

ATTACHMENT G

UDSP EIR 2025 ADDENDUM - APPENDIX F - DRAINAGE REPORT

APPENDIX F Drainage Report



PRELIMINARY DRAINAGE STUDY:

CUBESMART SELF STORAGE

CUP24-0005

SAN MARCOS, CA

Prepared for: **CARMEL ENTERPRISE, LLC.** 5550 Carmel Mountain Road, Suite 204 San Diego, CA 92130

Prepared by: **STEVENS CRESTO** ENGINEERS 9665 Chesapeake Drive, Suite 200 San Diego, CA 92123

> Date: 3/14/2025 SCE Project: 13003.85



PRELIMINARY DRAINAGE STUDY:

CUBESMART SELF STORAGE

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SAN MARCOS, CA

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 the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with current standards.

I understand that the check of project drawings and specifications by the City of San Marcos is confined to a review only and does not relieve me, as Engineer of Work, of my responsibilities for project design.

NO. 45601

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9665 Chesapeake Drive, Suite 200 San Diego, CA 92123

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Joseph G. Cresto

RCE 45601

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SECTION 1

PROJECT DESCRIPTION

<u>Purpose</u>

This study supports the development of the Cubesmart Self Storage project, located along the south side of East Carmel Street, north of Enterprise Street, and east of the North County Transit District's Sprinter light rail system.

The Cubesmart Self Storage project is approximately 2.9 acres and consists of buildings for commercial storage in addition to surface improvements and utilities associated with development. The project proposes two underground detention systems (UD-1 and UD-2) for 100-year peak flow and hydromodification mitigation. This study will calculate flow rates at POC1 (Point of Compliance) to ensure the proposed project flow rates will not exceed pre-project flow rates. See the Project's Storm Water Quality Management Plan (SWQMP) for pollutant control mitigation calculations and requirements.

Hydrologic Soil Group

Per USDA Web Soil Survey, the dominant hydrologic soil group is Type C. See referenced exhibit in Section 3-5.

Rational Method

Runoff generated by the project site is calculated for a 100-year peak design storm, using the Modified Rational Method.

Runoff was calculated using the Modified Rational Method Equation: Q = C * i * A

Q = flow rate in cubic feet per second (cfs)

C = runoff coefficient

i = rainfall intensity in inches per hour (in/hr)

A = drainage area in acres (ac)

Modified Rational Method calculations were performed using the Advanced Engineering Software (AES) 2016 computer software. To perform the hydrology routing, the total watershed area was divided into major drainage basins and the primary point of compliance (POC) was identified. The drainage basins were then broken down into smaller drainage areas tributary to a common collection point or POC. The drainage areas were then broken down into smaller sub-basins tributary to specific localized nodes of analysis. Key parameters were then inputted into AES to develop a nodal analysis and calculate project peak runoff flow rates.

Runoff Coefficient

Runoff coefficients were determined for post-project conditions. The runoff coefficients were calculated using Table 3-1 Runoff Coefficient for Urban Areas in SDCHM, which is included in Section 6 for reference. A runoff coefficient of 0.90 was used for fully impervious areas such as roads and drive aisles, and a runoff coefficient of 0.30 was used for fully pervious landscape areas in Soil Group C. Runoff coefficient exhibit and calculations are found in Section 4-3 for post-project.

Preliminary Drainage Study for: CUP24-0005

Rainfall Intensity

The 6-hour and 24-hour precipitation isopluvial maps in the SDCHM are used to determine the 6-hour precipitation (P6) storm duration needed to calculate the rainfall intensity based on Figure 3-1. The project uses a P6 of 3.3 inches for the hydrology analysis. See the Appendices in Section 6 for the references from SDCHM.

Conclusion

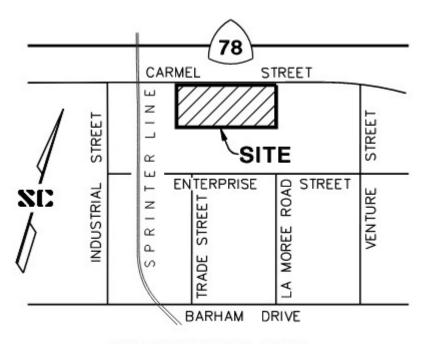
This report provides a hydrologic analysis of the pre-project and post-project condition for the Cubesmart Self Storage project and conforms to the 100-yr peak flow POC 1. For water quality calculations, see the project SWQMP. See Table 1 below for a hydrology summary.

TABLE 1: PROJECT HYDROLOGY SUMMARY

	Existing Condition			Proposed Condition			
OUTFALL	Area	T _c	Q ₁₀₀	Area	T _c	Q _{100,UNDETAINED}	Q _{100,DETAINED}
	(acres)	(min)	(cfs)	(acres)	(min)	(cfs)	(cfs)
POC 1	2.9	9.8	6.0	2.9	9.9	14 .9	5.3

SECTION 2

VICINITY MAP



THOMAS BROTHERS COORD: PAGE 1128; GRID J1

SECTION 3

PRE-PROJECT HYDROLOGY

The Cubesmart Self Storage project was previously analyzed in studies associated with the Rough Grade Condition Drainage Study for Campus Pointe (Campus Pointe Drainage Study), dated January 2022 and the Precise Grade Condition Drainage Study for Enterprise Affordable Housing, dated September 2024 (GP 24-00021, IP 24-00013). The project is currently composed of a rough graded pad per GP21-00004. The Campus Pointe Drainage Study analyzed the pre-project condition of the project area and established a 10.93 CFS 100-year pre-project flow rate. In the pre-project condition, the 100-year pre-project flow rate consists of 4.91 CFS of run-on from the Enterprise Affordable Housing unit. Therefore a 100-year pre-project flow rate of 6.02 CFS from Cubesmart Self Storage shall be maintained.

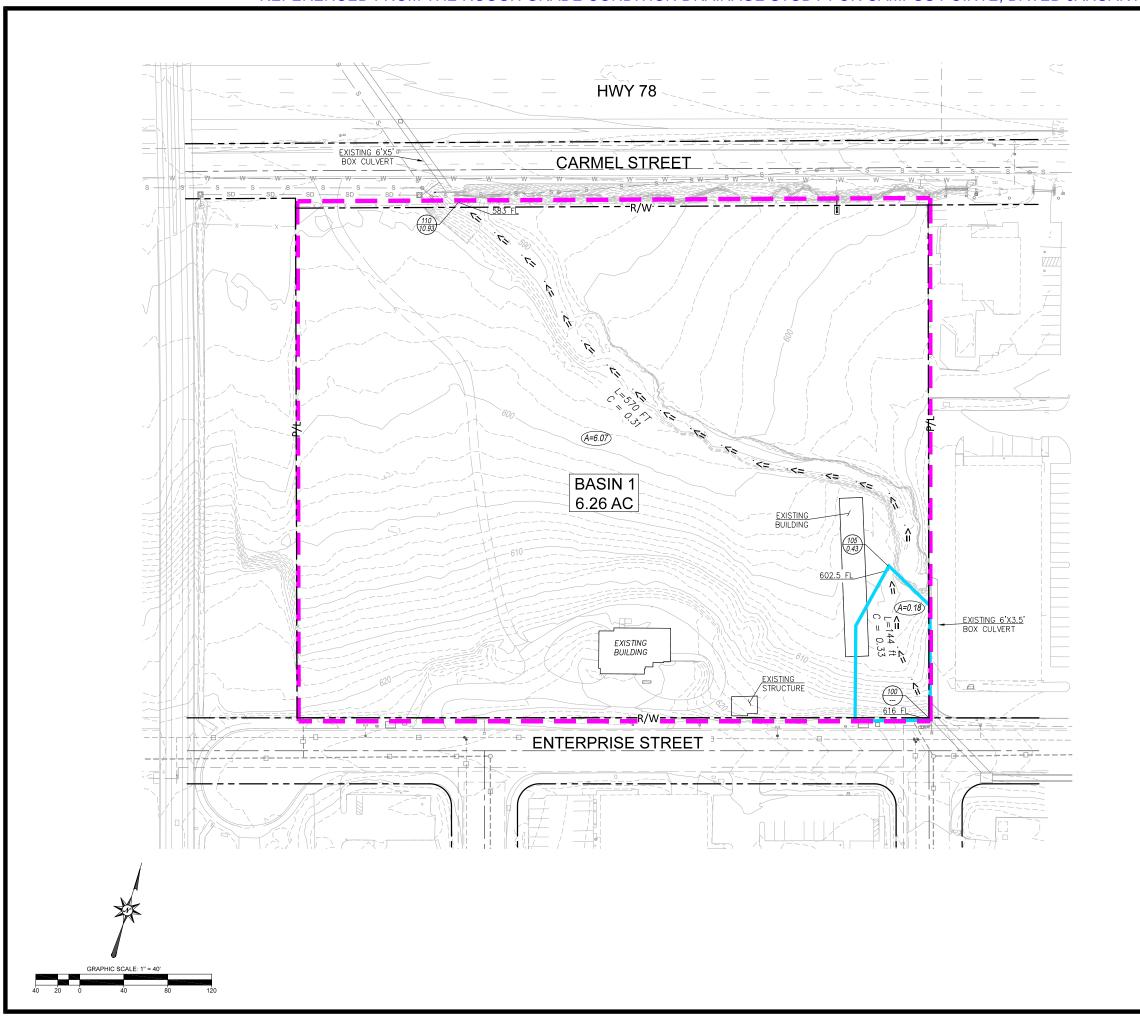
See Section 3 for the exhibit from the approved Drainage Study. The current rough graded condition discharges a total of 10.07 CFS at POC1 and complies with the pre-project flow rate. See Section 3 for the exhibit from the approved Drainage Study. There is 600.8 CFS of run-on that flows through the project via existing double 6'x5' culverts and double 72" RCP storm drains constructed per IP21-00005. Ultimate development will comply with the existing 10.93 CFS pre-project flow rate condition to prevent impact to downstream systems. See Table 2 below for a pre-project hydrology summary.

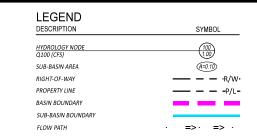
TABLE 2: PRE-PROJECT HYDROLOGY SUMMARY

	Pre-Project Condition			
OUTFALL	Area (acres)	T _c (min)	Q ₁₀₀ (cfs)	
POC 1	2.9	9.8	6.0	

POC 1 References: Excerpts from the Rough Grade Condition Drainage Study for Campus Pointe, Dated January 2022.

REFERENCED FROM THE ROUGH GRADE CONDITION DRAINAGE STUDY FOR CAMPUS POINTE, DATED JANUARY 2022 FROM PLSA.





HYDROLOGIC SOIL GROUP

HYDROLOGIC SOIL TYPE: C

DEPTH TO GROUNDWATER

DEPTH TO GROUNDWATER ~ 9 FT

PROJECT CHARACTERISTICS

PARCEL AREA: 0.14 AC

RUNOFF COEFFICIENT

IN ACCORDANCE WITH COUNTY OF SAN DIEGO STANDARDS, RUNOFF COEFFICIENTS WERE BASED ON LAND USE AND SOIL TYPE. AN APPROPRIATE RUNOFF COEFFICIENT WAS SELECTED FROM TABLE 3-1 OF THE SAN DIEGO COUNTY HYDROLOGY MANUAL AND MULTIPLIED BY THE PERCENTAGE OF TOTAL AREA IN THAT CLASS. THE SUM OF THE PRODUCTS FOR ALL LAND USES IS THE WEIGHTED RUNOFF COEFFICIENT.

FOR THE PURPOSE OF THIS STUDY, THE ENTIRE SITE WAS MODELED WITH TYPE C SOILS.

THE EXISTING SITE IS ASSUMED TO BE 2.2% IMPERVIOUS.

RUNOFF COEFFICIENT FOR 2% IMPERVIOUS, TYPE C SOILS: SUB-AREA = 0.33 REMAINING BASIN AREA = 0.31

SUMMARY OF EXISTING CONDITION PEAK FLOWS

DRAINAGE BASIN	DRAINAGE AREA (AC)	IMPERVIOUS AREA (AC)	% IMP	WEIGHTED RUNOFF COEFFICIENT, C
BASIN 1	6.26	0.14	2.2%	0.31

EXISTING CONDITION DRAINAGE EXHIBIT

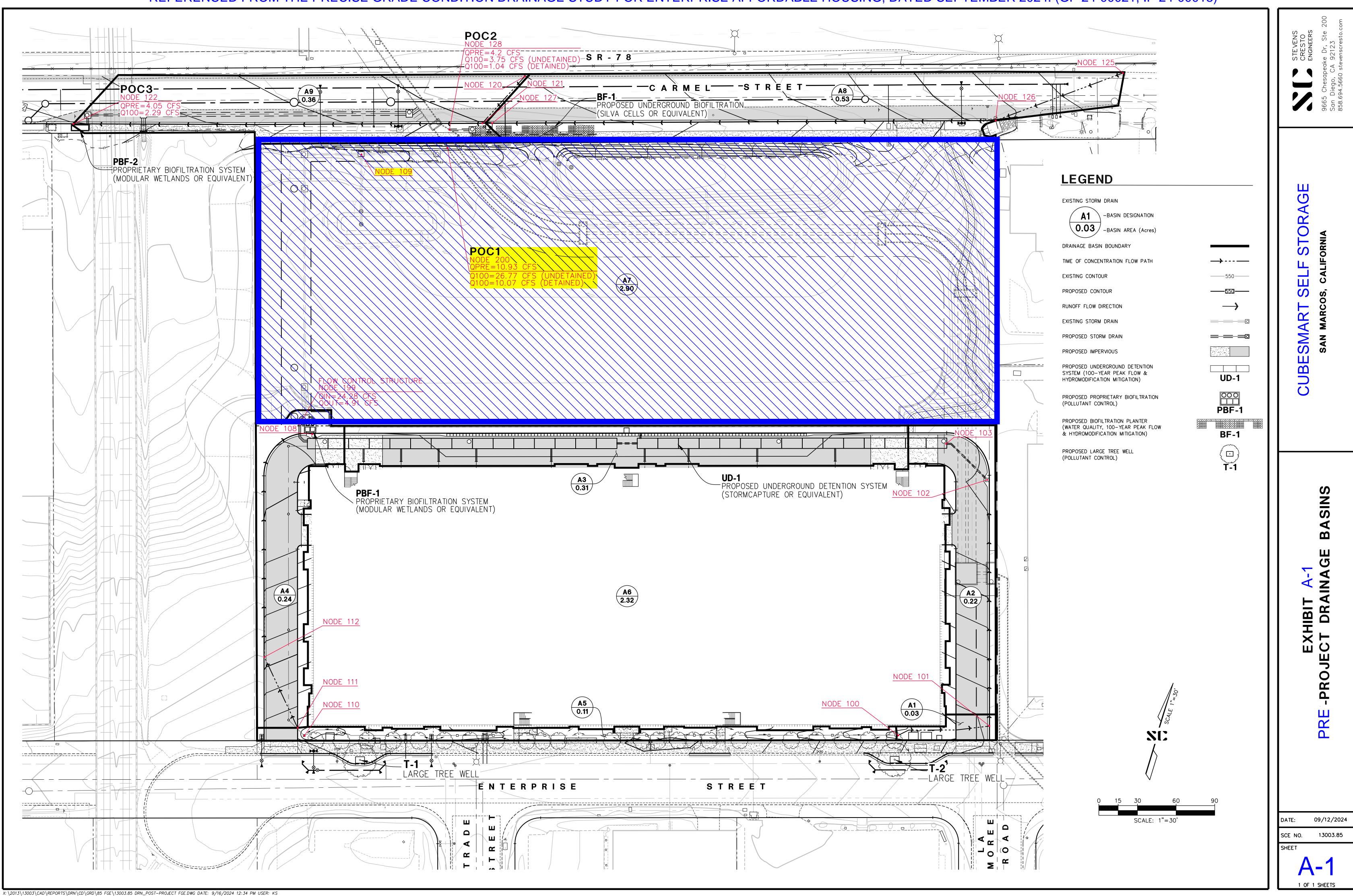
PASCO LARET SUITER

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CAMPUS POINTE SAN MARCOS, CA PLSA # 2413 NTS JANUARY 2022

SECTION 3-1

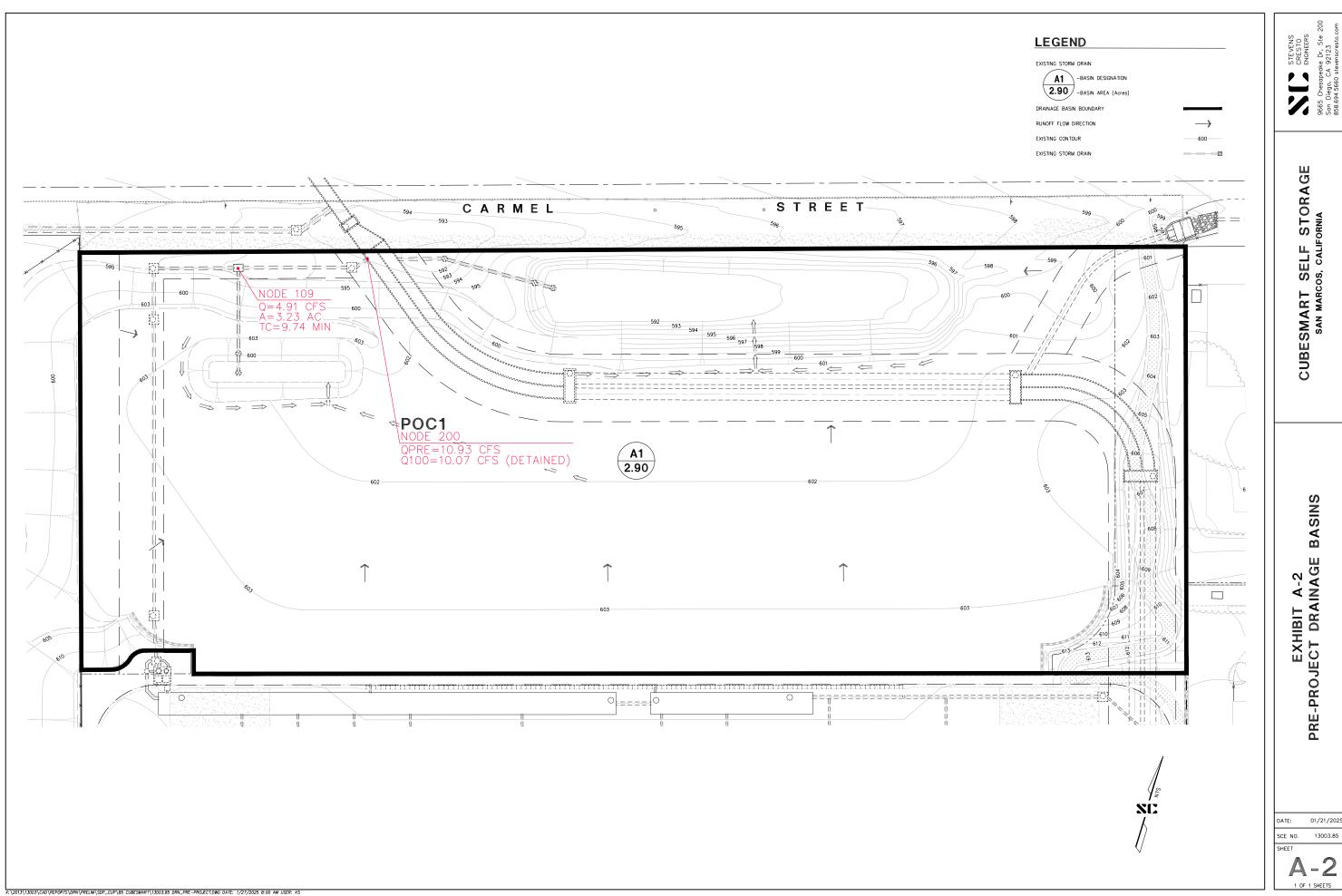
EXHIBIT A-1: PRE-PROJECT DRAINAGE BASINS (REFERENCE)



