ATTACHMENT D

ENVIRONMENTAL IMPACT REPORT

APPENDIX F-1

HYDROLOGY STUDY

APPENDIX F-1

Hydrology Study

PRIORITY PROJECT

HYDROLOGY STUDY

FOR:
HUGHES CIRCUITS
APN No. 219-223-20&22
NE Corner of South Pacific Street, San Marcos, California

PREPARED FOR:
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San Marcos, CA 92078
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Project No: 21-088

DATE PREPARED:
6/3/2022

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1.0 PROJECT DESCRIPTION

1.1 Project Purpose

The purpose of this project is to develop a vacant site into an industrial building with supporting parking lot and landscape area. The site is located at the northeast corner of south pacific street, San Marcos, CA. The total development area is 2.926 acres. This study will demonstrate that the post-development 100-year peak runoff will not exceed the existing peak runoff rates.

1.2 Project Proposed Drainage Facilities

The project is proposing to build approximately 2.44 acres of impervious area consisting of a single industrial building with supporting parking lot, and landscape area. The project proposes to build a parking lot which slopes at 0.5% to onsite biofiltration basins (BMP A and BMP B). To decrease impervious area on the site, the parking stalls will be pervious concrete. The building's roof is directed into two biofiltration basins along the east boundary of the development footprint.

The project includes onsite storage consisting of 600 ft of 48 inches HDPE pipe located at north and east edge of the project site. Once the stormwater gets treated in the water quality treatment systems, the stormwater flows through a pipe to the storage tank. This storage tank accepts onsite stormwater from proposed building roof and parking lot. The storage tank is used for detaining onsite stormwater. At the end of the storage tank, a weir plate with two orifices is used for regulating low flow.

The project will extend the existing dual 66 inches culvert from the current terminus through the site to the development limits on the north side of the project parking lot. A 24 inches pipe connects the weir structure and storage facility through the existing dual 66 inches pipe to proposed culvert. The proposed culvert routes stormwater to POC at South Pacific Street. From here, flows will follow the existing offsite flow path. Final design will include a WSPG fun of the extended dual 66 inches pipes.

The west and south edge of the project is approximately 0.497 acres section that includes pervious and landscaped slope. This is a self-mitigating area that will not flow to the basins. This section drains stormwater from the north to the south and collects water in an existing 18 inches storm drainpipe and ties to an existing 27 inches storm drainpipe to the POC.

2.0 VICINITY MAP

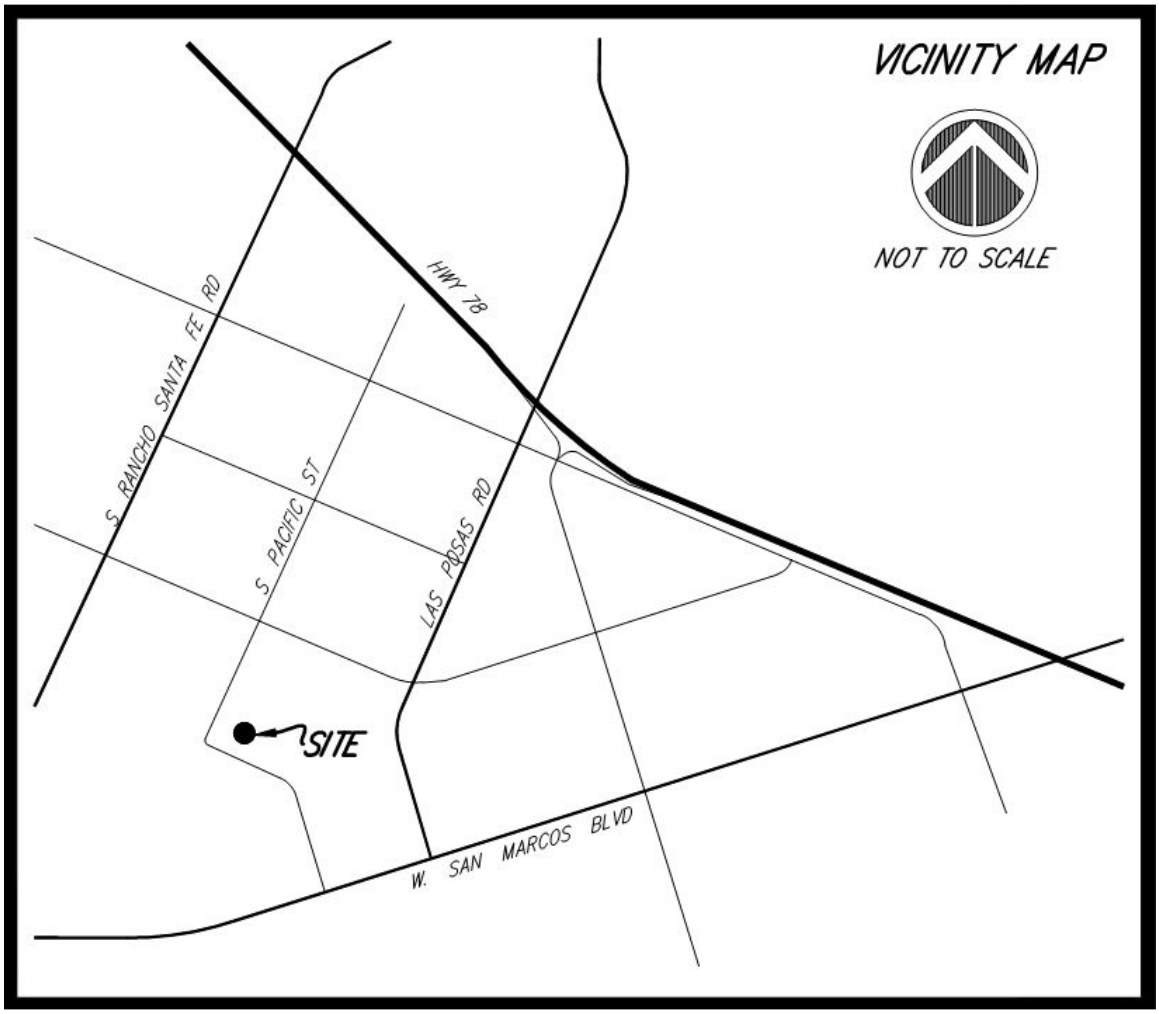


Figure 1. Project Site Map

3.0 Site Map

Please see Attachment 1 – Site Map

4.0 DESCRIPTION OF WATERSHED

4.1 Pre-Development Topography

The majority of the existing offsite surface slopes generally from the north to the south. When the water reaches South Pacific Street along the west border of the project, it flows into the existing dual 48 inches pipes then flow through vacant property before entry the project area.

The site is currently undeveloped. The existing onsite surface slope is approximately 2% and runs generally from the north to the south. When the water from offsite reaches to the north edge of the project, it flows along the slope until it reaches the project's POC at the south edge of the property. According to the Web Soil Survey, the entire existing site is Soil Type D.

The land use of the existing **offsite** area was estimated based on the City of San Marcos Land Use Plan. The runoff coefficient C of the offsite area is calculated using weighted average value. The land use of the existing **onsite** area was estimated based on the aerial photography and detailed aerial topographic mapping, and the value of the undisturbed natural terrain is used in the pre-development onsite runoff calculations.

A pre-developed drainage map can be found as Attachment 4 in this report.

4.2 Post-Development Topography

The project proposes to build a building, parking and landscape areas. The proposed parking slopes to the project's biofiltration basin (BMP-A) at 0.5%. To decrease impervious area on the site, the parking stalls will be installed with pervious concrete. The proposed building is approximately 1.298 acres. The 1.024 acres of the building will discharge roof water into BMP-A, another 0.274 acres of the building will discharge roof water into BMP-B. After all stormwater from parking lot and roof get collected and treated in BMP-A and BMP-B, it flows into the 48 inches storage tank, which is located at the north and east edge of the project site. This storage tank is used for detaining post-developed onsite water. At the end of the storage tank, a weir plate with two orifices is used for regulating low flow.

A 24 inches pipe connect the storage tank with two proposed new 66 inches culverts. These two new 66 inches culverts run from the north to the south and meet with the existing two 66 inches culvert at south pacific street. These two 66 inches culverts route stormwater through the site and finally collects into the POC at the South Pacific Street.

At the west and south edge of the project site, there is approximately 0.497 acres which include pervious and landscaped slope that will not flow to the basins. This

section drains surface water from the north to the south and collects in an existing 18 inches storm drainpipe which ties to an existing 27 inches storm drain to the POC.

According to the Web Soil Survey, the entire proposed project site is composed of type D soil. The land use of the post development condition includes Undisturbed Natural Terrain, Limited Industrial, General Industrial, High Density Residential 43.0 DU/A or less, and Medium Density Residential 14.5 DU/A or less. Values of runoff coefficient C related to these land use types were used in the post-development runoff calculations.
A post-developed drainage map can be found as Attachment 5 in this report.

4.3 Hydrologic Unit Contribution

The project is located in the Richland Hydrologic Sub Area of the San Marcos Hydrologic Area of the Carlsbad Hydrologic Unit (904.52).

Please find the watershed map as Attachment 3 in this report.

5.0 METHODOLOGY

This report is prepared in accordance with the 2003 San Diego County Hydrology Manual. Based on the overall tributary study area, calculations area on the Rational Method.

5.1 Hydrology Software

The “Rational Hydrology Method, San Diego County (2003 Manual)” module of the CIVILCADD/CIVIL DESIGN Engineering software version 7.4 is used in this study. Referred to as CivilD within this report, this software was also used to develop hydrographs from the rational method results. This procedure also complies with the 2003 San Diego Hydrology Manual as presented in Section 6.

5.2 Routing Software

Hydraflow Hydrographs Extension for Autodesk Civil 3D, Version 2021 is used for hydrologic routing of the entire project site. the hydrograph developed from the rational method is then manually entered into this software and routed into each detention pipe. The hydrograph report can be found in Attachment 8 in this report.

5.3 Soil Type Determination

The soil type for the proposed project was determined by mapping the project limits on the EPA Web Soil Survey website. The Web Soil Survey indicate that

the entire site is composed of soil type D. The soil report and soil index map can be found in Attachment 3 in this report.

5.4 Isopluvial Value Determination

The isopluvial values for the 100-year 6 hour and 24 hour storm events were determined by plotting the projects location on the respective exhibits from Appendix B of the Hydrology Manual. The rainfall isopluvial maps can be found in Attachment 3 in this report.

5.5 Conjunctive Use Considerations

Since BMP-A and BMP-B is being used to handle peak flows and hydromodification, conjunctive use as described by the County of San Diego Conjunctive Use Handout (January 2020) must be considered. For this site, the peak flow storage pond built in Hydraflow Hydrographs does not account for the first 9 inches of water quality ponding that accounts for the water up to the lowest surface outlet. An additional 6 inches is shown to be required for adequate storage space for water quality ponding and hydrology storage. When using a Biofiltration Basin for Conjunctive use, it is required that there be 1 foot of freeboard above the maximum depth achieved by the peak flows. The proposed design leaves 12 inches of freeboard in addition to the 6 inches of space needed for mitigation and 9 inches of water quality ponding. This leaves a total of 27 inches from the surface of the basin to the top.

6.0 CALCULATIONS

6.1 Determine the Watershed that affects the project

To ensure that the proposed project **onsite area** will not have a negative impact to the downstream facilities, the project design checks that the peak flow and velocity from the 100-year storm and make sure they are identical or less when comparing the Post Development conditions to the Pre Development conditions.

6.2 Calculate Runoff Coefficient

The proposed project and offsite runoff area lie primarily within hydraulic soil group D. Relevant soil properties are assigned according to this designation unless stated otherwise below. The runoff coefficient C is based on the land use for this project.

For both pre- and post- development **offsite** area, the runoff coefficient C value is estimated based on the City of San Marcos Land Use Plan. This was done closely match the City of San Marcos General Plan Land Use Map. The runoff coefficient C of the offsite area is calculated using the weighted average value.

For the pre-development **onsite** area, the site is an existing undeveloped area and not graded, therefore, the value of the undisturbed natural terrain is used in the pre-development onsite runoff calculations.

For the post-development **onsite** area, the land use condition includes Undisturbed Natural Terrain, Limited Industrial, General Industrial, High Density Residential 43.0 DU/A or less, and Medium Density Residential 14.5 DU/A or less. Values of runoff coefficient C related to these land use types were used in the post-development runoff calculations.
The runoff coefficients for each of the drainage areas are taken from Table 3-1 of the Hydrology Manual. Table 3-1 is included in the CIVILD software, and the values chosen based on the program input parameters. The output file was checked to ensure that the correct C values are used.

In order to not have a negative impact on the post development downstream facilities, detention structure is needed in this project. We are using the resulting outflow hydrograph to recalculate the runoff coefficient C based on the fix values of the outflow hydrograph to achieve a C_{out}. The detailed description and calculation of the C_{out} value can be found in Attachment 8 in this report.

Please find the City of San Marcos Land Use Plan in Attachment 7 in this report.

6.3 Manning Roughness Coefficient

Manning Roughness Coefficients are taken from Table A-1, Average Manning Roughness Coefficients for Pavement and Gutters, Table A-2, Average Manning Roughness Coefficients for Closed Conduits, and Table A-5, Average Manning Roughness Coefficients for Natural Channels. Values of 0.015 for concrete gutter, 0.013 for PVC pipe, and 0.03 for fairly regular section natural channels are used in the hydrology calculations. Table of Manning's n value can be found in Attachment 2 in this report.

6.4 Calculate Storm Flows using the Rational Method

The Rational Method (RM) is used to determine the maximum runoff rate from the 100-year storm event. The RM application is highly effective in urban and rural watersheds for the design of storm drains and small drainage structures. Application of the rational method is based on a simple formula that relates runoff producing potential of the watershed drainage area (A), runoff coefficient (C) rainfall intensity (I) for a particular length of time (T_c), which is the time required for water to flow from the most remote point of the basin to the location being analyzed. Thus, the following equation is used:

Q = CIA

Where:

Q = peak discharge, in cubic feet per second (cfs)
C = runoff coefficient
I = average rainfall intensity for a duration equal to Tc
T_c = time of concentration (note: if the computed Tc is less than 5 minutes, then use 5 minutes for computing the peak discharge, Q)
A = Drainage area contributing to the design location, in acres

The peak runoff calculations for the 100-year storm are performed using the CIVILD software. A summary of the initial calculations is summarized in the table below:

ONSITE	PRE	POST	POST MIT
Q (CFS)	**258.68**	**258.84**	**258.50**
Tc (MIN)	51.74	49.85	49.85
V (FT/S)	15.49	15.49	15.49
A (AC)	170.63	170.63	170.63

Table 1. Q100 Onsite Analysis Results

The offsite tributary area flows were provided by the City of San Marcos and were used to is larger than the onsite area, the offsite tributary area controls the overall site runoff. Detention of the post-developed **onsite** area occurs. The detention system is 600 ft of 48 inches HDPE storm drain. Per Table 1 (see above), the post development onsite flow of 258.84 cfs is higher than the pre development onsite flow of 258.68 cfs. Therefore, mitigation is to be used. Upon analysis of the mitigated flow is 258.50 cfs, which is lower than the pre development onsite flow.

CIVILD data and output files can be found in Attachment 6 of this report.

By observation of the results in the summary table, the proposed development of the site will have an overall decrease in the 100-year peak flow discharge from the site.

7.0 CONCLUSION

Based on the results of this report the project does not increase the 100-year peak flow rate. The mitigated stormwater discharge from the site is lower than those of the Pre-development. The project meets the County of San Diego standards for

peak flow control and therefore we can conclude that this project will not impact the existing downstream storm drainage facilities.

8.0 REFERENCES

County of San Diego, Department of Public Works, Flood Control Section, June 2003 San Diego County Hydrology Manual

9.0 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 codes, and that the design is consistent with current design.

I understand that the check of the 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.

ENGINEER OF WORK
Excel Engineering
440 State Place
Escondido, CA 92029
Tel – (760)745-8118
Fax – (760)745-1890

Project Number: 21-088

_____ 6/3/2022

Robert D. Dentino, RCE 45629 Date
Registration Expire: December 31, 2022

ATTACHMENT 1
SITE MAP

ATTACHMENT 2

FIGURES & TABLES FROM THE SAN DIEGO COUNTY HYDROLOGY MANUAL 2003

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

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

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

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

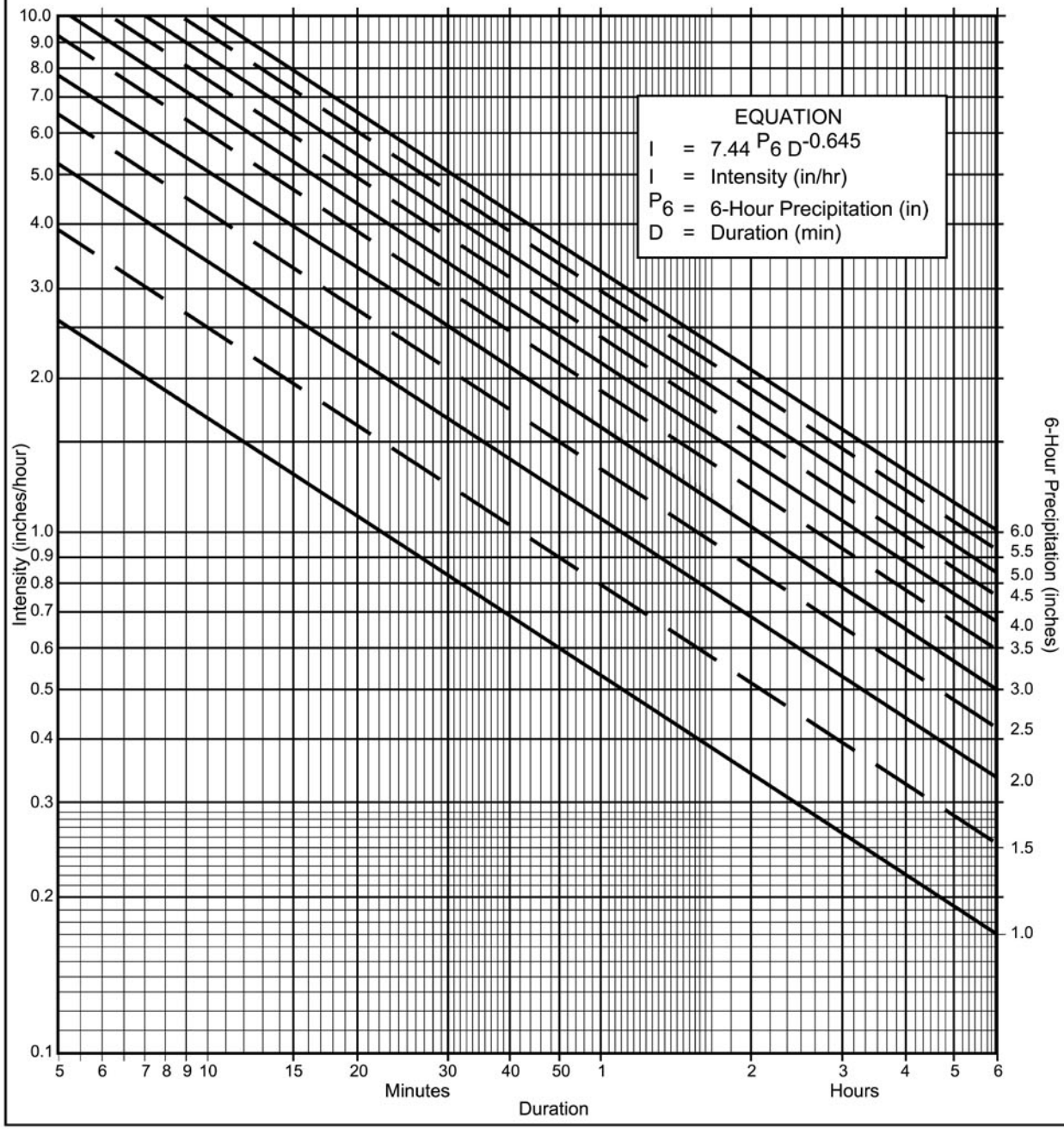
Table 3-2 provides limits of the length (Maximum Length (L_M)) of sheet flow to be used in hydrology studies. Initial T_i values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the "Regulating Agency" when submitted with a detailed study.

Table 3-2

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

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

*See Table 3-1 for more detailed description



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 _____ year

(b) P_6 = _____ in., P_{24} = _____, $\frac{P_6}{P_{24}}$ = _____ %(2)

(c) Adjusted P_6(2) = _____ in.

(d) t_x = _____ min.

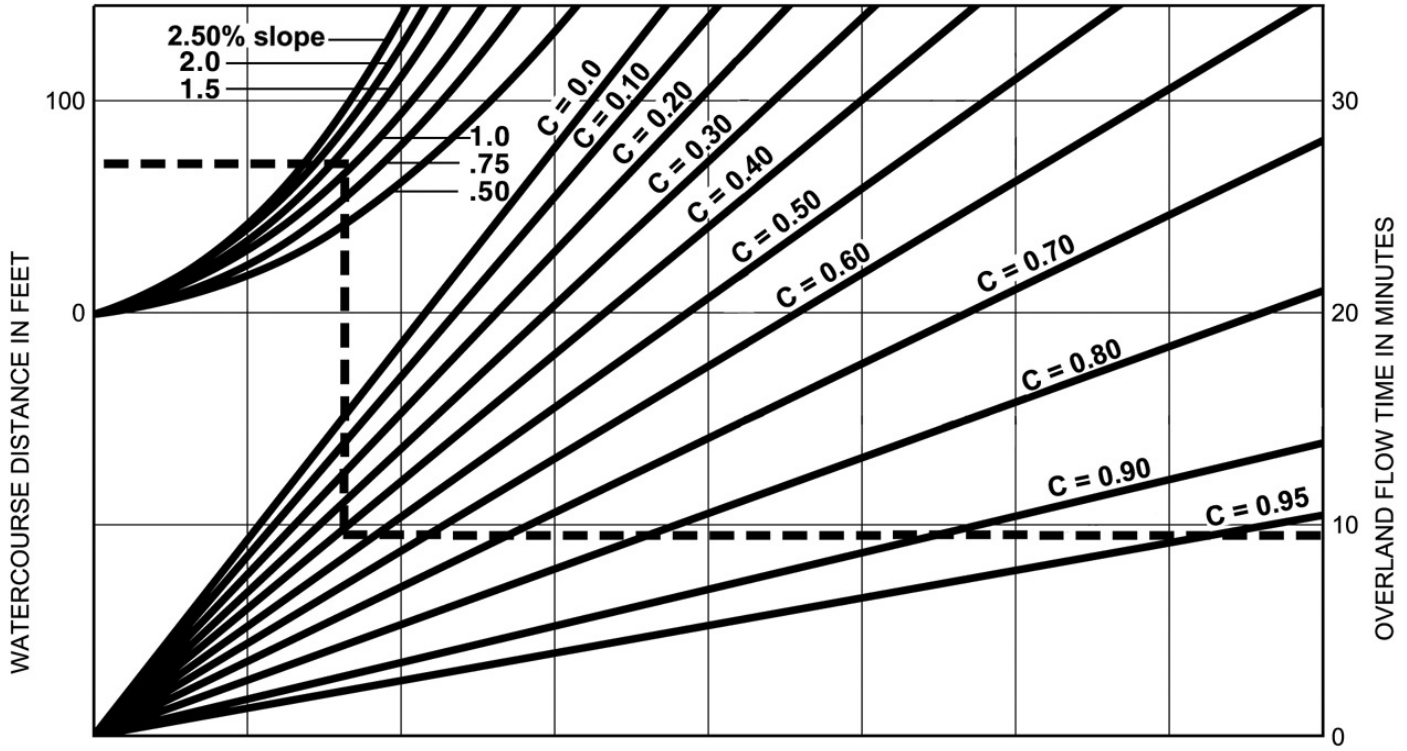
(e) I = _____ in./hr.

