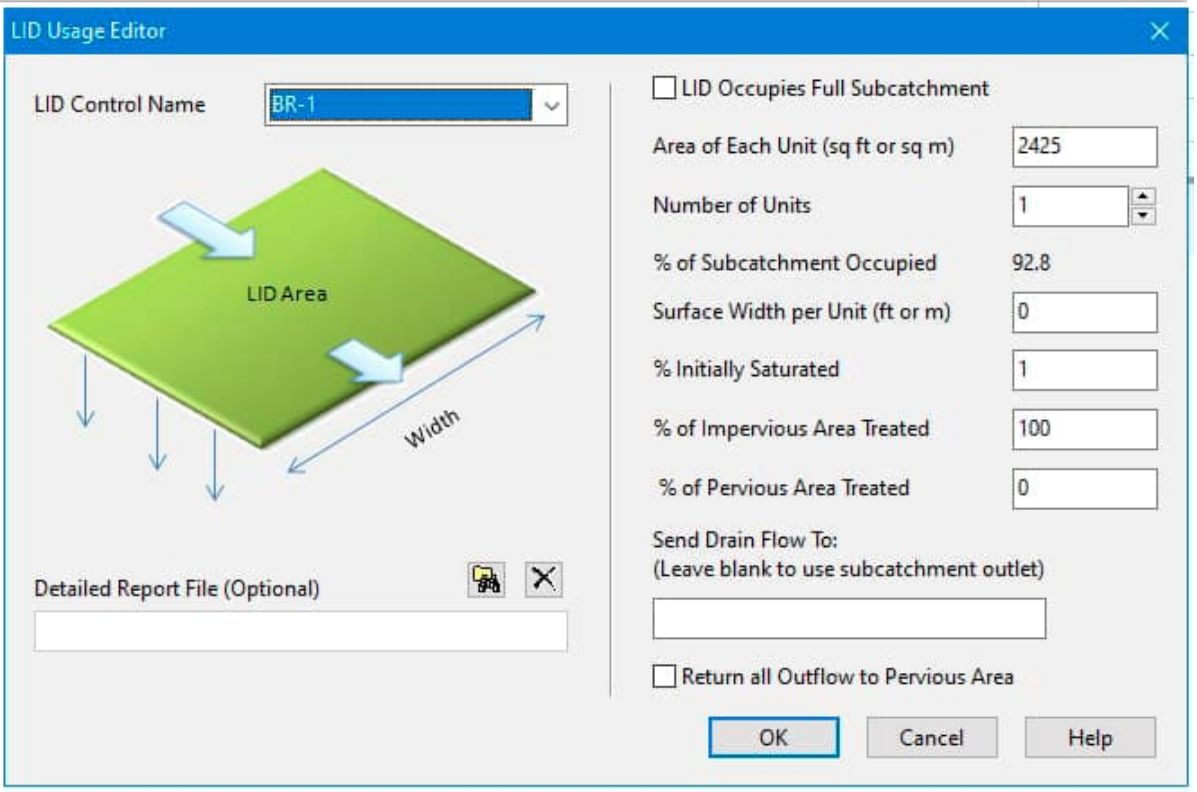
Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	1.5
Conductivity	0.3
Initial Deficit	0.30

Soil capillary suction head (inches or mm)

OK Cancel Help


LID Controls for Subcatchment DMA1BASIN
Control Name
LID Type
% of Area
% From Imperv
% From Perv
Report File
BR-1
Bio-Retention
92.8
100
0
Add
Edit
Delete
OK
Cancel
Help


LID Usage Editor
LID Control Name
BR-1
LID Area
Width
Detailed Report File (Optional)
LID Occupies Full Subcatchment
Area of Each Unit (sq ft or sq m)
2425
Number of Units
1
% of Subcatchment Occupied
92.8
Surface Width per Unit (ft or m)
0
% Initially Saturated
1
% of Impervious Area Treated
100
% of Pervious Area Treated
0
Send Drain Flow To:
(Leave blank to use subcatchment outlet)
Return all Outflow to Pervious Area
OK
Cancel
Help

Storage Unit BASIN

Property	Value
Name	BASIN
X-Coordinate	2000.000
Y-Coordinate	4000.000
Description	Basin #1
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Max. Depth	4.5
Initial Depth	0
Surcharge Depth	1
Evap. Factor	1
Seepage Loss	NO
Storage Curve	TABULAR
Functional Curve	
Coefficient	1000
Exponent	0
Constant	0
Tabular Curve	
Curve Name	BASIN

User-assigned name of storage unit

Outlet 1

Property	Value
Name	1
Inlet Node	BASIN
Outlet Node	POC1PR
Description	
Tag	
Inlet Offset	0
Flap Gate	NO
Rating Curve	TABULAR/DEPTH
Functional Curve	
Coefficient	10.0
Exponent	0.5
Tabular Curve	
Curve Name	BasinOUTLET