SECTION 3-2

EXHIBIT A-2: PRE-PROJECT DRAINAGE BASINS

(11" X 17" Reduction)



SIZE EXHIBIT 7 FOR FULL EXHIBIT. SEE SECTION SIZE *REDUCED

CUBESMART SELF STORAGE SAN MARCOS, CALIFORNIA

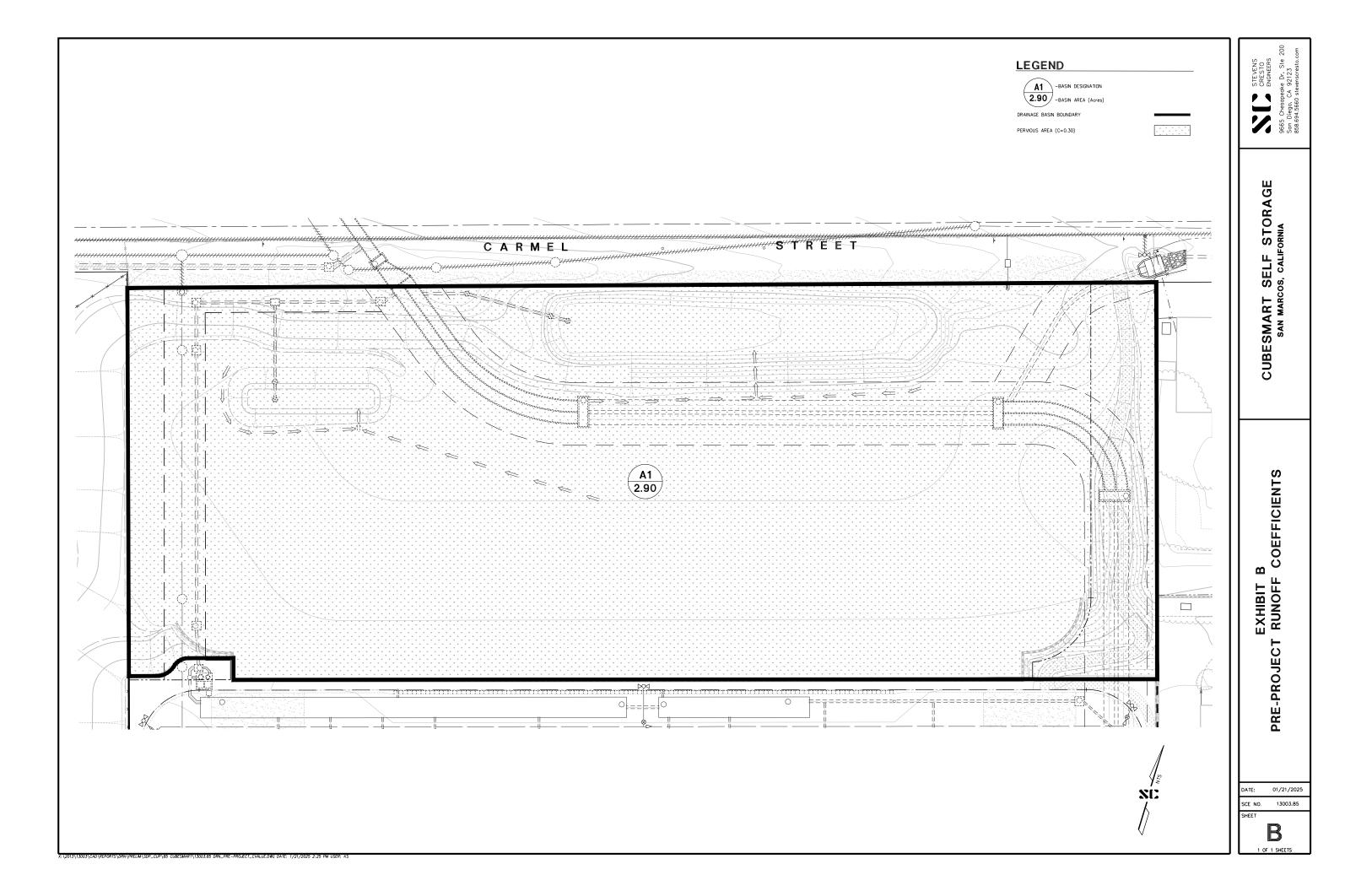
BASINS

01/21/2025

SCE NO. 13003.85

SECTION 3-3

EXHIBIT B: PRE-PROJECT RUNOFF COEFFICIENTS



SECTION 3-4

PRE-PROJECT AES CALCULATIONS

******************* 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 1452 Analysis prepared by: PASCO LARET SUITER & ASSOCIATES 535 NORTH HIGHWAY 101, STE A SOLANA BEACH, CA 92075 858-259-8212 * 2413 CAMPUS POINTE * EXISTING CONDITION ******************** FILE NAME: 2413E00.DAT TIME/DATE OF STUDY: 16:02 02/17/2021 USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION: 2003 SAN DIEGO MANUAL CRITERIA USER SPECIFIED STORM EVENT (YEAR) = 100.00 6-HOUR DURATION PRECIPITATION (INCHES) = SPECIFIED MINIMUM PIPE SIZE(INCH) = 3.00SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.95 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 (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (n)
 1
 30.0
 20.0
 0.018/0.018/0.020
 0.67
 2.00
 0.0313
 0.167
 0.0150

 2
 15.0
 10.0
 0.020/0.020/0.020
 0.50
 1.50
 0.0100
 0.125
 0.0180
 GLOBAL STREET FLOW-DEPTH CONSTRAINTS: 1. Relative Flow-Depth = 0.00 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 100.00 TO NODE 105.00 IS CODE = 21 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS< ______ *USER SPECIFIED (SUBAREA):

USER-SPECIFIED RUNOFF COEFFICIENT = .3300 S.C.S. CURVE NUMBER (AMC II) = 0

INITIAL SUBAREA FLOW-LENGTH (FEET) = 144.00

```
UPSTREAM ELEVATION (FEET) = 616.00
 DOWNSTREAM ELEVATION(FEET) = 602.50
ELEVATION DIFFERENCE(FEET) = 13.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         THE MAXIMUM OVERLAND FLOW LENGTH = 100.00
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN To CALCULATION!
  100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 7.288
 SUBAREA RUNOFF (CFS) = 0.43
 TOTAL AREA (ACRES) =
                     0.18
                           TOTAL RUNOFF(CFS) =
*****************
 FLOW PROCESS FROM NODE 105.00 TO NODE 110.00 IS CODE = 51
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<
_____
 ELEVATION DATA: UPSTREAM(FEET) = 602.50 DOWNSTREAM(FEET) = 583.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 570.00 CHANNEL SLOPE = 0.0342
 CHANNEL BASE (FEET) = 10.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 10.00
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 5.632
 *USER SPECIFIED (SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3100
 S.C.S. CURVE NUMBER (AMC II) = 0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.94
 AVERAGE FLOW DEPTH(FEET) = 0.19 TRAVEL TIME(MIN.) = 3.23
 Tc(MIN.) = 9.80
 SUBAREA AREA (ACRES) = 6.07 SUBAREA RUNOFF (CFS) = 10.60
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.311
                                 PEAK FLOW RATE (CFS) = 10.93
 TOTAL AREA(ACRES) =
                      6.3
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.28 FLOW VELOCITY(FEET/SEC.) = 3.64
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 110.00 = 714.00 FEET.
 END OF STUDY SUMMARY:
 TOTAL AREA (ACRES) =
                          6.3 \text{ TC}(MIN.) = 9.80
 PEAK FLOW RATE (CFS) = 10.93
_____
 END OF RATIONAL METHOD ANALYSIS
                                    — QPRE-PROJECT
```

SECTION 3-5

HYDROLOGIC SOIL GROUP

MAP LEGEND MAP INFORMATION The soil surveys that comprise your AOI were mapped at Area of Interest (AOI) С 1:24.000. Area of Interest (AOI) C/D Soils Warning: Soil Map may not be valid at this scale. D Soil Rating Polygons Enlargement of maps beyond the scale of mapping can cause Not rated or not available Α misunderstanding of the detail of mapping and accuracy of soil **Water Features** line placement. The maps do not show the small areas of A/D contrasting soils that could have been shown at a more detailed Streams and Canals Transportation B/D Rails ---Please rely on the bar scale on each map sheet for map measurements. Interstate Highways C/D Source of Map: Natural Resources Conservation Service **US Routes** Web Soil Survey URL: D Major Roads Coordinate System: Web Mercator (EPSG:3857) Not rated or not available -Local Roads Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts Soil Rating Lines Background distance and area. A projection that preserves area, such as the Aerial Photography Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required. This product is generated from the USDA-NRCS certified data as of the version date(s) listed below. B/D Soil Survey Area: San Diego County Area, California Survey Area Data: Version 19, Aug 30, 2023 Soil map units are labeled (as space allows) for map scales 1:50.000 or larger. Not rated or not available Date(s) aerial images were photographed: Mar 14, 2022—Mar 17. 2022 **Soil Rating Points** The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background A/D imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident. B/D

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
PeC	Placentia sandy loam, 2 to 9 percent slopes, warm MAAT, MLRA 19	С	8.0	98.7%
VaB	Visalia sandy loam, 2 to 5 percent slopes	А	0.1	1.3%
Totals for Area of Interest			8.2	100.0%

Description

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

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

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

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

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

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

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

SECTION 4

POST-PROJECT HYDROLOGY

The Cubesmart Self Storage post-project condition maintains pre-project drainage patterns and flow rates. Flow generated onsite will be captured and conveyed via a private storm drain system into the proposed underground detention systems UD-1 and UD-2. UD-1 and UD-2 will provide 100-year design flow mitigation for POC 1.

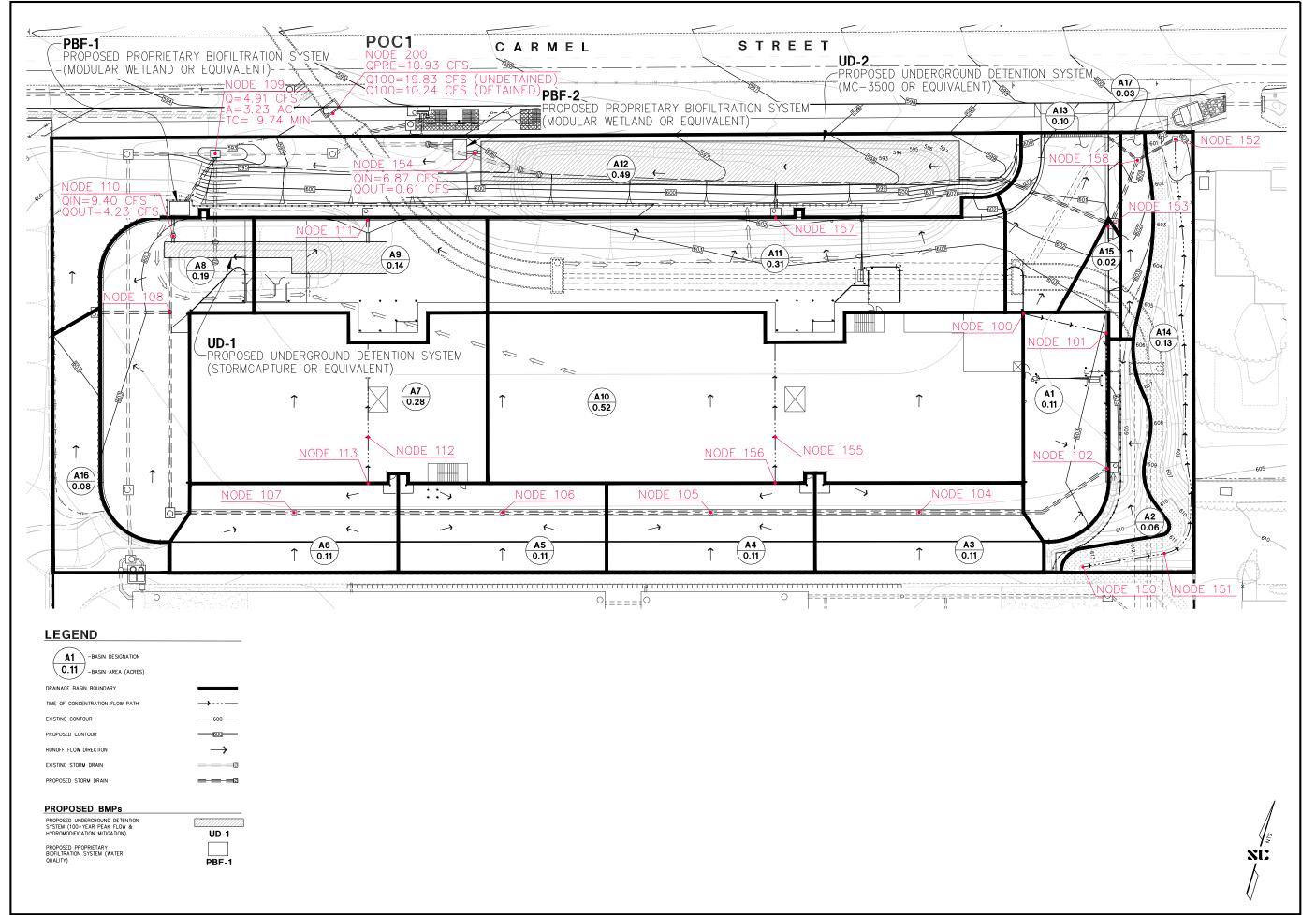
The analysis in this section demonstrates that peak flow rate generated by the proposed project is in conformance with the pre-project flow rate. This analysis is conceptual and simplified for a discretionary purpose. At final engineering, a detailed analysis will be provided. See Table 4 below for the post-project hydrology summary.