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	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
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

Intensity-Duration Design Chart - Template

FIGURE 3-1



EXAMPLE:

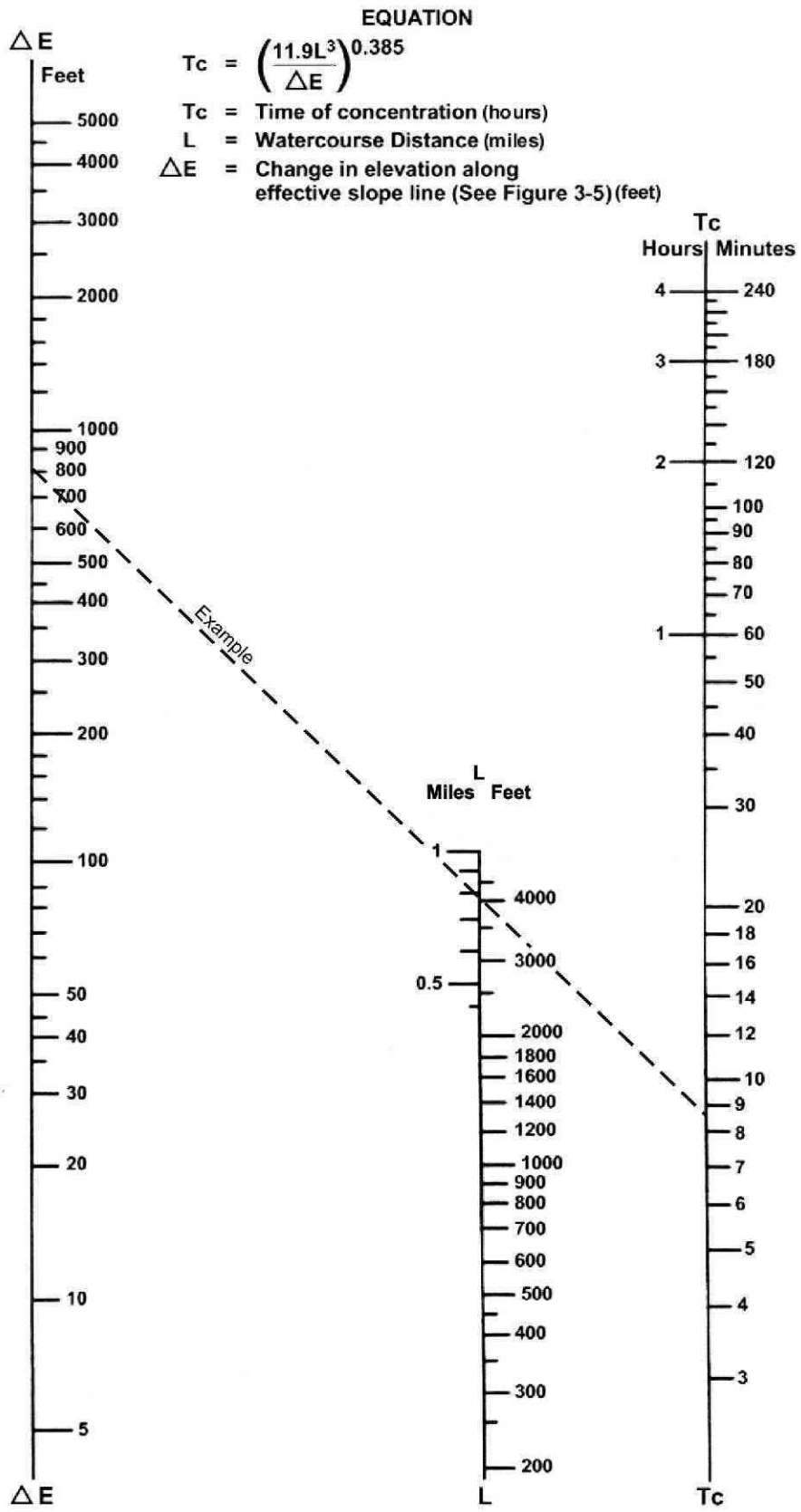
Given: Watercourse Distance (D) = 70 Feet
Slope (s) = 1.3%
Runoff Coefficient (C) = 0.41
Overland Flow Time (T) = 9.5 Minutes

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

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

FIGURE 3-3

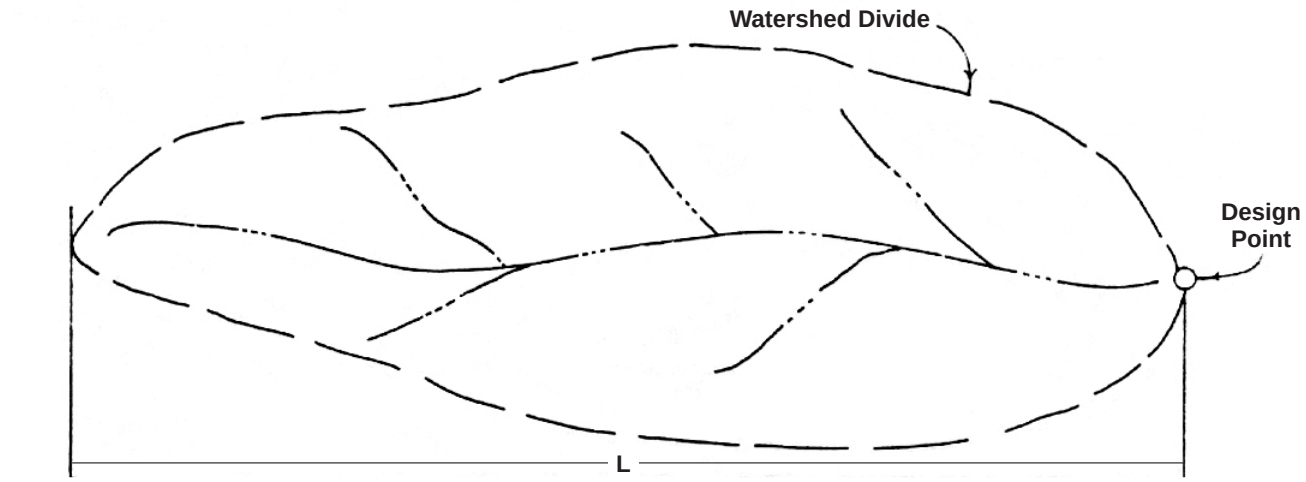
Rational Formula - Overland Time of Flow Nomograph

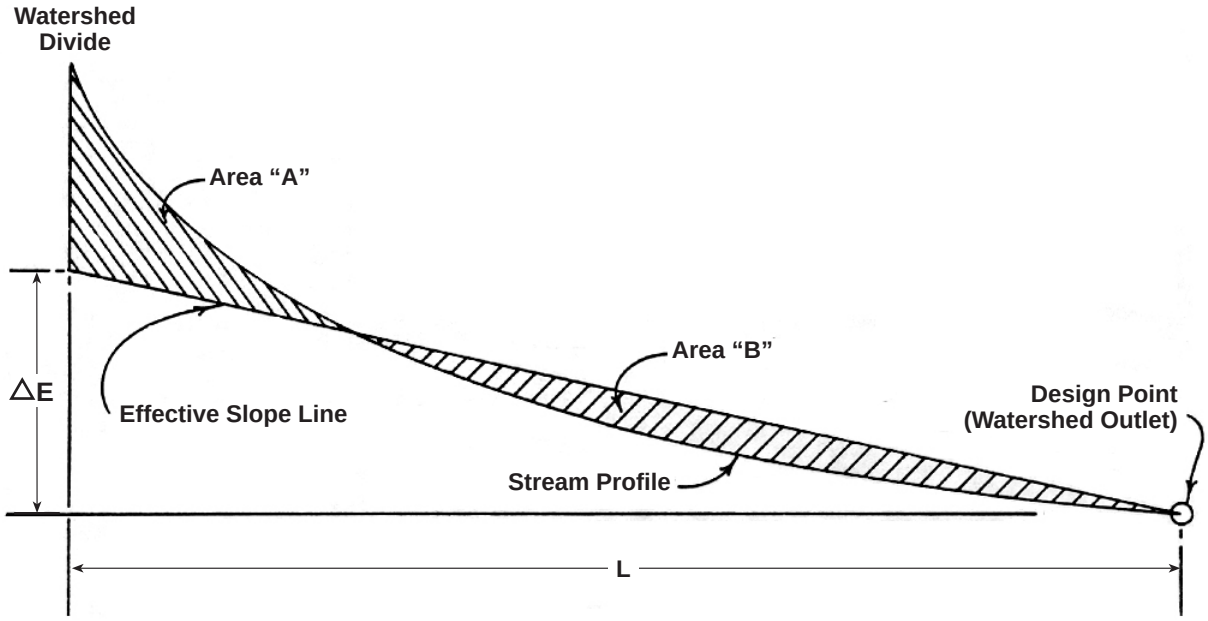


SOURCE: California Division of Highways (1941) and Kirpich (1940)

FIGURE 3-4

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



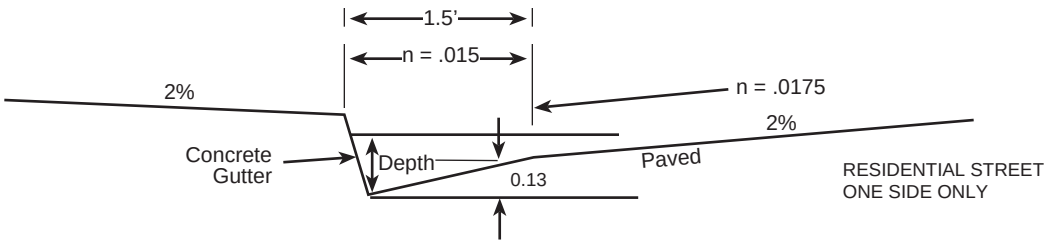


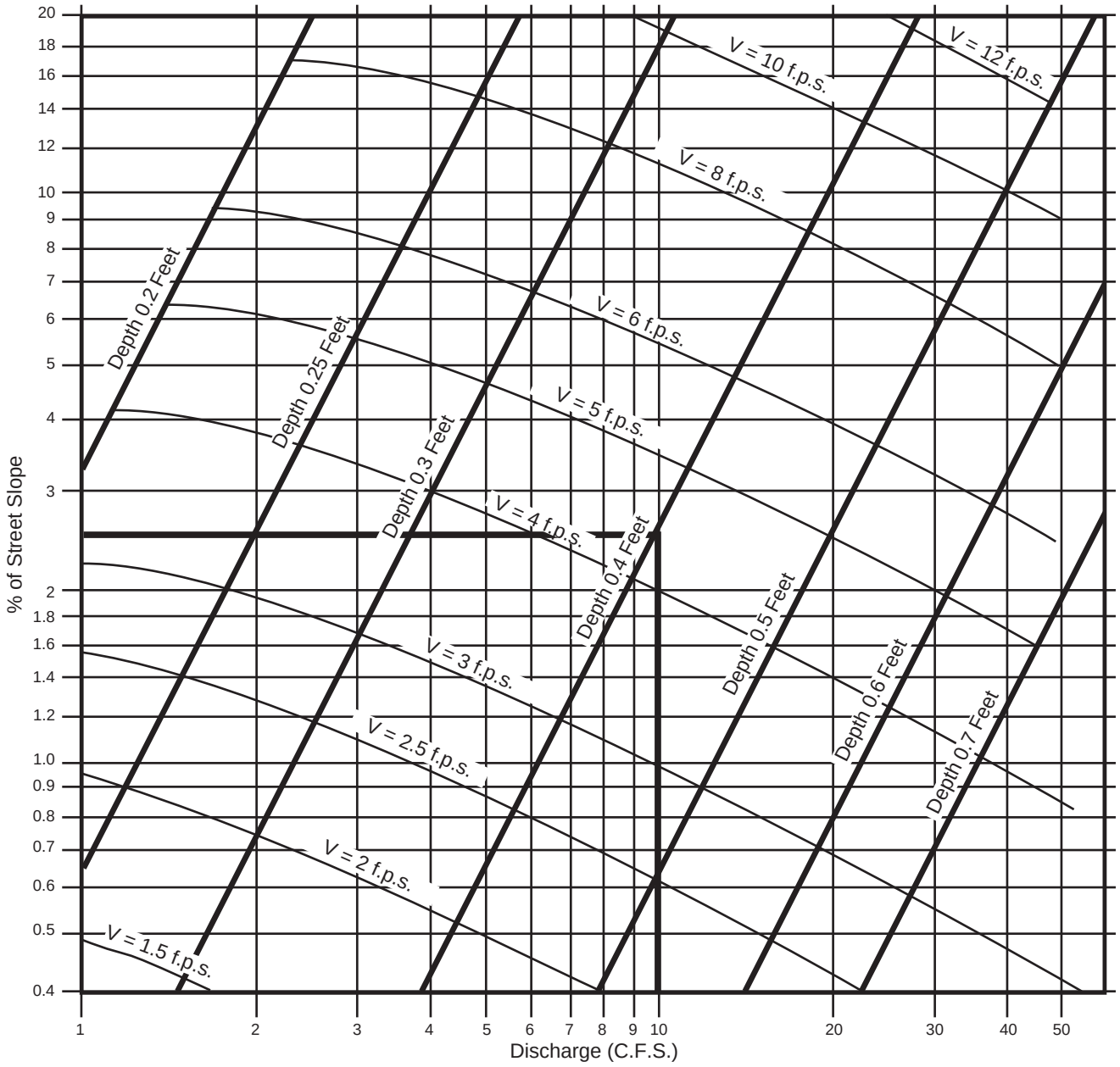
Area "A" = Area "B"

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

FIGURE 3-5

Computation of Effective Slope for Natural Watersheds





EXAMPLE:

Given: Q = 10 S = 2.5%

Chart gives: Depth = 0.4, Velocity = 4.4 f.p.s.

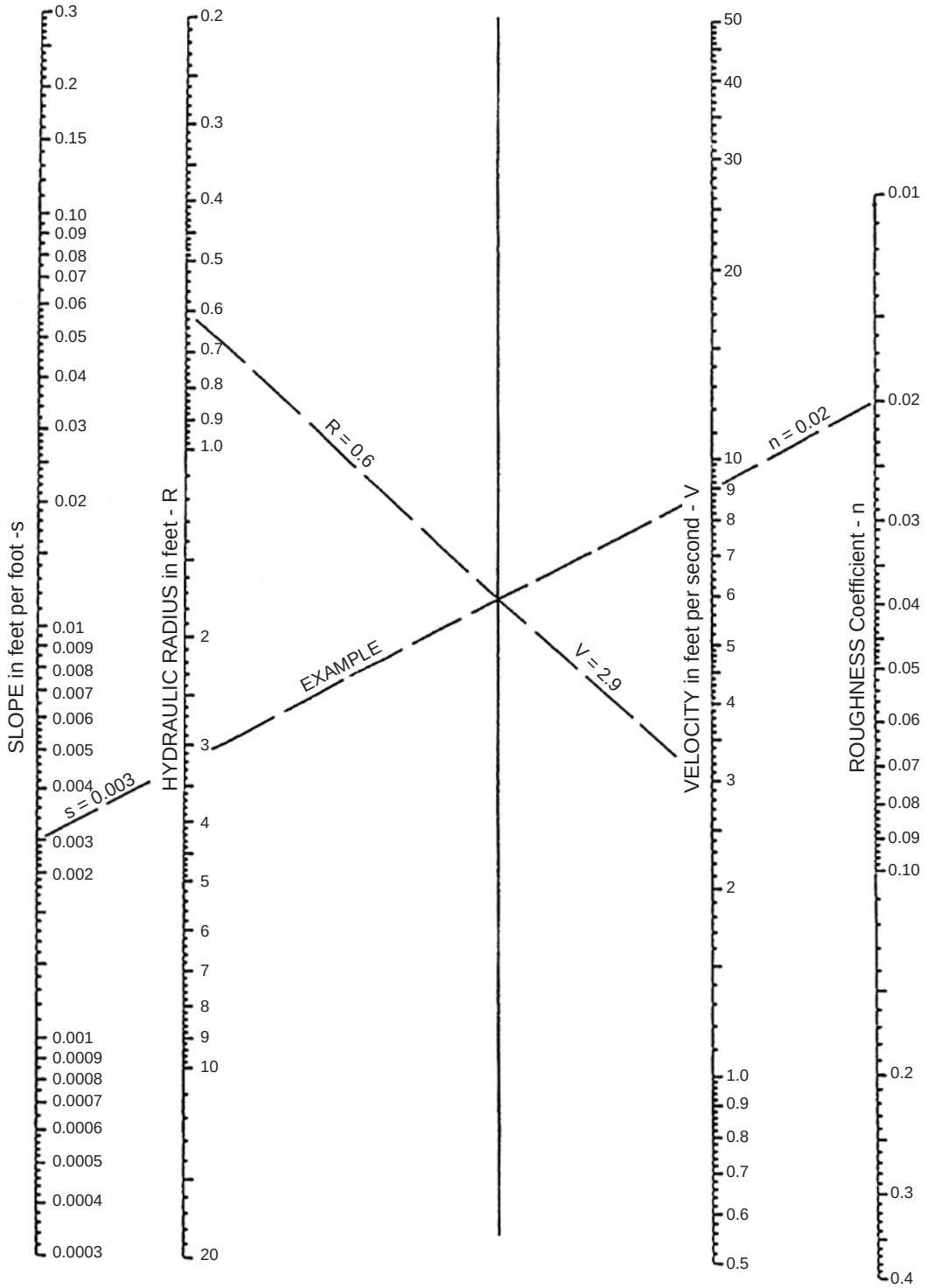
SOURCE: San Diego County Department of Special District Services Design Manual

F I G U R E

3-6

Gutter and Roadway Discharge - Velocity Chart

EQUATION: $V = \frac{1.49}{n} R^{2/3} s^{1/2}$



GENERAL SOLUTION

SOURCE: USDOT, FHWA, HDS-3 (1961)

FIGURE 3-7

Manning's Equation Nomograph

Table A-1 Average Manning Roughness Coefficients for Pavement and Gutters[1]

Concrete Gutter[2]	0.015
Concrete Pavement	
Float Finish	0.014
Broom Finish	0.016
Concrete Gutter with Asphalt Pavement	
Smooth Finish	0.013
Rough Texture	0.015
Asphalt Pavement	
Smooth Finish	0.013
Rough Texture	0.016

Based on FHWA HEC-22.

[1] Based on materials and workmanship required by standard specifications.
[2] Increase roughness coefficient in gutters with mild slopes where sediment might accumulate by 0.020.

Table A-2 Average Manning Roughness Coefficients for Closed Conduits[3]

Reinforced Concrete Pipe (RCP)	0.013
Corrugated Metal Pipe and Pipe Arch	
2-3/8 x 1/2 inch Corrugations	
Unlined	0.024
Half Lined	
Full Flow	0.018
d/D>=0.60	0.016
d/D<0.60	0.013
Fully Lined	0.013
3 x 1 inch Corrugations	0.027
6 x 2 inch Corrugations	0.032
Spiral Rib Pipe	0.013
Helically Wound Pipe	
18-inch	0.015
24-inch	0.017
30-inch	0.019
36-inch	0.021
42-inch	0.022
48-inch	0.023
Plastic Pipe (HPDE and PVC)	
Smooth	0.013
Corrugated	0.024
Vitrified Clay Pipe	0.014
Cast-Iron Pipe (Uncoated)	0.013
Steel Pipe	0.011
Brick	0.017
Cast-In-Place Concrete Pipe	
Rough Wood Forms	0.017
Smooth Wood or Steel Forms	0.014

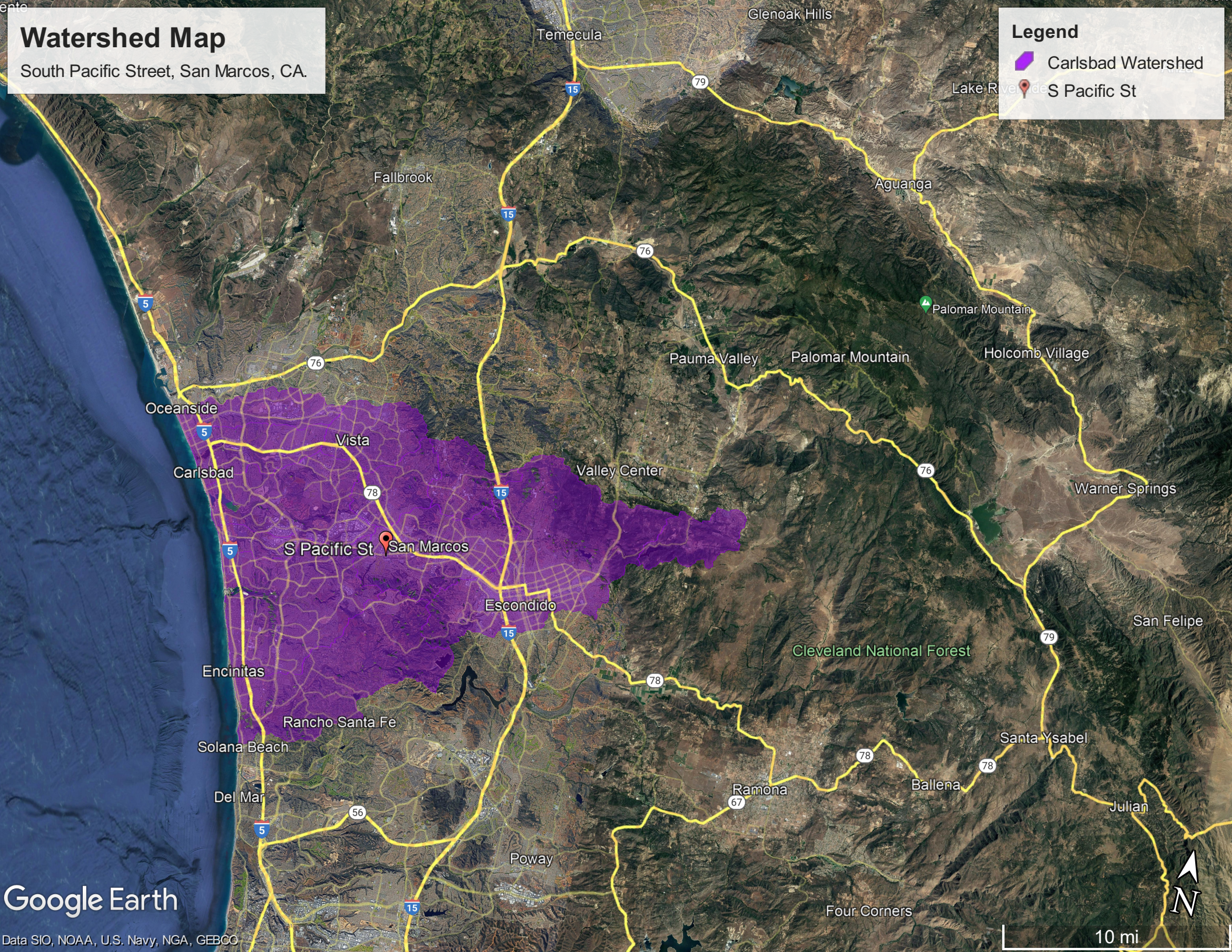
[3] Based on materials and workmanship required by standard specifications.

Table A-5 Average Manning Roughness Coefficients for Natural Channels

Minor Streams (Surface Width at Flood Stage < 100 ft)	
Fairly Regular Section	
(A) Some Grass and Weeds, Little or No Brush	0.030
(B) Dense Growth of Weeds, Depth of Flow Materially Greater Than Weed Height	0.040
(C) Some Weeds, Light Brush on Banks	0.040
(D) Some Weeds, Heavy Brush on Banks	0.060
(E) For Trees within Channel with Branches Submerged at High Stage, Increase All Above Values By	0.015
Irregular Section, with Pools, Slight Channel Meander	
Channels (A) to (E) Above, Increase All Values By	0.015
Mountain Streams; No Vegetation in Channel, Banks Usually Steep, Trees and Brush along Banks Submerged at High Stage	
(A) Bottom, Gravel, Cobbles and Few Boulders	0.050
(B) Bottom, Cobbles with Large Boulders	0.060
Flood Plains (Adjacent To Natural Streams)	
Pasture, No Brush	
(A) Short Grass	0.030
(B) High Grass	0.040
Cultivated Areas	
(A) No Crop	0.040
(B) Mature Row Crops	0.040
(C) Mature Field Crops	0.050
Heavy Weeds, Scattered Brush	0.050
Light Brush and Trees	0.060
Medium To Dense Brush	0.090
Dense Willows	0.170
Cleared Land with Tree Stumps, 100-150 Per Acre	0.060
Heavy Stand of Timber, Little Undergrowth	
(A) Flood Depth below Branches	0.110
(B) Flood Depth Reaches Branches	0.140

ATTACHMENT 3
WATERSHED INFORMATION

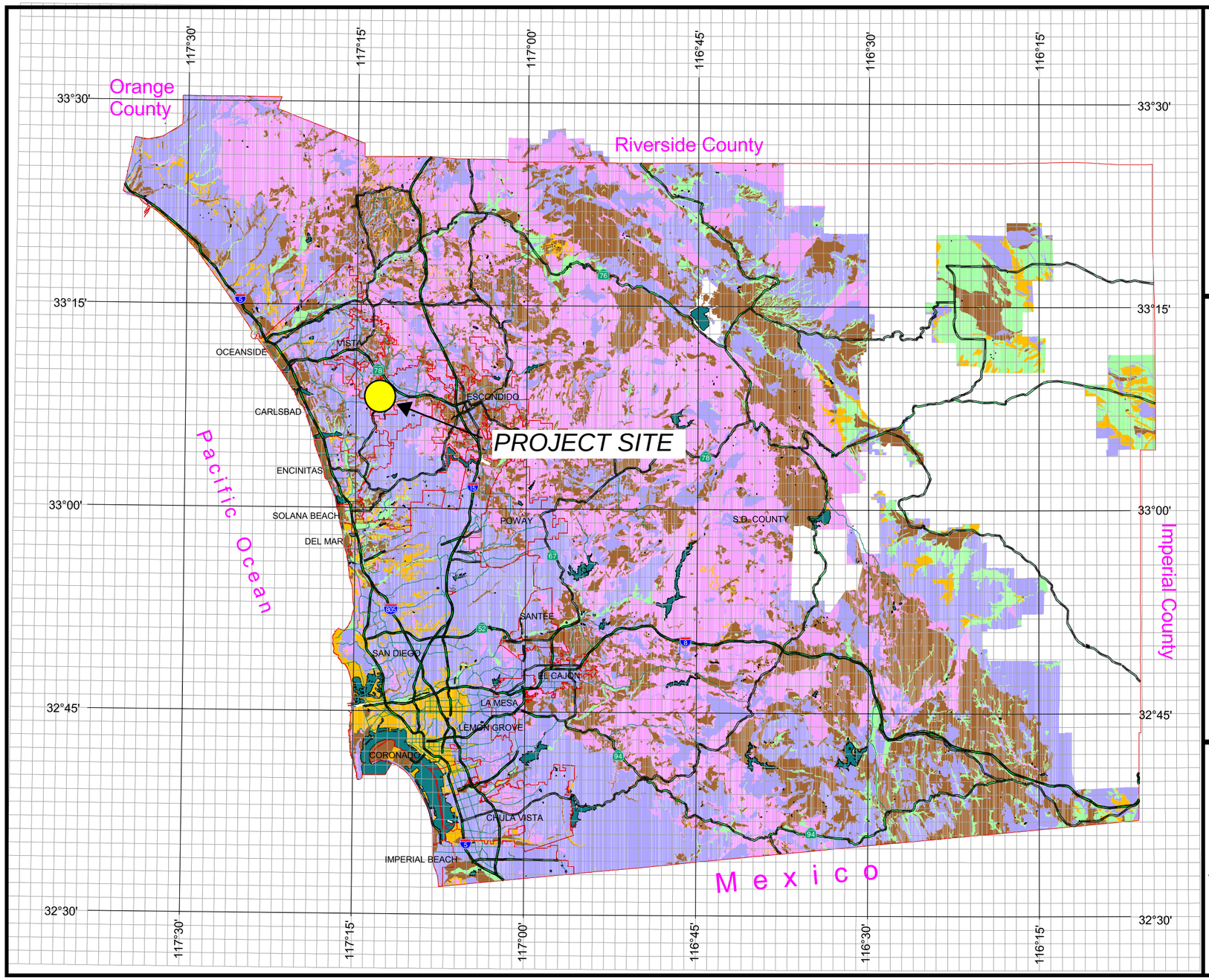
WATERSHED MAP


Watershed Map
South Pacific Street, San Marcos, CA.
Legend
Carlsbad Watershed
S Pacific St
Glenoak Hills
Temecula
Lake Riverside
Fallbrook
Aguanga
Palomar Mountain
Pauma Valley
Palomar Mountain
Holcomb Village
Oceanside
Vista
Carlsbad
Valley Center
Warner Springs
S Pacific St
San Marcos
Escondido
San Felipe
Cleveland National Forest
Encinitas
Rancho Santa Fe
Solana Beach
Santa Ysabel
Del Mar
Ramona
Ballena
Julian
Poway
Four Corners
N
10 mi
Google Earth
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