User-assigned name of outlet

Storage Curve Editor

Curve Name: BASIN

Description: Basin

	Depth (ft)	Area (ft2)
1	0	2425
2	4.5	2425
3		
4		
5		
6		
7		
8		
9		
10		
11		

View... Load... Save... OK Cancel Help

Rating Curve Editor

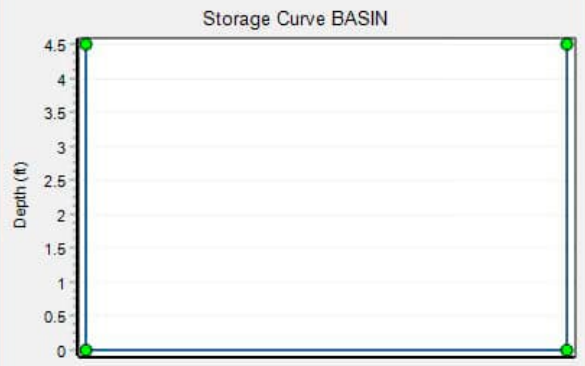
Curve Name: BasinOUTLET

Description:

	Head (ft)	Outflow (CFS)
1	0.0	0.000
2	0.1	0.000
3	0.2	0.000
4	0.30	0.0000
5	0.4	0.000
6	0.5	0.000
7	0.6	0.006
8	0.70	0.011
9	0.8	0.014
10	0.9	0.016
11	1.0	0.018

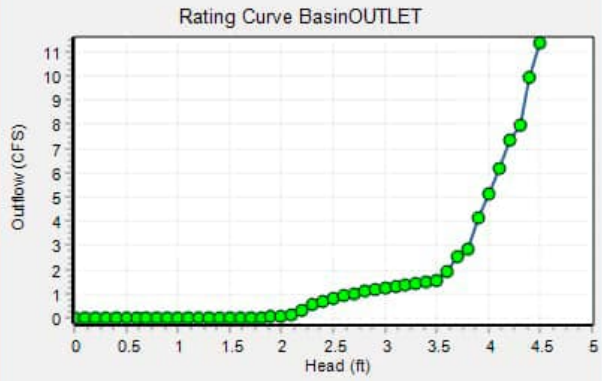
View... Load... Save... OK Cancel Help

Storage Curve Viewer



Copy To... Print Close

Curve Viewer



Copy To... Print Close

DETENTION Stage- Discharge

Discharge vs Elevation Table

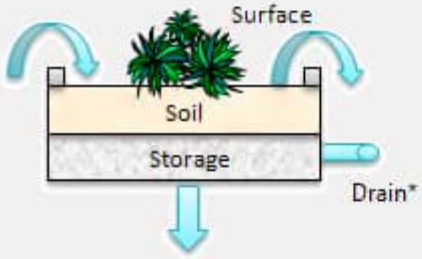
Low orifice:	1 "	Top orifice:	5 "
Number:	1	Number:	0
Cg-low:	0.61	Cg-low:	0.61
invert elev:	0.50 ft	invert elev:	4.75 ft
Middle orifice:	3.5 "	Emergency inlet:	
number of orif:	4	Rim height	3.50 ft
Cg-middle:	0.61	Area	0.56 sq ft
invert elev:	2.00 ft	Circumfere	3.00 ft

Actual Stage														
h	H/D-low	H/D-mid	H/D-top	Qlow-orif	Qlow-weir	Qtot-low	Qmid-orif	Qmid-weir	Qtot-med	Qtop-orif	Qtop-weir	Qtot-top	Qemerg	Qtot
(ft)	-	-	-	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
0.0	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.1	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.2	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.30	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0000
0.4	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.5	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.6	1.20	0.00	0.00	0.006	0.007	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
0.70	2.40	0.00	0.00	0.011	0.014	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011
0.8	3.60	0.00	0.00	0.014	0.017	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014
0.9	4.80	0.00	0.00	0.016	0.072	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016
1.0	6.00	0.00	0.00	0.018	0.344	0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.018
1.1	7.20	0.00	0.00	0.020	1.154	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020
1.2	8.40	0.00	0.00	0.022	3.028	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022
1.30	9.60	0.00	0.00	0.023	6.743	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.023
1.4	10.80	0.00	0.00	0.025	13.377	0.025	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025
1.5	12.00	0.00	0.00	0.026	24.355	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.026
1.6	13.20	0.00	0.00	0.027	41.500	0.027	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.027
1.70	14.40	0.00	0.00	0.029	67.076	0.029	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.029
1.80	15.60	0.00	0.00	0.030	103.841	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.030
1.9	16.80	0.00	0.00	0.031	155.093	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.031
2.0	18.00	0.00	0.00	0.032	224.716	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.032
2.1	19.20	0.34	0.00	0.033	317.231	0.033	0.000	0.069	0.069	0.000	0.000	0.000	0.000	0.102
2.2	20.40	0.69	0.00	0.034	437.841	0.034	0.304	0.251	0.251	0.000	0.000	0.000	0.000	0.285
2.3	21.60	1.03	0.00	0.035	592.483	0.035	0.514	0.499	0.499	0.000	0.000	0.000	0.000	0.535
2.4	22.80	1.37	0.00	0.036	787.870	0.036	0.660	0.765	0.660	0.000	0.000	0.000	0.000	0.696
2.5	24.00	1.71	0.00	0.037	1031.545	0.037	0.779	1.001	0.779	0.000	0.000	0.000	0.000	0.816
2.6	25.20	2.06	0.00	0.038	1331.926	0.038	0.882	1.172	0.882	0.000	0.000	0.000	0.000	0.920
2.7	26.40	2.40	0.00	0.039	1698.353	0.039	0.974	1.264	0.974	0.000	0.000	0.000	0.000	1.013
2.8	27.60	2.74	0.00	0.040	2141.138	0.040	1.058	1.291	1.058	0.000	0.000	0.000	0.000	1.098
2.9	28.80	3.09	0.00	0.041	2671.612	0.041	1.136	1.303	1.136	0.000	0.000	0.000	0.000	1.177
3.0	30.00	3.43	0.00	0.042	3302.171	0.042	1.209	1.397	1.209	0.000	0.000	0.000	0.000	1.251
3.1	31.20	3.77	0.00	0.043	4046.330	0.043	1.278	1.722	1.278	0.000	0.000	0.000	0.000	1.321
3.2	32.40	4.11	0.00	0.044	4918.762	0.044	1.343	2.491	1.343	0.000	0.000	0.000	0.000	1.387
3.3	33.60	4.46	0.00	0.044	5935.356	0.044	1.405	3.985	1.405	0.000	0.000	0.000	0.000	1.450
3.4	34.80	4.80	0.00	0.045	7113.254	0.045	1.465	6.566	1.465	0.000	0.000	0.000	0.000	1.510
3.5	36.00	5.14	0.00	0.046	8470.909	0.046	1.522	10.682	1.522	0.000	0.000	0.000	0.000	1.568
3.6	37.20	5.49	0.00	0.047	10028.126	0.047	1.578	16.877	1.578	0.000	0.000	0.000	0.294	1.918
3.7	38.40	5.83	0.00	0.047	11806.115	0.047	1.631	25.797	1.631	0.000	0.000	0.000	0.832	2.510
3.8	39.00	6.00	0.00	0.048	12784.921	0.048	1.657	31.513	1.657	0.000	0.000	0.000	1.163	2.867
3.9	40.80	6.51	0.00	0.049	16116.538	0.049	1.733	54.976	1.733	0.000	0.000	0.000	2.353	4.134
4.0	42.00	6.86	0.00	0.050	18698.833	0.050	1.781	77.124	1.781	0.000	0.000	0.000	3.288	5.119
4.1	43.20	7.20	0.00	0.050	21601.716	0.050	1.829	105.795	1.829	0.000	0.000	0.000	4.322	6.201
4.2	44.40	7.54	0.00	0.051	24854.127	0.051	1.875	142.280	1.875	0.000	0.000	0.000	5.447	7.373
4.3	45.00	7.71	0.00	0.051	26620.909	0.051	1.898	163.898	1.898	0.000	0.000	0.000	6.041	7.990
4.4	46.80	8.23	0.00	0.052	32531.786	0.052	1.964	244.641	1.964	0.000	0.000	0.000	7.940	9.957
4.5	48.00	8.57	0.00	0.053	37023.556	0.053	2.007	313.906	2.007	0.000	0.000	0.000	9.300	11.360