TABLE 4: POST-PROJECT HYDROLOGY SUMMARY

	Post-Project Condition				
OUTFALL	Area	Тс	Q100,UNDETAINED	Q100,DETAINED	
	(acres)	(min)	(cfs)	(cfs)	
POC 1	2.9	9.9	14.9	5.3	

SECTION 4-1

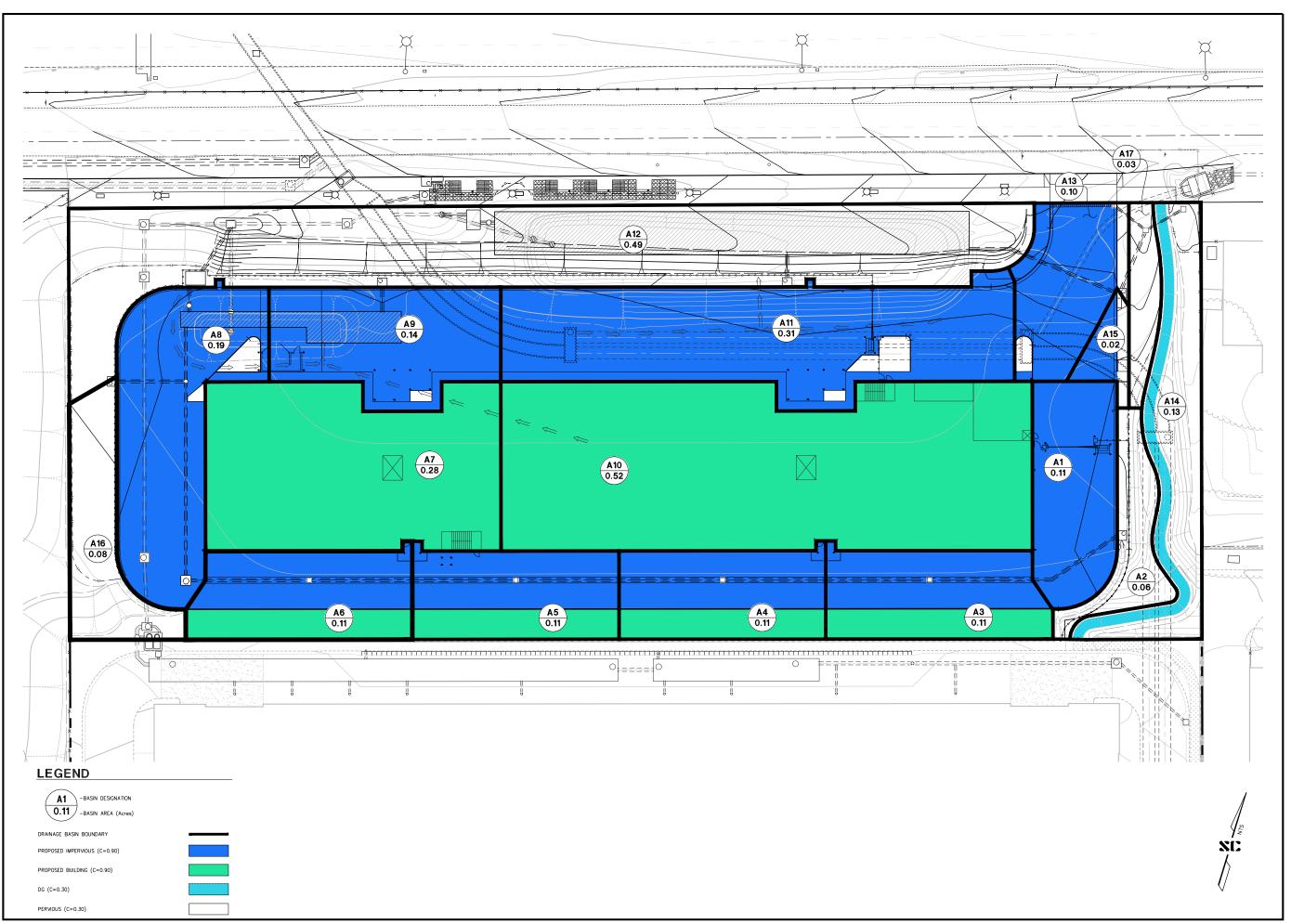
EXHIBIT C – POST-PROJECT DRAINAGE BASINS (11" X 17" REDUCTION)



STEVENS
CRESTO
ENGINEERS
peake Dr, Ste 2
CA 92123 9665 Ch San Die 858.694. STORAGE CUBESMART SELF SAN MARCOS, CALIF SINS BA GE EXHIBIT C -PROJE 03/24/2025 SCE NO. 13003.85 1 OF 1 SHEETS

SECTION 4-2

EXHIBIT D: POST-PROJECT RUNOFF COEFFICIENTS



STEVENS CRESTO ENGINEERS peake Dr, Ste 2 STORAGE FORNIA CUBESMART SELF san marcos, calif COEFFICIENTS EXHIBIT D POST-PROJECT RUNOFF 03/24/2025 SCE NO. 13003.85

1 OF 1 SHEETS

X:\2013\13003\CAD\REPORTS\DRN\PRELIM\SDP_CUP\85 CUBESMART\13003.85 DRN_POST-PROJECT_CVALUE.DWG DATE: 3/24/2025 1:59 PM USER: HJK

Post-Project Runoff Coefficients

C-VALUE DETERMINATION						
Basin	A _T (Ac.)	A _{0.90} (Ac.)	A _{0.30} (Ac.)	С	Remarks	
A1	0.11	0.11		0.90	Impervious Surface	
A2	0.06		0.06	0.30	Pervious Surface	
A3	0.11	0.11		0.90	Impervious Surface	
A4	0.11	0.11		0.90	Impervious Surface	
A5	0.11	0.11		0.90	Impervious Surface	
A6	0.11	0.11		0.90	Impervious Surface	
A7	0.28	0.28		0.90	Building	
A8	0.19	0.19	0.01	0.88	Mixed Land Use	
A9	0.14	0.14	0.00	0.89	Mixed Land Use	
A10	0.52	0.52		0.90	Building	
A11	0.31	0.30	0.01	0.88	Mixed Land Use	
A12	0.49		0.49	0.30	Pervious Surface	
A13	0.10	0.09	0.01	0.86	Mixed Land Use	
A14	0.13		0.13	0.30	Pervious Surface	
A15	0.02	0.01	0.01	0.68	Mixed Land Use	
A16	80.0		0.08	0.30	Pervious Surface	
A17	0.03		0.03	0.30	Pervious Surface	
TOTAL	2.90	WEIGHT	ED AVG:	0.73		

Assumptions:

1) Three land use types exist on site:

Impervious Surface (C-Value = 0.90)

Pervious Surface (C-Value = 0.30)

2) C-Values have been determined using Table 3-1 from the San Diego County

SECTION 4-3

POST-PROJECT AES CALCULATIONS

UNDETAINED HYDROLOGY ROUTING - POC 1

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 1662

Analysis prepared by:

STEVENS CRESTO ENGINEERING, INC. 9665 CHESAPEAKE DRIVE, SUITE 200 SAN DIEGO, CA 92123

PH: 858.694.5660 FAX: 858.694.5661 ******************** DESCRIPTION OF STUDY ****************** * CUBESMART SELF STORAGE * POSTPROJECT HYDROLOGY POC1 * 100YR DESIGN STORM - UNDETAINED ***************** FILE NAME: CUBEPOSU.DAT TIME/DATE OF STUDY: 09:06 01/21/2025 USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION: 2003 SAN DIEGO MANUAL CRITERIA USER SPECIFIED STORM EVENT (YEAR) = 100.00 6-HOUR DURATION PRECIPITATION (INCHES) = SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00 SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.85 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 (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) NO. (FT) 30.0 20.0 0.018/0.018/0.020 0.67 2.00 0.0313 0.167 0.0150 GLOBAL STREET FLOW-DEPTH CONSTRAINTS: 1. Relative Flow-Depth = 0.00 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 100.00 TO NODE 101.00 IS CODE = 21 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS< _____ *USER SPECIFIED (SUBAREA): STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .9000 S.C.S. CURVE NUMBER (AMC II) = 0 INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00

UPSTREAM ELEVATION(FEET) = 603.98 DOWNSTREAM ELEVATION(FEET) = 602.90

```
ELEVATION DIFFERENCE (FEET) =
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 1.969
  100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 SUBAREA RUNOFF (CFS) = 0.39
 TOTAL AREA(ACRES) = 0.05 TOTAL RUNOFF(CFS) = 0.39
*************************
 FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 61
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<
 >>>> (STANDARD CURB SECTION USED) <<<<
______
 REPRESENTATIVE SLOPE = 0.0280
 STREET LENGTH (FEET) = 65.00 CURB HEIGHT (INCHES) = 6.0
 STREET HALFWIDTH (FEET) = 43.00
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 38.00
 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) = 0.63
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH (FEET) = 0.20
   HALFSTREET FLOOD WIDTH (FEET) = 3.44
   AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.65
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.52
 STREET FLOW TRAVEL TIME (MIN.) = 0.41 Tc (MIN.) =
  100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON TC = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.900
 SUBAREA AREA(ACRES) = 0.06 SUBAREA RUNOFF(CFS) = 0.47 TOTAL AREA(ACRES) = 0.1 PEAK FLOW RATE(CFS) =
 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.21 HALFSTREET FLOOD WIDTH(FEET) = 4.43
 FLOW VELOCITY (FEET/SEC.) = 2.74 DEPTH*VELOCITY (FT*FT/SEC.) = 0.59
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 115.00 FEET.
*********************
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81
______
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
_____
  100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.6882
 SUBAREA AREA(ACRES) = 0.06 SUBAREA RUNOFF(CFS) = 0.16
 TOTAL AREA (ACRES) = 0.2 TOTAL RUNOFF (CFS) = 1.02
```

```
*******************
 FLOW PROCESS FROM NODE 102.00 TO NODE 104.00 IS CODE = 41
------
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
_____
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 101.29 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.56
 GIVEN PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1.02
 PIPE TRAVEL TIME (MIN.) = 0.47 Tc (MIN.) =
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 =
                                            216.29 FEET.
*************************
 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
______
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7714
 SUBAREA AREA(ACRES) = 0.11 SUBAREA RUNOFF(CFS) =
                  0.3 TOTAL RUNOFF(CFS) =
 TOTAL AREA (ACRES) =
 TC(MIN.) = 2.85
*************************
 FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 41
-----
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 102.67 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.24
 GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1.88
 PIPE TRAVEL TIME (MIN.) = 0.40 Tc (MIN.) =
                                   3.26
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 =
                                            318.96 FEET.
*****************************
 FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81
______
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
_____
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8077
 SUBAREA AREA(ACRES) = 0.11 SUBAREA RUNOFF(CFS) = 0.86
 TOTAL AREA (ACRES) = 0.4 TOTAL RUNOFF (CFS) = 2.74
```

```
*******************
 FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 41
______
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
_____
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 102.67 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.72
 GIVEN PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 2.74
 PIPE TRAVEL TIME (MIN.) = 0.36 Tc (MIN.) =
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 106.00 =
                                            421.63 FEET.
*************************
 FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
______
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8280
 SUBAREA AREA(ACRES) = 0.11 SUBAREA RUNOFF(CFS) =
                  0.5 TOTAL RUNOFF(CFS) =
 TOTAL AREA (ACRES) =
 TC(MIN.) = 3.62
*************************
 FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 41
-----
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 102.67 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.08
 GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 3.60
 PIPE TRAVEL TIME (MIN.) = 0.34 Tc (MIN.) =
                                   3.96
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 107.00 =
                                            524.30 FEET.
*****************************
 FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81
______
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
_____
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8410
 SUBAREA AREA(ACRES) = 0.11 SUBAREA RUNOFF(CFS) = 0.86
 TOTAL AREA(ACRES) = 0.6 TOTAL RUNOFF(CFS) =
```

```
*******************
 FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 41
______
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
_____
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 148.49 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.37
 GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 4.46
 PIPE TRAVEL TIME (MIN.) = 0.46 Tc (MIN.) =
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 =
                                            672.79 FEET.
************************
 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
_____
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7783
 SUBAREA AREA(ACRES) = 0.08 SUBAREA RUNOFF(CFS) = 0.21
                  0.7 TOTAL RUNOFF(CFS) =
 TOTAL AREA (ACRES) =
 TC(MIN.) =
*************************
 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81
._____
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
______
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8002
 SUBAREA AREA(ACRES) = 0.19 SUBAREA RUNOFF(CFS) = 1.45
 TOTAL AREA (ACRES) =
                   0.9 TOTAL RUNOFF (CFS) =
 TC(MIN.) = 4.42
****************************
 FLOW PROCESS FROM NODE 108.00 TO NODE 110.00 IS CODE = 41
______
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <><<
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 41.85 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.80
 GIVEN PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 6.12
 PIPE TRAVEL TIME (MIN.) = 0.12 Tc (MIN.) = 4.54
```

```
100.00 TO NODE
                                     110.00 =
 LONGEST FLOWPATH FROM NODE
                                               714.64 FEET.
*******************
 FLOW PROCESS FROM NODE 110.00 TO NODE
                                  110.00 \text{ 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.) = 4.54
 RAINFALL INTENSITY (INCH/HR) = 8.69
 TOTAL STREAM AREA(ACRES) = 0.88
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 6.12
*******************
 FLOW PROCESS FROM NODE 113.00 TO NODE 112.00 IS CODE = 21
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<
______
 *USER SPECIFIED (SUBAREA):
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =
 UPSTREAM ELEVATION (FEET) = 604.50
 DOWNSTREAM ELEVATION (FEET) = 604.00
 ELEVATION DIFFERENCE (FEET) = 0.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 SUBAREA RUNOFF (CFS) = 0.39
 TOTAL AREA (ACRES) =
                   0.05 TOTAL RUNOFF(CFS) =
************************
 FLOW PROCESS FROM NODE 112.00 TO NODE
                                  111.00 \text{ IS CODE} = 51
-----
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<
______
 CHANNEL LENGTH THRU SUBAREA (FEET) = 70.00
 REPRESENTATIVE CHANNEL SLOPE = 0.0100
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 99.000
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 0.50
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 1.41
 AVERAGE FLOW DEPTH(FEET) = 0.10 TRAVEL TIME(MIN.) = 0.83
 Tc(MIN.) = 3.38
 SUBAREA AREA(ACRES) = 0.23
                            SUBAREA RUNOFF (CFS) = 1.80
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.900
 TOTAL AREA (ACRES) = 0.3 PEAK FLOW RATE (CFS) = 2.19
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.12 FLOW VELOCITY(FEET/SEC.) = 1.56
 LONGEST FLOWPATH FROM NODE 113.00 TO NODE 111.00 = 120.00 FEET.
```

```
FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 81
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
_____
  100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON TC = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8900
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8967
 SUBAREA AREA(ACRES) = 0.14 SUBAREA RUNOFF(CFS) = 1.08
 TOTAL AREA(ACRES) = 0.4 TOTAL RUNOFF(CFS) =
 TC(MIN.) = 3.38
******************
 FLOW PROCESS FROM NODE 111.00 TO NODE 110.00 IS CODE = 41
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 11.25 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.95
 GIVEN PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 3.27
 PIPE TRAVEL TIME (MIN.) = 0.04 Tc (MIN.) =
 LONGEST FLOWPATH FROM NODE 113.00 TO NODE 110.00 = 131.25 FEET.
************************
 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 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.) = 3.41
 RAINFALL INTENSITY (INCH/HR) = 8.69
 TOTAL STREAM AREA(ACRES) = 0.42
 PEAK FLOW RATE (CFS) AT CONFLUENCE =
 ** CONFLUENCE DATA **
 STREAM RUNOFF TC INTENSITY

NUMBER (CFS) (MIN.) (INCH/HOUR)

1 6.12 4.54 8.695

2 3.27 3.41 8.695
                                     AREA
                                      (ACRE)
                                     0.88
                                       0.42
 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.
 ** PEAK FLOW RATE TABLE **
 STREAM RUNOFF TC INTENSITY
```

1 7.88 3.41 8.695
2 9.40 4.54 8.695

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 9.40 Tc (MIN.) = 4.54

TOTAL AREA (ACRES) = 1.3

(MIN.) (INCH/HOUR)

NUMBER

(CFS)

```
100.00 TO NODE
                                110.00 =
 LONGEST FLOWPATH FROM NODE
                                         714.64 FEET.
*******************
 FLOW PROCESS FROM NODE 110.00 TO NODE 109.00 IS CODE = 41
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
_____
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 26.87 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.24
 GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 9.40
 PIPE TRAVEL TIME (MIN.) = 0.07 Tc (MIN.) =
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 109.00 =
                                          741.51 FEET.
************************
 FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE = 81
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
_____
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.6859
 SUBAREA AREA(ACRES) = 0.49 SUBAREA RUNOFF(CFS) =
                 1.8 TOTAL RUNOFF (CFS) =
 TOTAL AREA (ACRES) =
                                       10.68
 TC(MIN.) =
*************************
 FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE =
______
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE <<<<
 ______
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 4.61
 RAINFALL INTENSITY (INCH/HR) =
 TOTAL STREAM AREA(ACRES) = 1.79
 PEAK FLOW RATE (CFS) AT CONFLUENCE =
*************************
 FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE =
 >>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE <
______
                                                 RUNON FROM
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
                                                 ENTERPRISE
 TC(MIN) = 9.74 RAIN INTENSITY(INCH/HOUR) = 5.66
 TOTAL AREA (ACRES) = 3.23 TOTAL RUNOFF (CFS) = 4.91
                                                AFFORDABLE
                                                 HOUSING
******************
 FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE = 1
 ______
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<
```

```
TIME OF CONCENTRATION (MIN.) = 9.74
 RAINFALL INTENSITY (INCH/HR) = 5.66
 TOTAL STREAM AREA(ACRES) = 3.23
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 4.91
 ** CONFLUENCE DATA **
                  TC INTENSITY
 STREAM RUNOFF
                                      AREA
         (CFS) (MIN.) (INCH/HOUR)
10.68 4.61 8.695
4.91 9.74 5.655
 NUMBER
                                     (ACRE)
                                      1.79
    1
                                        3.23
 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.
 ** PEAK FLOW RATE TABLE **
 STREAM RUNOFF Tc
                         INTENSITY
        (CFS) (MIN.) (INCH/HOUR)
13.00 4.61 8.695
11.85 9.74 5.655
 NUMBER
    1
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 13.00 Tc(MIN.) = 4.61
TOTAL AREA(ACRES) = 5.0
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 109.00 =
                                                 741.51 FEET.
******************
 FLOW PROCESS FROM NODE 109.00 TO NODE 200.00 IS CODE = 41
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
_____
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 62.56 MANNING'S N = 0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.36
 PIPE FLOW VELOCITY = (TOTAL FLOW) / (PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 13.00
 PIPE TRAVEL TIME (MIN.) = 0.14 Tc (MIN.) =
                                       4.75
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 200.00 =
                                                  804.07 FEET.
*******************
 FLOW PROCESS FROM NODE 200.00 TO NODE 200.00 IS CODE = 10
______
 >>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
*****************************
 FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21
______
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<
-----
 *USER SPECIFIED (SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) = 0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =
                                55.00
 UPSTREAM ELEVATION (FEET) = 614.50
 DOWNSTREAM ELEVATION (FEET) = 611.50
ELEVATION DIFFERENCE (FEET) = 3.00
```