SOIL INDEX MAP

County of San Diego Hydrology Manual

Soil Hydrologic Groups



Legend

Soil Groups

- Group A
- Group B
- Group C
- Group D
- Undetermined
- Data Unavailable

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3 0 3 Miles

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PROJECT SOIL MAP

SOIL REPORT

Hydrologic Soil Group—San Diego County Area, California

Map Scale: 1:9,410 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 450 900 1800 2700

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 16, Sep 13, 2021

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

Date(s) aerial images were photographed: Jan 23, 2020—Feb 13, 2020

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DaC	Diablo clay, 2 to 9 percent slopes	D	31.1	12.3%
DaE	Diablo clay, 15 to 30 percent slopes	D	2.2	0.9%
LeC	Las Flores loamy fine sand, 2 to 9 percent slopes	D	141.1	56.0%
LeD	Las Flores loamy fine sand, 9 to 15 percent slopes	D	15.9	6.3%
LeD2	Las Flores loamy fine sand, 9 to 15 percent slopes, eroded	D	8.2	3.3%
LfC	Las Flores-Urban land complex, 2 to 9 percent slopes	D	50.9	20.2%
PfA	Placentia sandy loam, thick surface, 0 to 2 percent slo pes	D	2.6	1.0%
Totals for Area of Interest			**251.9**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

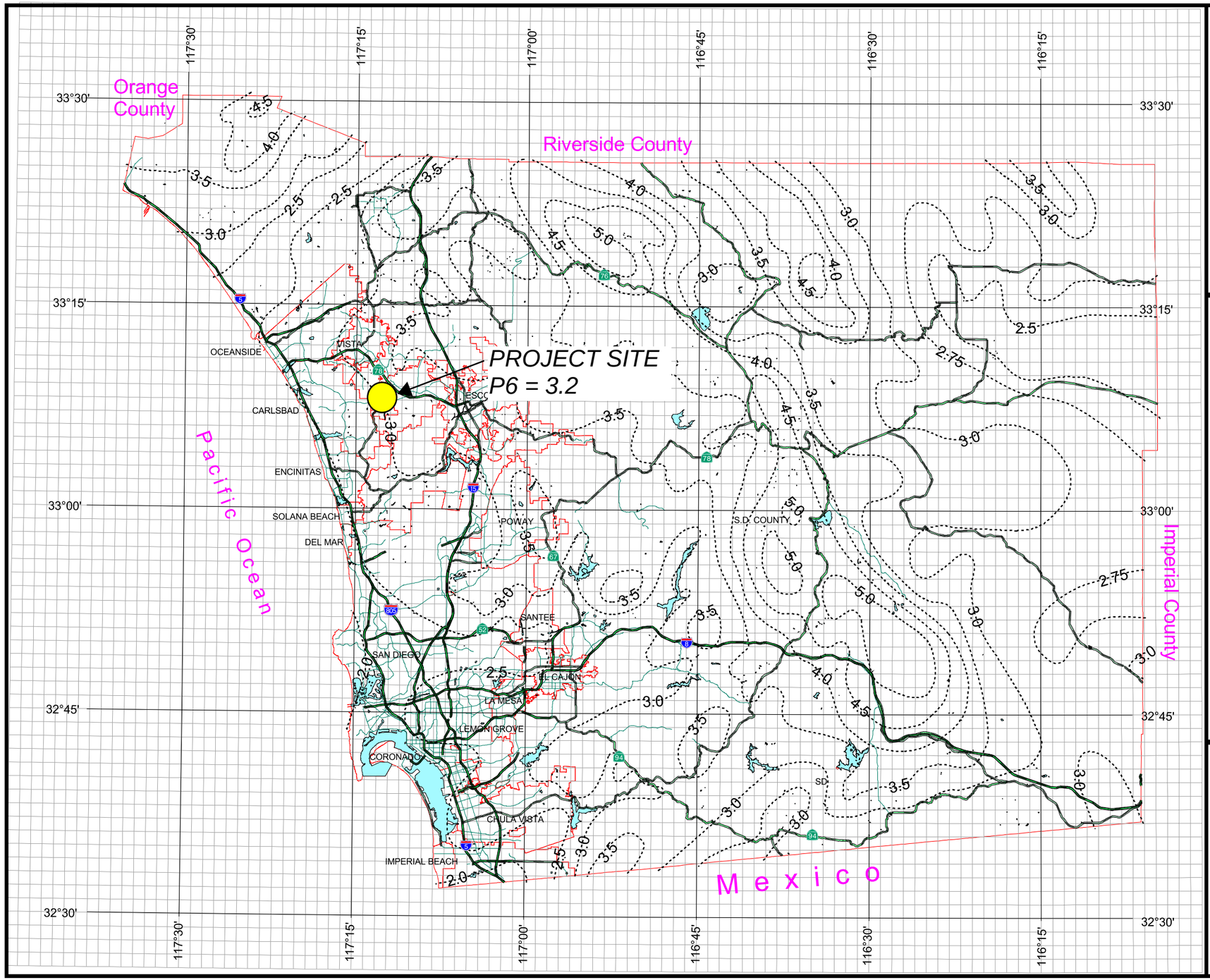
RAINFALL ISOPLUVIAL MAPS

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)



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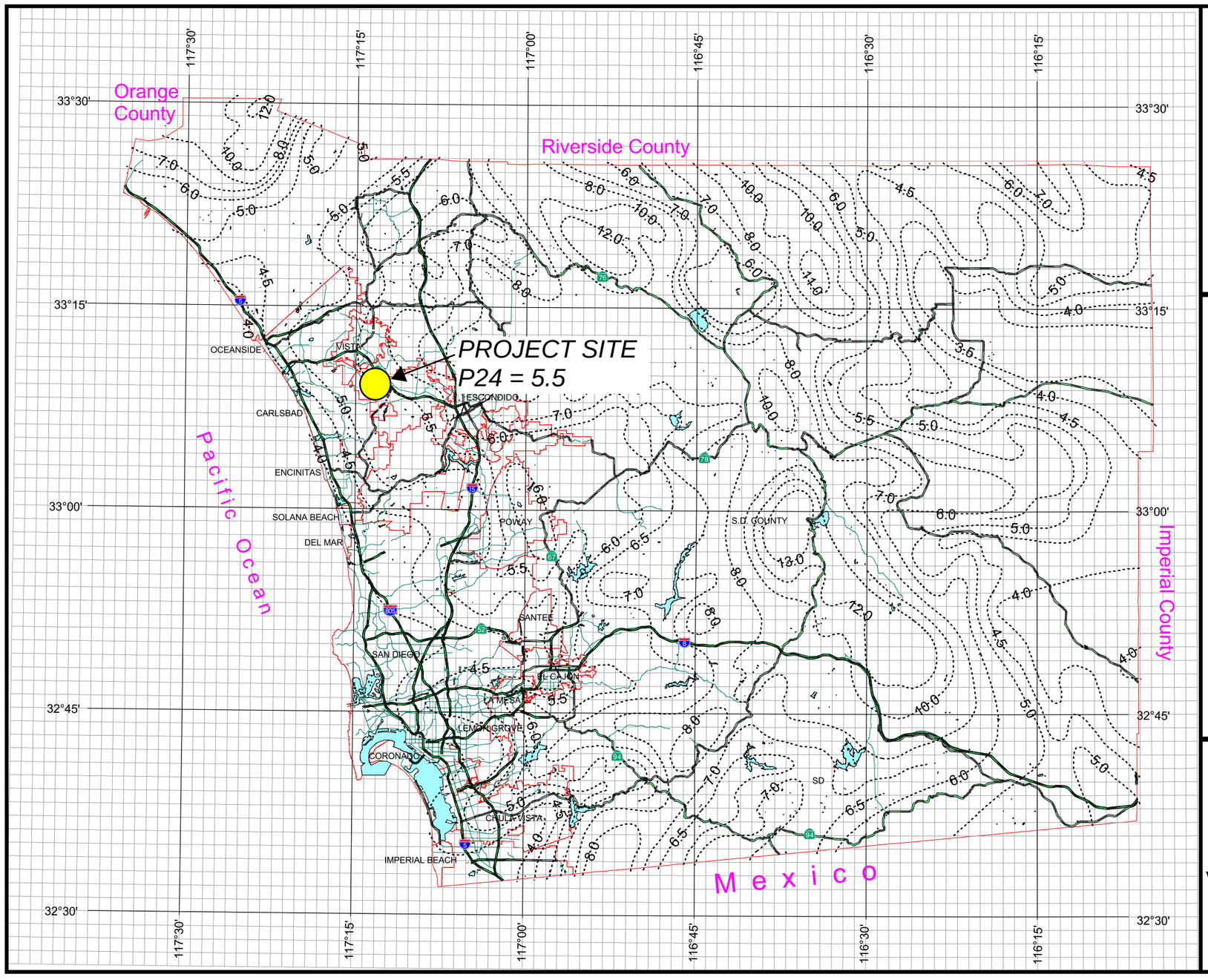
PROJECT ISOPULIVIAL MAP

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)



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3 0 3 Miles

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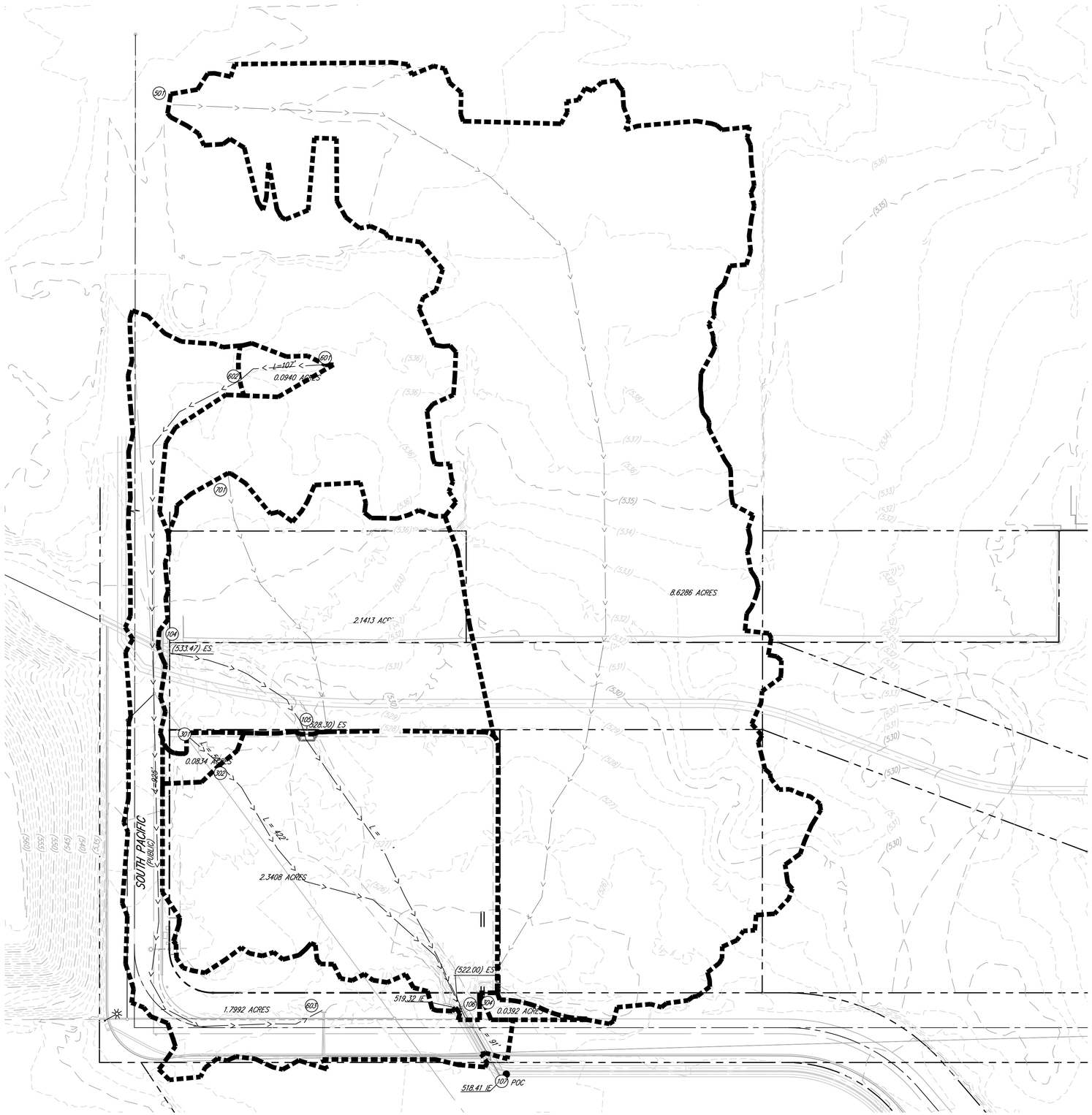
PROJECT ISOPULIVIAL MAP

ATTACHMENT 4
PRE-DEVELOPMENT HYDROLOGY EXHIBIT



LEGEND

- HYDRO BASIN BOUNDARY
- SURFACE FLOW
- PIPE FLOW
- 501 NODE NUMBER
- XXX ELEVATION

HYDROLOGY ANALYSIS RESULTS

	PRE	POST	POST MIT.
Q (CFS)	258.68	258.84	258.50
Tc (MIN)	51.74	49.85	49.85
V (FT/S)	15.49	15.49	15.49
A (AC)	170.63	170.63	170.63

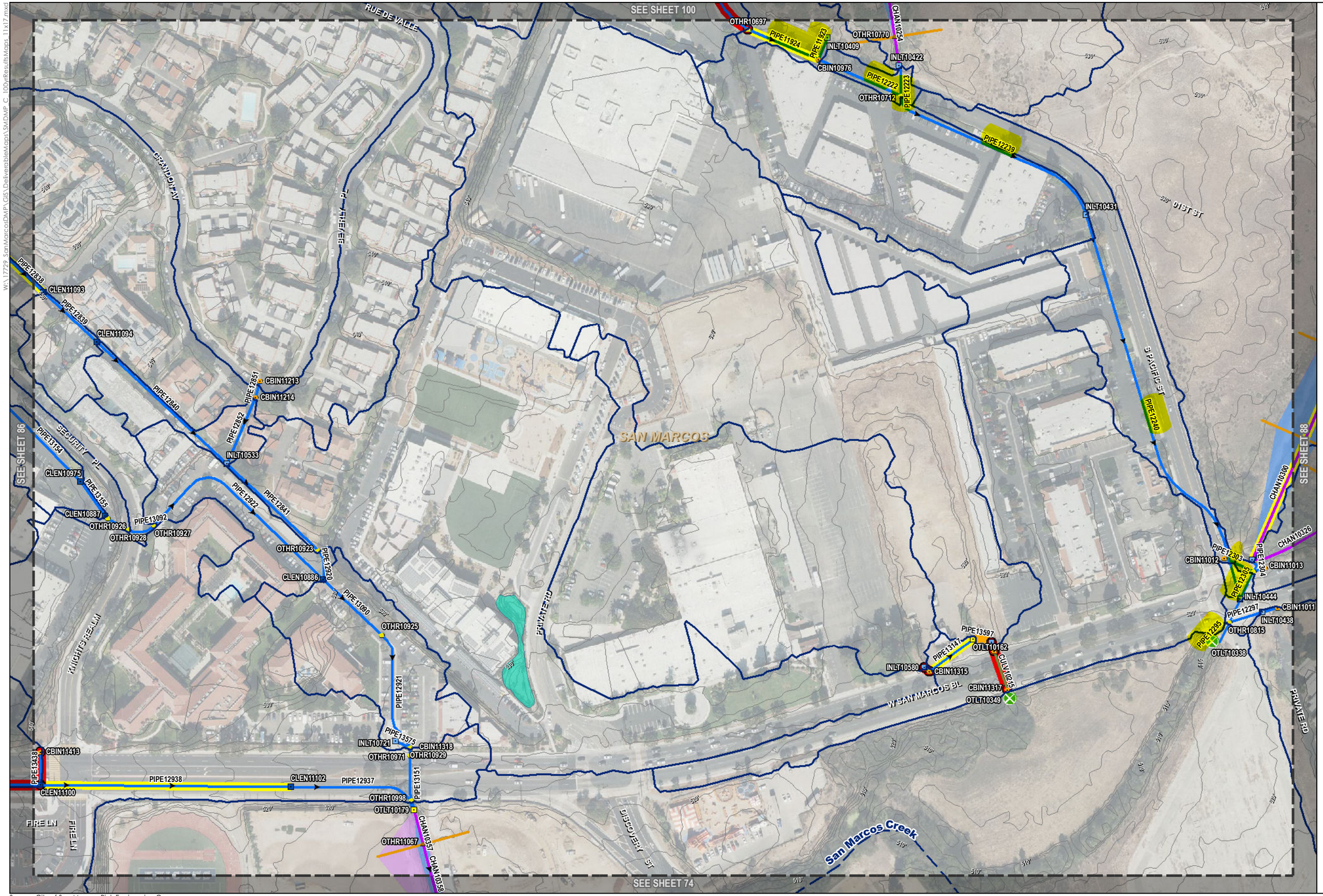
SCALE: 1:30

0 30 60 90 120

SOUTH PACIFIC STREET
PRE HYDROLOGY EXHIBIT
SHEETS 1 OF 2 ONSITE

V:\21\21088\Engineering\PrelimGP\Storm\Working Files\Hyd\21088-Pre-Hyd-Onsite.dwg 6/6/2022 11:49 AM ORIGINAL PLOT SIZE: PDF 24x36

W:\17729 SanMarcosDMP\GIS\DeliverableMaps\SMDMP_C_100yrResultsMaps_11x17.mxd



Map Legend

- Major River / Stream
- Sub-Catchments

Existing Inventory

- Channel Confluence
- Cleanout
- Curb Inlet
- Curb Outlet
- Detention Basin
- Inlet
- Outlet
- Other
- Separator
- Outfalls
- Culvert
- Channel wider than 5 ft
- Ditch less than 5 ft wide
- Elliptical
- Natural Channel
- Storm Main
- Channel / Ditch Transects
- 2-YR Flood Inundation
- 50-YR Flood Inundation
- 10-YR Flood Inundation
- 100-YR Flood Inundation
- Storm Detention Basin
- Surcharging Junctions

Surcharging Conduits

- Only Upstream Surcharging
- Only Downstream Surcharging
- Both Upstream and Downstream Surcharging

Source: City of San Marcos, Rick Engineering Company, SANGIS/USGS Aerial Imagery: 11/2014

Scale in Feet: 0 — 200 — 400

North

APPENDIX C

City of San Marcos - Drainage Master Plan

Existing Deficient Systems, 100 Year Results - Sheet 87

April, 2019

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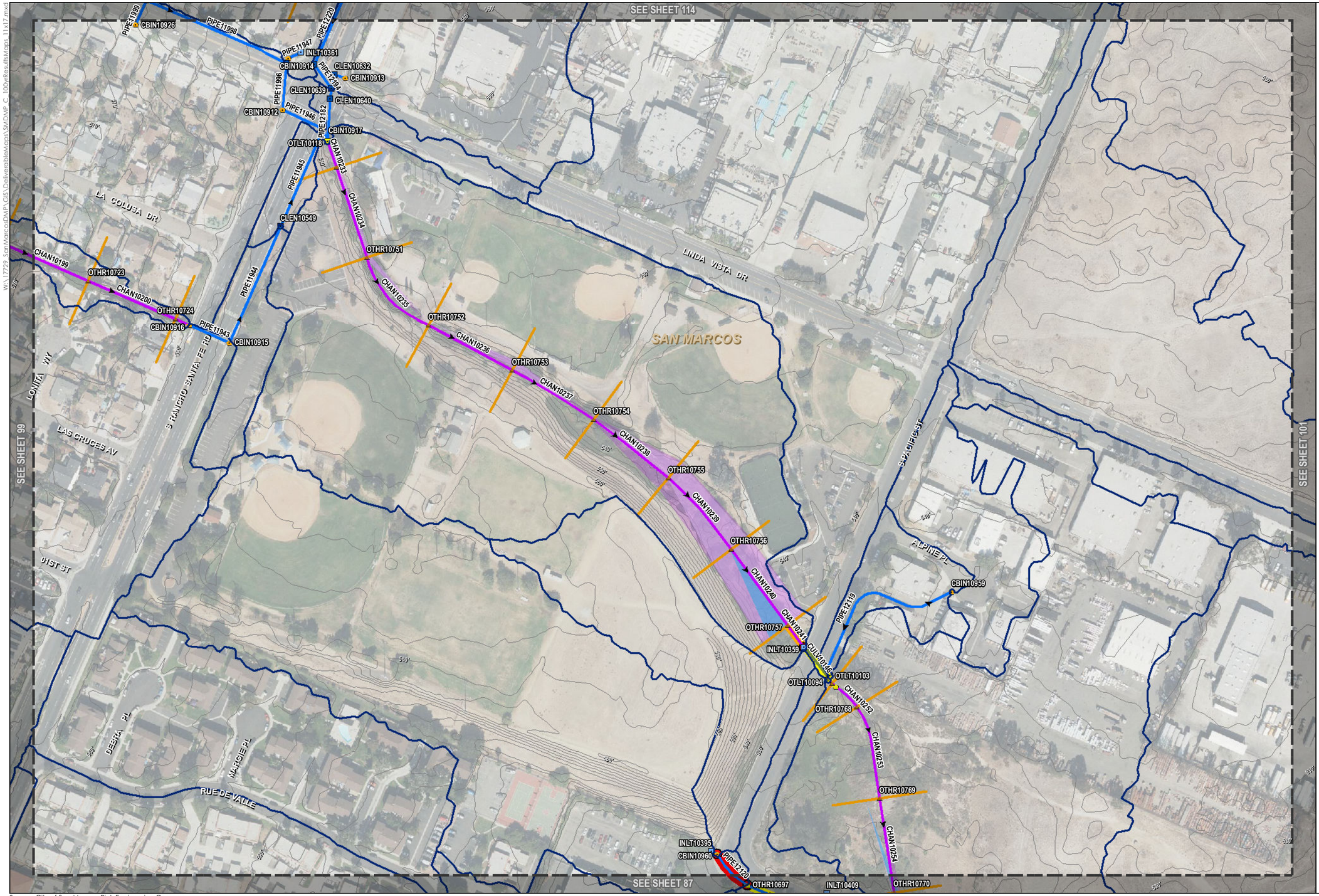

Map Legend

- Major River / Stream
- Sub-Catchments

Existing Inventory

- Channel Confluence
- Cleanout
- Curb Inlet
- Curb Outlet
- Detention Basin
- Inlet
- Outlet
- Other
- Separator
- Outfalls
- Culvert
- Channel wider than 5 ft
- Ditch less than 5 ft wide
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- Storm Main
- Channel / Ditch Transects
- 2-YR Flood Inundation
- 50-YR Flood Inundation
- 10-YR Flood Inundation
- 100-YR Flood Inundation
- Storm Detention Basin
- Surcharging Junctions

Surcharging Conduits

- Only Upstream Surcharging
- Only Downstream Surcharging
- Both Upstream and Downstream Surcharging

Source: City of San Marcos, Rick Engineering Company, SANGIS/USGS Aerial Imagery: 11/2014