LID Control Editor

Control Name: BR-1

LID Type: Bio-Retention Cell



*Optional

OK Cancel Help

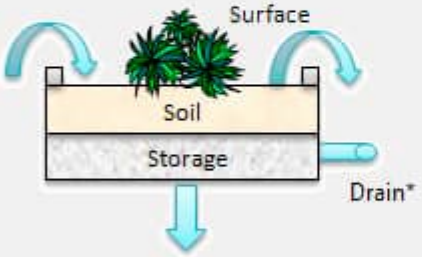
Surface | Soil | Storage | Drain

Berm Height (in. or mm)	6
Vegetation Volume Fraction	0
Surface Roughness (Mannings n)	0
Surface Slope (percent)	0

LID Control Editor

Control Name: BR-1

LID Type: Bio-Retention Cell

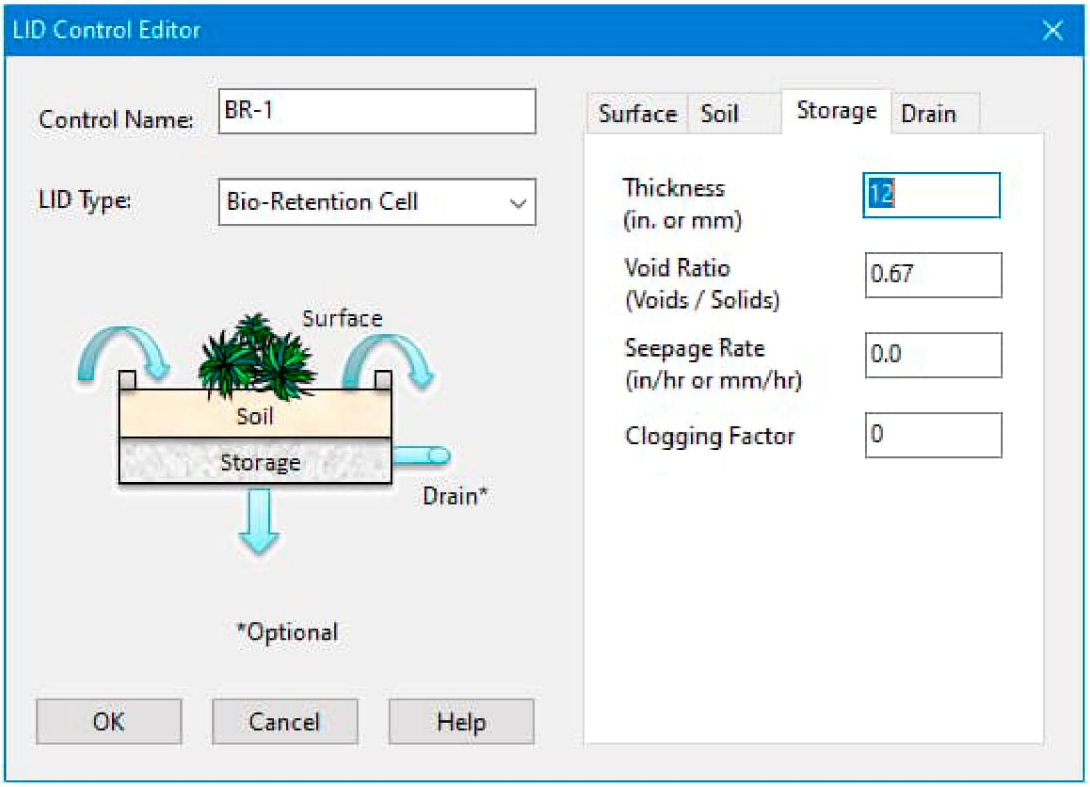


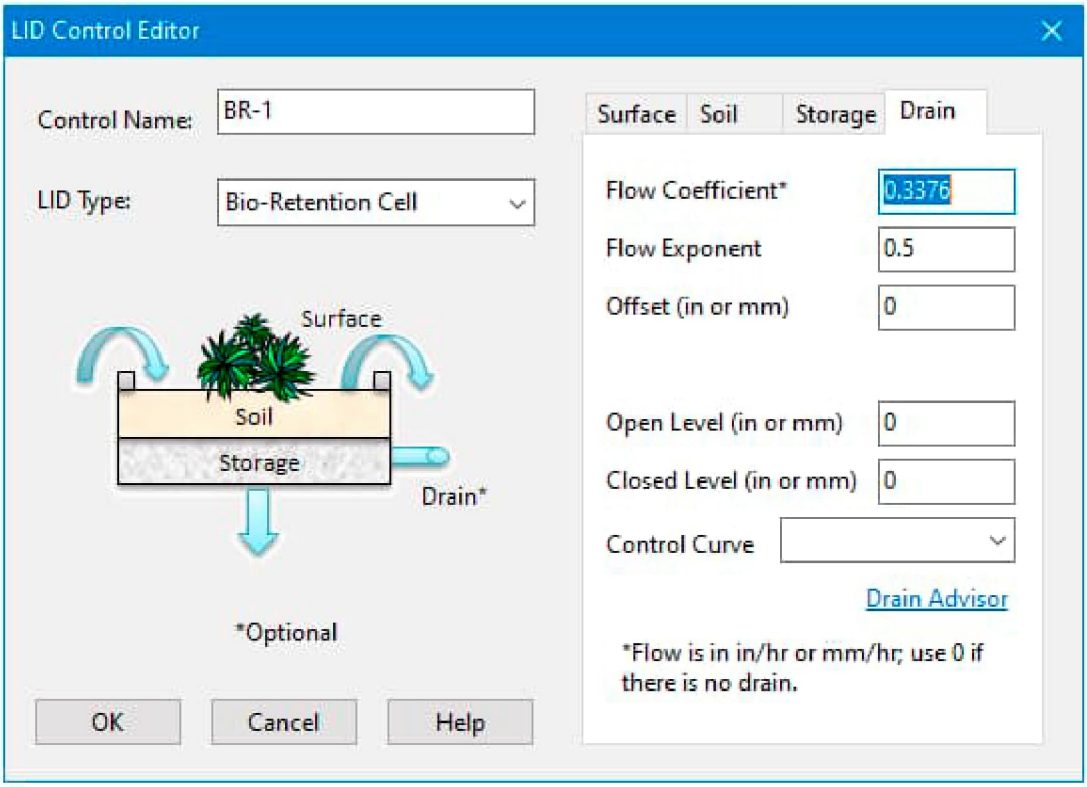
*Optional

OK Cancel Help

Surface | Soil | Storage | Drain

Thickness (in. or mm)	18
Porosity (volume fraction)	0.4
Field Capacity (volume fraction)	0.20
Wilting Point (volume fraction)	0.10
Conductivity (in/hr or mm/hr)	5
Conductivity Slope	5
Suction Head (in. or mm)	1.5


LID Control Editor
Control Name:
BR-1
LID Type:
Bio-Retention Cell
Surface
Soil
Storage
Drain*
*Optional
OK
Cancel
Help
Surface
Soil
Storage
Drain
Thickness (in. or mm)
12
Void Ratio (Voids / Solids)
0.67
Seepage Rate (in/hr or mm/hr)
0.0
Clogging Factor
0


LID Control Editor
Control Name:
BR-1
LID Type:
Bio-Retention Cell
Surface
Soil
Storage
Drain*
*Optional
OK
Cancel
Help
Surface
Soil
Storage
Drain
Flow Coefficient*
0.3376
Flow Exponent
0.5
Offset (in or mm)
0
Open Level (in or mm)
0
Closed Level (in or mm)
0
Control Curve
Drain Advisor
*Flow is in in/hr or mm/hr; use 0 if there is no drain.