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

```
SUBAREA OVERLAND TIME OF FLOW(MIN.) =
  100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 7.675
 SUBAREA RUNOFF (CFS) = 0.12
 TOTAL AREA (ACRES) = 0.05 TOTAL RUNOFF (CFS) = 0.12
****************************
 FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 51
 -----
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <>
______
 CHANNEL LENGTH THRU SUBAREA (FEET) = 197.40
 REPRESENTATIVE CHANNEL SLOPE = 0.0320
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 2.000
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 0.50
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 6.963
 *USER SPECIFIED (SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) = 0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.20
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.33
 AVERAGE FLOW DEPTH(FEET) = 0.17 TRAVEL TIME(MIN.) = 0.99
 Tc(MIN.) = 7.05
 SUBAREA AREA(ACRES) = 0.08
                           SUBAREA RUNOFF (CFS) = 0.17
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
                          PEAK FLOW RATE(CFS) =
 TOTAL AREA (ACRES) = 0.1
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.20 FLOW VELOCITY(FEET/SEC.) = 3.55
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 152.00 = 252.40 FEET.
************************
 FLOW PROCESS FROM NODE 152.00 TO NODE 158.00 IS CODE = 41
______
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <><<
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 21.81 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 2.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 2.43
 GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 0.27
 PIPE TRAVEL TIME (MIN.) = 0.15 Tc (MIN.) = 7.20
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE
                                     158.00 =
                                               274.21 FEET.
******************
 FLOW PROCESS FROM NODE 158.00 TO NODE 158.00 IS CODE = 81
 ______
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
______
  100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 6.870
 *USER SPECIFIED (SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3000
 SUBAREA AREA(ACRES) = 0.03 SUBAREA RUNOFF(CFS) = 0.06
TOTAL AREA(ACRES) = 0.2 TOTAL RUNOFF(CFS) = 0.33
 TC(MIN.) = 7.20
```

```
************************
 FLOW PROCESS FROM NODE 158.00 TO NODE 158.00 IS CODE = 81
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
______
  100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 6.870
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5154
 SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.59
 TOTAL AREA (ACRES) = 0.3 TOTAL RUNOFF (CFS) =
 TC(MIN.) = 7.20
*************************
 FLOW PROCESS FROM NODE 158.00 TO NODE 153.00 IS CODE = 41
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
_____
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 32.47 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.44
 GIVEN PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 0.92
 PIPE TRAVEL TIME (MIN.) = 0.16 Tc (MIN.) =
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 153.00 = 306.68 FEET.
************************
 FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 81
______
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
_____
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 6.775
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .6800
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5271
 SUBAREA AREA(ACRES) = 0.02 SUBAREA RUNOFF(CFS) = 0.09
 TOTAL AREA(ACRES) = 0.3 TOTAL RUNOFF(CFS) =
 TC(MIN.) = 7.36
************************
 FLOW PROCESS FROM NODE 153.00 TO NODE
                               154.00 \text{ IS CODE} = 41
_____
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <><<
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 65.86 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.54
 GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1.00
                                   7.67
 PIPE TRAVEL TIME (MIN.) = 0.31 Tc (MIN.) =
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 154.00 =
                                             372.54 FEET.
*******************
 FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 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.) =
                          7.67
 RAINFALL INTENSITY (INCH/HR) =
 TOTAL STREAM AREA(ACRES) = 0.28
 PEAK FLOW RATE (CFS) AT CONFLUENCE =
*******************
 FLOW PROCESS FROM NODE 156.00 TO NODE 155.00 IS CODE = 21
 ______
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<
______
 *USER SPECIFIED (SUBAREA):
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 INITIAL SUBAREA FLOW-LENGTH (FEET) =
 UPSTREAM ELEVATION (FEET) = 604.50
 DOWNSTREAM ELEVATION (FEET) =
 ELEVATION DIFFERENCE (FEET) = 0.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON TC = 5-MINUTE.
 SUBAREA RUNOFF (CFS) = 0.39
 TOTAL AREA(ACRES) = 0.05 TOTAL RUNOFF(CFS) =
************************
 FLOW PROCESS FROM NODE 155.00 TO NODE 157.00 IS CODE = 51
______
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<
______
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00
 REPRESENTATIVE CHANNEL SLOPE = 0.0100
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 99.000
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 0.50
  100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.23
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 1.59
 AVERAGE FLOW DEPTH(FEET) = 0.12 TRAVEL TIME(MIN.) = 0.75
 Tc(MIN.) = 3.29
 SUBAREA AREA(ACRES) = 0.47
                             SUBAREA RUNOFF (CFS) = 3.68
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.900
 TOTAL AREA (ACRES) = 0.5
                              PEAK FLOW RATE(CFS) =
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.15 FLOW VELOCITY(FEET/SEC.) = 1.83
 LONGEST FLOWPATH FROM NODE 156.00 TO NODE 157.00 =
****************************
                                  157.00 \text{ IS CODE} = 81
 FLOW PROCESS FROM NODE 157.00 TO NODE
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
```

```
100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON TC = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8925
 SUBAREA AREA(ACRES) = 0.31 SUBAREA RUNOFF(CFS) = 2.37
 TOTAL AREA (ACRES) = 0.8 TOTAL RUNOFF (CFS) =
 TC(MIN.) = 3.29
*******************
 FLOW PROCESS FROM NODE 157.00 TO NODE 154.00 IS CODE = 41
______
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <>
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 12.28 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.86
 GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 6.44
 PIPE TRAVEL TIME (MIN.) = 0.03 Tc (MIN.) = 3.33
 LONGEST FLOWPATH FROM NODE 156.00 TO NODE 154.00 =
                                                133.28 FEET.
*************************
 FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 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.) = 3.33
 RAINFALL INTENSITY (INCH/HR) = 8.69
 TOTAL STREAM AREA(ACRES) = 0.83
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 6.44
 ** CONFLUENCE DATA **
 STREAM RUNOFF
                 TC INTENSITY
                                     AREA
        (CFS) (MIN.) (INCH/HOUR)
1.00 7.67 6.597
6.44 3.33 8.695
 NUMBER
                                    (ACRE)
                                      0.28
   1
 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.
 ** PEAK FLOW RATE TABLE **
 STREAM RUNOFF TC INTENSITY
        (CFS) (MIN.) (INCH/HOUR)
6.87 3.33 8.695
5.89 7.67 6.597
 NUMBER
   1
                                    — UD2 QIN
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 6.87 Tc (MIN.) = 3.33
TOTAL AREA (ACRES) = 1.1
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 154.00 =
                                                372.54 FEET.
******************
 FLOW PROCESS FROM NODE 154.00 TO NODE 200.00 IS CODE = 41
```

```
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <><<
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 44.14 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.95
 GIVEN PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 6.87
 PIPE TRAVEL TIME (MIN.) = 0.12 Tc (MIN.) =
                                   3.45
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 200.00 =
                                           416.68 FEET.
*************************
 FLOW PROCESS FROM NODE 200.00 TO NODE 200.00 IS CODE = 11
 >>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<
______
 ** MAIN STREAM CONFLUENCE DATA **
 STREAM RUNOFF TC INTENSITY
                                AREA
 NUMBER
        (CFS)
               (MIN.) (INCH/HOUR)
                                (ACRE)
          6.87
                3.45
                      8.695
                                 1.11
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE
                                  200.00 =
                                           416.68 FEET.
 ** MEMORY BANK # 1 CONFLUENCE DATA **
 STREAM RUNOFF
               TC INTENSITY
                                AREA
                (MIN.) (INCH/HOUR)
 NUMBER
         (CFS)
                                (ACRE)
               4.75
         13.00
                       8.695
                                 5.02
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 200.00 = 804.07 FEET.
 ** PEAK FLOW RATE TABLE **
                      INTENSITY
 STREAM RUNOFF TC
        (CFS)
 NUMBER
                (MIN.) (INCH/HOUR)
        16.32
                3.45
                       8.695
        19.87
                4.75
                          8.695
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 19.87 Tc(MIN.) =
                   6.1
 TOTAL AREA (ACRES) =
______
 END OF STUDY SUMMARY:
                      6.1 \text{ TC}(MIN.) = 4.75
 TOTAL AREA (ACRES) =
 PEAK FLOW RATE (CFS) = 19.87
_____
______
                           ______
 END OF RATIONAL METHOD ANALYSIS
                     Q UNDETAINED
```

Q UNDETAINED POC1

DETAINED HYDROLOGY ROUTING - POC 1

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT 2003,1985,1981 HYDROLOGY MANUAL

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Analysis prepared by:

STEVENS CRESTO ENGINEERING, INC. 9665 CHESAPEAKE DRIVE, SUITE 200 SAN DIEGO, CA 92123

PH: 858.694.5660 FAX: 858.694.5661 ******************** DESCRIPTION OF STUDY ****************** * CUBESMART SELF STORAGE * POSTPROJECT HYDROLOGY POC1 * 100YR DESIGN STORM - DETAINED ***************** FILE NAME: CUBEPOSD.DAT TIME/DATE OF STUDY: 13:40 01/21/2025 USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION: 2003 SAN DIEGO MANUAL CRITERIA USER SPECIFIED STORM EVENT (YEAR) = 100.00 6-HOUR DURATION PRECIPITATION (INCHES) = SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00 SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.85 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 (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) NO. (FT) 30.0 20.0 0.018/0.018/0.020 0.67 2.00 0.0313 0.167 0.0150 GLOBAL STREET FLOW-DEPTH CONSTRAINTS: 1. Relative Flow-Depth = 0.00 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 100.00 TO NODE 101.00 IS CODE = 21 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS< _____ *USER SPECIFIED (SUBAREA): STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .9000 S.C.S. CURVE NUMBER (AMC II) = 0 INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00

UPSTREAM ELEVATION(FEET) = 603.98 DOWNSTREAM ELEVATION(FEET) = 602.90

```
ELEVATION DIFFERENCE (FEET) =
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 1.969
  100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 SUBAREA RUNOFF (CFS) = 0.39
 TOTAL AREA(ACRES) = 0.05 TOTAL RUNOFF(CFS) = 0.39
************************
 FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 61
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<
 >>>> (STANDARD CURB SECTION USED) <<<<
______
 REPRESENTATIVE SLOPE = 0.0280
 STREET LENGTH (FEET) = 65.00 CURB HEIGHT (INCHES) = 6.0
 STREET HALFWIDTH (FEET) = 43.00
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 38.00
 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) = 0.63
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH (FEET) = 0.20
   HALFSTREET FLOOD WIDTH (FEET) = 3.44
   AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.65
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.52
 STREET FLOW TRAVEL TIME (MIN.) = 0.41 Tc (MIN.) =
  100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON TC = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.900
 SUBAREA AREA(ACRES) = 0.06 SUBAREA RUNOFF(CFS) = 0.47 TOTAL AREA(ACRES) = 0.1 PEAK FLOW RATE(CFS) =
 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.21 HALFSTREET FLOOD WIDTH(FEET) = 4.43
 FLOW VELOCITY (FEET/SEC.) = 2.74 DEPTH*VELOCITY (FT*FT/SEC.) = 0.59
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 115.00 FEET.
***********************
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81
______
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
_____
  100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.6882
 SUBAREA AREA(ACRES) = 0.06 SUBAREA RUNOFF(CFS) = 0.16
 TOTAL AREA (ACRES) = 0.2 TOTAL RUNOFF (CFS) = 1.02
```

```
*******************
 FLOW PROCESS FROM NODE 102.00 TO NODE 104.00 IS CODE = 41
------
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
_____
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 101.29 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.56
 GIVEN PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1.02
 PIPE TRAVEL TIME (MIN.) = 0.47 Tc (MIN.) =
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 =
                                            216.29 FEET.
************************
 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
______
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7714
 SUBAREA AREA(ACRES) = 0.11 SUBAREA RUNOFF(CFS) =
                  0.3 TOTAL RUNOFF(CFS) =
 TOTAL AREA (ACRES) =
 TC(MIN.) = 2.85
*************************
 FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 41
-----
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 102.67 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.24
 GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1.88
 PIPE TRAVEL TIME (MIN.) = 0.40 Tc (MIN.) =
                                   3.26
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 =
                                            318.96 FEET.
****************************
 FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81
______
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
_____
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8077
 SUBAREA AREA(ACRES) = 0.11 SUBAREA RUNOFF(CFS) = 0.86
 TOTAL AREA (ACRES) = 0.4 TOTAL RUNOFF (CFS) = 2.74
```

```
*******************
 FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 41
______
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
_____
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 102.67 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.72
 GIVEN PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 2.74
 PIPE TRAVEL TIME (MIN.) = 0.36 Tc (MIN.) =
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 106.00 =
                                            421.63 FEET.
************************
 FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
______
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8280
 SUBAREA AREA(ACRES) = 0.11 SUBAREA RUNOFF(CFS) =
                  0.5 TOTAL RUNOFF(CFS) =
 TOTAL AREA (ACRES) =
 TC(MIN.) = 3.62
*************************
 FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 41
-----
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 102.67 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.08
 GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 3.60
 PIPE TRAVEL TIME (MIN.) = 0.34 Tc (MIN.) =
                                   3.96
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 107.00 =
                                            524.30 FEET.
*****************************
 FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81
______
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
_____
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8410
 SUBAREA AREA(ACRES) = 0.11 SUBAREA RUNOFF(CFS) = 0.86
 TOTAL AREA(ACRES) = 0.6 TOTAL RUNOFF(CFS) =
```

```
*******************
 FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 41
______
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
_____
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 148.49 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.37
 GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 4.46
 PIPE TRAVEL TIME (MIN.) = 0.46 Tc (MIN.) =
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 =
                                            672.79 FEET.
************************
 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
_____
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7783
 SUBAREA AREA(ACRES) = 0.08 SUBAREA RUNOFF(CFS) = 0.21
                  0.7 TOTAL RUNOFF(CFS) =
 TOTAL AREA (ACRES) =
 TC(MIN.) =
*************************
 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81
._____
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
______
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8002
 SUBAREA AREA(ACRES) = 0.19 SUBAREA RUNOFF(CFS) = 1.45
 TOTAL AREA (ACRES) =
                   0.9 TOTAL RUNOFF (CFS) =
 TC(MIN.) = 4.42
*****************************
 FLOW PROCESS FROM NODE 108.00 TO NODE 110.00 IS CODE = 41
______
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <><<
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 41.85 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.80
 GIVEN PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 6.12
 PIPE TRAVEL TIME (MIN.) = 0.12 Tc (MIN.) = 4.54
```

```
100.00 TO NODE
                                     110.00 =
 LONGEST FLOWPATH FROM NODE
                                               714.64 FEET.
*******************
 FLOW PROCESS FROM NODE 110.00 TO NODE
                                  110.00 \text{ 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.) = 4.54
 RAINFALL INTENSITY (INCH/HR) = 8.69
 TOTAL STREAM AREA(ACRES) = 0.88
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 6.12
********************
 FLOW PROCESS FROM NODE 113.00 TO NODE 112.00 IS CODE = 21
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<
______
 *USER SPECIFIED (SUBAREA):
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =
 UPSTREAM ELEVATION (FEET) = 604.50
 DOWNSTREAM ELEVATION (FEET) = 604.00
 ELEVATION DIFFERENCE (FEET) = 0.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 SUBAREA RUNOFF (CFS) = 0.39
 TOTAL AREA (ACRES) =
                   0.05 TOTAL RUNOFF(CFS) =
************************
 FLOW PROCESS FROM NODE 112.00 TO NODE
                                  111.00 \text{ IS CODE} = 51
-----
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<
______
 CHANNEL LENGTH THRU SUBAREA (FEET) = 70.00
 REPRESENTATIVE CHANNEL SLOPE = 0.0100
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 99.000
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 0.50
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 1.41
 AVERAGE FLOW DEPTH(FEET) = 0.10 TRAVEL TIME(MIN.) = 0.83
 Tc(MIN.) = 3.38
 SUBAREA AREA(ACRES) = 0.23
                            SUBAREA RUNOFF (CFS) = 1.80
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.900
 TOTAL AREA (ACRES) = 0.3 PEAK FLOW RATE (CFS) = 2.19
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.12 FLOW VELOCITY(FEET/SEC.) = 1.56
 LONGEST FLOWPATH FROM NODE 113.00 TO NODE 111.00 = 120.00 FEET.
```

```
FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 81
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
_____
  100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON TC = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8900
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8967
 SUBAREA AREA(ACRES) = 0.14 SUBAREA RUNOFF(CFS) = 1.08
 TOTAL AREA(ACRES) = 0.4 TOTAL RUNOFF(CFS) =
 TC(MIN.) = 3.38
*************************
 FLOW PROCESS FROM NODE 111.00 TO NODE 110.00 IS CODE = 41
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 11.25 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.95
 GIVEN PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 3.27
 PIPE TRAVEL TIME (MIN.) = 0.04 Tc (MIN.) =
 LONGEST FLOWPATH FROM NODE 113.00 TO NODE 110.00 = 131.25 FEET.
************************
 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 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.) = 3.41
 RAINFALL INTENSITY (INCH/HR) = 8.69
 TOTAL STREAM AREA(ACRES) = 0.42
 PEAK FLOW RATE (CFS) AT CONFLUENCE =
 ** CONFLUENCE DATA **

        STREAM
        RUNOFF
        Tc
        INTENSITY

        NUMBER
        (CFS)
        (MIN.)
        (INCH/HOUR)

        1
        6.12
        4.54
        8.695

        2
        3.27
        3.41
        8.695

                                         AREA
                                         (ACRE)
                                         0.88
           3.27
                   3.41
                             8.695
                                           0.42
 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)
           7.88
                   3.41 8.695
    1
                   4.54
           9.40
                            8.695
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 9.40 Tc (MIN.) = 4.54
 TOTAL AREA (ACRES) =
                        1.3
```