Scale in Feet
0 200 400

North

APPENDIX C

City of San Marcos - Drainage Master Plan

Existing Deficient Systems, 100 Year Results - Sheet 100

April, 2019

Existing Condition Storm Conveyance Results Summary Table

Conveyance Info			Dimensions						2-year				10-year				50-year				100-year			
Facility ID	SubWatershed	Original FacilityID	D' or H' (diameter) or (height)	B' (width)	Barrels	Shape	Slope (ft/ft)	Material	Q_2 (cfs)	Q_{con} (2-year) (cfs)	Surcharging (2-year)	Qcon vs Qcap	Q_{10} (cfs)	Q_{con} (10-year) (cfs)	Surcharging (10-year)	Q_{50} (cfs)	Q_{con} (50-year) (cfs)	Surcharging (50-year)	Q_{100} (cfs)	Q_{con} (100-year) (cfs)	Surcharging (100-year)
FLOW10091	A2		0	0	1	DUMMY	0.012	RCP	0.0	98.7	None	0	0.0	167.6	None	0.0	243.8	None	285.8	285.8	None
FLOW10092	A2		0	0	1	DUMMY	0.006	RCP	0.0	98.2	None	0	0.0	167.0	None	0.0	300.2	None	308.0	308.0	None
PIPE11928	A3	ZPIP11347	1.5	0	1	CIRCULAR	0.006	RCP	56.0	40.5	Both Upstream and Downstream	5.17	90.5	52.8	Both Upstream and Downstream	133.4	66.2	Both Upstream and Downstream	153.2	71.9	Both Upstream and Downstream
PIPE11995	A3	ZPIP17423	1.5	0	1	CIRCULAR	0.001	PVC	10.8	9.2	Upstream	3.41	18.0	13.4	Upstream	27.1	18.1	Upstream	30.9	20.1	Upstream
PIPE11871	A3	ZPIP11140	2	0	2	CIRCULAR	0.001	RCP	43.5	44.2	Both Upstream and Downstream	2.56	86.2	75.3	Both Upstream and Downstream	110.5	107.7	Both Upstream and Downstream	126.5	123.9	Both Upstream and Downstream
PIPE11796	A3	ZPIP13803	1.5	0	1	CIRCULAR	0.004	RCP	15.1	14.5	Downstream	2.32	25.8	23.7	Both Upstream and Downstream	39.2	34.9	Both Upstream and Downstream	44.9	39.6	Both Upstream and Downstream
PIPE11654	A3	ZPIP16773	1.083	0	1	CIRCULAR	0.005	CMP	7.2	4.9	Upstream	2.9	12.2	6.8	Upstream	18.3	8.8	Upstream	20.8	9.6	Upstream
PIPE11655	A3	ZPIP16774	1.083	0	1	CIRCULAR	0.006	CMP	7.2	4.9	None	2.68	12.2	6.8	None	18.3	8.8	None	20.8	9.6	None
PIPE12066	A3	ZPIP17503	1.5	0	1	CIRCULAR	0.001	RCP	8.7	9.0	None	2.46	15.3	15.3	None	26.0	17.5	Upstream	28.6	18.7	Upstream
PIPE12202	A3	ZPIP15865	4	0	1	CIRCULAR	0.000	HDPE	30.5	24.7	None	1.84	90.4	52.7	Both Upstream and Downstream	78.8	70.0	Both Upstream and Downstream	85.5	65.0	Both Upstream and Downstream
CULV10154	A3	CUL13262	3.583	2.25	1	ARCH	0.003	CMP	26.3	19.5	None	0.88	50.0	35.5	None	72.3	94.5	Upstream	83.4	106.1	Both Upstream and Downstream
PIPE12290	A3	ZPIP11574	1.5	0	1	CIRCULAR	0.001	RCP	0.1	2.9	None	0.96	0.8	6.0	Both Upstream and Downstream	5.7	15.4	Both Upstream and Downstream	13.0	12.2	Both Upstream and Downstream
PIPE12133	A3	ZPIP16083	1	0	1	CIRCULAR	0.042	CMP	9.0	7.2	Upstream	1.83	15.0	10.5	Upstream	41.0	14.1	Both Upstream and Downstream	43.8	15.9	Both Upstream and Downstream
PIPE12210	A3	ZPIP14864	2	0	1	CIRCULAR	0.003	RCP	15.9	16.1	None	1.4	27.2	27.1	None	41.3	40.1	Upstream	47.3	45.7	Upstream
PIPE12015	A3	ZPIP15401	2.5	0	1	CIRCULAR	0.002	RCP	28.4	34.2	None	2.06	39.2	58.2	None	42.2	64.2	None	45.0	65.2	None
PIPE11801	A3	ZPIP17042	3.25	0	1	CIRCULAR	0.001	RCP	53.2	52.4	None	2.01	89.3	88.0	None	139.5	98.2	Upstream	158.9	100.7	Upstream
PIPE11929	A3	ZPIP14874	2	0	1	CIRCULAR	0.007	RCP	57.8	40.9	Both Upstream and Downstream	2.17	93.9	53.1	Both Upstream and Downstream	138.2	66.6	Both Upstream and Downstream	158.7	72.4	Both Upstream and Downstream
PIPE11898	A3	ZPIP11209	1.5	0	1	CIRCULAR	0.002	RCP	0.0	0.0	None	0	0.0	0.0	None	0.1	0.1	None	0.1	18.1	None
PIPE11799	A3	ZPIP17040	3.5	0	1	CIRCULAR	0.001	RCP	60.6	60.6	None	1.95	100.9	97.3	None	163.9	108.9	None	183.1	112.2	None
PIPE11925	A3	ZPIP14866	2.5	0	1	CIRCULAR	0.003	RCP	27.7	27.6	None	1.18	51.9	48.3	Both Upstream and Downstream	81.3	71.7	Both Upstream and Downstream	93.4	81.6	Both Upstream and Downstream
PIPE11953	A3	ZPIP11498	2.5	0	1	CIRCULAR	0.005	CMP	29.4	27.6	None	1.71	47.5	38.0	Upstream	68.2	48.6	Upstream	77.7	53.3	Upstream
PIPE12156	A3	ZPIP16535	1.5	0	1	CIRCULAR	0.002	RCP	4.9	5.0	None	1.18	8.3	9.0	None	12.5	13.4	None	14.2	13.8	None
PIPE11927	A3	ZPIP11346	2	0	1	CIRCULAR	0.010	RCP	57.8	40.9	Both Upstream and Downstream	1.81	93.9	53.0	Both Upstream and Downstream	138.4	66.5	Both Upstream and Downstream	158.8	72.2	Both Upstream and Downstream
PIPE11931	A3	ZPIP17269	2	0	1	CIRCULAR	0.011	RCP	62.1	42.5	Both Upstream and Downstream	1.8	101.3	55.0	Both Upstream and Downstream	149.3	68.9	Both Upstream and Downstream	171.4	74.8	Both Upstream and Downstream
PIPE11800	A3	ZPIP17041	3	0	1	CIRCULAR	0.001	RCP	31.0	30.2	None	1.37	53.1	56.5	None	82.0	66.9	Both Upstream and Downstream	94.6	68.9	Both Upstream and Downstream
PIPE12302	A3	ZPIP10920	2.5	0	1	CIRCULAR	0.004	RCP	73.4	50.7	None	2.06	110.5	60.3	Upstream	247.7	72.0	Upstream	239.3	77.0	Upstream
PIPE11642	A3	ZPIP16768	3.5	0	1	CIRCULAR	0.005	CIPCP	362.4	182.5	Upstream	2.86	605.4	192.5	Upstream	894.2	196.6	Upstream	998.4	198.3	Upstream
PIPE11782	A3	ZPIP10625	1.5	0	1	CIRCULAR	0.006	RCP	0.1	2.8	None	0.33	0.1	22.3	Both Upstream and Downstream	0.2	24.6	Both Upstream and Downstream	0.2	25.4	Both Upstream and Downstream
PIPE12225	A3		2.5	0	1	CIRCULAR	0.002	RCP	26.4	23.9	None	1.29	48.6	38.0	None	74.9	51.4	None	82.9	54.1	Upstream
PIPE12164	A3	PIP19069	4	0	2	CIRCULAR	0.005	CIPCP	524.9	138.0	None	0.8	903.3	253.2	None	1258.3	482.9	Upstream	1371.1	486.5	Upstream
PIPE11906	A3	ZPIP14764	3	0	1	CIRCULAR	0.004	HDPE	64.5	64.5	None	1.52	102.0	99.8	None	149.7	113.5	None	169.3	116.0	None
PIPE12163	A3	PIP19068	4	0	2	CIRCULAR	0.005	CIPCP	523.5	134.9	None	0.78	896.8	247.9	None	1245.9	471.7	Both Upstream and Downstream	1355.5	471.1	Both Upstream and Downstream
PIPE12161	A3	ZPIP17908	1.5	0	1	CIRCULAR	0.006	RCP	7.7	7.7	None	0.92	12.8	12.8	None	19.5	19.5	None	22.5	22.4	None
PIPE11855	A3	ZPIP14300	3	3	3	RECT_CLOSED	0.009	RCP	1.0	88.5	None	0.36	2.4	346.4	None	4.0	568.2	Upstream	4.6	632.2	Upstream
PIPE12249	A3	ZPIP10627	3.5	0	1	CIRCULAR	0.004	RCP	64.8	79.6	None	1.32	104.1	113.6	Upstream	153.8	143.9	Upstream	172.9	154.5	Upstream
PIPE11602	A3	ZPIP16641	2	0	1	CIRCULAR	0.009	RCP	11.8	11.8	None	0.54	24.0	24.0	None	37.8	37.7	None	44.4	55.5	None
PIPE12176	A3	ZPIP20005	3	0	1	CIRCULAR	0.010	RCP	45.1	65.6	Both Upstream and Downstream	0.98	73.3	103.0	Both Upstream and Downstream	108.0	149.1	Both Upstream and Downstream	124.4	169.7	Both Upstream and Downstream
PIPE11797	A3	ZPIP13804	2.5	0	1	CIRCULAR	0.006	RCP	69.6	45.0	Both Upstream and Downstream	1.42	114.2	58.3	Both Upstream and Downstream	168.1	72.9	Both Upstream and Downstream	192.1	79.3	Both Upstream and Downstream
CULV10155	A3	CUL16010	3.583	2.25	1	ARCH	0.003	CMP	22.2	17.5	None	0.78	45.5	33.7	None	68.7	49.8	None	79.7	55.9	Upstream
PIPE11798	A3	ZPIP17038	2.5	0	1	CIRCULAR	0.006	RCP	67.5	44.5	Both Upstream and Downstream	1.42	110.9	57.5	Both Upstream and Downstream	163.5	71.9	Both Upstream and Downstream	187.6	78.2	Both Upstream and Downstream
PIPE11905	A3	ZPIP14763	3	0	1	CIRCULAR	0.005	HDPE	64.5	64.6	None	1.39	102.0	99.8	None	149.7	113.5	None	172.5	116.0	None
PIPE11794	A3	ZPIP16667	2.5	0	1	CIRCULAR	0.007	RCP	83.0	49.9	None	1.41	136.3	63.7	Upstream	199.8	79.8	Upstream	228.8	86.8	Upstream
PIPE11795	A3	ZPIP13802	2.5	0	1	CIRCULAR	0.007	RCP	83.0	50.4	Upstream	1.43	136.1	63.5	Both Upstream and Downstream	200.6	79.5	Both Upstream and Downstream	228.5	86.4	Both Upstream and Downstream
PIPE11689	A3	ZPIP16844	2.25	0	1	CIRCULAR	0.006	RCP	14.1	26.7	None	1.13	30.4	35.9	None	51.9	62.6	None	59.7	56.8	Upstream
PIPE12016	A3	ZPIP17456	2.5	0	1	CIRCULAR	0.004	RCP	28.0	33.3	None	1.29	38.2	57.2	None	40.3	61.6	Upstream	42.2	62.4	Upstream
PIPE12123	A3	ZPIP15943	1.5	0	1	CIRCULAR	0.016	RCP	0.0	0.7	None	0.05	0.1	0.3	None	0.5	28.1	None	0.6	31.6	None
CHAN10282	A3		0	0	1	IRREGULAR	0.009	Concrete	4.2	4.8	None	0.03	7.2	8.7	None	11.7	12.9	None	13.9	408.5	None
PIPE11780	A3	ZPIP13222	1.5	0	1	CIRCULAR	0.051	RCP	31.7	31.2	None	1.32	50.8	44.6	Upstream	74.8	52.5	Upstream	84.7	56.1	Upstream
PIPE12186	A3	PIP10617	3.5	0	1	CIRCULAR	0.002	RCP	47.7	40.9	None	0.83	111.4	82.0	None	158.6	110.1	None	172.8	117.0	None
PIPE12162	A3	ZPIP17911	1.5	0	1	CIRCULAR	0.023	RCP	39.2	19.0	None	1.19	67.3	26.7	None	103.4	34.2	None	120.9	37.5	Upstream
PIPE12195	A3	PIP10789	4	0	1	CIRCULAR	0.003	RCP	77.4	73.2	None	0.89	152.7	125.2	None	230.6	172.5	None	262.0	192.9	None
PIPE12182	A3	ZPIP11353	4	0	1	CIRCULAR	0.003	RCP	77.4	73.2	None	0.89	152.8	125.2	None	230.7	172.5	None	262.3	192.9	None
PIPE11653	A3	ZPIP16772	1.083	0	1	CIRCULAR	0.004	CMP	2.6	1.9	Both Upstream and Downstream	1.18	4.4	2.6	Both Upstream and Downstream	6.5	3.3	Both Upstream and Downstream	7.4	3.6	Both Upstream and Downstream
PIPE12287	A3	ZPIP15295	1.5	0	1	CIRCULAR	0.002	RCP	0.0	0.1	None	0.02	0.3	2.9	Both Upstream and Downstream	8.1	10.6	Both Upstream and Downstream	7.5	11.1	Both Upstream and Downstream
PIPE11700	A3	ZPIP13073	1.5	0	1	CIRCULAR	0.010	RCP	7.8	7.8	None	0.74	12.8	13.2	None	19.1	20.7	None	21.7	22.8	None
PIPE12264	A3	ZPIP10918	2.5	0	1	CIRCULAR	0.005	RCP	65.1	43.4	None	1.49	99.3	50.3	Both Upstream and Downstream	218.7	59.0	Both Upstream and Downstream	207.3	63.0	Both Upstream and Downstream
PIPE12267	A3	ZPIP17099	2.5	0	1	CIRCULAR	0.004	RCP	56.9	37.7	Both Upstream and Downstream	1.46	95.1	44.6	Both Upstream and Downstream	197.1	52.3	Both Upstream and Downstream	180.8	55.9	Both Upstream and Downstream
PIPE11688	A3	ZPIP16843	6.5	0	1	CIRCULAR	0.006	CIPCP	514.3	484.3	None	1.43	854.7	500.1	None	1228.9	671.7	None	1388.7	715.9	None
PIPE11926	A3	ZPIP11343	2.5	0	1	CIRCULAR	0.013	RCP	38.7	38.6	None	0.84	70.5	61.8	Both Upstream and Downstream	109.0	86.0	Both Upstream and Downstream	124.9	96.7	Both Upstream and Downstream
PIPE12316	A3	ZPIP11344	2.5	0	1	CIRCULAR	0.013	RCP	40.4	40.5	None	0.87	67.9	63.3	Upstream	115.5	86.3	Both Upstream and Downstream	136.0	96.8	Both Upstream and Downstream
PIPE12059	A3	ZPIP17500	3.5	0	1	CIRCULAR	0.006	RCP	77.8	81.3	None	1.06	128.0	117.9	Both Upstream and Downstream	189.7	146.9	Both Upstream and Downstream	213.2	158.1	Both Upstream and Downstream
PIPE11783	A3	ZPIP10626	3.5	0	1	CIRCULAR	0.006	RCP	77.4	79.7	None	1.04	126.4	115.1	Both Upstream and Downstream	185.2	145.0	Both Upstream and Downstream	207.0	155.7	Both Upstream and Downstream
PIPE11806	A3	ZPIP10821	2.5	0	1	CIRCULAR	0.038	CMP	27.5	27.4	None	0.63	48.5	49.9	None	77.3	76.3	None	89.3	87.6	None
PIPE11917	A3	ZPIP11338	1.5	0	1	CIRCULAR	0.008	PVC	5.4	5.4	None	0.59	9.8	9.8	None	15.0	16.2	None	17.2	18.4	None
PIPE12215	A3	ZPIP11046	1.5	0	1	CIRCULAR	0.027	RCP	10.3	10.7	None	0.62	19.8	20.6	None	32.5	31.2	Both Upstream and Downstream	36.9	34.6	Both Upstream and Downstream
PIPE12269	A3	ZPIP17101	2.5	0	1	CIRCULAR	0.006	RCP	63.5	42.2	Upstream	1.37	99.7	49.2	Both Upstream and Downstream	212.9	57.6	Both Upstream and Downstream	201.6	61.6	Both Upstream and Downstream
PIPE12148	A3	ZPIP17847	4	0	1	CIRCULAR	0.000	HDPE	12.1	20.8	None	0.76	17.5	33.3	None	35.9	47.8	None	46.2	53.9	None
PIPE11687	A3	ZPIP13032	6.5	0	1	CIRCULAR	0.005	CIPCP	504.5	354.9	None	1.06	835.8	466.5	None	1202.7	585.1	None	1353.8	645.4	None
PIPE12222	A3	ZPIP11342	2.25	0	1	CIRCULAR	0.004	RCP	10.3	10.3	None	0.51	22.6	22.4	None	36.7	36.3	None	42.7	38.8	None
PIPE12288	A3	ZPIP11572	2	3.167	1	HORIZ_ELLIPSE	0.004	RCP	22.6	22.7	None	0.86	40.3	33.9	Both Upstream and Downstream	86.9	44.4	Both Upstream and Downstream	72.7	50.6	Both Upstream and Downstream
PIPE12301	A3	ZPIP10919	2.5	0	1	CIRCULAR	0.007	RCP	66.1	44.5	None	1.34	98.9	51.3	Both Upstream and Downstream	222.9	60.1	Both Upstream and Downstream	211.7	64.2	Both Upstream and Downstream
PIPE12268	A3	ZPIP17100	2.5	0	1	CIRCULAR	0.005	RCP	59.5	40.1	Both Upstream and Downstream	1.33	96.0	46.0	Both Upstream and Downstream	201.5	54.1	Both Upstream and Downstream	188.9	57.8	Both Upstream and Downstream
CULV10176	A3	CUL063	3	0	2	CIRCULAR	0.038	RCP	528.4	194.0	None	0.74	881.2	262.5	None	1174.1	485.5	Both Upstream and Downstream	1357.4	500.1	Both Upstream and Downstream
PIPE11753	A3	ZPIP13188	1.5	0	1	CIRCULAR	0.026	RCP	12.8	12.9	None	0.76	20.6	20.6	None	30.3	29.2	None	34.2	31.7	None
PIPE12198	A3		6.5	0	1	CIRCULAR	0.005	CIPCP	506.5	351.4	None	1.05	836.5	466.3	None	1204.4	594.6	None	1357.1	623.1	None
PIPE11712	A3	ZPIP13091	6	0	1	CIRCULAR	0.006	CIPCP	492.7	318.8	None	1.12	809.0	435.4	None	1186.6	529.7	None	1342.9	526.7	None