SWMM Model Flow Coefficient Calculation

BASIN

PARAMETER	ABBREV.	Bio-Retention Cell LID BMP	
Ponding Depth	PD	6	in
Bioretention Soil Layer	S	18	in
Gravel Layer	G	12	in
TOTAL		3.0	ft
		36	in
Orifice Coefficient	c_g	0.6	--
Low Flow Orifice Diameter	D	1	in
Drain (Flow) exponent	n	0.5	--
Flow Rate (volumetric)	Q	0.045	cfs
Ponding Depth Surface Area	A_{PD}	2425	ft^2
Bioretention Surface Area	A_S, A_G	2425	ft^2
	A_S, A_G	0.0557	ac
Porosity of Bioretention Soil	n	0.40	-
Flow Rate (per unit area)	q	2.012	in/hr
Effective Ponding Depth	PD_{eff}	6.00	in
Flow Coefficient	C	0.3376	--

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

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

START_DATE           01/03/1973
START_TIME           05:00:00
REPORT_START_DATE    01/03/1973
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
RULE_STEP            00:00:00

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

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          0.06   0.08   0.11   0.16   0.18   0.21   0.21   0.20   0.16   0.12   0.08   0.06
DRY_ONLY         NO
```

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

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
;Area Tributary to Basin
DMA1             SanVicente       DMA1BASIN        2.26     51.7     221      4.9      0
DMA1BASIN        SanVicente       Div-1            0.06     0        39       0.1      0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA1             .012       0.05       0.05       .1         25         OUTLET
DMA1BASIN        0.012      0.1        0.05       .1         25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
DMA1             9          0.01875    0.33
DMA1BASIN        1.5        0.3        0.30

[LID_CONTROLS]
;;Name           Type/Layer Parameters
;;-------------- ---------- ----------
BR-1             BC
BR-1             SURFACE    6          0          0          0          5
BR-1             SOIL       18         0.4        0.20       0.10       5          5          1.5
BR-1             STORAGE    12         0.67       0.0        0
BR-1             DRAIN      0.3376     0.5        0          6          0          0

[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSat    FromImp    ToPerv     RptFile                  DrainTo          FromPerv
;;-------------- ---------------- ------- ---------- ---------- ---------- ---------- ---------- ------------------------ ---------------- ----------
DMA1BASIN        BR-1             1       2425       0          1          100        0          *                        *                0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC1PR           0          FREE                        NO

[DIVIDERS]
;;Name           Elevation  Diverted Link    Type       Parameters
;;-------------- ---------- ---------------- ---------- ----------
Div-1            0          Bypass-1         CUTOFF     0.045      0          0          0          0
```

```
[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap    Psi      Ksat     IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- -------- --------          -------- --------
;Basin #1
BASIN            0        4.5        0          TABULAR    BASIN                        1        1

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- ----------
Bypass-1         Div-1            BASIN            1          0.013      0          0          0          0
2                Div-1            POC1PR           1          0.013      0          0          0          0

[OUTLETS]
;;Name           From Node        To Node          Offset     Type            QTable/Qcoeff    Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- --------------- ---------------- ---------- --------
1                BASIN            POC1PR           0          TABULAR/DEPTH   BasinOUTLET                 NO

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
Bypass-1         DUMMY        0                0          0          0          1
2                DUMMY        0                0          0          0          1

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
BasinOUTLET      Rating     0.0        0.000
BasinOUTLET                 0.1        0.000
BasinOUTLET                 0.2        0.000
BasinOUTLET                 0.30       0.0000
BasinOUTLET                 0.4        0.000
BasinOUTLET                 0.5        0.000
BasinOUTLET                 0.6        0.006
BasinOUTLET                 0.70       0.011
BasinOUTLET                 0.8        0.014
BasinOUTLET                 0.9        0.016
BasinOUTLET                 1.0        0.018
BasinOUTLET                 1.1        0.020
BasinOUTLET                 1.2        0.022
BasinOUTLET                 1.30       0.023
BasinOUTLET                 1.4        0.025
BasinOUTLET                 1.5        0.026
BasinOUTLET                 1.6        0.027
BasinOUTLET                 1.70       0.029
BasinOUTLET                 1.80       0.030
BasinOUTLET                 1.9        0.031
```

```
BasinOUTLET                2.0        0.032
BasinOUTLET                2.1        0.102
BasinOUTLET                2.2        0.285
BasinOUTLET                2.3        0.535
BasinOUTLET                2.4        0.696
BasinOUTLET                2.5        0.816
BasinOUTLET                2.6        0.920
BasinOUTLET                2.7        1.013
BasinOUTLET                2.8        1.098
BasinOUTLET                2.9        1.177
BasinOUTLET                3.0        1.251
BasinOUTLET                3.1        1.321
BasinOUTLET                3.2        1.387
BasinOUTLET                3.3        1.450
BasinOUTLET                3.4        1.510
BasinOUTLET                3.5        1.568
BasinOUTLET                3.6        1.918
BasinOUTLET                3.7        2.510
BasinOUTLET                3.8        2.867
BasinOUTLET                3.9        4.134
BasinOUTLET                4.0        5.119
BasinOUTLET                4.1        6.201
BasinOUTLET                4.2        7.373
BasinOUTLET                4.3        7.990
BasinOUTLET                4.4        9.957
BasinOUTLET                4.5        11.360
;
;Basin
BASIN            Storage   0          2425
BASIN                      4.5        2425

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;San Vicente Rain Gage
SanVicente       FILE "F:\ESCOBAR External HD\BUSINESS\COMPANY NEW WEST\Slope Street\CALCS\SWMM5.1\rainfall_sanvicente.dat"

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
```

```
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC1PR           1500.000           3500.000
Div-1            2502.728           3500.000
BASIN            2000.000           4000.000

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA1             3500.000           3500.000
DMA1BASIN        3000.000           3500.000

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
SanVicente       2652.812           4417.278
```