QIN UD1

```
100.00 TO NODE
                                 110.00 =
 LONGEST FLOWPATH FROM NODE
                                          714.64 FEET.
*******************
 FLOW PROCESS FROM NODE 110.00 TO NODE 110.00 IS CODE =
 ._____
 >>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE <<<<
______
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) = 9.54 RAIN INTENSITY(INCH/HOUR) = 5.73
 TOTAL AREA (ACRES) = 1.30 TOTAL RUNOFF (CFS) = 4.23 ← QOUT UD1
*****************************
 FLOW PROCESS FROM NODE
                  110.00 TO NODE
                               109.00 \text{ IS CODE} = 41
._____
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <><<
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 26.87 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.30
 GIVEN PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 4.23
 PIPE TRAVEL TIME (MIN.) = 0.08 Tc (MIN.) =
                                  9.62
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE
                                 109.00 =
                                           741.51 FEET.
*******************
 FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE = 81
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
______
  100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 5.699
 *USER SPECIFIED (SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.4944
 SUBAREA AREA(ACRES) = 0.49 SUBAREA RUNOFF(CFS) = 0.84
                  1.8 TOTAL RUNOFF (CFS) =
 TOTAL AREA (ACRES) =
 TC(MIN.) = 9.62
******************
 FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE =
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 9.62
 RAINFALL INTENSITY (INCH/HR) = 5.70
 TOTAL STREAM AREA(ACRES) = 1.79
 PEAK FLOW RATE (CFS) AT CONFLUENCE =
******************
                  109.00 TO NODE
 FLOW PROCESS FROM NODE
                               109.00 IS CODE =
 >>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<
______
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
                                              RUNON FROM
 TC(MIN) = 9.74 RAIN INTENSITY(INCH/HOUR) = 5.66
                                       4.91 ENTERPRISE
 TOTAL AREA (ACRES) = 3.23 TOTAL RUNOFF (CFS) =
                                              AFFORDABLE
```

HOUSING

```
*****************************
 FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 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.) = 9.74
 RAINFALL INTENSITY (INCH/HR) = 5.66
 TOTAL STREAM AREA(ACRES) = 3.23
 PEAK FLOW RATE (CFS) AT CONFLUENCE =
 ** CONFLUENCE DATA **
                 Tc INTENSITY
 STREAM RUNOFF
                                    AREA
         (CFS) (MIN.) (INCH/HOUR)
5.04 9.62 5.699
4.91 9.74 5.655
                 (MIN.) (INCH/HOUR)
 NUMBER
                                   (ACRE)
                                    1.79
   1
                                      3.23
 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.
 ** PEAK FLOW RATE TABLE **
 STREAM RUNOFF Tc
                       INTENSITY
        (CFS) (MIN.) (INCH/HOUR)
9.90 9.62 5.699
 NUMBER
          9.90 9.62
9.92 9.74
                         5.655
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 9.92 Tc (MIN.) =
 TOTAL AREA (ACRES) = 5.0
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE
                                     109.00 =
                                               741.51 FEET.
*************************
 FLOW PROCESS FROM NODE 109.00 TO NODE 200.00 IS CODE = 41
 ._____
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 62.56 MANNING'S N = 0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.61
 PIPE FLOW VELOCITY = (TOTAL FLOW) / (PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 9.92
 PIPE TRAVEL TIME (MIN.) = 0.19 Tc (MIN.) =
                                     9.93
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 200.00 =
                                              804.07 FEET.
************************
 FLOW PROCESS FROM NODE 200.00 TO NODE 200.00 IS CODE = 10
 >>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
______
*****************************
 FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21
```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<

```
*USER SPECIFIED (SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) = 0
 INITIAL SUBAREA FLOW-LENGTH (FEET) =
 UPSTREAM ELEVATION (FEET) = 614.50
 DOWNSTREAM ELEVATION (FEET) = 611.50
 ELEVATION DIFFERENCE (FEET) =
                           3.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =
  100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 7.675
 SUBAREA RUNOFF (CFS) = 0.12
 TOTAL AREA (ACRES) = 0.05 TOTAL RUNOFF (CFS) = 0.12
*************************
 FLOW PROCESS FROM NODE
                    >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <
______
 CHANNEL LENGTH THRU SUBAREA (FEET) = 197.40
 REPRESENTATIVE CHANNEL SLOPE = 0.0320
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 2.000
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 0.50
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 6.963
 *USER SPECIFIED (SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) = 0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.20
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.33
 AVERAGE FLOW DEPTH(FEET) = 0.17 TRAVEL TIME(MIN.) = 0.99
 Tc(MIN.) =
           7.05
 SUBAREA AREA (ACRES) = 0.08
                             SUBAREA RUNOFF (CFS) = 0.17
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
 TOTAL AREA (ACRES) = 0.1
                               PEAK FLOW RATE(CFS) =
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.20 FLOW VELOCITY(FEET/SEC.) = 3.55
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 152.00 =
                                                 252.40 FEET.
**************************
 FLOW PROCESS FROM NODE 152.00 TO NODE 158.00 IS CODE = 41
______
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 21.81 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 2.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 2.43
 GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 0.27
 PIPE TRAVEL TIME (MIN.) = 0.15 Tc (MIN.) =
                                       7.20
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 158.00 = 274.21 FEET.
**************************
 FLOW PROCESS FROM NODE 158.00 TO NODE 158.00 IS CODE = 81
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
```

100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 6.870

```
*USER SPECIFIED (SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3000
 SUBAREA AREA(ACRES) = 0.03 SUBAREA RUNOFF(CFS) = 0.06
 TOTAL AREA (ACRES) =
                 0.2 TOTAL RUNOFF (CFS) =
 TC(MIN.) = 7.20
*******************
 FLOW PROCESS FROM NODE 158.00 TO NODE 158.00 IS CODE = 81
______
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
______
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 6.870
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5154
 SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.59
 TOTAL AREA (ACRES) = 0.3 TOTAL RUNOFF (CFS) = 0.92
 TC(MIN.) = 7.20
******************
 FLOW PROCESS FROM NODE 158.00 TO NODE 153.00 IS CODE = 41
______
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <><<
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 32.47 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.44
 GIVEN PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 0.92
 PIPE TRAVEL TIME (MIN.) = 0.16 Tc (MIN.) =
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 153.00 =
                                           306.68 FEET.
************************
 FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 81
______
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
_____
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 6.775
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .6800
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5271
 SUBAREA AREA(ACRES) = 0.02 SUBAREA RUNOFF(CFS) = 0.09
 TOTAL AREA(ACRES) = 0.3 TOTAL RUNOFF(CFS) = 1.00
 TC(MIN.) = 7.36
*******************
 FLOW PROCESS FROM NODE 153.00 TO NODE 154.00 IS CODE = 41
_____
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <>
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 65.86 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.9 INCHES
```

```
PIPE-FLOW VELOCITY (FEET/SEC.) = 3.54
 GIVEN PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1.00
 PIPE TRAVEL TIME (MIN.) = 0.31 Tc (MIN.) =
                                     7.67
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 154.00 = 372.54 FEET.
******************
 FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 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.) = 7.67
 RAINFALL INTENSITY (INCH/HR) = 6.60
 TOTAL STREAM AREA(ACRES) = 0.28
 PEAK FLOW RATE (CFS) AT CONFLUENCE =
******************
 FLOW PROCESS FROM NODE 156.00 TO NODE
                                 155.00 \text{ IS CODE} = 21
______
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<
______
 *USER SPECIFIED (SUBAREA):
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =
 UPSTREAM ELEVATION (FEET) = 604.50
 DOWNSTREAM ELEVATION (FEET) = 604.00
ELEVATION DIFFERENCE (FEET) = 0.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON TC = 5-MINUTE.
 SUBAREA RUNOFF (CFS) = 0.39
 TOTAL AREA (ACRES) = 0.05 TOTAL RUNOFF (CFS) =
*************************
 FLOW PROCESS FROM NODE
                    155.00 TO NODE 157.00 IS CODE = 51
______
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<
______
 CHANNEL LENGTH THRU SUBAREA (FEET) =
 REPRESENTATIVE CHANNEL SLOPE = 0.0100
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 99.000
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 0.50
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON TC = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) = 0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.23
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 1.59
 AVERAGE FLOW DEPTH(FEET) = 0.12 TRAVEL TIME(MIN.) = 0.75
 Tc(MIN.) =
           3.29
 SUBAREA AREA (ACRES) = 0.47
                            SUBAREA RUNOFF (CFS) = 3.68
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.900
 TOTAL AREA(ACRES) = 0.5 PEAK FLOW RATE(CFS) = 4.07
```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

```
DEPTH(FEET) = 0.15 FLOW VELOCITY(FEET/SEC.) = 1.83
 LONGEST FLOWPATH FROM NODE 156.00 TO NODE 157.00 = 121.00 FEET.
**********************
 FLOW PROCESS FROM NODE 157.00 TO NODE 157.00 IS CODE = 81
-----
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<
_____
  100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695
 NOTE: RAINFALL INTENSITY IS BASED ON To = 5-MINUTE.
 *USER SPECIFIED (SUBAREA):
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) = 0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8925
 SUBAREA AREA(ACRES) = 0.31 SUBAREA RUNOFF(CFS) = 2.37
                   0.8 TOTAL RUNOFF (CFS) =
 TOTAL AREA (ACRES) =
                                             6.44
 TC(MIN.) = 3.29
********************
 FLOW PROCESS FROM NODE 157.00 TO NODE 154.00 IS CODE = 41
._____
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 12.28 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.86
 GIVEN PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 6.44
 PIPE TRAVEL TIME (MIN.) = 0.03 Tc (MIN.) =
                                     3.33
 LONGEST FLOWPATH FROM NODE 156.00 TO NODE 154.00 =
                                              133.28 FEET.
*************************
 FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 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.) = 3.33
 RAINFALL INTENSITY (INCH/HR) = 8.69
 TOTAL STREAM AREA(ACRES) = 0.83
 PEAK FLOW RATE (CFS) AT CONFLUENCE =
 ** CONFLUENCE DATA **
 STREAM RUNOFF
                 Tc
                        INTENSITY
                                    AREA
       (CFS) (MIN.) (INCH/HOUR)
1.00 7.67 6.597
6.44 3.33 8.695
                                   (ACRE)
 NUMBER
   1
                                    0.28
                                     0.83
 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.
 ** PEAK FLOW RATE TABLE **
 STREAM RUNOFF Tc
                       INTENSITY
       (CFS) (MIN.) (INCH/HOUR)
6.87 3.33 8.695
5.89 7.67 6.597
 NUMBER
   1
```

```
COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 6.87 Tc (MIN.) = 3.33
TOTAL AREA (ACRES) = 1.1 QIN UD2
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE
                                   154.00 = 372.54 \text{ FEET.}
********************
 FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 7
______
 >>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE <<< <
______
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) = 18.33 RAIN INTENSITY(INCH/HOUR) = 3.76
 TOTAL AREA(ACRES) = 1.11 TOTAL RUNOFF(CFS) =
************************
 FLOW PROCESS FROM NODE 154.00 TO NODE 200.00 IS CODE = 41
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <>>>
______
 REPRESENTATIVE SLOPE = 0.0100
 FLOW LENGTH (FEET) = 44.14 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 3.07
 GIVEN PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 0.61
 PIPE TRAVEL TIME (MIN.) = 0.24 Tc (MIN.) = 18.57
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE
                                   200.00 =
************************
 FLOW PROCESS FROM NODE 200.00 TO NODE 200.00 IS CODE = 11
 ______
 >>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<
______
 ** MAIN STREAM CONFLUENCE DATA **
 STREAM RUNOFF TC INTENSITY AREA
        (CFS)
               (MIN.) (INCH/HOUR) (ACRE)
18.57 3.730 1.11
 NUMBER
         0.61 18.57
                                1.11
  1
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 200.00 = 416.68 FEET.
 ** MEMORY BANK # 1 CONFLUENCE DATA **
 STREAM RUNOFF TC INTENSITY AREA
       (CFS) (MIN.) (INCH/HOUR) (ACRE)
9.92 9.93 5.587 5.02
 NUMBER
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 200.00 = 804.07 FEET.
 ** PEAK FLOW RATE TABLE **
 STREAM RUNOFF Tc
                     INTENSITY
       (CFS) (MIN.) (INCH/HOUR)
 NUMBER
        10.24 9.93
7.23 18.57
   1
                         5.587
                          3.730
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 10.24 Tc (MIN.) =
                                   9.93
 TOTAL AREA (ACRES) = 6.1
_____
 END OF STUDY SUMMARY:
 TOTAL AREA (ACRES) = 6.1 TC (MIN.) = 9.93
```

PEAK FLOW RATE(CFS) = 1	0.24)
	- /
END OF RATIONAL METHOD ANALYSI	1
	Q DETAINED
	POC1

SECTION 5

PRELIMINARY DETENTION ROUTING

Description

This section provides detention calculations to ensure the post-project flow rate is not exceeded by the proposed development.

Calculations

1. GENERATE RATIONAL METHOD PEAK FLOW

See routing calculations in Section 4.

2. GENERATE INFLOW HYDROGRAPH UTILIZING "RATHYDRO":

The "Rational Method Hydrograph Program" by Rick Engineering Company, supplied by the County of San Diego, has been utilized to determine the developed "inflow" hydrograph, utilizing parameters at the outfall points for each of the regional detention facility. The parameters for the inflow hydrograph are the Rational Method weighted runoff coefficient, time of concentration, peak flow, six-hour precipitation and tributary basin area.

3. ROUTE INFLOW HYDROGRAPHS THROUGH DETENTION FACILITIES:

The software utilized to route the inflow hydrograph through the detention facility is Hydraflow Hydrographs Extension for Autodesk Civil 3D 2023. The facility is modeled in the software using contour areas and outlet structure parameters, which have been iteratively adjusted to satisfy the mitigation criteria. The software generates an outflow hydrograph for the facility and a graphic output that depicts the hydraulic operation of the outlet structure; Hydrograph Reports and Pond Reports for the facility follow in this section.

Detention Conclusion

As shown in the routing calculations within Section 4 and summarized in the following table within this section, the proposed detention facility will adequately mitigate for the increase in runoff from a 100-year design storm so that runoff generated by the project does not exceed the pre-project peak flow rate. See the following Table 5 for the detention summary.