Existing Condition Storm Conveyance Results Summary Table

Conveyance Info			Dimensions						2-year				10-year				50-year				100-year			
Facility ID	SubWatershed	Original FacilityID	D' or H' (diameter) or (height)	B' (width)	Barrels	Shape	Slope (ft/ft)	Material	Q_2 (cfs)	Q_{con} (2-year) (cfs)	Surcharging (2-year)	Qcon vs Qcap	Q_{10} (cfs)	Q_{con} (10-year) (cfs)	Surcharging (10-year)	Q_{50} (cfs)	Q_{con} (50-year) (cfs)	Surcharging (50-year)	Q_{100} (cfs)	Q_{con} (100-year) (cfs)	Surcharging (100-year)
PIPE11667	A3	ZPIP10366	1.5	0	1	CIRCULAR	0.027	RCP	6.0	6.0	None	0.35	9.5	9.5	None	13.9	16.1	None	15.6	21.5	None
PIPE11717	A3	ZPIP10443	2.25	0	1	CIRCULAR	0.011	RCP	16.5	16.5	None	0.52	27.4	26.1	None	41.1	40.0	None	46.9	40.2	None
CULV10137	A3	ZCUL12204	4	8	1	RECT_CLOSED	0.002	RCP	110.6	120.6	None	0.57	168.8	191.2	None	241.4	248.0	None	253.0	267.7	None
PIPE12018	A3	ZPIP11635	3.5	0	1	CIRCULAR	0.004	RCP	44.5	44.4	None	0.66	73.2	91.9	None	111.3	82.4	Both Upstream and Downstream	126.7	84.1	Both Upstream and Downstream
PIPE11840	A3	ZPIP17070	1.5	0	1	CIRCULAR	0.010	RCP	4.5	4.6	None	0.45	7.3	7.5	None	11.2	11.2	None	12.8	12.8	None
PIPE12022	A3	ZPIP15406	3	0	1	CIRCULAR	0.012	RCP	38.5	38.6	None	0.53	63.7	77.0	None	97.3	91.0	Both Upstream and Downstream	110.9	91.2	Both Upstream and Downstream
PIPE12251	A3	ZPIP15290	1.5	0	1	CIRCULAR	0.005	RCP	2.1	6.5	None	0.87	3.4	3.4	Both Upstream and Downstream	6.6	4.7	Both Upstream and Downstream	5.5	9.2	Both Upstream and Downstream
CHAN10221	A3	CH10142C	0	0	1	IRREGULAR	0.005	Earthen	199.0	225.6	None	0.72	314.6	362.0	Upstream	326.2	417.8	Upstream	268.2	388.0	Upstream
DTCH10276	A3	DD055A	0	0	1	IRREGULAR	0.001	CONCRETE	522.0	178.6	None	0.45	921.3	262.3	None	1171.5	485.5	Both Upstream and Downstream	1353.8	500.1	Both Upstream and Downstream
PIPE12017	A3	ZPIP11634	3.5	0	1	CIRCULAR	0.004	RCP	48.0	47.4	None	0.74	79.4	80.9	Downstream	120.4	82.0	Both Upstream and Downstream	136.8	78.8	Both Upstream and Downstream
PIPE12064	A3	ZPIP15559	1.5	0	1	CIRCULAR	0.002	RCP	0.7	3.6	None	0.7	1.1	5.8	None	1.7	5.7	None	1.6	6.3	Downstream
PIPE12124	A3	ZPIP11929	3.5	0	3	CIRCULAR	0.003	RCP	81.4	91.2	None	0.56	127.3	141.7	None	169.9	176.2	None	187.8	200.3	None
PIPE11682	A3	ZPIP10379	6	0	1	CIRCULAR	0.015	CIPCP	499.0	325.6	None	0.72	820.0	444.9	None	1199.0	543.5	None	1362.6	549.8	None
PIPE11804	A3	ZPIP10820	2.5	0	1	CIRCULAR	0.058	CMP	26.5	26.7	None	0.5	41.7	42.1	None	63.3	58.8	None	75.2	65.0	None
PIPE11836	A3	ZPIP13972	2	0	1	CIRCULAR	0.005	RCP	7.2	7.2	None	0.44	11.3	11.4	None	16.5	17.3	None	18.6	19.9	None
CHAN10285	A3	CH050A	0	0	1	IRREGULAR	0.002	Concrete	93.7	112.5	None	0.62	146.9	172.3	None	204.8	206.4	None	228.7	221.7	None
PIPE11588	A3	ZPIP12751	1.5	0	1	CIRCULAR	0.033	RCP	8.6	8.6	None	0.45	13.7	13.7	None	20.2	20.1	None	22.8	23.1	None
PIPE11661	A3	ZPIP12992	1.75	0	1	CIRCULAR	0.096	RCP	27.2	27.3	None	0.56	47.7	47.7	None	72.1	58.0	Upstream	82.3	59.7	Upstream
PIPE12285	A3	ZPIP15293	1.5	0	1	CIRCULAR	0.004	RCP	0.0	0.0	None	0	0.7	2.9	Both Upstream and Downstream	25.6	4.0	Both Upstream and Downstream	7.5	8.4	Both Upstream and Downstream
PIPE11534	A3	ZPIP12709	4.5	0	1	CIRCULAR	0.015	RCP	99.7	100.1	None	0.42	172.8	173.1	None	254.5	255.5	None	281.5	290.4	None
PIPE11681	A3	ZPIP10378	6	0	1	CIRCULAR	0.015	CIPCP	496.1	322.7	None	0.72	814.9	440.6	None	1193.3	526.5	None	1354.6	537.9	None
PIPE11720	A3	ZPIP10446	1.5	0	1	CIRCULAR	0.019	RCP	6.8	6.8	None	0.47	11.1	12.0	None	16.6	18.4	None	18.8	17.4	None
CULV10146	A3	CUL051A	4	0	1	CIRCULAR	0.010	RCP	99.9	89.7	None	0.63	166.3	131.4	Upstream	214.6	160.8	Upstream	232.2	172.0	Upstream
PIPE12197	A3	PIP10825	2	0	1	CIRCULAR	0.025	PVC	32.4	30.5	None	0.85	60.0	39.4	None	91.5	42.5	None	103.3	43.1	None
PIPE11828	A3	ZPIP10855	2.5	0	1	CIRCULAR	0.056	RCP	34.4	34.4	None	0.35	70.7	71.6	None	109.1	107.5	None	127.0	114.5	Upstream
PIPE12051	A3	ZPIP17471	2	0	1	CIRCULAR	0.011	RCP	9.9	9.9	None	0.43	17.0	16.2	None	25.5	23.1	None	29.1	27.4	None
PIPE12199	A3	ZPIP18000	1.5	0	1	CIRCULAR	0.024	RCP	5.7	5.3	None	0.33	9.3	9.2	None	11.0	17.4	None	11.9	19.1	None
PIPE12294	A3	ZPIP15301	2	3.167	2	HORIZ_ELLIPSE	0.004	RCP	34.7	35.1	None	0.67	63.7	50.4	Both Upstream and Downstream	115.5	53.9	Both Upstream and Downstream	107.6	61.3	Both Upstream and Downstream
PIPE11908	A3	ZPIP11288	4	0	1	CIRCULAR	0.005	HDPE	65.7	65.5	None	0.64	104.2	105.2	None	153.0	117.6	None	173.3	119.4	None
PIPE11613	A3	ZPIP10259	7	0	1	CIRCULAR	0.013	CIPCP	314.0	314.6	None	0.49	530.0	518.4	None	784.0	702.8	Upstream	866.9	742.8	Both Upstream and Downstream
PIPE11636	A3	ZPIP10269	2	0	1	CIRCULAR	0.095	RCP	28.2	28.1	None	0.4	46.3	45.1	None	69.5	70.7	Both Upstream and Downstream	79.0	80.5	Both Upstream and Downstream
PIPE11650	A3	ZPIP16769	1.5	0	1	CIRCULAR	0.096	RCP	10.2	10.2	None	0.31	17.1	17.1	None	25.4	30.3	None	28.8	37.7	None
CHAN10218	A3	CH10142B	0	0	1	IRREGULAR	0.005	Earthen	236.3	243.9	Downstream	1.08	417.2	249.5	Downstream	596.3	249.0	Downstream	646.6	262.3	Downstream
PIPE11698	A3	ZPIP10404	3	0	1	CIRCULAR	0.013	RCP	29.5	29.8	None	0.39	50.4	50.2	None	76.0	75.4	None	86.9	88.2	None
PIPE11764	A3	ZPIP10468	3	0	1	CIRCULAR	0.036	RCP	54.4	54.7	None	0.43	91.1	91.1	None	139.1	135.7	None	158.0	145.4	None
PIPE12021	A3	ZPIP15405	3	0	1	CIRCULAR	0.011	RCP	38.7	38.8	None	0.56	64.1	73.9	None	98.0	79.6	Both Upstream and Downstream	111.8	79.4	Both Upstream and Downstream
PIPE11872	A3	ZPIP14488	2	0	2	CIRCULAR	0.058	RCP	43.8	44.2	Both Upstream and Downstream	0.41	86.0	75.3	Both Upstream and Downstream	110.5	108.1	Both Upstream and Downstream	126.5	124.1	Both Upstream and Downstream
PIPE11934	A3	ZPIP14877	2.5	0	1	CIRCULAR	0.020	RCP	30.4	28.3	None	0.49	53.1	44.7	None	83.0	64.5	Downstream	91.2	66.1	Downstream
PIPE11924	A3	ZPIP14863	2.25	0	1	CIRCULAR	0.010	RCP	8.7	8.7	None	0.28	20.1	20.1	None	33.0	32.1	None	38.4	35.3	Upstream
CULV10167	A3	ZCUL13915	4	8	1	RECT_CLOSED	0.003	RCP	112.3	122.8	None	0.5	170.4	196.4	None	248.3	256.4	None	261.4	277.7	None
PIPE12280	A3	ZPIP15285	2	0	1	CIRCULAR	0.009	PVC	7.7	9.1	None	0.41	8.2	14.5	None	24.1	21.2	None	25.7	25.0	None
PIPE11711	A3	ZPIP10415	2.5	0	1	CIRCULAR	0.038	RCP	38.8	39.0	None	0.49	66.2	69.2	None	99.3	87.5	None	112.8	89.1	Upstream
PIPE12007	A3	ZPIP15333	2	0	1	CIRCULAR	0.008	RCP	8.1	8.3	None	0.41	13.4	13.5	None	20.0	19.8	None	22.7	22.9	None
PIPE12247	A3		3	0	1	CIRCULAR	0.011	RCP	46.5	39.1	Both Upstream and Downstream	0.56	74.9	53.5	Both Upstream and Downstream	110.1	70.3	Both Upstream and Downstream	127.1	78.0	Both Upstream and Downstream
PIPE12154	A3	ZPIP16527	3.75	2.417	1	VERT_ELLIPSE	0.005	RCP	19.8	19.2	None	0.39	32.1	32.2	None	48.4	50.0	None	57.6	54.3	Upstream
PIPE12231	A3	ZPIP10469	1.5	0	1	CIRCULAR	0.137	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	31.3	None	0.0	43.3	None
PIPE11984	A3	ZPIP11550	3	0	1	CIRCULAR	0.006	RCP	19.0	19.0	None	0.37	33.0	32.7	None	49.5	49.0	None	56.3	57.3	None
PIPE11713	A3	ZPIP13093	4	0	1	CIRCULAR	0.003	CIPCP	17.6	14.9	None	0.22	23.7	24.4	None	37.1	65.3	None	42.6	72.1	None
PIPE11914	A3	ZPIP14827	7	10	1	RECT_CLOSED	0.002	RCP	551.1	208.0	None	0.41	827.2	334.6	None	1264.2	536.7	None	1392.1	559.2	Downstream
PIPE11986	A3	ZPIP15286	2	0	1	CIRCULAR	0.007	PVC	6.9	7.7	None	0.41	6.7	12.4	None	20.0	18.2	None	21.8	20.4	None
PIPE12065	A3	ZPIP17502	1.5	0	1	CIRCULAR	0.002	RCP	1.9	3.1	None	0.66	4.0	5.5	None	6.7	5.8	Downstream	5.8	5.1	Both Upstream and Downstream
PIPE11846	A3	ZPIP14135	2	3.167	1	HORIZ_ELLIPSE	0.003	RCP	6.6	22.7	None	0.92	13.4	30.5	None	17.3	27.3	Both Upstream and Downstream	19.1	26.8	Both Upstream and Downstream
PIPE11581	A3	ZPIP12745	2	0	1	CIRCULAR	0.024	RCP	15.0	15.1	None	0.43	24.3	24.1	None	35.9	35.7	None	40.8	37.8	None
PIPE11936	A3	ZPIP14879	2.5	0	1	CIRCULAR	0.023	RCP	30.4	28.2	None	0.46	52.6	44.6	None	81.2	64.0	None	88.9	66.0	None
PIPE11985	A3	ZPIP15250	2	0	1	CIRCULAR	0.026	RCP	13.0	13.1	None	0.36	23.3	23.2	None	35.3	34.3	None	40.3	39.2	None
PIPE11994	A3	ZPIP17422	3	0	1	CIRCULAR	0.010	RCP	28.2	27.0	None	0.4	47.9	47.6	None	73.2	64.4	None	83.9	72.2	None
PIPE12035	A3	ZPIP15435	1.5	0	1	CIRCULAR	0.086	RCP	11.7	11.7	None	0.38	19.4	19.4	None	28.9	28.8	None	32.8	32.6	None
PIPE12175	A3	ZPIP20004	1.5	0	1	CIRCULAR	0.018	RCP	0.0	4.7	Both Upstream and Downstream	0.33	0.0	8.3	Both Upstream and Downstream	0.0	12.9	Both Upstream and Downstream	0.0	15.1	Both Upstream and Downstream
PIPE11644	A3	ZPIP10275	2.5	0	1	CIRCULAR	0.027	RCP	20.2	19.7	None	0.29	31.5	36.0	None	49.9	68.1	None	68.3	71.2	None
PIPE11648	A3	ZPIP12830	7	0	1	CIRCULAR	0.017	CIPCP	319.1	309.5	Downstream	0.43	538.4	539.0	Downstream	797.2	720.8	Downstream	879.6	749.1	Downstream
PIPE11686	A3	ZPIP13028	1.5	0	1	CIRCULAR	0.032	RCP	5.2	5.2	None	0.28	8.5	8.4	None	12.5	12.8	None	14.1	19.6	None
PIPE11640	A3	ZPIP16766	7	0	1	CIRCULAR	0.017	CIPCP	316.1	314.2	None	0.44	533.4	546.0	None	790.3	740.0	None	873.7	745.9	Upstream
PIPE11977	A3	ZPIP15245	2	0	1	CIRCULAR	0.019	RCP	10.5	10.6	None	0.33	19.0	19.0	None	28.9	28.0	None	33.1	32.7	None
PIPE11643	A3	ZPIP10274	4.5	0	1	CIRCULAR	0.012	CIPCP	363.5	182.7	None	0.97	607.5	195.5	None	901.5	195.0	None	1001.8	194.5	None
PIPE12052	A3	ZPIP11673	2	0	1	CIRCULAR	0.018	RCP	9.9	9.9	None	0.33	17.0	16.2	None	25.6	27.5	None	29.1	30.9	None
PIPE11757	A3	ZPIP13189	1.75	0	1	CIRCULAR	0.061	RCP	12.5	12.6	None	0.32	22.4	22.4	None	34.0	36.3	None	38.9	39.8	None
PIPE11603	A3	ZPIP12787	4	0	1	CIRCULAR	0.036	RCP	87.6	87.6	None	0.32	148.2	148.4	None	219.2	220.5	None	249.7	276.2	None
PIPE11624	A3	ZPIP12807	3	0	1	CIRCULAR	0.022	RCP	32.3	32.4	None	0.33	57.7	57.8	None	87.9	87.6	None	100.6	99.8	None
PIPE11634	A3	ZPIP16763	2.5	0	1	CIRCULAR	0.029	RCP	27.4	27.5	None	0.4	43.1	43.1	None	62.7	62.4	None	70.6	70.3	None
PIPE11714	A3	ZPIP13141	3	0	1	CIRCULAR	0.008	RCP	24.5	24.1	None	0.41	40.4	38.9	None	60.5	62.0	None	67.3	58.8	None
PIPE12046	A3	ZPIP15481	2.5	0	1	CIRCULAR	0.008	RCP	17.1	14.7	None	0.41	29.4	23.2	None	44.1	35.1	None	50.4	35.5	Downstream
PIPE11707	A3	ZPIP10411	1.5	0	1	CIRCULAR	0.009	RCP	0.0	2.4	None	0.24	0.0	0.6	None	1.3	9.9	None	1.8	9.8	None
PIPE11721	A3	ZPIP13145	1.5	0	1	CIRCULAR	0.021	RCP	5.7	5.7	None	0.38	9.3	9.7	None	14.0	15.6	None	15.9	15.0	None
PIPE11768	A3	ZPIP13198	4	0	1	CIRCULAR	0.014	RCP	59.0	59.2	None	0.35	98.4	97.8	None	149.7	151.6	None	170.0	169.5	None
DTCH10271	A3	DD055B	0	0	1	IRREGULAR	0.006	CONCRETE	438.4	158.5	None	0.3	735.8	267.4	None	1159.7	503.0	None	1345.7	517.5	None
PIPE11517	A3	ZPIP12698	5	0	1	CIRCULAR	0.033	CIPCP	139.3	139.9	None	0.34	242.8	243.5	None	358.2	358.7	None	403.7	402.4	None

Existing Condition Storm Conveyance Results Summary Table

Conveyance Info			Dimensions						2-year				10-year				50-year				100-year			
Facility ID	SubWatershed	Original FacilityID	D' or H' (diameter) or (height)	B' (width)	Barrels	Shape	Slope (ft/ft)	Material	Q_2 (cfs)	Q_{con} (2-year) (cfs)	Surcharging (2-year)	Qcon vs Qcap	Q_{10} (cfs)	Q_{con} (10-year) (cfs)	Surcharging (10-year)	Q_{50} (cfs)	Q_{con} (50-year) (cfs)	Surcharging (50-year)	Q_{100} (cfs)	Q_{con} (100-year) (cfs)	Surcharging (100-year)	
PIPE11987	A3	ZPIP17409	1.5	0	1	CIRCULAR	0.008	PVC	3.3	3.3	None	0.36	4.1	5.4	None	8.4	8.1	None	9.5	9.2	None	
PIPE12125	A3	ZPIP15995	4	0	3	CIRCULAR	0.005	RCP	102.8	134.6	None	0.44	185.9	208.6	None	285.1	262.1	None	329.3	302.1	None	
PIPE12248	A3		6.5	0	1	CIRCULAR	0.016	CIPCP	502.6	331.7	None	0.58	825.8	462.2	None	1211.3	548.9	None	1371.3	557.8	None	
PIPE11628	A3	ZPIP10266	5	0	1	CIRCULAR	0.032	CIPCP	140.8	141.4	None	0.35	245.3	246.1	None	362.7	365.4	None	405.7	388.1	None	
PIPE11695	A3	ZPIP13072	3	0	1	CIRCULAR	0.018	RCP	29.6	29.8	None	0.33	50.5	50.2	None	76.3	75.5	None	87.4	87.2	None	
PIPE12194	A3	PIP10788	4	0	1	CIRCULAR	0.016	RCP	70.6	66.7	None	0.36	141.3	113.6	None	214.0	158.6	None	243.4	176.3	None	
PIPE12243	A3	ZPIP13176	3	0	1	CIRCULAR	0.052	RCP	52.5	52.8	None	0.35	88.0	88.0	None	134.5	136.2	None	152.8	145.3	None	
PIPE11747	A3	ZPIP13182	1.75	0	1	CIRCULAR	0.016	RCP	5.0	5.1	None	0.25	9.8	9.8	None	15.2	15.2	None	17.5	18.8	None	
PIPE12293	A3	ZPIP15300	2	3.167	2	HORIZ_ELLIPSE	0.004	RCP	34.8	34.1	None	0.65	64.0	52.4	Both Upstream and Downstream	116.6	46.3	Both Upstream and Downstream	107.9	49.9	Both Upstream and Downstream	
PIPE11538	A3	ZPIP12713	1.5	0	1	CIRCULAR	0.018	RCP	5.1	5.1	None	0.36	8.1	8.1	None	11.9	11.9	None	13.4	13.4	None	
PIPE11669	A3	ZPIP12997	1.75	0	1	CIRCULAR	0.092	RCP	15.4	15.5	None	0.32	28.7	28.7	None	44.0	42.9	Downstream	50.4	45.5	Downstream	
PIPE11716	A3	ZPIP13144	1.5	0	1	CIRCULAR	0.010	RCP	1.1	1.1	None	0.1	1.7	2.6	None	2.6	14.7	None	2.9	9.8	None	
PIPE11990	A3	ZPIP11590	2	0	1	CIRCULAR	0.021	RCP	8.6	8.7	None	0.27	16.0	16.0	None	24.4	27.4	None	27.9	30.6	None	
PIPE11750	A3	ZPIP13185	1.5	0	1	CIRCULAR	0.070	RCP	10.4	10.4	None	0.38	16.8	16.8	None	24.8	24.0	None	28.1	25.9	None	
PIPE11841	A3	ZPIP17071	6.5	0	1	CIRCULAR	0.003	RCP	108.7	118.4	None	0.43	167.8	185.5	None	240.2	237.9	None	251.8	255.6	None	
PIPE11842	A3	ZPIP17072	6.5	0	1	CIRCULAR	0.003	RCP	109.3	117.4	None	0.43	175.4	183.7	None	266.5	236.7	None	278.3	253.6	None	
PIPE11843	A3	ZPIP17073	6.5	0	1	CIRCULAR	0.003	RCP	110.4	117.2	None	0.42	179.9	183.9	None	281.8	241.3	None	305.4	261.4	None	
PIPE11941	A3	ZPIP11352	6	0	2	CIRCULAR	0.004	RCP	186.5	229.3	None	0.41	317.1	354.4	None	461.0	451.5	None	523.1	519.2	None	
PIPE12178	A3	ZPIP20007	3.5	0	1	CIRCULAR	0.015	HDPE	62.8	62.9	None	0.52	99.6	109.3	None	146.0	110.9	Both Upstream and Downstream	165.1	113.2	Both Upstream and Downstream	
PIPE11631	A3	ZPIP16760	2.75	0	1	CIRCULAR	0.034	RCP	31.6	31.7	None	0.32	49.6	49.7	None	72.3	84.8	None	81.5	90.6	Downstream	
PIPE11885	A3	ZPIP14599	2	0	1	CIRCULAR	0.016	RCP	9.9	9.9	None	0.35	15.8	15.8	None	23.4	23.2	None	26.5	26.1	None	
PIPE11975	A3	ZPIP15243	1.5	0	1	CIRCULAR	0.013	RCP	3.8	3.8	None	0.32	6.5	6.5	None	9.8	9.8	None	11.1	11.1	None	
PIPE12135	A3	ZPIP11973	2.5	0	1	CIRCULAR	0.116	RCP	58.0	58.0	None	0.41	93.5	174.9	None	676.6	149.6	Both Upstream and Downstream	688.7	129.3	Both Upstream and Downstream	
CULV10169	A3	CUL033B	4	6	1	RECT_CLOSED	0.003	RCP	80.2	55.1	Both Upstream and Downstream	0.32	127.0	67.1	Both Upstream and Downstream	384.3	139.7	Both Upstream and Downstream	371.8	160.7	Both Upstream and Downstream	
PIPE12292	A3	ZPIP15299	2	3.167	2	HORIZ_ELLIPSE	0.004	RCP	39.6	36.8	None	0.71	68.6	52.9	Both Upstream and Downstream	132.4	47.6	Both Upstream and Downstream	122.0	47.9	Both Upstream and Downstream	
PIPE11751	A3	ZPIP13186	1.5	0	1	CIRCULAR	0.084	RCP	10.4	10.4	None	0.34	16.8	16.8	None	24.8	24.8	None	28.1	27.6	None	
PIPE11770	A3	ZPIP13200	4	0	1	CIRCULAR	0.015	RCP	56.5	56.8	None	0.32	94.4	94.2	None	143.8	145.2	None	163.3	159.6	None	
PIPE11919	A3	ZPIP14855	2	0	1	CIRCULAR	0.030	RCP	12.0	12.0	None	0.3	21.0	20.9	None	31.7	31.4	None	36.1	35.7	None	
PIPE11563	A3	ZPIP16736	3.5	0	1	CIRCULAR	0.043	RCP	77.2	74.9	None	0.36	129.7	122.8	None	193.8	169.0	None	220.5	187.6	None	
PIPE11632	A3	ZPIP16761	6.5	0	1	CIRCULAR	0.013	CIPCP	168.7	169.4	None	0.32	290.0	290.3	None	428.4	461.8	Downstream	472.5	472.0	Both Upstream and Downstream	
PIPE11988	A3	ZPIP17410	2	0	1	CIRCULAR	0.007	PVC	6.3	6.3	None	0.34	6.1	10.1	None	15.9	15.0	None	17.6	16.9	None	
PIPE12048	A3	ZPIP15483	1.5	0	1	CIRCULAR	0.015	RCP	7.2	4.9	None	0.39	12.2	6.8	None	18.4	9.4	None	20.9	11.4	None	
PIPE11728	A3	ZPIP13168	2	0	1	CIRCULAR	0.034	RCP	13.2	13.2	None	0.32	21.6	21.6	None	32.7	33.9	Downstream	37.3	37.4	Downstream	
PIPE11763	A3	ZPIP13195	1.5	0	1	CIRCULAR	0.008	RCP	3.1	3.1	None	0.33	4.7	5.3	None	6.0	7.3	None	7.0	8.3	None	
PIPE12032	A3	ZPIP15432	1.5	0	1	CIRCULAR	0.006	RCP	0.1	0.1	None	0.01	0.2	0.2	None	0.3	7.0	None	0.3	7.4	None	
PIPE12146	A3	ZPIP17845	4	0	1	CIRCULAR	0.001	RCP	18.7	15.8	None	0.32	21.3	24.9	None	33.4	37.9	None	37.6	43.9	None	
PIPE12158	A3	ZPIP12240	2	0	1	CIRCULAR	0.032	RCP	12.0	12.0	None	0.3	21.0	20.9	None	31.7	31.3	None	36.1	35.7	None	
PIPE12216	A3	ZPIP15200	6	0	2	CIRCULAR	0.005	RCP	187.2	230.0	None	0.39	318.2	356.3	None	463.0	458.9	None	525.4	520.8	None	
PIPE11626	A3	ZPIP12810	5.5	0	1	CIRCULAR	0.008	RCP	106.7	104.9	None	0.35	176.5	169.5	None	261.0	237.9	None	292.0	265.1	None	
PIPE11670	A3	ZPIP12998	1.75	0	1	CIRCULAR	0.028	RCP	7.3	7.3	None	0.28	13.6	13.6	None	20.9	20.9	None	24.0	23.3	None	
PIPE11672	A3	ZPIP16814	2	0	1	CIRCULAR	0.048	RCP	17.1	17.2	None	0.35	26.9	26.9	None	39.3	38.9	None	44.2	43.8	None	
PIPE11852	A3	ZPIP11038	2	0	1	CIRCULAR	0.005	RCP	5.0	4.9	None	0.31	8.4	8.0	None	12.5	12.6	None	13.1	13.9	None	
CHAN10288	A3	CH050B	0	0	1	IRREGULAR	0.003	Concrete	87.8	111.3	None	0.33	144.8	170.8	None	203.1	206.6	None	228.0	294.7	None	
PIPE11521	A3	ZPIP12702	5	0	1	CIRCULAR	0.039	CIPCP	140.7	141.3	None	0.32	245.6	246.2	None	363.1	369.6	None	404.1	386.8	Downstream	
PIPE11565	A3	ZPIP10227	3.5	0	1	CIRCULAR	0.043	RCP	75.1	72.8	None	0.35	126.4	119.6	None	189.1	164.3	None	215.1	182.3	None	
PIPE12047	A3	ZPIP15482	2.5	0	1	CIRCULAR	0.010	RCP	17.0	14.7	None	0.36	29.3	22.6	None	43.8	35.5	None	49.9	35.5	None	
PIPE12050	A3	ZPIP17470	2	0	1	CIRCULAR	0.017	RCP	9.9	9.9	None	0.34	17.0	16.2	None	25.5	24.3	None	29.1	25.6	None	
PIPE12145	A3	ZPIP16518	4	0	1	CIRCULAR	0.001	HDPE	31.6	15.3	Upstream	0.31	30.0	25.5	Both Upstream and Downstream	52.0	37.8	Both Upstream and Downstream	50.9	42.8	Both Upstream and Downstream	
PIPE12315	A3	ZPIP16492	10	10	1	RECT_OPEN	0.004	RCP	520.0	138.0	None	0.25	899.8	252.9	None	1252.4	483.0	Downstream	1369.1	486.2	Downstream	
PIPE11662	A3	ZPIP12993	1.75	0	1	CIRCULAR	0.086	RCP	15.5	15.5	None	0.33	28.7	28.7	None	44.1	39.8	Both Upstream and Downstream	50.5	40.1	Both Upstream and Downstream	
PIPE11807	A3	ZPIP13885	3	0	1	CIRCULAR	0.023	RCP	85.2	52.4	None	0.52	139.6	64.5	None	202.8	80.7	None	233.8	87.8	Downstream	
PIPE11923	A3	ZPIP11341	1.5	0	1	CIRCULAR	0.005	RCP	1.8	1.8	None	0.24	2.8	2.8	None	4.0	6.5	None	4.5	6.4	None	
PIPE11943	A3	ZPIP14884	3	0	1	CIRCULAR	0.013	RCP	26.7	26.8	None	0.35	41.6	41.7	None	61.7	59.2	None	71.8	65.3	None	
PIPE12227	A3	ZPIP10264	1.5	0	1	CIRCULAR	0.326	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	49.0	None	0.0	51.7	Both Upstream and Downstream	
PIPE12289	A3	ZPIP11573	1.5	0	1	CIRCULAR	0.007	RCP	0.0	0.3	None	0.03	2.0	3.9	Both Upstream and Downstream	16.1	8.7	Both Upstream and Downstream	23.2	7.8	Both Upstream and Downstream	
PIPE11585	A3	ZPIP10234	3.5	0	1	CIRCULAR	0.043	RCP	73.3	70.9	None	0.34	123.4	116.7	None	184.8	160.2	None	210.2	177.8	None	
PIPE11590	A3	ZPIP16743	1.5	0	1	CIRCULAR	0.026	RCP	3.2	3.2	None	0.19	5.1	5.1	None	7.4	7.4	None	8.3	14.2	None	
PIPE11594	A3	ZPIP12781	5.5	0	1	CIRCULAR	0.011	RCP	116.1	115.0	None	0.32	191.5	184.4	None	282.7	307.5	Downstream	317.1	305.4	Both Upstream and Downstream	
PIPE11735	A3	ZPIP13172	1.5	0	1	CIRCULAR	0.036	RCP	6.2	6.3	None	0.31	10.0	10.0	None	14.8	14.9	None	16.8	16.9	None	
PIPE12020	A3	ZPIP11637	3	0	1	CIRCULAR	0.026	RCP	33.0	33.1	None	0.31	54.9	54.9	None	84.3	82.5	Downstream	96.3	92.2	Downstream	
PIPE12029	A3	ZPIP11649	1.5	0	1	CIRCULAR	0.077	RCP	8.9	8.9	None	0.3	14.9	14.8	None	22.1	21.9	None	25.1	24.9	None	
PIPE12181	A3	ZPIP14888	4	0	1	CIRCULAR	0.012	RCP	44.1	44.7	None	0.28	76.6	77.9	None	118.3	119.2	None	134.7	135.4	None	
PIPE12192	A3	PIP10682	4	0	1	CIRCULAR	0.007	RCP	25.1	22.8	None	0.19	56.6	49.9	None	86.9	89.6	None	100.2	103.1	None	
PIPE12219	A3	PIP10784	4	0	1	CIRCULAR	0.009	RCP	30.8	28.8	None	0.21	67.4	59.8	None	101.8	101.2	None	117.2	116.0	None	
PIPE11715	A3	ZPIP13143	2.25	0	1	CIRCULAR	0.027	RCP	17.5	17.5	None	0.35	29.0	27.9	None	43.6	50.0	None	49.7	42.4	None	
PIPE11819	A3	ZPIP10843	2	0	1	CIRCULAR	0.040	RCP	10.9	10.9	None	0.24	21.4	21.3	None	33.3	33.2	None	38.3	38.2	None	
PIPE11991	A3	ZPIP15320	2	0	1	CIRCULAR	0.025	RCP	8.6	8.7	None	0.24	15.9	16.0	None	24.4	24.9	None	28.0	30.1	None	
PIPE12067	A3	ZPIP17504	1.5	0	1	CIRCULAR	0.002	RCP	3.1	3.0	None	0.61	6.4	4.9	None	10.4	4.3	Both Upstream and Downstream	9.4	4.2	Both Upstream and Downstream	
PIPE11731	A3	ZPIP10459	1.5	0	1	CIRCULAR	0.024	RCP	0.0	0.0	None	0	0.0	0.1	None	0.0	12.5	Downstream	0.0	13.3	Both Upstream and Downstream	
PIPE11945	A3	ZPIP14886	3	0	1	CIRCULAR	0.014	RCP	27.2	27.4	None	0.34	42.4	42.5	None	62.8	60.2	None	73.0	66.4	None	
PIPE12191	A3	PIP10681	4	0	1	CIRCULAR	0.008	RCP	25.1	22.8	None	0.18	56.8	49.9	None	87.1	88.6	None	100.3	103.1	None	
PIPE12213	A3	ZPIP12169	2.5	0	1	CIRCULAR	0.015	RCP	9.9	13.4	None	0.27	18.1	25.0	None	34.4	37.4	Both Upstream and Downstream	34.6	41.6	Both Upstream and Downstream	
PIPE11638	A3	ZPIP12818	1.5	0	1	CIRCULAR	0.016	RCP	4.3	4.3	None	0.32	6.6	6.6	None	9.6	9.6	None	10.8	10.8	None	
PIPE11756	A3	ZPIP10467	1.5	0	1	CIRCULAR	0.009	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	4.0	None	0.0	8.1	None	
PIPE11835	A3	ZPIP13971	1.5	0	1	CIRCULAR	0.007	RCP	2.7	2.7	None	0.31	4.3	4.3	None	6.3	6.3	None	7.1	7.1	None	
PIPE11944	A3	ZPIP14885	3	0	1	CIRCULAR	0.014	RCP	26.8	26.9	None	0.34	41.7	41.8	None	61.9	59.3	None	72.0	65.5	None	