POC1
SWMM Model Output/Results

Peak Flow Frequency Summary

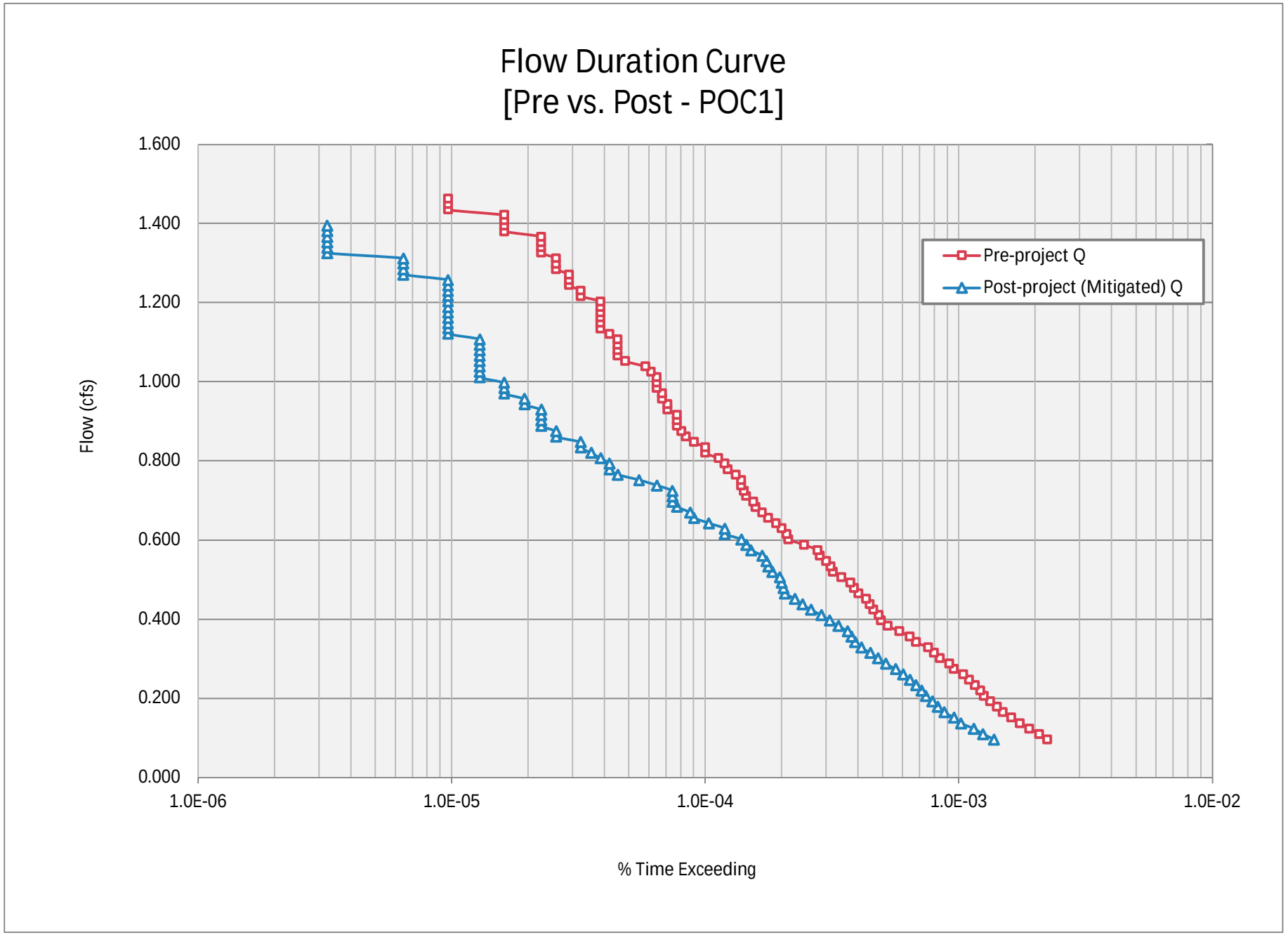
Return Period	Pre-project Qpeak (cfs)	Post-project - Mitigated Q (cfs)
LF = 0.1xQ2	0.096	0.052
2-year	0.963	0.521
5-year	1.319	0.830
10-year	1.462	1.015