TABLE 5: DETENTION SUMMARY

	Detention Summary								
OUTEALL	Area	Tc _{in}	Qin	Tc _{out}	Qout	WSE			
OUTFALL	(acres)	(min)	(cfs)	(min)	(cfs)	(ft)			
UD-1	1.3	4.5	9.4	9.5	4.2	5.6			
UD-2	1.1	3.3	6.9	18.3	0.6	3.7			

UD1 INFLOW

RATIONAL METHOD HYDROGRAPH PROGRAM COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 1/16/2025 HYDROGRAPH FILE NAME Text1 TIME OF CONCENTRATION 5 MIN. 6 HOUR RAINFALL 3.3 INCHES BASIN AREA 1.3 ACRES RUNOFF COEFFICIENT 0.84 PEAK DISCHARGE 9.4 CFS

DISCHARGE (CFS) = 0 DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 TIME (MIN) = 0 TIME (MIN) = 5 TIME (MIN) = 10 TIME (MIN) = 15DISCHARGE (CFS) = 0.2
DISCHARGE (CFS) = 0.2 TIME (MIN) = 20TIME (MIN) = 25TIME (MIN) = 30TIME (MIN) = 35 TIME (MIN) = 40 TIME (MIN) = 45 TIME (MIN) = 50 TIME (MIN) = 55 TIME (MIN) = 60 DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.3 DISCHARGE (CFS) = 0.3 TIME (MIN) = 65DISCHARGE (CFS) = 0.3
DISCHARGE (CFS) = 0.3 TIME (MIN) = 70TIME (MIN) = 75 TIME (MIN) = 80 TIME (MIN) = 85 TIME(MIN) = 90TIME (MIN) = 95TIME (MIN) = 100 TIME (MIN) = 105 TIME (MIN) = 110 TIME (MIN) = 115TIME (MIN) = 120DISCHARGE (CFS) = 0.3 DISCHARGE (CFS) = 0.3
DISCHARGE (CFS) = 0.3
DISCHARGE (CFS) = 0.4
DISCHARGE (CFS) = 0.4
DISCHARGE (CFS) = 0.4 TIME (MIN) = 125 TIME (MIN) = 130 TIME (MIN) = 135 TIME (MIN) = 140 TIME (MIN) = 145 TIME (MIN) = 150 TIME (MIN) = 155 DISCHARGE (CFS) = 0.4
DISCHARGE (CFS) = 0.4
DISCHARGE (CFS) = 0.4
DISCHARGE (CFS) = 0.4 TIME (MIN) = 160 TIME (MIN) = 165TIME (MIN) = 170DISCHARGE (CFS) = 0.5 DISCHARGE (CFS) = 0.5
DISCHARGE (CFS) = 0.5
DISCHARGE (CFS) = 0.5
DISCHARGE (CFS) = 0.5
DISCHARGE (CFS) = 0.6
DISCHARGE (CFS) = 0.6
DISCHARGE (CFS) = 0.6
DISCHARGE (CFS) = 0.7
DISCHARGE (CFS) = 0.7
DISCHARGE (CFS) = 0.7
DISCHARGE (CFS) = 0.8
DISCHARGE (CFS) = 0.9
DISCHARGE (CFS) = 0.9 TIME (MIN) = 175TIME (MIN) = 180TIME (MIN) = 185 TIME (MIN) = 190TIME (MIN) = 195TIME (MIN) = 200 TIME (MIN) = 205 TIME (MIN) = 210 TIME (MIN) = 215 TIME (MIN) = 220 TIME (MIN) = 225 TIME (MIN) = 230 DISCHARGE (CFS) = 0.9 DISCHARGE (CFS) = 1.1 DISCHARGE (CFS) = 1.3 DISCHARGE (CFS) = 1.9 DISCHARGE (CFS) = 2.7 TIME (MIN) = 235 TIME (MIN) = 240 DISCHARGE (CFS) = 2.7
DISCHARGE (CFS) = 9.4
DISCHARGE (CFS) = 1.5
DISCHARGE (CFS) = 1
DISCHARGE (CFS) = 0.8
DISCHARGE (CFS) = 0.7 TIME (MIN) = 245 TIME (MIN) = 250 TIME (MIN) = 255 TIME (MIN) = 260 TIME (MIN) = 265TIME (MIN) = 270DISCHARGE (CFS) = 0.6 TIME (MIN) = 275 TIME (MIN) = 280 TIME (MIN) = 285 DISCHARGE (CFS) = 0.5 DISCHARGE (CFS) = 0.5 DISCHARGE (CFS) = 0.4 DISCHARGE (CFS) = 0.4 TIME (MIN) = 290DISCHARGE (CFS) = 0.4
DISCHARGE (CFS) = 0.3
DISCHARGE (CFS) = 0.3 TIME (MIN) = 295 TIME (MIN) = 300 TIME (MIN) = 305 TIME (MIN) = 310 TIME (MIN) = 315 TIME (MIN) = 320DISCHARGE (CFS) = 0.3 DISCHARGE (CFS) = 0.3 DISCHARGE (CFS) = 0.3 DISCHARGE (CFS) = 0.2 TIME (MIN) = 325 TIME (MIN) = 330 TIME (MIN) = 335 TIME (MIN) = 340TIME (MIN) = 345DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 TIME (MIN) = 350TIME (MIN) = 355TIME (MIN) = 360 TIME (MIN) = 365DISCHARGE (CFS) = 0

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

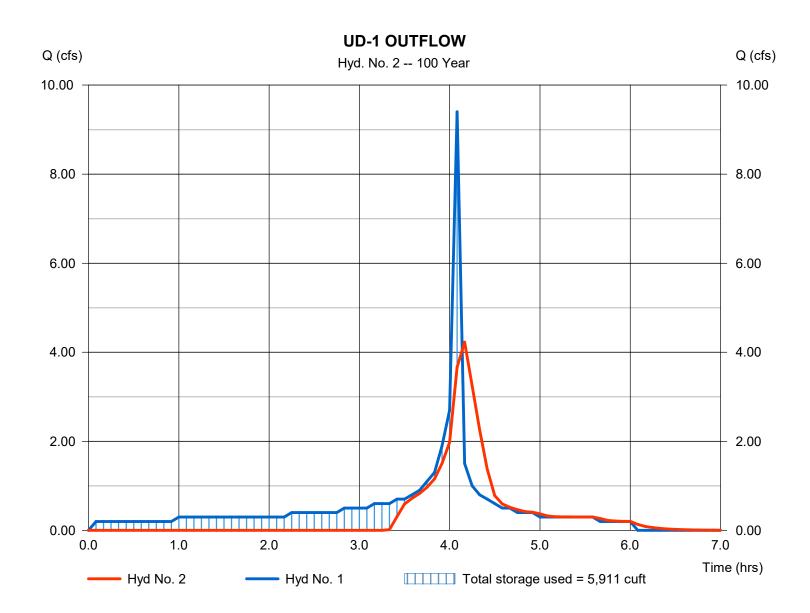
Thursday, 01 / 16 / 2025

Hyd. No. 2

UD-1 OUTFLOW

Hydrograph type = Reservoir Peak discharge = 4.226 cfsStorm frequency = 100 yrsTime to peak $= 4.17 \, hrs$ Time interval = 5 min Hyd. volume = 9,015 cuftInflow hyd. No. Max. Elevation = 1 - UD-1 INFLOW = 596.13 ftReservoir name = UD-1 Max. Storage = 5,911 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Wednesday, 01 / 22 / 2025

Pond No. 1 - **UD-1**

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 590.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	590.50	1,050	0	0
1.00	591.50	1,050	1,050	1,050
2.00	592.50	1,050	1,050	2,100
3.00	593.50	1,050	1,050	3,150
4.00	594.50	1,050	1,050	4,200
5.00	595.50	1,050	1,050	5,249
6.00	596.50	1,050	1,050	6,299
7.00	597.50	1,050	1,050	7,349
8.00	598.50	1,050	1,050	8,399

Culvert / Orifice Structures

Weir Structures

	[A]	[B]	[C]	[PrfRsr]		[A]	[B]	[C]	[D]
Rise (in)	= 1.13	4.00	Inactive	Inactive	Crest Len (ft)	= 2.50	Inactive	Inactive	Inactive
Span (in)	= 1.13	24.00	0.00	0.00	Crest El. (ft)	= 597.00	0.00	0.00	0.00
No. Barrels	= 1	1	1	0	Weir Coeff.	= 3.33	3.33	3.33	3.33
Invert El. (ft)	= 590.50	594.23	0.00	0.00	Weir Type	= Rect			
Length (ft)	= 0.00	0.00	0.00	0.00	Multi-Stage	= Yes	No	No	No
Slope (%)	= 0.00	0.00	0.00	n/a					
N-Value	= .013	.013	.013	n/a					
Orifice Coeff.	= 0.60	0.60	0.60	0.60	Exfil.(in/hr)	= 0.000 (by	Wet area)		
Multi-Stage	= n/a	No	No	No	TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	CIv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	590.50	0.00	0.00			0.00						0.000
1.00	1,050	591.50	0.00	0.00			0.00						0.000
2.00	2,100	592.50	0.00	0.00			0.00						0.000
3.00	3,150	593.50	0.00	0.00			0.00						0.000
4.00	4,200	594.50	0.00	0.96 ic			0.00						0.955
5.00	5,249	595.50	0.00	3.37 ic			0.00						3.372
6.00	6,299	596.50	0.00	4.66 ic			0.00						4.655
7.00	7,349	597.50	0.09 ic	5.65 ic			0.07 s						5.727
8.00	8,399	598.50	0.09 ic	6.50 ic			0.00						6.596

Vault Drawdown Calculation - UD1

Project Name

Cubesmart Self Storage

Project Number

13003.85

Vault Drawdown

49.37 hrs

Total Vault Volume (cf)	8400
Total Chamber Height (ft)	8

Note: Drawdown time is calculated assuming initial water surface depth equal to the invert of the lowest surface discharge opening in the basin outlet structure.

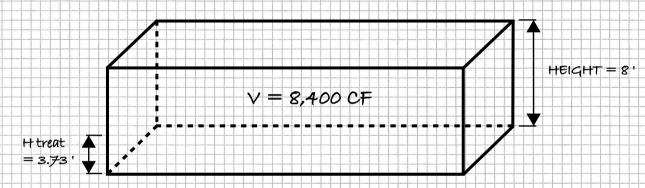
Orifice Diameter:		1.13	Qorifice=CoAo*[(2gHo)^0.5				
C:		0.6					
Surface Depth (ft)	Area (sq. ft)	Volume (cf)	Qorifice (cfs)	T (hrs)	Total Time (hrs)		
3.73	1050	3916.5	0.06	0.00	0.00		
3.5	1050	3675	0.06	1.08	1.08		
3.25	1050	3413	0.06	1.22	2.30		
3	1050	3150	0.06 1.27		3.56		
2.5	1050	2625	0.05	2.77	6.34		
2	1050	2100	0.05	3.10	9.44		
1.5	1050	1575	0.04	3.58	13.02		
1	1050	1050	0.03	4.39	17.41		
0.75	1050	788	0.03	2.53	19.94		
0.5	1050	525	0.02	3.10	23.05		
0.25	1050	263	0.02	4.39	27.43		
0.0	1050	0	0.00	21.94	49.37		



Sheet 1	of	1
Project No	13003.85	
Project		
By KGS	Chk	
Date 01/20	/2025	

UD-1 VOLUME SIZING CALC

- · MODULE SIZE (INTERNAL DIM): 8 'HX7'WX15'L
- · NUMBER OF MODULES: 10
- TOTAL VOLUME (V) = 10 (8 ' x 7 ' x 15 ') = 8,400 CF



· VOLUME PER 1 FT:

V1FT = 1,050 CF

- TREATMENT VOLUME: DCV * 1.5 = 2,605 CF * 1.5 = 3907.5 CF
- · HEIGHT OF TREATMENT VOLUME:

Htreat = 3.73'

UD2 INFLOW

RATIONAL METHOD HYDROGRAPH PROGRAM COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 1/21/2025
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 3.3 INCHES
BASIN AREA 1.11 ACRES
RUNOFF COEFFICIENT 0.8
PEAK DISCHARGE 6.87 CFS

DISCHARGE (CFS) = 0 DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 TIME (MIN) = 0 TIME (MIN) = 5 TIME(MIN) = 10TIME (MIN) = 15DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2
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DISCHARGE (CFS) = 0.2 TIME (MIN) = 20 TIME (MIN) = 25 TIME (MIN) = 30TIME (MIN) = 35TIME (MIN) = 40DISCHARGE (CFS) = 0.2
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DISCHARGE (CFS) = 0.2
DISCHARGE (CFS) = 0.2 TIME (MIN) = 45 TIME (MIN) = 50 TIME (MIN) = 55 TIME(MIN) = 60TIME (MIN) = 65DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 TIME (MIN) = 70TIME (MIN) = 75TIME (MIN) = 80 TIME (MIN) = 85DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 TIME (MIN) = 90TIME (MIN) = 95 TIME (MIN) = 100 TIME (MIN) = 105 TIME (MIN) = 110 TIME (MIN) = 115 TIME (MIN) = 120 TIME (MIN) = 125 TIME (MIN) = 130 DISCHARGE (CFS) = 0.3 DISCHARGE (CFS) = 0.3
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DISCHARGE (CFS) = 0.3 TIME (MIN) = 140 TIME (MIN) = 145 TIME (MIN) = 150 TIME (MIN) = 155 TIME (MIN) = 160TIME (MIN) = 165DISCHARGE (CFS) = 0.4 TIME (MIN) = 170 TIME (MIN) = 175 TIME (MIN) = 180 DISCHARGE (CFS) = 0.4 DISCHARGE (CFS) = 0.4 DISCHARGE (CFS) = 0.4 DISCHARGE (CFS) = 0.4 TIME (MIN) = 185DISCHARGE (CFS) = 0.4
DISCHARGE (CFS) = 0.5
DISCHARGE (CFS) = 0.5
DISCHARGE (CFS) = 0.6
DISCHARGE (CFS) = 0.6
DISCHARGE (CFS) = 0.6
DISCHARGE (CFS) = 0.7 TIME (MIN) = 190 TIME (MIN) = 195 TIME (MIN) = 200 TIME (MIN) = 205 TIME (MIN) = 210 TIME (MIN) = 215 TIME (MIN) = 225 TIME (MIN) = 225 TIME (MIN) = 230 DISCHARGE (CFS) = 0.7 DISCHARGE (CFS) = 0.9 DISCHARGE (CFS) = 1 DISCHARGE (CFS) = 1.5 TIME (MIN) = 235DISCHARGE (CFS) = 1.5
DISCHARGE (CFS) = 6.87
DISCHARGE (CFS) = 6.87
DISCHARGE (CFS) = 1.2
DISCHARGE (CFS) = 0.8
DISCHARGE (CFS) = 0.6
DISCHARGE (CFS) = 0.5
DISCHARGE (CFS) = 0.5
DISCHARGE (CFS) = 0.4
DISCHARGE (CFS) = 0.4
DISCHARGE (CFS) = 0.3
DISCHARGE (CFS) = 0.3 TIME (MIN) = 240TIME (MIN) = 245TIME (MIN) = 250TIME (MIN) = 255 TIME (MIN) = 260TIME (MIN) = 265TIME (MIN) = 270 TIME (MIN) = 275 TIME (MIN) = 280 TIME (MIN) = 285 TIME (MIN) = 290DISCHARGE (CFS) = 0.3 DISCHARGE (CFS) = 0.3
DISCHARGE (CFS) = 0.3
DISCHARGE (CFS) = 0.3
DISCHARGE (CFS) = 0.3 TIME (MIN) = 295 TIME (MIN) = 300 TIME (MIN) = 305 TIME (MIN) = 310 DISCHARGE (CFS) = 0.2 TIME (MIN) = 315 TIME (MIN) = 320 TIME (MIN) = 325 TIME (MIN) = 330 TIME (MIN) = 335TIME (MIN) = 340DISCHARGE (CFS) = 0.2 TIME (MIN) = 345TIME (MIN) = 350DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 DISCHARGE (CFS) = 0.2 TIME (MIN) = 355 TIME (MIN) = 360 TIME (MIN) = 365 DISCHARGE (CFS) = 0

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

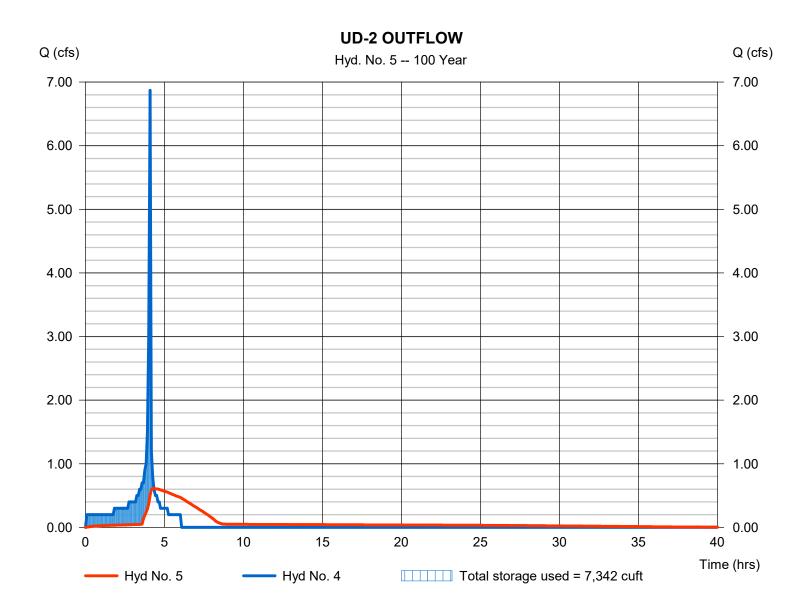
Wednesday, 01 / 22 / 2025

Hyd. No. 5

UD-2 OUTFLOW

Hydrograph type Peak discharge = 0.609 cfs= Reservoir Storm frequency = 100 yrsTime to peak $= 4.33 \, hrs$ Time interval = 5 min Hyd. volume = 10,476 cuftInflow hyd. No. = 4 - UD-2 INFLOW Max. Elevation $= 593.71 \, \text{ft}$ Reservoir name = UD-2 Max. Storage = 7,342 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Wednesday, 01 / 22 / 2025

Pond No. 5 - UD-2

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	590.00	n/a	0	0
0.75	590.75	n/a	841	841
1.00	591.00	n/a	606	1,447
1.25	591.25	n/a	600	2,047
1.50	591.50	n/a	593	2,640
1.75	591.75	n/a	586	3,226
2.00	592.00	n/a	576	3,802
2.25	592.25	n/a	565	4,367
2.50	592.50	n/a	553	4,920
2.75	592.75	n/a	539	5,459
3.00	593.00	n/a	522	5,981
3.25	593.25	n/a	503	6,484
3.50	593.50	n/a	479	6,963
3.75	593.75	n/a	450	7,413
4.00	594.00	n/a	411	7,824
4.25	594.25	n/a	347	8,171
4.50	594.50	n/a	297	8,468
4.75	594.75	n/a	281	8,749
5.00	595.00	n/a	280	9,029
5.25	595.25	n/a	281	9,310
5.50	595.50	n/a	280	9,590

Culvert / Orifice Structures

Weir Structures

	[A]	[B]	[C]	[PrfRsr]		[A]	[B]	[C]	[D]
Rise (in)	= 1.10	1.00	Inactive	Inactive	Crest Len (ft)	= 2.50	0.00	0.00	0.00
Span (in)	= 1.00	11.75	0.00	0.00	Crest El. (ft)	= 595.25	0.00	0.00	0.00
No. Barrels	= 1	1	1	0	Weir Coeff.	= 3.33	3.33	3.33	3.33
Invert El. (ft)	= 590.00	591.79	0.00	0.00	Weir Type	= Rect			
Length (ft)	= 0.00	0.00	0.00	0.00	Multi-Stage	= No	No	No	No
Slope (%)	= 0.00	0.00	0.00	n/a					
N-Value	= .013	.013	.013	n/a					
Orifice Coeff.	= 0.60	0.60	0.60	0.60	Exfil.(in/hr)	= 0.000 (by	Wet area)		
Multi-Stage	= n/a	No	No	No	TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	CIv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	590.00	0.00	0.00			0.00						0.000
0.75	841	590.75	0.03 ic	0.00			0.00						0.031
1.00	1,447	591.00	0.04 ic	0.00			0.00						0.036
1.25	2,047	591.25	0.04 ic	0.00			0.00						0.040
1.50	2,640	591.50	0.04 ic	0.00			0.00						0.044
1.75	3,226	591.75	0.05 ic	0.00			0.00						0.048
2.00	3,802	592.00	0.05 ic	0.16 ic			0.00						0.213
2.25	4,367	592.25	0.05 ic	0.25 ic			0.00						0.309
2.50	4,920	592.50	0.06 ic	0.32 ic			0.00						0.379
2.75	5,459	592.75	0.06 ic	0.38 ic			0.00						0.437
3.00	5,981	593.00	0.06 ic	0.42 ic			0.00						0.488
3.25	6,484	593.25	0.07 ic	0.47 ic			0.00						0.534
3.50	6,963	593.50	0.07 ic	0.51 ic			0.00						0.576
3.75	7,413	593.75	0.07 ic	0.54 ic			0.00						0.615
4.00	7,824	594.00	0.07 ic	0.58 ic			0.00						0.652
4.25	8,171	594.25	0.08 ic	0.61 ic			0.00						0.686
4.50	8,468	594.50	0.08 ic	0.64 ic			0.00						0.719
4.75	8,749	594.75	0.08 ic	0.67 ic			0.00						0.751
5.00	9,029	595.00	0.08 ic	0.70 ic			0.00						0.781
5.25	9,310	595.25	0.08 ic	0.73 ic			0.00						0.810
5.50	9,590	595.50	0.09 ic	0.75 ic			1.04						1.879

Vault Drawdown Calculation - UD2

Project Name

Cubesmart Self Storage

Project Number

13003.85

Vault Drawdown

49.25 hrs

Total Vault Volume (cf)	9591
Total Chamber Height (ft)	5.5

Note: Drawdown time is calculated assuming initial water surface depth equal to the invert of the lowest surface discharge opening in the basin outlet structure.