Existing Condition Storm Conveyance Results Summary Table

Conveyance Info			Dimensions						2-year				10-year				50-year				100-year			
Facility ID	SubWatershed	Original FacilityID	D' or H' (diameter) or (height)	B' (width)	Barrels	Shape	Slope (ft/ft)	Material	Q_2 (cfs)	Q_{con} (2-year) (cfs)	Surcharging (2-year)	Qcon vs Qcap	Q_{10} (cfs)	Q_{con} (10-year) (cfs)	Surcharging (10-year)	Q_{50} (cfs)	Q_{con} (50-year) (cfs)	Surcharging (50-year)	Q_{100} (cfs)	Q_{con} (100-year) (cfs)	Surcharging (100-year)
PIPE11532	A3	ZPIP10215	4	0	1	CIRCULAR	0.064	RCP	82.2	82.3	None	0.23	139.8	139.9	None	208.0	209.1	None	237.1	238.4	None
PIPE11604	A3	ZPIP12788	4	0	1	CIRCULAR	0.061	RCP	80.5	80.5	None	0.23	136.9	137.0	None	204.4	204.7	None	233.0	233.6	None
PIPE11677	A3	ZPIP13002	2	0	1	CIRCULAR	0.045	RCP	12.4	12.4	None	0.26	19.5	19.4	None	28.4	28.2	None	32.1	31.8	None
PIPE11758	A3	ZPIP13190	1.5	0	1	CIRCULAR	0.010	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	0.2	None	0.0	6.9	None
PIPE12239	A3	ZPIP14861	5.5	0	2	CIRCULAR	0.004	CIPCP	174.1	114.0	None	0.31	189.9	162.3	None	327.6	218.7	None	331.8	244.1	None
CHAN10309	A3	CH062A	6	25	1	TRAPEZOIDAL	0.006	Earthen	0.0	88.4	None	0.09	0.0	353.9	None	0.0	613.3	None	0.0	659.6	None
PIPE12318	A3	PIP16815	2	0	1	CIRCULAR	0.005	RCP	3.6	3.6	Both Upstream and Downstream	0.23	6.8	5.5	Both Upstream and Downstream	10.7	9.0	Both Upstream and Downstream	11.5	10.2	Both Upstream and Downstream
PIPE11530	A3	ZPIP12708	1.5	0	1	CIRCULAR	0.021	RCP	3.7	3.8	None	0.25	6.0	6.0	None	8.7	8.7	None	9.8	9.9	None
PIPE11586	A3	ZPIP10235	2	0	1	CIRCULAR	0.053	RCP	15.2	20.0	None	0.38	24.2	34.1	Downstream	35.5	34.9	Both Upstream and Downstream	40.1	33.9	Both Upstream and Downstream
PIPE11684	A3	ZPIP13026	1.5	0	1	CIRCULAR	0.015	RCP	3.2	2.9	None	0.23	5.8	5.3	None	7.0	7.3	None	9.4	8.2	None
CULV10153	A3	CUL055B	3.583	2.25	1	ARCH	0.046	CMP	16.8	14.5	None	0.16	37.7	28.2	None	48.3	65.5	None	56.1	57.3	None
PIPE12095	A3	ZPIP15866	4	0	1	CIRCULAR	0.005	RCP	32.0	25.6	None	0.25	86.2	42.3	Both Upstream and Downstream	73.0	72.3	Both Upstream and Downstream	88.3	66.9	Both Upstream and Downstream
PIPE12260	A3	ZPIP14000	4.5	0	1	CIRCULAR	0.003	RCP	24.4	24.2	None	0.24	38.7	39.3	None	53.6	56.7	None	51.3	65.5	None
PIPE11519	A3	ZPIP12700	4.5	0	1	CIRCULAR	0.058	RCP	104.6	105.1	None	0.22	180.8	181.2	None	265.6	266.9	None	295.2	305.4	None
PIPE11550	A3	ZPIP10221	3	0	1	CIRCULAR	0.064	RCP	39.8	39.8	None	0.24	64.9	64.9	None	95.3	95.3	None	109.1	109.1	None
PIPE11560	A3	ZPIP12727	1.5	0	1	CIRCULAR	0.021	RCP	3.7	3.7	None	0.24	5.9	5.9	None	8.7	8.6	None	9.7	9.7	None
PIPE11733	A3	ZPIP13170	2	0	1	CIRCULAR	0.020	RCP	5.0	5.0	None	0.16	10.1	10.1	None	18.0	18.0	None	20.5	20.5	None
PIPE11792	A3	ZPIP10786	2	0	2	CIRCULAR	0.018	CMP	8.0	8.0	None	0.24	12.9	13.0	None	15.1	18.3	Downstream	17.2	21.2	Downstream
PIPE12273	A3	ZPIP14484	2	0	1	CIRCULAR	0.005	RCP	3.1	3.6	Both Upstream and Downstream	0.23	6.8	4.9	Both Upstream and Downstream	11.0	8.7	Both Upstream and Downstream	11.5	9.9	Both Upstream and Downstream
CULV10170	A3	ZCUL16855	6	14	1	RECT_CLOSED	0.003	RCP	446.5	172.9	None	0.2	756.3	281.9	None	1554.3	538.0	None	1577.2	556.9	None
PIPE11845	A3	ZPIP10959	2	3.167	1	HORIZ_ELLIPSE	0.004	RCP	5.4	14.3	None	0.56	12.1	20.0	Downstream	18.0	16.4	Both Upstream and Downstream	19.1	15.9	Both Upstream and Downstream
PIPE11989	A3	ZPIP11589	2	0	1	CIRCULAR	0.027	RCP	7.0	7.0	None	0.19	13.1	13.1	None	20.0	20.0	None	23.0	23.4	None
CULV10178	A3	ZCUL069A	3	8	3	RECT_CLOSED	0.008	RCP	478.5	164.8	None	0.22	689.2	249.1	None	1129.6	468.1	Both Upstream and Downstream	1302.5	478.6	Both Upstream and Downstream
CHAN10314	A3	CH062B	6	25	1	TRAPEZOIDAL	0.006	Earthen	0.5	65.3	None	0.06	1.5	311.3	None	2.5	565.8	None	3.0	631.1	None
CHAN10317	A3	CH062B	6	25	1	TRAPEZOIDAL	0.006	Earthen	0.5	53.5	None	0.05	1.3	286.9	None	2.3	563.4	None	2.7	630.1	None
CHAN10319	A3	CH062B	6	25	1	TRAPEZOIDAL	0.006	Earthen	2.3	49.0	None	0.05	5.0	271.5	None	8.5	566.6	None	10.1	634.9	None
CHAN10320	A3	CH062B	6	25	1	TRAPEZOIDAL	0.006	Earthen	1.9	46.5	None	0.05	4.4	261.7	None	11.0	565.2	None	19.7	634.6	None
CHAN10321	A3	CH062B	6	25	1	TRAPEZOIDAL	0.006	Earthen	1.8	45.8	None	0.05	5.0	260.9	None	35.3	562.9	None	86.9	634.1	None
PIPE11536	A3	ZPIP12711	3	0	1	CIRCULAR	0.079	RCP	37.8	37.9	None	0.2	66.8	67.0	None	101.0	101.3	None	115.2	115.9	None
CULV10138	A3	CUL066	3.5	8.5	2	RECT_CLOSED	0.007	RCP	192.7	219.3	None	0.34	333.8	360.2	Both Upstream and Downstream	372.5	421.7	Both Upstream and Downstream	284.3	395.2	Both Upstream and Downstream
PIPE11870	A3	ZPIP11138	2.75	0	1	CIRCULAR	0.051	CSP	14.0	14.1	Both Upstream and Downstream	0.22	27.1	25.9	Both Upstream and Downstream	35.4	34.7	Both Upstream and Downstream	40.6	39.9	Both Upstream and Downstream
CULV10144	A3	ZCUL14827	7	10	1	RECT_CLOSED	0.005	RCP	412.4	230.5	Both Upstream and Downstream	0.25	794.7	363.4	Both Upstream and Downstream	1284.6	530.7	Both Upstream and Downstream	1421.9	564.6	Both Upstream and Downstream
PIPE11888	A3	ZPIP17211	2	0	1	CIRCULAR	0.035	RCP	9.9	9.9	None	0.23	15.8	15.8	None	61.1	23.2	None	148.6	26.1	None
PIPE11952	A3	ZPIP11497	3	0	2	CIRCULAR	0.005	RCP	30.6	26.3	None	0.29	49.6	39.8	None	71.7	50.9	None	81.8	55.8	None
CULV10149	A3	ZCUL16854	6	14	1	RECT_CLOSED	0.003	RCP	447.1	172.8	None	0.2	757.8	282.0	None	1692.2	531.6	None	1373.8	548.0	None
PIPE12088	A3	ZPIP11866	2	0	1	CIRCULAR	0.005	HDPE	3.6	3.6	None	0.23	15.4	5.7	None	15.7	8.4	None	30.3	9.5	None
PIPE12099	A3	ZPIP17587	7	10	1	RECT_CLOSED	0.005	RCP	421.0	235.4	Both Upstream and Downstream	0.26	794.4	385.6	Both Upstream and Downstream	1282.1	533.5	Both Upstream and Downstream	1421.2	569.1	Both Upstream and Downstream
PIPE12117	A3	ZPIP17588	4	0	1	CIRCULAR	0.001	RCP	19.1	10.8	None	0.22	23.1	17.2	None	28.3	25.4	None	31.7	30.3	None
PIPE12211	A3	ZPIP14865	1.5	0	1	CIRCULAR	0.004	RCP	1.5	1.5	None	0.22	2.5	2.5	None	3.7	3.7	None	4.3	4.3	None
CHAN10313	A3	CH062B	6	25	1	TRAPEZOIDAL	0.006	Earthen	0.6	69.6	None	0.07	1.6	328.7	None	2.7	569.3	None	3.2	632.3	None
CHAN10318	A3	CH062B	6	25	1	TRAPEZOIDAL	0.006	Earthen	0.4	50.6	None	0.05	1.2	279.7	None	2.2	562.7	None	2.6	629.8	None
PIPE11612	A3	ZPIP12795	3	0	1	CIRCULAR	0.043	RCP	26.2	26.3	None	0.19	48.0	48.0	None	73.5	73.5	None	84.3	84.4	None
PIPE11860	A3	ZPIP11044	1.5	0	1	CIRCULAR	0.007	RCP	1.8	1.8	None	0.21	4.0	2.9	None	8.7	4.2	None	8.0	5.3	None
CULV10150	A3	ZCUL066	3.5	8.5	2	RECT_CLOSED	0.007	RCP	191.8	218.5	None	0.34	336.2	359.4	Both Upstream and Downstream	380.9	420.2	Both Upstream and Downstream	291.4	393.7	Both Upstream and Downstream
PIPE12094	A3	ZPIP11869	7	10	1	RECT_CLOSED	0.005	RCP	454.8	229.7	None	0.25	789.2	361.4	Both Upstream and Downstream	1271.0	533.2	Both Upstream and Downstream	1410.6	556.9	Both Upstream and Downstream
CHAN10305	A3	CH062A	6	25	1	TRAPEZOIDAL	0.008	Earthen	0.0	117.2	Upstream	0.1	0.0	380.3	Upstream	0.0	631.0	Upstream	0.0	705.0	Upstream
CHAN10316	A3	CH062B	6	25	1	TRAPEZOIDAL	0.006	Earthen	0.5	56.6	None	0.06	1.3	296.5	None	2.3	564.1	None	2.8	630.4	None
PIPE11691	A3	ZPIP16846	1.5	0	1	CIRCULAR	0.019	RCP	1.1	5.1	None	0.35	1.5	4.9	None	1.5	9.5	None	1.6	8.8	Downstream
PIPE11729	A3	ZPIP10457	1.5	0	1	CIRCULAR	0.031	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	9.4	None	0.0	11.0	None
PIPE11765	A3	ZPIP10470	4	0	1	CIRCULAR	0.036	RCP	64.5	64.7	None	0.24	107.2	107.6	None	162.6	160.9	None	184.6	164.3	None
PIPE11767	A3	ZPIP13197	2	0	1	CIRCULAR	0.020	RCP	5.8	5.8	None	0.18	9.4	9.4	None	13.8	16.6	None	15.6	19.2	None
PIPE11963	A3	ZPIP11519	7	10	1	RECT_CLOSED	0.005	RCP	490.7	210.0	None	0.23	820.6	337.7	Downstream	1267.0	529.2	Both Upstream and Downstream	1393.3	550.9	Both Upstream and Downstream
PIPE12044	A3	ZPIP11655	2.5	0	1	CIRCULAR	0.012	RCP	10.0	10.0	None	0.22	16.1	16.2	None	23.8	23.9	None	26.9	27.1	None
PIPE12093	A3	ZPIP11868	7	10	1	RECT_CLOSED	0.005	RCP	483.9	210.8	None	0.23	820.6	336.1	Both Upstream and Downstream	1267.3	527.4	Both Upstream and Downstream	1393.3	547.1	Both Upstream and Downstream
PIPE12098	A3	ZPIP17586	7	10	1	RECT_CLOSED	0.005	RCP	441.8	228.2	Downstream	0.25	789.2	366.1	Both Upstream and Downstream	1271.0	530.8	Both Upstream and Downstream	1410.6	553.8	Both Upstream and Downstream
PIPE12253	A3	ZPIP11134	1.5	0	1	CIRCULAR	0.009	RCP	2.2	2.3	Both Upstream and Downstream	0.23	3.8	3.4	Both Upstream and Downstream	5.9	5.3	Both Upstream and Downstream	6.5	6.1	Both Upstream and Downstream
PIPE12255	A3	ZPIP14860	2	0	1	CIRCULAR	0.007	PVC	4.2	4.2	None	0.22	6.8	6.8	None	10.1	10.1	None	11.4	11.5	None
PIPE11555	A3	ZPIP16733	4	0	1	CIRCULAR	0.075	RCP	94.3	92.0	None	0.23	156.9	149.5	None	233.1	208.1	None	265.1	231.6	None
PIPE11665	A3	ZPIP10364	1.5	0	1	CIRCULAR	0.021	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	0.3	None	0.0	8.9	None
PIPE11704	A3	ZPIP13079	1.5	0	1	CIRCULAR	0.085	RCP	5.9	5.9	None	0.19	10.4	10.4	None	15.7	15.7	None	17.9	17.9	None
PIPE11958	A3	ZPIP17375	7	10	1	RECT_CLOSED	0.006	RCP	447.8	172.9	None	0.18	761.7	282.0	None	1615.7	529.7	None	1314.4	573.4	None
PIPE12277	A3	ZPIP14964	2	0	1	CIRCULAR	0.013	RCP	5.6	5.6	None	0.21	9.1	9.1	None	13.6	13.8	None	15.7	15.6	None
PIPE11510	A3	ZPIP12693	3	0	1	CIRCULAR	0.020	RCP	15.6	15.6	None	0.17	30.5	30.5	None	47.2	47.2	None	54.2	54.2	None
PIPE11516	A3	ZPIP12697	5	0	1	CIRCULAR	0.057	CIPCP	106.7	107.1	None	0.2	184.0	184.5	None	270.2	271.5	None	300.8	312.2	None
PIPE11557	A3	ZPIP10223	4	0	1	CIRCULAR	0.075	RCP	92.7	90.4	None	0.23	154.4	147.1	None	229.4	204.5	None	260.9	227.6	None
PIPE11680	A3	ZPIP13025	3	0	1	CIRCULAR	0.009	RCP	10.2	10.2	None	0.16	17.2	18.2	None	25.6	32.8	None	29.0	37.1	None
PIPE11866	A3	ZPIP11047	1.5	0	1	CIRCULAR	0.032	RCP	0.0	0.0	None	0	0.0	0.0	None	1.0	10.9	None	2.3	10.9	None
PIPE11983	A3	ZPIP11549	3	0	1	CIRCULAR	0.014	RCP	15.6	15.6	None	0.19	27.5	27.5	None	41.6	40.7	None	47.6	46.4	None
PIPE12055	A3	ZPIP11688	2.25	0	1	CIRCULAR	0.015	RCP	4.9	4.9	None	0.13	7.9	7.9	None	11.8	12.1	None	13.4	21.8	None
PIPE12137	A3	ZCUL16847	6	0	1	CIRCULAR	0.030	RCP	162.1	172.5	Downstream	0.24	271.2	287.9	Both Upstream and Downstream	406.4	394.7	Both Upstream and Downstream	464.6	425.8	Both Upstream and Downstream
PIPE12171	A3	PIP19084	3	0	2	CIRCULAR	0.007	RCP	36.2	32.0	None	0.28	59.0	48.8	None	85.8	62.6	None	98.0	65.9	None
PIPE12223	A3	ZPIP14862	5.5	0	2	CIRCULAR	0.004	CIPCP	148.7	113.9	None	0.3	181.5	151.9	None	301.4	196.8	None	291.9	217.3	None
CHAN10283	A3	CH050A	0	0	1	IRREGULAR	0.014	Concrete	100.6	118.1	None	0.31	157.0	176.3	None	217.9	210.1	None	244.1	222.4	None
PIPE11606	A3	ZPIP16756	3	0	1	CIRCULAR	0.084	RCP	40.6	40.6	None	0.21	66.1	66.1	None	96.9	96.9	None	110.9	110.9	None
PIPE11723	A3	ZPIP16887	1.5	0	1	CIRCULAR	0.009	RCP	0.0	0.0	None	0	0.0	0.1	None	0.0	6.1	None	0.0	5.6	None
PIPE11903	A3	ZPIP14622	3	0	2	CIRCULAR	0.006	RCP	31.8	27.6	None	0.27	51.8	41.8	None	75.1	53.3	None	85.8	58.5	None