Low-flow Threshold:	10%	
0.1xQ2 (Pre):	0.096	cfs
Q10 (Pre):	1.462	cfs
Ordinate #:	100	
Incremental Q (Pre):	0.01366	cfs
Total Hourly Data:	310194	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	0.096	693	2.23E-03	427	1.38E-03	61.62%	Pass
1	0.110	644	2.08E-03	386	1.24E-03	59.94%	Pass
2	0.124	589	1.90E-03	355	1.14E-03	60.27%	Pass
3	0.137	540	1.74E-03	316	1.02E-03	58.52%	Pass
4	0.151	499	1.61E-03	297	9.57E-04	59.52%	Pass
5	0.165	462	1.49E-03	272	8.77E-04	58.87%	Pass
6	0.178	438	1.41E-03	256	8.25E-04	58.45%	Pass
7	0.192	413	1.33E-03	244	7.87E-04	59.08%	Pass
8	0.206	390	1.26E-03	230	7.41E-04	58.97%	Pass
9	0.219	377	1.22E-03	221	7.12E-04	58.62%	Pass
10	0.233	359	1.16E-03	210	6.77E-04	58.50%	Pass
11	0.247	341	1.10E-03	199	6.42E-04	58.36%	Pass
12	0.260	323	1.04E-03	187	6.03E-04	57.89%	Pass
13	0.274	297	9.57E-04	175	5.64E-04	58.92%	Pass
14	0.288	285	9.19E-04	160	5.16E-04	56.14%	Pass
15	0.301	261	8.41E-04	149	4.80E-04	57.09%	Pass
16	0.315	248	7.99E-04	139	4.48E-04	56.05%	Pass
17	0.329	235	7.58E-04	128	4.13E-04	54.47%	Pass
18	0.342	210	6.77E-04	121	3.90E-04	57.62%	Pass
19	0.356	199	6.42E-04	117	3.77E-04	58.79%	Pass
20	0.369	181	5.84E-04	113	3.64E-04	62.43%	Pass
21	0.383	163	5.25E-04	104	3.35E-04	63.80%	Pass
22	0.397	153	4.93E-04	96	3.09E-04	62.75%	Pass
23	0.410	150	4.84E-04	89	2.87E-04	59.33%	Pass
24	0.424	143	4.61E-04	81	2.61E-04	56.64%	Pass
25	0.438	138	4.45E-04	75	2.42E-04	54.35%	Pass
26	0.451	134	4.32E-04	70	2.26E-04	52.24%	Pass
27	0.465	125	4.03E-04	64	2.06E-04	51.20%	Pass
28	0.479	120	3.87E-04	63	2.03E-04	52.50%	Pass
29	0.492	116	3.74E-04	62	2.00E-04	53.45%	Pass
30	0.506	107	3.45E-04	61	1.97E-04	57.01%	Pass
31	0.520	99	3.19E-04	57	1.84E-04	57.58%	Pass
32	0.533	97	3.13E-04	55	1.77E-04	56.70%	Pass
33	0.547	93	3.00E-04	54	1.74E-04	58.06%	Pass
34	0.561	88	2.84E-04	52	1.68E-04	59.09%	Pass
35	0.574	86	2.77E-04	47	1.52E-04	54.65%	Pass
36	0.588	76	2.45E-04	45	1.45E-04	59.21%	Pass
37	0.602	66	2.13E-04	43	1.39E-04	65.15%	Pass
38	0.615	65	2.10E-04	37	1.19E-04	56.92%	Pass
39	0.629	62	2.00E-04	37	1.19E-04	59.68%	Pass
40	0.643	59	1.90E-04	32	1.03E-04	54.24%	Pass
41	0.656	55	1.77E-04	28	9.03E-05	50.91%	Pass
42	0.670	52	1.68E-04	27	8.70E-05	51.92%	Pass
43	0.684	49	1.58E-04	24	7.74E-05	48.98%	Pass
44	0.697	48	1.55E-04	23	7.41E-05	47.92%	Pass
45	0.711	45	1.45E-04	23	7.41E-05	51.11%	Pass
46	0.725	44	1.42E-04	23	7.41E-05	52.27%	Pass
47	0.738	43	1.39E-04	20	6.45E-05	46.51%	Pass