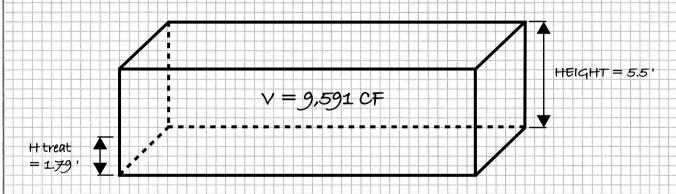
			1	_	
Orifice Diameter:		1.10	Qorifice=CoAo*[(2gHo)^0.5]		
C:		0.6			
Surface Depth (ft)	Area (sq. ft)	Volume (cf)	Qorifice (cfs)	T (hrs)	Total Time (hrs)
1.79	1743.8	3121.4	0.04	0.00	0.00
1.75	1743.8	3051.7	0.04	0.46	0.46
1.5	1743.8	2615.7	0.04	3.11	3.57
1.25	1743.8	2179.8	0.04	3.41	6.98
1	1743.8	1743.8	0.03	3.81	10.79
0.75	1743.8	1307.9	0.03	4.40	15.19
0.5	1743.8	871.9	0.02	5.39	20.58
0.4	1743.8	697.5	0.02	2.41	22.99
0.3	1743.8	523.1	0.02	2.78	25.78
0.2	1743.8	348.8	0.01	3.41	29.18
0.1	1743.8	174.4	0.01	4.82	34.00
0.0	1743.8	0.0	0.00	15.24	49.25



Sheet 1	of	1
Project No1	3003.85	
Project		
By KGS	Chk	
Date 01/20/		

UD-2 VOLUME SIZING CALC

- · MODULE SIZE (INTERNAL DIM): 5.5 'HX 13.67 'WX 127.54 'L
- · TOTAL VOLUME: 9,591 CF



· VOLUME PER 1 FT:

$$9,591 \text{ CF} = 5.5 \text{ FT}$$
 $V1FT = 1 \text{ FT}$
 $V1FT = 1,743.8 \text{ CF}$

- TREATMENT VOLUME: DCV * 1.5 = 2,074 CF * 1.5 = 3,111 CF
- · HEIGHT OF TREATMENT VOLUME:

H treat = 1.79

CUBESMART SELF STORAGE 13003.85 -

Project:

UD2

StormTec

Chamber Model -Units -Number of Chambers -Number of End Caps -Voids in the stone (porosity) -Base of Stone Elevation -Amount of Stone Above Chambers -Amount of Stone Below Chambers -Amount of Stone Between Chambers -Area of system -

MC-3500	
Imperial	Click Here for Metric
51	
6	
40	%
0.00	ft Inclu
12	in Incit
9	in
6	in
2806	sf Min. Area - 2

A division of

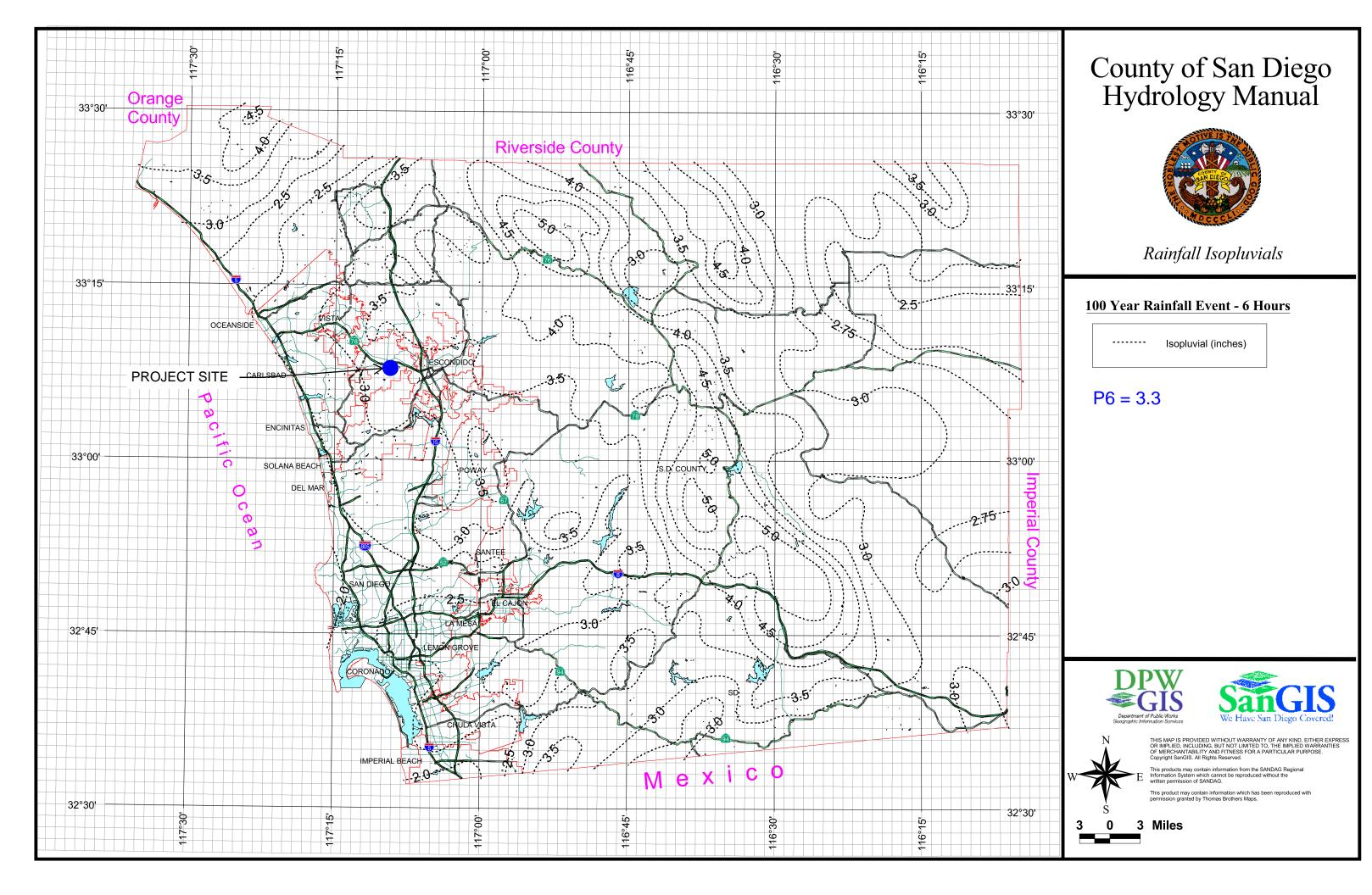
✓ Include Perimeter Stone in Calculations

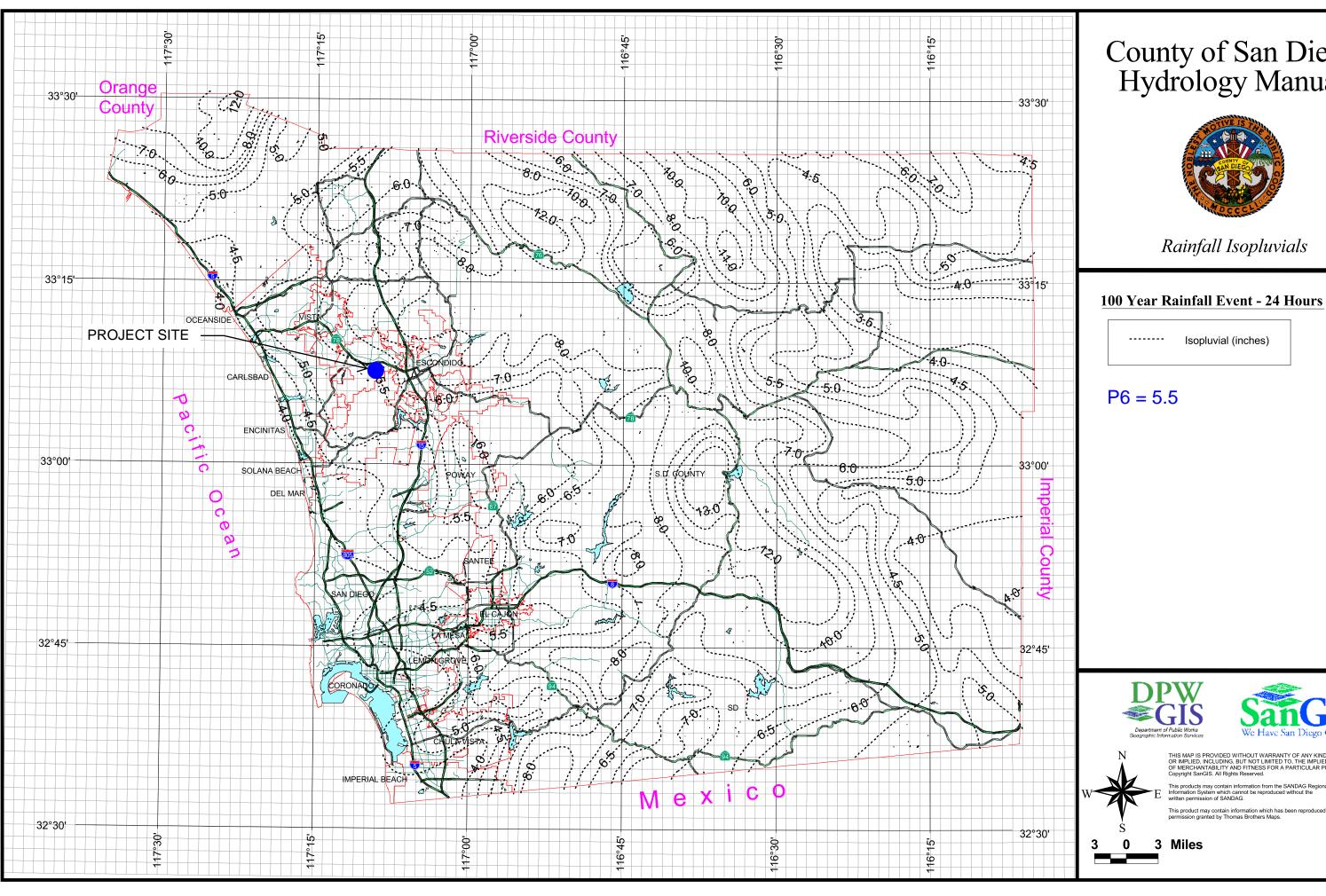
sf Min. Area - 2626 sf min.	area
-----------------------------	------

Height of	Incremental Single	Incremental	Incremental	Incremental	Incremental	Incremental Ch,	Cumulative	
System	Chamber	Single End Cap	Chambers	End Cap	Stone	EC and Stone	System	Elevation
(inches)	(cubic feet)	(cubic feet)	(cubic feet)	(cubic feet)	(cubic feet)	(cubic feet)	(cubic feet)	(feet)
66 65	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	93.53 93.53	93.53 93.53	9590.96 9497.44	5.50 5.42
64	0.00	0.00	0.00	0.00	93.53	93.53	9403.91	5.33
63	0.00	0.00	0.00	0.00	93.53	93.53	9310.38	5.25
62	0.00	0.00	0.00	0.00	93.53	93.53	9216.86	5.17
61	0.00	0.00	0.00	0.00	93.53	93.53	9123.33	5.08
60 59	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	93.53 93.53	93.53 93.53	9029.81 8936.28	5.00 4.92
58	0.00	0.00	0.00	0.00	93.53	93.53	8842.75	4.83
57	0.00	0.00	0.00	0.00	93.53	93.53	8749.23	4.75
56	0.00	0.00	0.00	0.00	93.53	93.53	8655.70	4.67
55	0.00	0.00	0.00	0.00	93.53	93.53	8562.17	4.58
54 53	0.06 0.19	0.00 0.02	2.96 9.90	0.00 0.14	92.34 89.51	95.30 99.55	8468.65	4.50 4.42
53 52	0.19	0.02	14.99	0.14	87.44	102.66	8373.34 8273.79	4.42
51	0.40	0.05	20.59	0.31	85.17	106.06	8171.13	4.25
50	0.69	0.07	35.05	0.41	79.35	114.80	8065.07	4.17
49	1.03	0.09	52.44	0.53	72.34	125.31	7950.27	4.08
48	1.25	0.11	63.73	0.64	67.78	132.15	7824.96	4.00
47 46	1.42 1.57	0.13 0.14	72.53 80.23	0.76 0.87	64.21 61.09	137.50 142.18	7692.82 7555.32	3.92 3.83
45	1.71	0.14	87.06	0.98	58.31	146.35	7413.13	3.75
44	1.83	0.18	93.25	1.09	55.79	150.13	7266.78	3.67
43	1.94	0.20	98.83	1.20	53.51	153.54	7116.65	3.58
42	2.04	0.22	104.08	1.31	51.37	156.76	6963.10	3.50
41	2.13	0.23	108.87 113.44	1.41	49.41	159.69	6806.34	3.42
40 39	2.22 2.31	0.25 0.27	117.65	1.50 1.59	47.55 45.83	162.49 165.07	6646.65 6484.16	3.33 3.25
38	2.38	0.28	121.62	1.68	44.21	167.51	6319.09	3.17
37	2.46	0.29	125.41	1.76	42.66	169.83	6151.58	3.08
36	2.53	0.31	128.94	1.85	41.21	172.00	5981.75	3.00
35	2.59	0.32	132.28	1.93	39.84	174.05	5809.75	2.92
34 33	2.66 2.72	0.33 0.35	135.46 138.47	2.01 2.08	38.54 37.31	176.01 177.86	5635.70 5459.69	2.83 2.75
32	2.77	0.36	141.34	2.16	36.13	179.62	5281.84	2.67
31	2.82	0.37	144.06	2.23	35.01	181.30	5102.21	2.58
30	2.88	0.38	146.65	2.31	33.94	182.90	4920.91	2.50
29	2.92	0.40	149.13	2.38	32.92	184.43	4738.01	2.42
28 27	2.97 3.01	0.41 0.42	151.46 153.63	2.45 2.51	31.96 31.07	185.87 187.21	4553.58 4367.71	2.33 2.25
26	3.05	0.43	155.72	2.58	30.21	188.50	4180.50	2.23
25	3.09	0.44	157.81	2.64	29.35	189.80	3991.99	2.08
24	3.13	0.45	159.66	2.70	28.58	190.94	3802.20	2.00
23	3.17	0.46	161.45	2.77	27.84	192.05	3611.25	1.92
22 21	3.20 3.23	0.47 0.48	163.17 164.79	2.82 2.88	27.13 26.46	193.12 194.13	3419.20 3226.07	1.83 1.75
20	3.26	0.49	166.33	2.94	25.82	195.09	3031.95	1.73
19	3.29	0.50	167.80	2.99	25.21	196.00	2836.86	1.58
18	3.32	0.51	169.22	3.04	24.62	196.88	2640.86	1.50
17	3.34	0.51	170.55	3.09	24.07	197.71	2443.98	1.42
16	3.37	0.52	171.80	3.13	23.55	198.49	2246.27	1.33
15 14	3.39 3.41	0.53 0.54	173.02 174.14	3.18 3.22	23.05 22.58	199.24 199.94	2047.78 1848.54	1.25 1.17
13	3.44	0.54	175.29	3.26	22.11	200.65	1648.60	1.08
12	3.46	0.55	176.34	3.30	21.67	201.31	1447.94	1.00
11	3.48	0.56	177.41	3.33	21.23	201.97	1246.63	0.92
10	3.51	0.59	178.76	3.57	20.59	202.92	1044.66	0.83
9 8	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	93.53 93.53	93.53 93.53	841.74 748.21	0.75 0.67
o 7	0.00	0.00	0.00	0.00	93.53	93.53	654.68	0.57
6	0.00	0.00	0.00	0.00	93.53	93.53	561.16	0.50
5	0.00	0.00	0.00	0.00	93.53	93.53	467.63	0.42
4	0.00	0.00	0.00	0.00	93.53	93.53	374.11	0.33
3	0.00	0.00	0.00	0.00	93.53	93.53	280.58	0.25
2 1	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	93.53 93.53	93.53 93.53	187.05 93.53	0.17 0.08
'	0.00	0.00	0.00	0.00	55.55	50.55	55.55	0.00

SECTION 6

SAN DIEGO COUNTY HYDROLOGY MANUAL REFERENCES

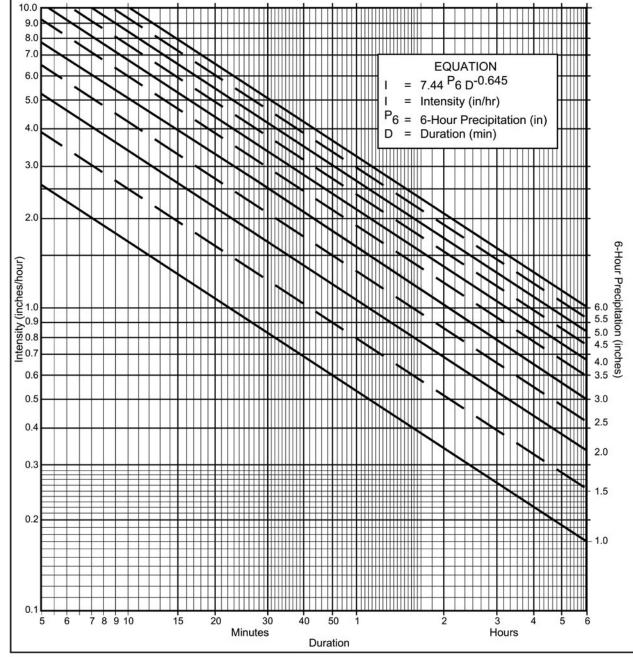




County of San Diego Hydrology Manual



THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.