Existing Condition Storm Conveyance Results Summary Table

Conveyance Info			Dimensions						2-year				10-year			50-year			100-year		
Facility ID	SubWatershed	Original FacilityID	D' or H' (diameter) or (height)	B' (width)	Barrels	Shape	Slope (ft/ft)	Material	Q_2 (cfs)	Q_{con} (2-year) (cfs)	Surcharging (2-year)	Qcon vs Qcap	Q_{10} (cfs)	Q_{con} (10-year) (cfs)	Surcharging (10-year)	Q_{50} (cfs)	Q_{con} (50-year) (cfs)	Surcharging (50-year)	Q_{100} (cfs)	Q_{con} (100-year) (cfs)	Surcharging (100-year)
PIPE11778	A3	ZPIP10476	1.5	0	1	CIRCULAR	0.074	RCP	3.5	3.5	None	0.12	5.9	5.9	None	8.9	8.9	None	10.1	10.1	None
PIPE11876	A3	ZPIP14493	1.5	0	1	CIRCULAR	0.017	RCP	0.4	0.1	None	0.01	1.2	18.6	Both Upstream and Downstream	10.0	9.3	Both Upstream and Downstream	18.8	4.7	Both Upstream and Downstream
CULV10148	A3	ZCUL13955	7	11	1	RECT_CLOSED	0.005	RCP	133.7	138.2	Both Upstream and Downstream	0.13	261.9	226.6	Both Upstream and Downstream	399.2	370.0	Both Upstream and Downstream	300.2	369.8	Both Upstream and Downstream
PIPE12042	A3	ZPIP15444	2.5	0	1	CIRCULAR	0.008	RCP	4.9	5.0	None	0.13	7.8	7.9	None	11.4	11.5	None	12.8	13.0	None
PIPE12102	A3	ZPIP11872	2	0	1	CIRCULAR	0.005	HDPE	4.8	2.1	None	0.14	15.8	3.3	None	5.9	4.9	None	6.0	5.5	None
PIPE12136	A3	ZPIP11974	5.5	0	1	CIRCULAR	0.013	RCP	58.4	58.4	None	0.15	94.4	195.8	None	664.9	150.4	Both Upstream and Downstream	631.8	134.4	Both Upstream and Downstream
PIPE12177	A3	ZPIP20006	3.5	0	1	CIRCULAR	0.097	RCP	61.0	61.2	None	0.2	97.3	108.2	None	142.8	108.5	Both Upstream and Downstream	161.5	110.9	Both Upstream and Downstream
CULV10162	A3	ZCUL13082	3	5	2	RECT_CLOSED	0.031	RCP	78.6	81.7	None	0.14	127.8	127.6	None	267.5	181.3	None	323.1	198.7	None
PIPE11525	A3	ZPIP12703	2	0	1	CIRCULAR	0.035	RCP	5.6	5.6	None	0.13	8.8	8.8	None	12.8	12.8	None	14.4	14.5	None
PIPE11556	A3	ZPIP16734	1.5	0	1	CIRCULAR	0.012	RCP	1.6	1.6	None	0.13	2.5	2.5	None	3.6	3.6	None	4.0	4.0	None
PIPE11893	A3	ZPIP14610	2	8	1	RECT_CLOSED	0.017	RCP	22.8	23.0	None	0.11	39.8	40.0	None	60.8	60.9	None	69.6	69.8	None
PIPE12084	A3	ZPIP15858	2	0	1	CIRCULAR	0.004	HDPE	1.9	1.8	None	0.13	10.8	2.9	None	17.9	4.3	None	26.2	4.8	None
CULV10161	A3	ZCUL16808B	2	6	3	RECT_CLOSED	0.009	RCP	61.0	61.2	None	0.19	97.3	100.7	None	142.8	108.5	Both Upstream and Downstream	161.5	110.5	Both Upstream and Downstream
PIPE11561	A3	ZPIP12728	2	0	1	CIRCULAR	0.035	RCP	5.4	5.5	None	0.13	8.6	8.6	None	12.5	12.5	None	14.1	14.2	None
PIPE11754	A3	ZPIP10465	2.5	0	1	CIRCULAR	0.206	RCP	20.9	20.9	None	0.11	34.1	34.4	None	50.6	52.4	None	57.4	62.2	None
PIPE11761	A3	ZPIP13193	1.75	0	1	CIRCULAR	0.023	RCP	2.2	2.2	None	0.09	4.4	4.4	None	6.9	6.9	None	7.9	7.9	None
PIPE12023	A3	ZPIP17459	3	0	1	CIRCULAR	0.202	RCP	33.0	33.1	None	0.11	55.0	73.2	None	84.4	99.3	Both Upstream and Downstream	96.3	99.8	Both Upstream and Downstream
PIPE12053	A3	ZPIP17484	2.25	0	1	CIRCULAR	0.017	RCP	4.9	4.9	None	0.12	8.0	8.0	None	11.8	11.8	None	13.4	13.4	None
PIPE12233	A3	ZPIP16084	5.5	0	1	CIRCULAR	0.013	RCP	0.1	1.7	None	0	0.1	126.4	None	15.8	98.2	Both Upstream and Downstream	37.3	125.5	Both Upstream and Downstream
CULV10165	A3	ZCUL16808A	2	6	3	RECT_CLOSED	0.010	RCP	61.6	60.8	None	0.18	96.8	99.5	None	142.2	110.5	Both Upstream and Downstream	160.8	111.0	Both Upstream and Downstream
PIPE11766	A3	ZPIP13196	1.5	0	1	CIRCULAR	0.178	RCP	0.0	0.0	None	0	0.0	0.2	None	0.0	10.8	None	0.0	14.4	None
PIPE11889	A3	ZPIP17212	2	0	1	CIRCULAR	0.037	RCP	5.0	5.0	None	0.12	8.1	8.1	None	12.1	12.1	None	13.7	13.7	None
PIPE12092	A3	ZPIP17584	4	10	1	TRAPEZOIDAL	0.000	CMP	10.0	8.3	None	0.12	17.5	13.1	None	28.3	19.3	None	49.2	21.8	None
CHAN10297	A3	CH043B	4	4	1	TRAPEZOIDAL	0.003	Concrete	77.2	60.2	Both Upstream and Downstream	0.12	122.5	76.3	Both Upstream and Downstream	373.3	138.7	Both Upstream and Downstream	360.0	159.2	Both Upstream and Downstream
PIPE11616	A3	ZPIP12802	2.75	0	1	CIRCULAR	0.034	RCP	1.8	1.8	None	0.02	2.9	2.9	None	4.2	33.1	None	4.8	30.2	None
PIPE11873	A3	ZPIP14489	1.5	0	1	CIRCULAR	0.058	RCP	2.9	2.9	Both Upstream and Downstream	0.11	4.7	4.7	Both Upstream and Downstream	7.1	6.9	Both Upstream and Downstream	8.1	7.9	Both Upstream and Downstream
PIPE12132	A3	ZPIP16082	7	11	1	RECT_CLOSED	0.005	RCP	132.0	120.9	None	0.11	205.5	304.8	Downstream	327.8	294.8	Both Upstream and Downstream	395.8	329.2	Both Upstream and Downstream
PIPE11739	A3	ZPIP10461	3	0	1	CIRCULAR	0.062	RCP	15.7	15.7	None	0.09	27.3	27.4	None	43.6	42.9	None	49.5	49.7	None
PIPE11812	A3	ZPIP13902	1.5	0	1	CIRCULAR	0.010	RCP	1.2	1.2	None	0.11	1.9	1.9	None	2.7	2.7	None	3.1	3.1	None
PIPE11820	A3	ZPIP10844	2.5	0	1	CIRCULAR	0.140	RCP	13.5	13.5	None	0.09	25.7	25.7	None	39.8	39.7	None	45.7	45.6	None
PIPE11832	A3	ZPIP13930	2.5	0	1	CIRCULAR	0.085	RCP	11.1	11.1	None	0.09	20.5	20.5	None	31.4	31.4	None	36.0	36.0	None
CHAN10296	A3	CH060C	0	0	1	IRREGULAR	0.001	Earthen	671.8	437.4	Both Upstream and Downstream	0.15	759.4	596.1	Both Upstream and Downstream	767.1	784.1	Both Upstream and Downstream	1070.9	857.4	Both Upstream and Downstream
PIPE12304	A3	PIP19073	5.5	12	3	RECT_CLOSED	0.005	RCP	186.8	180.1	None	0.08	639.2	607.0	None	763.2	669.2	None	803.3	707.1	None
PIPE12305	A3	PIP19074	5.5	12	3	RECT_CLOSED	0.005	RCP	188.3	181.2	None	0.08	641.3	609.5	None	769.3	673.1	None	812.2	711.6	None
PIPE12085	A3	ZPIP11863	2	0	1	CIRCULAR	0.005	HDPE	1.8	1.8	None	0.11	15.0	2.9	None	17.5	4.2	None	26.0	4.8	None
PIPE11501	A3	ZPIP10191	1.5	0	1	CIRCULAR	0.067	RCP	3.0	3.0	None	0.11	4.7	4.7	None	6.8	6.8	None	7.6	7.6	None
PIPE11537	A3	ZPIP12712	1.5	0	1	CIRCULAR	0.030	RCP	2.0	2.0	None	0.11	3.1	3.1	None	4.5	4.6	None	5.1	5.2	None
PIPE11605	A3	ZPIP16755	2	0	1	CIRCULAR	0.108	RCP	7.7	7.7	None	0.1	12.4	12.4	None	18.4	18.4	None	20.9	20.9	None
PIPE11859	A3	ZPIP11043	1.5	0	1	CIRCULAR	0.029	RCP	1.9	1.9	None	0.11	3.0	3.0	None	4.4	4.4	None	5.0	5.0	None
PIPE12069	A3	ZPIP17579	2.5	0	1	CIRCULAR	0.006	HDPE	3.4	3.4	None	0.11	5.3	5.3	None	10.9	7.7	None	14.1	8.7	None
PIPE12076	A3	ZPIP15840	2.5	0	1	CIRCULAR	0.006	HDPE	3.4	3.4	None	0.11	5.3	5.3	None	10.9	7.8	None	14.1	8.7	None
PIPE12086	A3	ZPIP11864	2	0	1	CIRCULAR	0.006	HDPE	1.8	1.8	None	0.11	13.2	2.8	None	17.6	4.2	None	26.2	4.7	None
PIPE11509	A3	ZPIP12692	3.5	0	1	CIRCULAR	0.072	CIPCP	18.4	18.4	None	0.08	35.4	35.4	None	54.7	54.7	None	62.8	62.8	None
PIPE11554	A3	ZPIP16732	2	0	1	CIRCULAR	0.132	RCP	8.7	8.7	None	0.11	13.6	13.6	None	19.8	19.8	None	22.2	22.3	None
PIPE11769	A3	ZPIP13199	1.5	0	1	CIRCULAR	0.092	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	8.8	None	0.0	8.7	None
PIPE11831	A3	ZPIP13929	1.5	0	1	CIRCULAR	0.162	RCP	0.0	0.0	None	0	0.0	7.5	None	0.0	8.7	Both Upstream and Downstream	0.0	11.6	Both Upstream and Downstream
PIPE11837	A3	ZPIP13973	1.5	0	1	CIRCULAR	0.067	RCP	2.9	2.9	None	0.11	4.5	4.6	None	6.6	6.6	None	7.4	7.4	None
PIPE12037	A3	ZPIP15437	1.5	0	1	CIRCULAR	0.020	RCP	1.2	1.2	None	0.08	2.2	2.2	None	3.5	3.6	None	4.0	4.0	None
PIPE12122	A3	ZPIP17607	3	0	1	CIRCULAR	0.022	RCP	0.0	7.1	None	0.07	1.0	1.9	None	5.1	31.6	None	7.3	26.9	None
PIPE12188	A3	PIP10623	4	0	1	CIRCULAR	0.071	RCP	25.2	22.9	None	0.06	58.1	50.5	None	87.8	91.3	None	100.6	104.3	None
PIPE12218	A3	PIP10826	2	0	2	CIRCULAR	0.380	PVC	40.1	37.8	None	0.14	73.4	55.9	None	111.2	70.4	None	126.0	76.3	None
CHAN10299	A3	CH043C	4	4	1	TRAPEZOIDAL	0.003	Concrete	83.9	62.6	Both Upstream and Downstream	0.12	107.9	81.7	Both Upstream and Downstream	338.2	124.8	Both Upstream and Downstream	321.9	139.1	Both Upstream and Downstream
PIPE11535	A3	ZPIP12710	3	0	1	CIRCULAR	0.084	RCP	16.5	16.5	None	0.09	29.2	29.2	None	44.1	44.1	None	50.2	50.2	None
PIPE11813	A3	ZPIP13903	1.5	0	1	CIRCULAR	0.009	RCP	1.0	1.0	None	0.1	1.6	1.6	None	2.3	2.3	None	2.6	2.6	None
PIPE11868	A3	ZPIP14482	1.5	0	1	CIRCULAR	0.012	RCP	1.2	1.2	None	0.1	1.8	1.8	None	2.6	2.7	None	3.0	3.0	None
PIPE11553	A3	ZPIP12722	1.5	0	1	CIRCULAR	0.086	RCP	2.9	2.9	None	0.1	4.6	4.6	None	6.7	6.7	None	7.6	7.6	None
PIPE11564	A3	ZPIP16737	2.5	0	1	CIRCULAR	0.063	RCP	7.2	7.2	None	0.07	14.3	14.3	None	22.5	22.5	None	26.0	26.2	None
PIPE12155	A3	ZPIP12231	1.5	0	1	CIRCULAR	0.079	RCP	2.8	2.8	None	0.1	4.4	4.4	None	6.5	6.5	None	7.3	7.3	None
PIPE11577	A3	ZPIP16739	2	0	1	CIRCULAR	0.085	RCP	4.2	4.2	None	0.06	8.8	8.8	None	13.9	13.9	None	16.1	16.1	None
PIPE11649	A3	ZPIP12831	5.5	0	1	CIRCULAR	0.008	RCP	25.6	29.5	Downstream	0.1	41.7	47.0	Downstream	63.8	86.8	Downstream	71.3	71.6	Downstream
PIPE11877	A3	ZPIP14495	7	11	1	RECT_CLOSED	0.005	RCP	132.0	120.9	Downstream	0.11	186.8	219.4	Both Upstream and Downstream	328.2	295.3	Both Upstream and Downstream	250.8	262.7	Both Upstream and Downstream
PIPE12038	A3	ZPIP11651	1.5	0	1	CIRCULAR	0.018	RCP	0.0	0.0	None	0	0.0	0.0	None	0.1	3.3	None	0.1	3.3	None
PIPE12091	A3	ZPIP17581	4	10	1	TRAPEZOIDAL	0.000	CMP	13.1	14.8	None	0.09	35.5	24.0	None	43.2	36.2	None	55.6	40.5	None
PIPE12311	A3	ZPIP17214	1.5	0	1	CIRCULAR	0.006	RCP	0.6	0.6	None	0.08	1.1	1.1	None	3.4	1.7	None	60.4	1.9	None
PIPE12033	A3	ZPIP15433	1.5	0	1	CIRCULAR	0.101	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	8.5	None	0.0	7.7	None
PIPE12070	A3	ZPIP17580	3	0	1	CIRCULAR	0.006	HDPE	4.6	4.6	None	0.09	8.8	7.3	None	11.9	10.6	None	16.7	12.0	None
PIPE12082	A3	ZPIP15855	2.333	0	1	CIRCULAR	0.015	HDPE	3.6	3.6	None	0.09	5.7	5.7	None	8.3	8.3	None	9.4	9.4	None
PIPE12265	A3	ZPIP10960	3	0	1	CIRCULAR	0.008	RCP	7.1	11.6	Both Upstream and Downstream	0.19	16.3	15.4	Both Upstream and Downstream	43.3	12.1	Both Upstream and Downstream	26.8	13.9	Both Upstream and Downstream
PIPE11690	A3	ZPIP19000	1.5	0	1	CIRCULAR	0.048	RCP	0.0	1.3	None	0.06	1.5	1.4	None	1.5	4.5	None	1.6	5.0	None
PIPE11851	A3	ZPIP17129	1.5	0	1	CIRCULAR	0.013	RCP	1.0	1.1	None	0.09	1.8	1.7	None	2.4	2.4	Both Upstream and Downstream	2.7	2.7	Both Upstream and Downstream
PIPE12263	A3	ZPIP14003	4.5	0	1	CIRCULAR	0.003	RCP	8.0	8.0	None	0.08	12.7	12.9	None	16.1	19.2	None	17.4	23.2	None
PIPE12281	A3	ZPIP17411	3.167	5	1	HORIZ_ELLIPSE	0.026	RCP	50.2	50.3	Downstream	0.22	86.7	57.9	Both Upstream and Downstream	166.2	49.0	Both Upstream and Downstream	157.5	50.2	Both Upstream and Downstream
PIPE11904	A3	ZPIP14762	1.5	0	1	CIRCULAR	0.081	HDPE	1.3	1.3	None	0.04	3.2	3.2	None	5.3	5.3	None	6.2	6.2	None
PIPE12112	A3	ZPIP11875	1.5	0	1	CIRCULAR	0.024	HDPE	6.4	1.3	None	0.08	5.4	2.1	None	3.4	3.1	None	3.8	3.5	None
PIPE12212	A3	ZPIP14311	2.5	0	1	CIRCULAR	0.016	RCP	3.3	2.9	None	0.05	8.6	4.6	None	10.9	14.4	Downstream	13.1	10.9	Downstream
CHAN10276	A3		0	0	1	IRREGULAR	0.012	Concrete	4.5	5.7	None	0.1	6.8	9.1	None	8.6	12.3	None	9.4	12.7	None

Existing Condition Storm Conveyance Results Summary Table

Conveyance Info			Dimensions						2-year				10-year			50-year			100-year		
Facility ID	SubWatershed	Original FacilityID	D' or H' (diameter) or (height)	B' (width)	Barrels	Shape	Slope (ft/ft)	Material	Q_2 (cfs)	Q_{con} (2-year) (cfs)	Surcharging (2-year)	Qcon vs Qcap	Q_{10} (cfs)	Q_{con} (10-year) (cfs)	Surcharging (10-year)	Q_{50} (cfs)	Q_{con} (50-year) (cfs)	Surcharging (50-year)	Q_{100} (cfs)	Q_{con} (100-year) (cfs)	Surcharging (100-year)
PIPE11960	A3	ZPIP17377	7	10	1	RECT_CLOSED	0.006	RCP	493.0	207.4	None	0.21	832.2	333.5	None	1264.3	536.2	None	1391.8	559.0	None
CULV10172	A3	ZCUL064B	6	14	1	RECT_CLOSED	0.004	RCP	446.1	173.3	None	0.18	755.6	282.1	None	1574.9	537.2	None	1605.6	563.4	None
PIPE11533	A3	ZPIP10216	4	0	1	CIRCULAR	0.095	RCP	85.9	85.8	None	0.19	145.3	145.5	None	215.7	217.2	None	245.8	248.6	None
PIPE11809	A3	ZPIP17062	3	0	1	CIRCULAR	0.058	RCP	29.0	29.0	None	0.18	51.7	51.7	None	78.3	78.4	None	89.5	89.6	None
PIPE11894	A3	ZPIP14612	7	10	1	RECT_CLOSED	0.006	RCP	449.9	175.4	None	0.18	762.4	284.2	None	1335.3	530.6	None	1291.2	549.9	None
PIPE11899	A3	ZPIP14616	3	0	2	CIRCULAR	0.007	RCP	36.1	32.0	None	0.28	59.1	48.9	None	85.6	66.1	Downstream	91.5	63.9	Downstream
PIPE11900	A3	ZPIP14617	3	0	2	CIRCULAR	0.007	RCP	36.0	32.0	None	0.28	57.4	47.8	Downstream	76.1	66.2	Both Upstream and Downstream	82.2	63.9	Both Upstream and Downstream
PIPE11959	A3	ZPIP17376	7	10	1	RECT_CLOSED	0.006	RCP	491.9	204.9	None	0.21	830.7	329.5	None	1263.4	534.9	None	1389.4	557.2	None
PIPE11965	A3	ZPIP11521	7	10	1	RECT_CLOSED	0.006	RCP	491.8	204.7	None	0.21	830.6	329.1	None	1264.7	535.1	None	1389.4	557.2	None
PIPE11966	A3	ZPIP11522	7	10	1	RECT_CLOSED	0.006	RCP	451.3	176.5	None	0.18	764.1	285.1	None	1297.1	532.1	None	1293.8	548.0	None
PIPE11967	A3	ZPIP15192	7	10	1	RECT_CLOSED	0.006	RCP	450.6	175.8	None	0.18	763.2	284.5	None	1292.5	529.6	None	1293.0	549.5	None
PIPE11539	A3	ZPIP12714	3	0	1	CIRCULAR	0.090	RCP	40.1	40.1	None	0.2	65.5	65.5	None	96.1	96.1	None	110.0	110.0	None
PIPE11591	A3	ZPIP16744	2	0	1	CIRCULAR	0.028	RCP	7.9	8.0	None	0.21	12.6	12.6	None	18.3	18.4	None	20.7	20.7	None
PIPE11679	A3	ZPIP13024	3	0	1	CIRCULAR	0.010	RCP	10.1	10.2	None	0.15	17.1	17.3	None	25.7	30.1	None	29.3	36.4	None
PIPE11732	A3	ZPIP13169	1.5	0	1	CIRCULAR	0.057	RCP	5.1	5.2	None	0.2	8.2	8.3	None	12.2	12.3	None	13.8	13.9	None
PIPE11935	A3	ZPIP14878	2.5	0	1	CIRCULAR	0.069	RCP	27.3	24.8	None	0.23	48.6	39.5	None	74.3	57.6	None	83.0	59.0	None
PIPE12108	A3	ZPIP15876	3	0	1	CIRCULAR	0.005	HDPE	14.6	9.4	None	0.21	14.4	15.0	None	25.0	22.2	None	27.7	25.1	None
PIPE12240	A3	ZPIP11525	5.5	0	2	CIRCULAR	0.005	RCP	122.4	118.5	None	0.26	191.8	164.4	None	285.4	225.1	None	320.9	250.7	None
PIPE12242	A3	ZPIP10225	4	0	1	CIRCULAR	0.075	RCP	88.5	86.2	None	0.22	147.7	140.5	None	219.7	195.0	None	249.9	216.8	None
CHAN10224	A3	CH10142D	0	0	1	IRREGULAR	0.014	Earthen	197.4	225.0	Downstream	0.33	278.6	355.6	Downstream	248.2	410.2	Downstream	259.1	380.7	Downstream
PIPE11615	A3	ZPIP12798	3.5	0	1	CIRCULAR	0.050	CIPCP	31.6	31.7	None	0.16	49.6	49.7	None	72.3	104.2	None	81.4	104.8	Both Upstream and Downstream
PIPE11659	A3	ZPIP12990	1.5	0	1	CIRCULAR	0.042	RCP	4.5	4.5	None	0.21	7.1	7.1	None	10.4	10.4	None	11.7	11.7	None
PIPE12006	A3	ZPIP15332	2	0	1	CIRCULAR	0.034	RCP	8.0	8.2	None	0.19	13.4	13.4	None	19.9	19.8	None	22.6	22.8	None
PIPE12119	A3	ZPIP11880	1.75	0	1	CIRCULAR	0.010	RCP	3.1	3.2	None	0.2	5.1	5.1	None	7.5	7.6	None	8.6	8.6	None
PIPE12291	A3	ZPIP15298	2.417	3.75	2	HORIZ_ELLIPSE	0.004	RCP	43.1	35.7	None	0.42	74.3	47.9	Both Upstream and Downstream	144.0	45.5	Both Upstream and Downstream	132.7	45.6	Both Upstream and Downstream
PIPE11545	A3	ZPIP12717	5.5	0	1	CIRCULAR	0.019	RCP	98.5	97.5	None	0.21	163.7	156.4	None	243.1	217.9	None	271.0	242.8	None
PIPE11921	A3	ZPIP14857	1.5	0	1	CIRCULAR	0.007	RCP	1.8	1.8	None	0.2	2.9	2.9	None	4.2	4.2	None	4.7	4.7	None
PIPE11922	A3	ZPIP14858	1.5	0	1	CIRCULAR	0.007	RCP	1.8	1.8	None	0.2	2.9	2.9	None	4.2	4.2	None	4.8	4.8	None
CHAN10310	A3	CH062A	6	25	1	TRAPEZOIDAL	0.008	Earthen	0.0	88.4	None	0.07	0.0	351.4	None	0.0	573.6	None	0.0	630.3	None
PIPE11589	A3	ZPIP12752	2	0	1	CIRCULAR	0.050	RCP	11.1	11.1	None	0.22	17.7	17.9	None	25.9	25.4	Downstream	29.3	26.4	Downstream
PIPE12170	A3	PIP19083	3	0	2	CIRCULAR	0.007	RCP	33.0	28.8	None	0.25	53.7	43.7	None	78.3	55.7	None	89.5	59.9	None
PIPE11946	A3	ZPIP14887	3	0	1	CIRCULAR	0.010	RCP	11.7	12.0	None	0.18	19.5	19.6	None	29.3	29.0	None	33.4	33.5	None
PIPE12087	A3	ZPIP11865	2.5	0	1	CIRCULAR	0.004	HDPE	5.2	5.2	None	0.19	15.3	8.1	None	15.8	11.9	None	33.6	13.4	None
PIPE12107	A3	ZPIP15875	3	0	1	CIRCULAR	0.005	HDPE	16.0	9.4	None	0.19	16.7	15.1	None	25.0	22.3	None	27.8	25.0	None
PIPE12149	A3	ZPIP16522	3.5	0	1	CIRCULAR	0.015	HDPE	22.9	22.5	None	0.18	39.2	38.2	None	57.7	59.2	None	67.4	64.0	None
PIPE12262	A3	ZPIP14002	3	0	1	CIRCULAR	0.016	RCP	15.7	15.7	None	0.18	25.7	25.7	None	38.4	38.2	None	43.2	43.3	None
PIPE11572	A3	ZPIP10229	3.5	0	1	CIRCULAR	0.049	RCP	36.8	36.9	None	0.17	64.9	65.0	None	98.5	98.1	None	112.7	111.5	None
PIPE11663	A3	ZPIP12994	1.5	0	1	CIRCULAR	0.050	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	11.3	Both Upstream and Downstream	0.0	11.8	Both Upstream and Downstream
PIPE11863	A3	ZPIP14305	1.5	0	1	CIRCULAR	0.010	RCP	4.6	1.9	None	0.18	3.7	3.1	None	3.5	4.6	None	3.8	5.2	None
PIPE11901	A3	ZPIP11211	3	0	2	CIRCULAR	0.008	RCP	33.0	28.8	None	0.24	53.7	43.7	None	78.2	55.6	None	89.4	60.9	None
PIPE11961	A3	ZPIP11517	7	10	1	RECT_CLOSED	0.007	RCP	504.6	209.0	None	0.19	820.3	336.1	None	1266.1	534.1	Downstream	1392.7	555.4	Both Upstream and Downstream
PIPE12286	A3	ZPIP15294	1.5	0	1	CIRCULAR	0.010	RCP	0.0	0.0	None	0	1.0	4.5	Both Upstream and Downstream	5.4	4.5	Both Upstream and Downstream	1.7	5.1	Both Upstream and Downstream
PIPE12121	A3	ZPIP11885	1.75	0	1	CIRCULAR	0.168	RCP	7.3	7.3	None	0.11	16.6	16.6	None	27.1	27.1	None	31.5	31.5	Downstream
PIPE12174	A3	ZPIP13075	3	0	1	CIRCULAR	0.073	RCP	29.6	29.8	None	0.17	50.5	50.3	None	76.3	75.5	None	87.4	87.4	None
PIPE12252	A3	ZPIP14483	1.5	0	1	CIRCULAR	0.008	RCP	1.9	1.9	Both Upstream and Downstream	0.2	3.0	2.6	Both Upstream and Downstream	4.5	4.0	Both Upstream and Downstream	5.0	4.6	Both Upstream and Downstream
CHAN10222	A3	CH10142C	0	0	1	IRREGULAR	0.032	Earthen	198.7	225.5	None	0.29	303.6	360.4	Downstream	307.5	415.6	Downstream	265.6	386.1	Downstream
CHAN10278	A3		0	0	1	IRREGULAR	0.012	Concrete	5.6	5.3	None	0.21	7.3	8.7	None	8.7	11.9	None	9.1	12.4	None
PIPE11523	A3	ZPIP10212	1.5	0	1	CIRCULAR	0.032	RCP	3.5	3.5	None	0.19	5.4	5.5	None	7.9	7.9	None	8.9	8.9	None
PIPE11583	A3	ZPIP16740	1.5	0	1	CIRCULAR	0.019	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	6.8	None	0.0	6.9	Downstream
PIPE11660	A3	ZPIP12991	1.5	0	1	CIRCULAR	0.017	RCP	2.3	2.4	None	0.17	3.9	3.9	None	5.8	5.8	None	6.6	6.6	None
PIPE11823	A3	ZPIP13909	3	0	1	CIRCULAR	0.101	RCP	33.3	33.3	None	0.16	58.9	58.9	None	88.9	89.2	None	101.6	102.0	None
PIPE11824	A3	ZPIP13925	4	0	1	CIRCULAR	0.040	RCP	42.3	42.3	None	0.15	84.9	84.9	None	132.1	125.2	None	152.8	136.3	None
CULV10142	A3	ZCUL067B	4	6	3	RECT_CLOSED	0.021	RCP	9.7	45.7	None	0.03	27.7	260.1	None	54.1	562.5	None	128.7	634.5	None
PIPE11896	A3	ZPIP14615	4	0	1	CIRCULAR	0.009	RCP	20.9	20.8	None	0.16	36.8	36.7	None	56.2	56.1	None	64.4	64.4	None
PIPE12008	A3	ZPIP11622	1.5	0	1	CIRCULAR	0.008	RCP	0.6	2.1	None	0.22	0.9	2.9	Downstream	1.3	4.0	Both Upstream and Downstream	1.5	4.4	Both Upstream and Downstream
PIPE11702	A3	ZPIP16860	3	0	1	CIRCULAR	0.078	RCP	29.5	29.8	None	0.16	50.3	50.2	None	76.0	75.4	None	87.1	87.1	None
PIPE11821	A3	ZPIP10845	2.5	0	1	CIRCULAR	0.056	RCP	13.5	13.5	None	0.14	25.7	25.7	None	39.8	39.8	None	45.8	45.7	None
PIPE11822	A3	ZPIP10846	3	0	1	CIRCULAR	0.106	RCP	33.3	33.3	None	0.15	59.2	58.7	None	89.0	89.5	Downstream	101.7	102.0	Downstream
PIPE12089	A3	ZPIP15859	2.5	0	1	CIRCULAR	0.005	HDPE	5.1	5.1	None	0.18	15.0	8.0	None	19.3	11.9	None	38.4	13.5	None
PIPE12234	A3	ZPIP15991	2	0	1	CIRCULAR	0.005	RCP	0.0	2.1	None	0.13	0.0	10.5	Downstream	0.4	11.2	Both Upstream and Downstream	1.0	7.3	Both Upstream and Downstream
CHAN10286	A3	CH050A	0	0	1	IRREGULAR	0.014	Concrete	89.8	110.3	None	0.21	143.7	170.3	None	201.4	204.7	None	225.6	241.8	None
PIPE12310	A3	ZPIP17213	1.5	0	1	CIRCULAR	-0.010	RCP	0.0	0.0	None	0	0.1	0.0	None	9.7	0.1	None	147.3	4.9	None
PIPE11569	A3	ZPIP12735	2	0	1	CIRCULAR	0.081	RCP	8.2	8.2	None	0.13	16.5	16.5	None	25.9	25.9	None	29.9	29.9	None
PIPE11573	A3	ZPIP12739	3	0	1	CIRCULAR	0.080	RCP	27.3	27.4	None	0.14	49.8	49.8	None	76.2	76.2	None	87.3	87.3	None
PIPE11574	A3	ZPIP12740	2.5	0	1	CIRCULAR	0.050	RCP	13.4	13.5	None	0.15	24.3	24.3	None	37.1	37.1	None	42.5	42.4	None
PIPE11576	A3	ZPIP16738	2	0	1	CIRCULAR	0.064	RCP	7.3	7.3	None	0.13	14.4	14.4	None	22.6	22.6	None	26.1	26.1	None
PIPE11706	A3	ZPIP16861	4	0	1	CIRCULAR	0.015	CIPCP	23.9	21.2	Downstream	0.14	36.6	36.4	Downstream	59.6	64.3	Downstream	72.2	70.6	Downstream
PIPE11858	A3	ZPIP11042	1.5	0	1	CIRCULAR	0.010	RCP	1.9	1.9	None	0.17	3.0	3.0	None	4.4	4.4	None	4.9	4.9	None
PIPE11930	A3	ZPIP17268	1.5	0	1	CIRCULAR	0.010	RCP	0.3	2.5	Both Upstream and Downstream	0.24	0.5	2.5	Both Upstream and Downstream	0.7	4.1	Both Upstream and Downstream	0.8	4.7	Both Upstream and Downstream
PIPE12060	A3	ZPIP15543	3	0	1	CIRCULAR	0.005	RCP	6.7	6.7	None	0.14	12.0	12.0	None	18.0	17.9	None	20.5	21.6	None
PIPE12097	A3	ZPIP17585	4	0	1	CIRCULAR	0.004	RCP	32.1	15.0	Downstream	0.17	30.0	25.9	Both Upstream and Downstream	52.9	37.6	Both Upstream and Downstream	51.0	42.0	Both Upstream and Downstream
PIPE12111	A3	ZPIP11874	1.5	0	1	CIRCULAR	0.005	HDPE	2.6	1.3	None	0.18	2.0	2.1	None	3.2	3.1	None	3.6	3.5	None
PIPE12187	A3	PIP10622	3.5	0	1	CIRCULAR	0.030	RCP	38.7	33.2	None	0.19	81.6	60.5	None	118.5	78.4	None	135.4	80.0	None
PIPE12235	A3	ZPIP17446	2.5	0	1	CIRCULAR	0.005	RCP	5.8	8.4	None	0.29	9.3	14.2	Both Upstream and Downstream	14.4	13.8	Both Upstream and Downstream	16.6	13.3	Both Upstream and Downstream
PIPE11568	A3	ZPIP12733	2.5	0	1	CIRCULAR	0.043	RCP	12.0	12.0	None	0.14	22.0	22.0	None	33.7	33.7	None	38.6	38.5	None
PIPE11623	A3	ZPIP12806	3	0	1	CIRCULAR	0.089	RCP	28.4	28.5	None	0.14	51.5	51.6	None	78.8	78.7	None	90.2	90.2	None