48	0.752	43	1.39E-04	17	5.48E-05	39.53%	Pass
49	0.766	41	1.32E-04	14	4.51E-05	34.15%	Pass

Interval	Pre-project Flow (cfs)	Pre-project Hours	Pre-project % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
50	0.779	38	1.23E-04	13	4.19E-05	34.21%	Pass
51	0.793	37	1.19E-04	13	4.19E-05	35.14%	Pass
52	0.807	35	1.13E-04	12	3.87E-05	34.29%	Pass
53	0.820	31	9.99E-05	11	3.55E-05	35.48%	Pass
54	0.834	31	9.99E-05	10	3.22E-05	32.26%	Pass
55	0.848	28	9.03E-05	10	3.22E-05	35.71%	Pass
56	0.861	26	8.38E-05	8	2.58E-05	30.77%	Pass
57	0.875	25	8.06E-05	8	2.58E-05	32.00%	Pass
58	0.888	24	7.74E-05	7	2.26E-05	29.17%	Pass
59	0.902	24	7.74E-05	7	2.26E-05	29.17%	Pass
60	0.916	24	7.74E-05	7	2.26E-05	29.17%	Pass
61	0.929	22	7.09E-05	7	2.26E-05	31.82%	Pass
62	0.943	22	7.09E-05	6	1.93E-05	27.27%	Pass
63	0.957	21	6.77E-05	6	1.93E-05	28.57%	Pass
64	0.970	21	6.77E-05	5	1.61E-05	23.81%	Pass
65	0.984	20	6.45E-05	5	1.61E-05	25.00%	Pass
66	0.998	20	6.45E-05	5	1.61E-05	25.00%	Pass
67	1.011	20	6.45E-05	4	1.29E-05	20.00%	Pass
68	1.025	19	6.13E-05	4	1.29E-05	21.05%	Pass
69	1.039	18	5.80E-05	4	1.29E-05	22.22%	Pass
70	1.052	15	4.84E-05	4	1.29E-05	26.67%	Pass
71	1.066	14	4.51E-05	4	1.29E-05	28.57%	Pass
72	1.080	14	4.51E-05	4	1.29E-05	28.57%	Pass
73	1.093	14	4.51E-05	4	1.29E-05	28.57%	Pass
74	1.107	14	4.51E-05	4	1.29E-05	28.57%	Pass
75	1.121	13	4.19E-05	3	9.67E-06	23.08%	Pass
76	1.134	12	3.87E-05	3	9.67E-06	25.00%	Pass
77	1.148	12	3.87E-05	3	9.67E-06	25.00%	Pass
78	1.162	12	3.87E-05	3	9.67E-06	25.00%	Pass
79	1.175	12	3.87E-05	3	9.67E-06	25.00%	Pass
80	1.189	12	3.87E-05	3	9.67E-06	25.00%	Pass
81	1.203	12	3.87E-05	3	9.67E-06	25.00%	Pass
82	1.216	10	3.22E-05	3	9.67E-06	30.00%	Pass
83	1.230	10	3.22E-05	3	9.67E-06	30.00%	Pass
84	1.244	9	2.90E-05	3	9.67E-06	33.33%	Pass
85	1.257	9	2.90E-05	3	9.67E-06	33.33%	Pass
86	1.271	9	2.90E-05	2	6.45E-06	22.22%	Pass
87	1.285	8	2.58E-05	2	6.45E-06	25.00%	Pass
88	1.298	8	2.58E-05	2	6.45E-06	25.00%	Pass
89	1.312	8	2.58E-05	2	6.45E-06	25.00%	Pass
90	1.326	7	2.26E-05	1	3.22E-06	14.29%	Pass
91	1.339	7	2.26E-05	1	3.22E-06	14.29%	Pass
92	1.353	7	2.26E-05	1	3.22E-06	14.29%	Pass
93	1.367	7	2.26E-05	1	3.22E-06	14.29%	Pass
94	1.380	5	1.61E-05	1	3.22E-06	20.00%	Pass
95	1.394	5	1.61E-05	1	3.22E-06	20.00%	Pass
96	1.407	5	1.61E-05	0	0.00E+00	0.00%	Pass
97	1.421	5	1.61E-05	0	0.00E+00	0.00%	Pass
98	1.435	3	9.67E-06	0	0.00E+00	0.00%	Pass
99	1.448	3	9.67E-06	0	0.00E+00	0.00%	Pass
100	1.462	3	9.67E-06	0	0.00E+00	0.00%	Pass