Directions for Application:

- (1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).
- (2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).
- (3) Plot 6 hr precipitation on the right side of the chart.
- (4) Draw a line through the point parallel to the plotted lines.
- (5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency
$$\underline{100}$$
 year
(b) $P_6 = \underline{3.3}$ in., $P_{24} = \underline{5.5}$, $\underline{P_6}$ = $\underline{60}$ %⁽²⁾

(c) Adjusted
$$P_6^{(2)} = 3.3$$
 in.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	- 1	1	- 1	1	1	- 1	1	1	1	1	- 1
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.8
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

San Diego County Hydrology Manual Date: June 2003

Section: Page:

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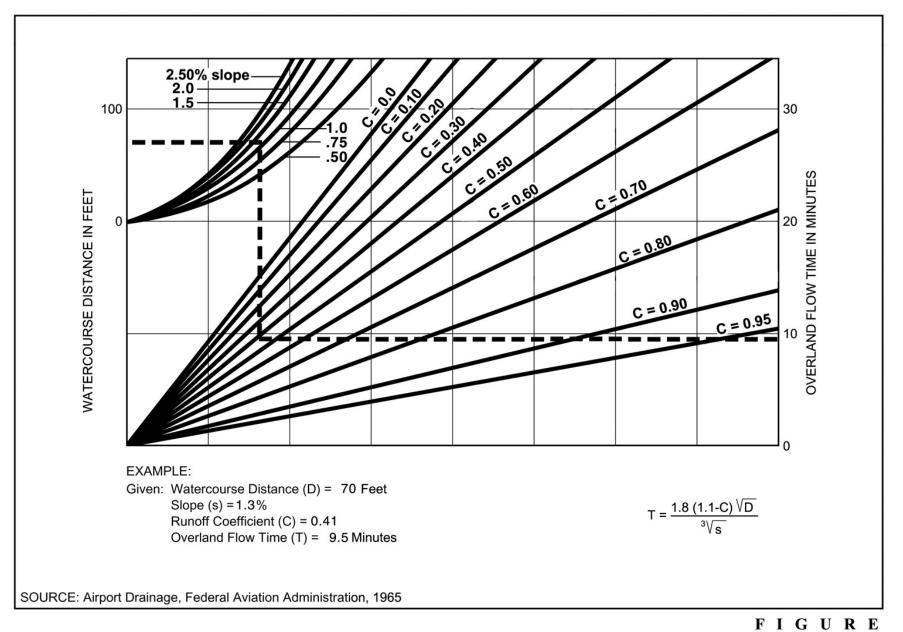
Table 3-1 RUNOFF COEFFICIENTS FOR URBAN AREAS

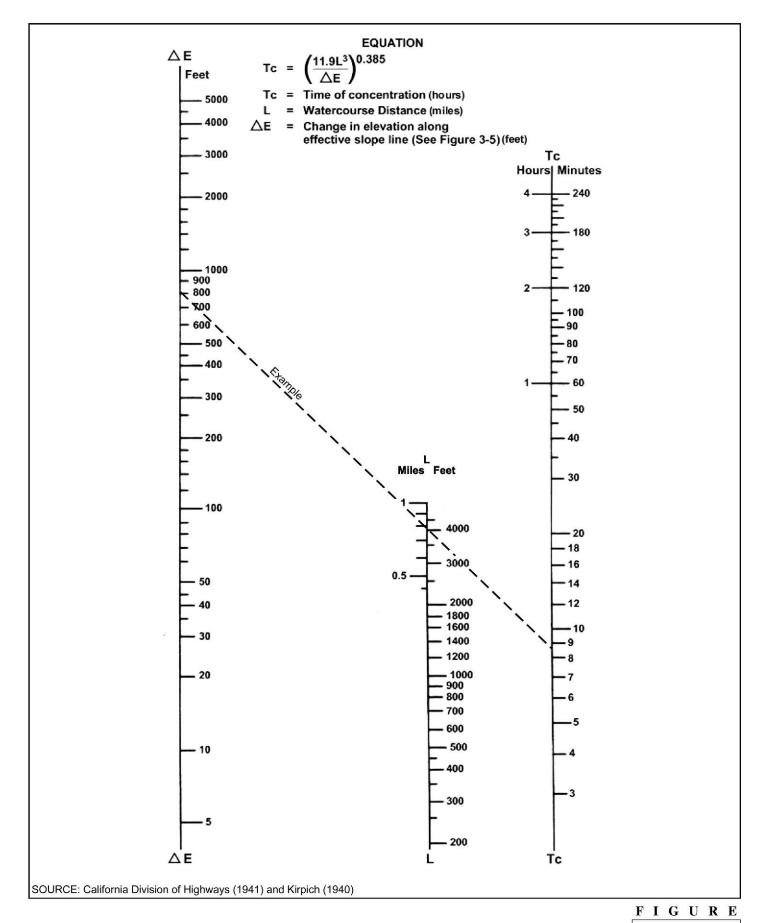
Lai	Runoff Coefficient "C"						
		Soil Type					
NRCS Elements	County Elements	% IMPER.	A	В	C	D	
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35	
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41	
Low Density Residential (LDR)	Residential, 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	

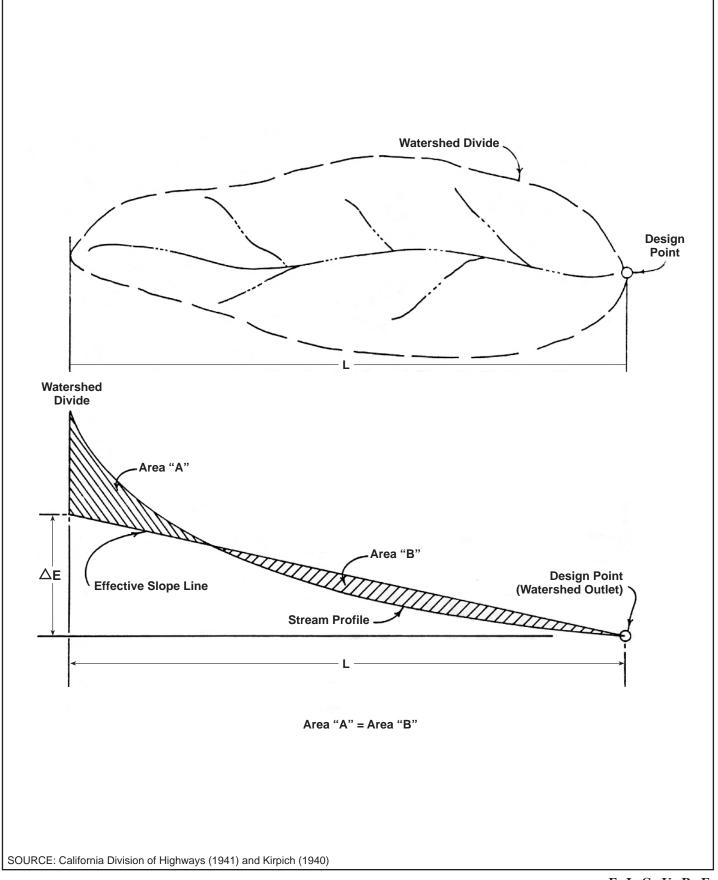
^{*}The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).

NRCS = National Resources Conservation Service

DU/A = dwelling units per acre





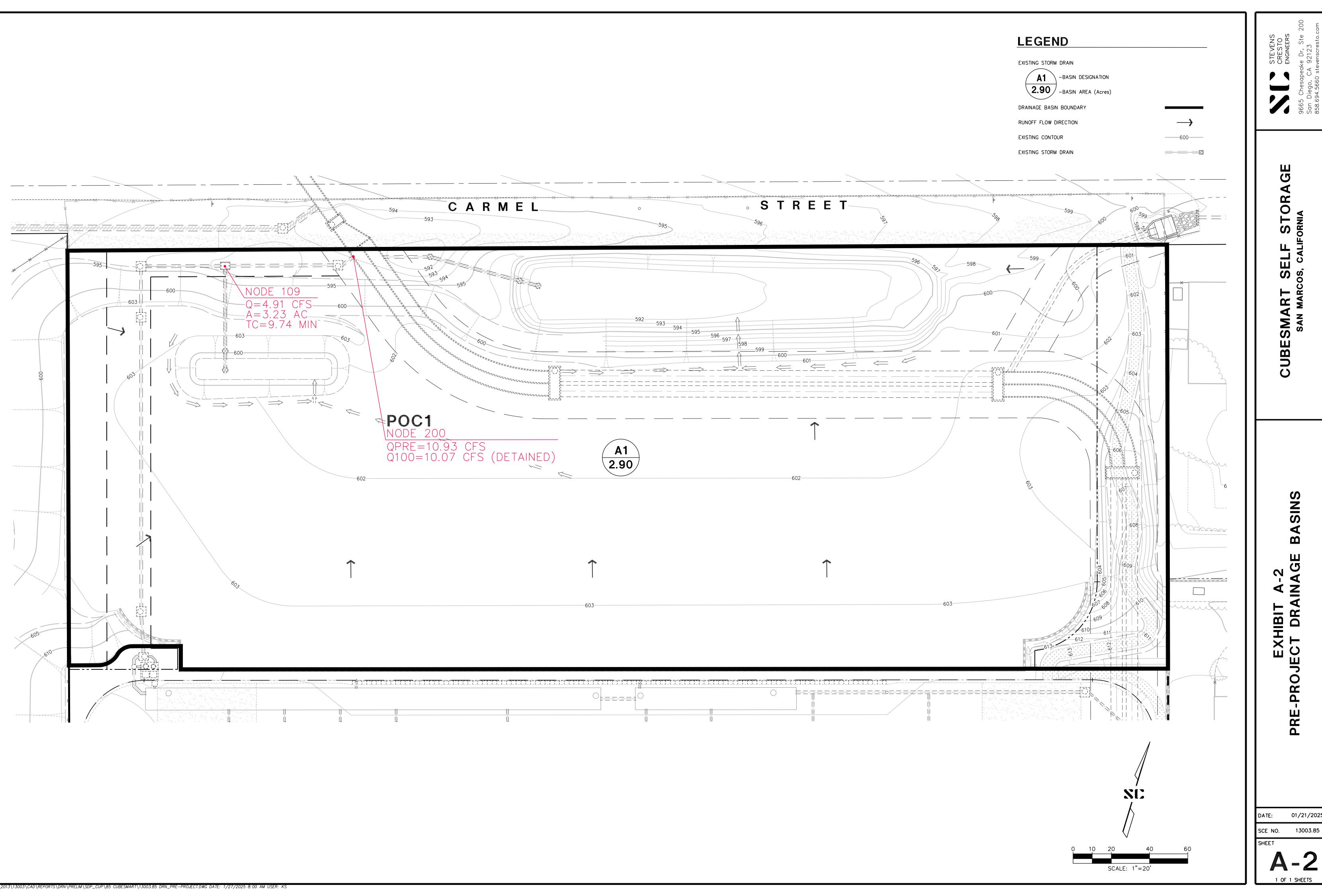


SECTION 7

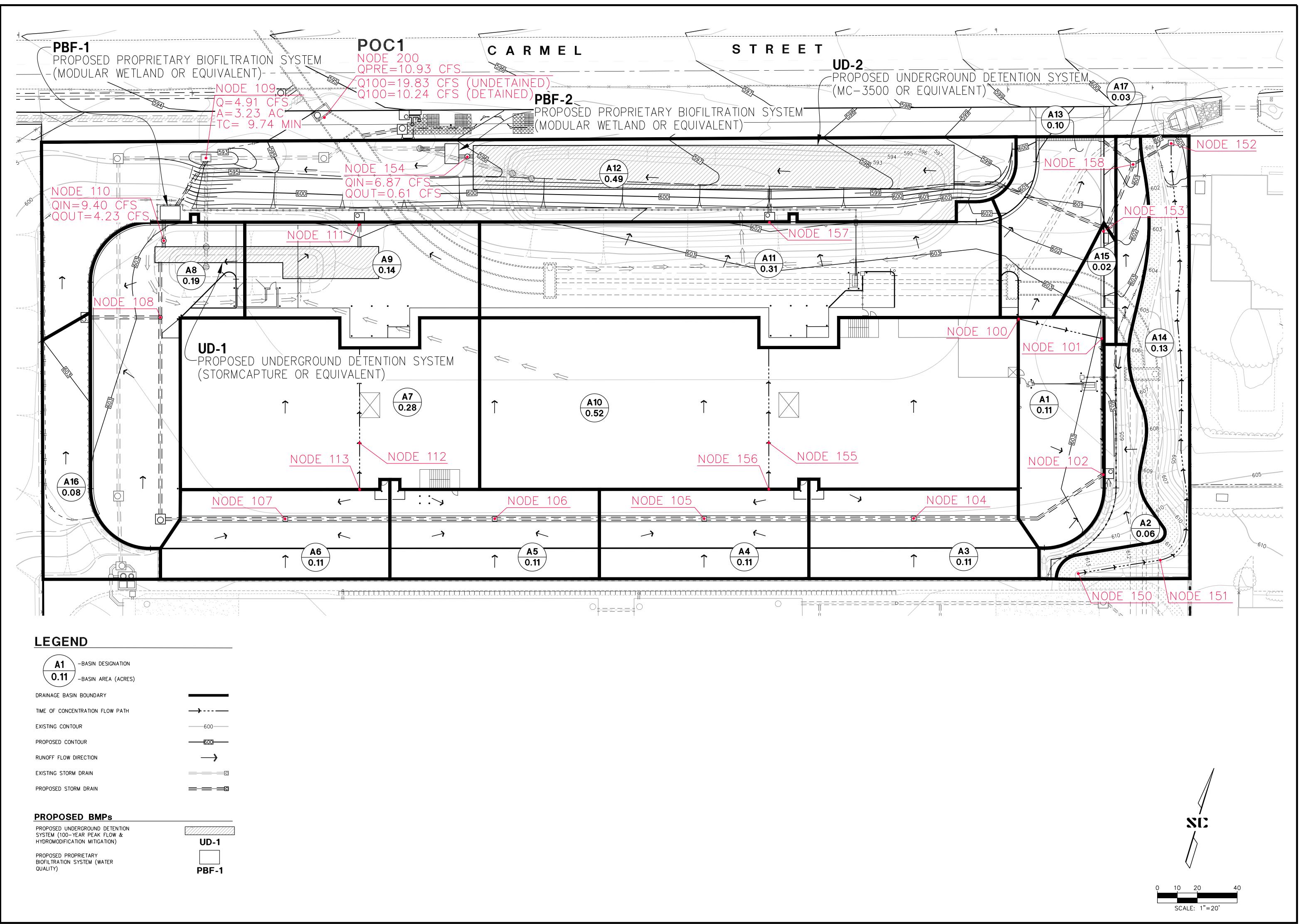
DRAINAGE EXHIBITS

Exhibit A-2 (Pre-Project Drainage Basins)

Exhibit C (Post-Project Drainage Basins)



01/21/2025



5 HIBIT C DRAIN 03/24/2025 13003.85 SCE NO. 1 OF 1 SHEETS