Flow Duration Curve
[Pre vs. Post - POC1]
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
Flow (cfs)
1.0E-06
1.0E-05
1.0E-04
1.0E-03
1.0E-02
% Time Exceeding
Pre-project Q
Post-project (Mitigated) Q

ATTACHMENT 2e
VECTOR CONTROL PLAN

-NOT NECESSARY SINCE BASIN WILL DEWATER WITHIN 96 HOURS-

ATTACHMENT 3
Structural BMP Maintenance Information

This is the cover sheet for Attachment 3.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Thresholds and Actions (Required)	☑ Included See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet.
Attachment 3b	Draft Maintenance Agreement (when applicable)	☐ Included ☑ Not Applicable

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

☑ Preliminary Design / Planning / CEQA level submittal:

Attachment 3a must identify:

☑ Typical maintenance indicators and actions for proposed structural BMP(s) based on Section 7.7 of the BMP Design Manual

Attachment 3b is not required for preliminary design / planning / CEQA level submittal.

☐ Final Design level submittal:

Attachment 3a must identify:

- ☐ Specific maintenance indicators and actions for proposed structural BMP(s). This shall be based on Section 7.7 of the BMP Design Manual and enhanced to reflect actual proposed components of the structural BMP(s)
- ☐ How to access the structural BMP(s) to inspect and perform maintenance
- ☐ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- ☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- ☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- ☐ Recommended equipment to perform maintenance
- ☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management

Attachment 3b: For private entity operation and maintenance, Attachment 3b shall include a draft maintenance agreement in the local jurisdiction's standard format (PDP applicant to contact the [City Engineer] to obtain the current maintenance agreement forms).

ATTACHMENT 3a
STRUCTURAL BMP MAINTENANCE THRESHOLDS

BF-1
Biofiltration

BMP MAINTENANCE FACT SHEET
FOR
STRUCTURAL BMP BF-1 BIOFILTRATION

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

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

Normal Expected Maintenance

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

Non-Standard Maintenance or BMP Failure

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

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

Other Special Considerations

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

BF-1
Biofiltration

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

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

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

References

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

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BF-1
Biofiltration

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

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

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

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

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

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

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 3 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Erosion due to concentrated irrigation flow Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Repair/re-seed/re-plant eroded areas and adjust the irrigation system ☐ Other / Comments:		
Erosion due to concentrated storm water runoff flow Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan ☐ If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction ☐ Other / Comments:		

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

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

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

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

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

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

ATTACHMENT 3b
DRAFT MAINTENANCE AGREEMENT

NOT REQUIRED FOR PRELIMINARY PHASE

ATTACHMENT 4
Copy of Plan Sheets Showing Permanent Storm Water BMPs

This is the cover sheet for Attachment 4.

Use this checklist to ensure the required information has been included on the plans:

The plans must identify:

- ☐ Structural BMP(s) with ID numbers matching Form I-6 Summary of PDP Structural BMPs
- ☐ 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)
- ☐ Signage indicating the location and boundary of structural BMP(s) as required by the [City Engineer]
- ☐ How to access the structural BMP(s) to inspect and perform maintenance
- ☐ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- ☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- ☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- ☐ Recommended equipment to perform maintenance
- ☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management
- ☐ Include landscaping plan sheets 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 model number shall be provided. Photocopies of general brochures are not acceptable.