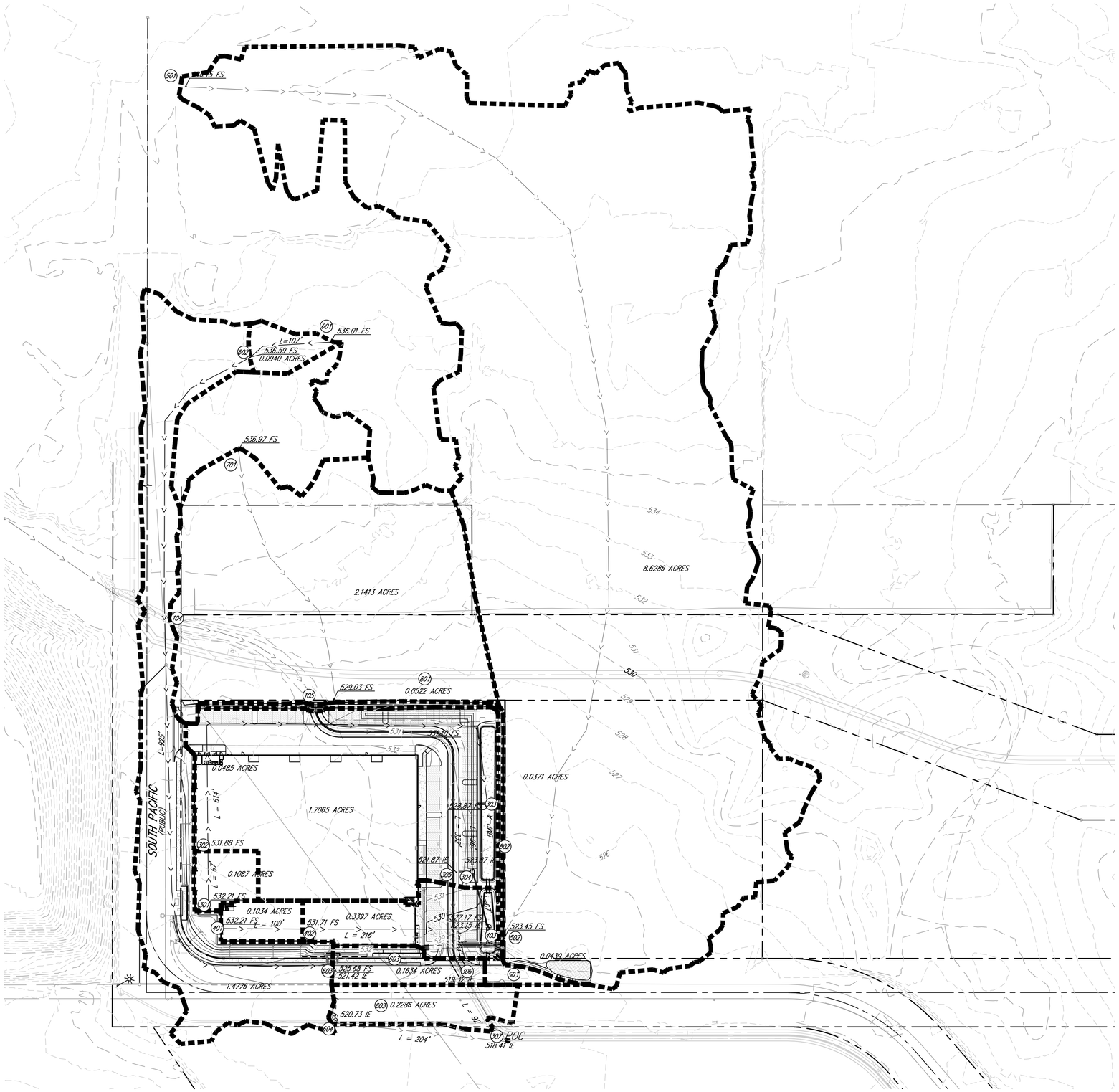
Existing Condition Storm Conveyance Results Summary Table

Conveyance Info			Dimensions						2-year				10-year			50-year			100-year		
Facility ID	SubWatershed	Original FacilityID	D' or H' (diameter) or (height)	B' (width)	Barrels	Shape	Slope (ft/ft)	Material	Q_2 (cfs)	Q_{con} (2-year) (cfs)	Surcharging (2-year)	Qcon vs Qcap	Q_{10} (cfs)	Q_{con} (10-year) (cfs)	Surcharging (10-year)	Q_{50} (cfs)	Q_{con} (50-year) (cfs)	Surcharging (50-year)	Q_{100} (cfs)	Q_{con} (100-year) (cfs)	Surcharging (100-year)
PIPE11818	A3	ZPIP13908	3	0	1	CIRCULAR	0.028	RCP	15.1	15.1	None	0.14	28.1	28.1	None	43.3	43.2	None	49.7	49.6	None
PIPE12068	A3	ZPIP17578	3.5	0	1	CIRCULAR	0.006	HDPE	12.6	12.6	None	0.16	18.6	20.7	None	19.1	30.4	None	36.6	34.6	None
CULV10157	A3	ZCUL11918E	3	5	3	RECT_CLOSED	0.009	RCP	82.6	92.9	None	0.2	129.4	144.3	None	172.7	183.6	None	191.5	211.2	None
CHAN10290	A3	ZCH10206	0	0	1	IRREGULAR	0.031	Concrete	98.7	126.8	None	0.1	164.3	193.3	None	232.4	233.8	Downstream	261.9	556.3	Downstream
PIPE12313	A3	ZPIP15195	2	8	1	RECT_CLOSED	0.013	RCP	24.2	27.9	None	0.15	46.9	47.3	None	164.5	71.8	None	317.3	81.4	None
PIPE11522	A3	ZPIP10211	1.5	0	1	CIRCULAR	0.067	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	0.0	None	0.0	12.1	None
PIPE11743	A3	ZPIP13178	1.5	0	1	CIRCULAR	0.081	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	10.2	None	0.0	13.1	None
PIPE11772	A3	ZPIP10473	1.5	0	1	CIRCULAR	0.029	RCP	0.5	0.9	None	0.05	1.5	5.6	None	1.3	4.9	None	1.6	7.9	None
PIPE11847	A3	ZPIP14230	1.5	0	1	CIRCULAR	0.055	RCP	4.0	4.0	None	0.16	6.5	6.5	None	9.6	9.6	None	11.1	10.9	None
PIPE11865	A3	ZPIP14307	1.5	0	1	CIRCULAR	0.008	RCP	0.9	1.4	None	0.15	2.1	2.4	None	3.5	3.7	None	4.0	4.2	None
CULV10145	A3	ZCUL11918C	3	5	3	RECT_CLOSED	0.009	RCP	82.6	92.9	None	0.2	129.4	144.3	None	172.7	183.6	None	191.5	211.0	None
PIPE12169	A3	PIP19076	3	0	1	CIRCULAR	0.105	RCP	31.8	31.9	None	0.15	53.1	53.0	None	81.5	81.2	None	93.0	95.2	None
PIPE12276	A3	ZPIP14825	1.5	0	1	CIRCULAR	0.007	RCP	9.9	4.0	Both Upstream and Downstream	0.46	2.8	1.9	Both Upstream and Downstream	4.4	3.0	Both Upstream and Downstream	4.7	3.8	Both Upstream and Downstream
PIPE11567	A3	ZPIP12732	1.5	0	1	CIRCULAR	0.037	RCP	3.4	3.4	None	0.17	5.3	5.3	None	7.8	7.8	None	8.7	8.7	None
PIPE11596	A3	ZPIP12783	3.5	0	1	CIRCULAR	0.053	RCP	31.5	31.3	None	0.14	57.5	57.2	None	87.8	87.4	None	100.6	100.0	None
PIPE11657	A3	ZPIP10282	1.5	0	1	CIRCULAR	0.015	ACP	0.0	0.0	None	0	0.1	0.1	None	0.1	3.6	Downstream	0.1	5.5	Both Upstream and Downstream
PIPE11745	A3	ZPIP13180	2	0	1	CIRCULAR	0.034	RCP	7.0	7.0	None	0.17	11.0	11.0	None	16.0	15.7	None	18.1	18.1	None
PIPE11838	A3	ZPIP13974	1.5	0	1	CIRCULAR	0.027	RCP	2.9	2.9	None	0.17	4.5	4.5	None	6.5	6.5	None	7.4	7.4	None
PIPE11998	A3	ZPIP11592	2.5	0	1	CIRCULAR	0.025	RCP	9.8	10.0	None	0.16	16.4	16.5	None	24.4	24.3	None	27.8	27.9	None
PIPE12028	A3	ZPIP11648	3	0	1	CIRCULAR	0.005	RCP	6.7	6.6	None	0.14	12.0	11.9	None	17.8	17.5	None	20.4	20.3	None
PIPE12209	A3	ZPIP14614	4	0	1	CIRCULAR	0.011	RCP	21.0	21.1	None	0.14	36.8	37.0	None	56.2	56.6	None	64.4	64.8	None
PIPE11505	A3	ZPIP12684	1.5	0	1	CIRCULAR	0.084	RCP	4.4	4.4	None	0.14	7.4	7.4	None	11.2	11.2	None	12.8	12.8	None
PIPE11508	A3	ZPIP12691	1.5	0	1	CIRCULAR	0.082	RCP	4.4	4.4	None	0.15	7.4	7.4	None	11.2	11.2	None	12.8	12.8	None
PIPE11697	A3	ZPIP10403	3.5	0	1	CIRCULAR	0.033	RCP	26.1	26.0	None	0.14	43.8	43.9	None	64.1	66.8	None	72.9	76.5	None
PIPE11719	A3	ZPIP10445	1.5	0	1	CIRCULAR	0.019	RCP	0.0	0.0	None	0	0.0	0.9	None	0.0	6.1	None	0.0	6.0	None
PIPE12075	A3	ZPIP15839	2.5	0	1	CIRCULAR	0.005	HDPE	4.6	4.6	None	0.16	7.3	7.3	None	11.5	10.7	None	16.7	12.0	None
PIPE12090	A3	ZPIP15860	2.5	0	1	CIRCULAR	0.006	HDPE	5.2	5.2	None	0.16	15.2	8.1	None	17.0	11.9	None	36.4	13.4	None
CULV10156	A3	ZCUL11918D	3	5	3	RECT_CLOSED	0.009	RCP	81.3	91.1	None	0.19	127.1	141.6	None	169.4	176.2	None	187.6	199.9	None
PIPE12295	A3	ZPIP15928	5.5	12	3	RECT_CLOSED	0.005	RCP	300.1	283.7	None	0.12	821.3	725.2	None	1039.6	896.1	None	1105.3	975.3	None
PIPE12306	A3	PIP19074	5.5	12	3	RECT_CLOSED	0.005	RCP	299.3	285.6	None	0.12	822.2	725.1	None	1041.2	896.1	None	1106.8	975.4	None
PIPE11674	A3	ZPIP10367	1.5	0	1	CIRCULAR	0.009	RCP	1.6	1.6	None	0.16	2.5	2.5	None	3.6	3.6	None	4.1	4.1	None
PIPE11970	A3	ZPIP15198	6	0	2	CIRCULAR	0.022	RCP	186.2	228.5	None	0.18	316.7	354.4	None	459.9	450.0	None	523.1	513.4	None
PIPE12010	A3	ZPIP11631	1.5	0	1	CIRCULAR	0.028	RCP	0.0	0.0	None	0	0.0	5.3	None	0.0	7.4	None	0.0	7.2	None
PIPE12172	A3	PIP19091	3.5	0	1	CIRCULAR	0.036	CIPCP	19.8	19.8	None	0.12	38.2	38.1	None	58.9	58.9	None	67.7	67.7	None
PIPE12173	A3	PIP19092	3.5	0	1	CIRCULAR	0.036	CIPCP	19.8	19.8	None	0.12	38.2	38.2	None	59.0	59.0	None	67.8	67.8	None
PIPE11562	A3	ZPIP16735	3.5	0	1	CIRCULAR	0.006	RCP	11.4	11.5	None	0.15	18.2	18.3	None	26.6	26.8	None	30.3	30.2	None
PIPE11593	A3	ZPIP10250	5.5	0	1	CIRCULAR	0.042	RCP	109.6	107.9	None	0.16	181.3	174.6	None	268.1	252.6	None	300.0	271.3	Downstream
PIPE11864	A3	ZPIP14306	1.5	0	1	CIRCULAR	0.010	RCP	1.2	1.4	None	0.14	2.3	2.4	None	3.7	3.7	None	4.2	4.2	None
PIPE12043	A3	ZPIP11654	2.5	0	1	CIRCULAR	0.038	RCP	11.7	11.8	None	0.15	19.4	19.5	None	28.8	29.4	None	32.6	31.8	None
PIPE12150	A3	ZPIP16523	1.5	0	1	CIRCULAR	0.012	HDPE	0.0	0.0	None	0	0.0	0.0	None	0.0	0.9	None	0.0	4.7	None
PIPE12167	A3	PIP19072	3	0	1	CIRCULAR	0.105	RCP	29.0	29.2	None	0.14	48.8	48.8	None	75.2	75.1	None	85.9	85.8	None
PIPE12168	A3	PIP19075	3	0	1	CIRCULAR	0.105	RCP	29.0	29.1	None	0.13	48.8	48.7	None	75.3	75.0	None	86.0	85.7	None
PIPE12185	A3	PIP10606	3.5	0	1	CIRCULAR	0.051	RCP	41.3	35.9	None	0.16	87.2	66.2	None	129.2	87.3	None	156.8	90.5	None
DTCH10275	A3	DD055A	0	0	1	IRREGULAR	0.001	CONCRETE	471.2	157.6	None	0.12	745.5	270.2	None	1173.0	500.4	Upstream	1352.8	517.6	Upstream
PIPE11600	A3	ZPIP16639	4.5	0	1	CIRCULAR	0.149	RCP	102.2	102.7	None	0.14	176.8	177.1	None	260.0	261.1	None	287.5	297.6	None
PIPE11808	A3	ZPIP17061	1.5	0	1	CIRCULAR	0.041	RCP	2.9	2.9	None	0.14	4.8	4.8	None	7.2	7.2	None	8.2	8.2	None
PIPE12189	A3	PIP10624	4	0	1	CIRCULAR	0.035	RCP	25.1	22.8	None	0.09	57.2	50.0	None	87.4	89.8	None	100.3	104.5	None
PIPE12190	A3	PIP10681	4	0	1	CIRCULAR	0.035	RCP	25.1	22.8	None	0.09	57.4	50.1	None	87.9	90.2	None	100.8	104.2	None
CULV10168	A3	CUL033A	4	6	1	RECT_CLOSED	0.019	RCP	80.2	57.6	Both Upstream and Downstream	0.13	131.8	69.1	Both Upstream and Downstream	396.6	145.9	Both Upstream and Downstream	383.3	168.6	Both Upstream and Downstream
CHAN10315	A3	CH062B	6	25	1	TRAPEZOIDAL	0.015	Earthen	0.5	72.5	None	0.04	1.5	310.0	None	2.5	565.3	None	3.0	630.8	None
PIPE11513	A3	ZPIP10208	3.5	0	1	CIRCULAR	0.079	CIPCP	28.9	28.8	None	0.12	53.4	53.2	None	81.7	81.4	None	93.6	93.3	None
PIPE11673	A3	ZPIP16815	1.5	0	1	CIRCULAR	0.010	RCP	1.5	1.5	None	0.15	2.4	2.5	None	3.5	3.6	None	3.9	4.0	None
PIPE11741	A3	ZPIP13175	3	0	1	CIRCULAR	0.062	RCP	19.9	20.0	None	0.12	34.3	34.4	None	54.1	53.4	None	61.4	62.5	None
PIPE11891	A3	ZPIP11204	2	0	1	CIRCULAR	0.014	RCP	4.0	4.0	None	0.15	6.3	6.3	None	9.2	9.1	None	10.4	10.2	None
PIPE11969	A3	ZPIP15196	2	0	1	CIRCULAR	0.037	RCP	6.1	6.1	None	0.14	9.9	9.9	None	14.6	14.7	None	16.6	16.6	None
PIPE12074	A3	ZPIP15838	2.5	0	1	CIRCULAR	0.006	HDPE	4.6	4.7	None	0.15	7.3	7.3	None	11.5	10.7	None	16.7	12.1	None
PIPE12257	A3	ZPIP11618	1.5	4	1	RECT_CLOSED	0.011	RCP	6.4	6.4	None	0.13	10.4	10.5	None	15.8	15.8	None	17.9	17.9	None
CHAN10289	A3	ZCH10206	0	0	1	IRREGULAR	0.031	Concrete	98.7	126.9	None	0.1	164.3	193.7	None	232.4	234.3	None	262.0	474.5	None
PIPE11528	A3	ZPIP12706	1.5	0	1	CIRCULAR	0.009	RCP	1.4	1.4	None	0.14	2.2	2.2	None	3.2	3.2	None	3.6	3.6	None
PIPE11541	A3	ZPIP10218	3	0	1	CIRCULAR	0.065	RCP	20.8	20.8	None	0.12	36.7	36.7	None	55.5	55.5	None	63.3	63.3	None
PIPE11658	A3	ZPIP12989	1.5	0	1	CIRCULAR	0.038	RCP	2.9	2.9	None	0.14	4.6	4.6	None	6.7	6.8	None	7.6	7.6	None
PIPE11664	A3	ZPIP10363	1.5	0	1	CIRCULAR	0.040	RCP	3.0	3.0	None	0.14	4.7	4.7	None	6.9	6.9	None	7.7	7.8	None
PIPE11996	A3	ZPIP17425	3	0	1	CIRCULAR	0.018	RCP	11.7	11.9	None	0.13	19.3	19.5	None	28.8	28.7	None	32.9	33.2	None
PIPE12013	A3	ZPIP15399	1.5	0	1	CIRCULAR	0.022	RCP	0.0	0.0	None	0	0.0	2.6	None	0.0	6.5	None	0.0	5.8	None
PIPE12056	A3	ZPIP11689	2.25	0	1	CIRCULAR	0.014	RCP	4.9	4.9	None	0.13	7.9	7.9	None	11.8	11.8	None	13.4	13.4	None
PIPE12072	A3	ZPIP11855	4	0	1	CIRCULAR	0.005	HDPE	12.4	13.3	None	0.13	17.2	22.5	None	26.0	34.0	None	43.4	37.0	None
PIPE11815	A3	ZPIP13905	2	0	1	CIRCULAR	0.093	RCP	6.6	6.6	None	0.1	13.4	13.4	None	21.1	21.1	None	24.4	24.5	None
PIPE11964	A3	ZPIP15188	7	11	1	RECT_CLOSED	0.005	RCP	141.9	140.8	Both Upstream and Downstream	0.14	253.4	246.7	Both Upstream and Downstream	394.7	367.5	Both Upstream and Downstream	296.3	366.7	Both Upstream and Downstream
PIPE12104	A3	ZPIP15872	2.5	0	1	CIRCULAR	0.005	HDPE	7.6	4.0	None	0.14	15.3	6.3	None	10.8	9.3	None	11.7	10.6	None
PIPE12134	A3	ZPIP11972	5.5	0	1	CIRCULAR	0.017	RCP	64.8	65.1	None	0.15	107.4	178.2	None	598.7	168.7	Both Upstream and Downstream	623.0	158.3	Both Upstream and Downstream
CULV10160	A3	ZCUL070D	2	6	3	RECT_CLOSED	0.004	RCP	54.2	26.5	None	0.12	91.1	44.6	None	133.6	66.2	None	146.3	75.5	None
PIPE11502	A3	ZPIP16727	1.5	0	1	CIRCULAR	0.042	RCP	2.7	2.7	None	0.12	4.4	4.4	None	6.6	6.6	None	7.5	7.5	None
PIPE11511	A3	ZPIP12694	3.5	0	1	CIRCULAR	0.055	RCP	24.7	24.7	None	0.1	46.4	46.4	None	71.3	71.3	None	81.8	81.8	None
PIPE11549	A3	ZPIP10220	2	0	1	CIRCULAR	0.039	RCP	6.1	6.1	None	0.14	9.5	9.5	None	13.8	13.8	None	15.5	15.6	None
PIPE11558	A3	ZPIP10224	1.5	0	1	CIRCULAR	0.120	RCP	4.9	4.9	None	0.13	7.7	7.7	None	11.3	11.3	None	12.7	12.7	None
PIPE11579	A3	ZPIP10232	3.5	0	1	CIRCULAR	0.036	RCP	36.8	34.2	None	0.18	59.0	51.7	None	87.0	62.1	None	98.5	66.2	None

Existing Condition Storm Conveyance Results Summary Table

Conveyance Info			Dimensions						2-year				10-year				50-year				100-year			
Facility ID	SubWatershed	Original FacilityID	D' or H' (diameter) or (height)	B' (width)	Barrels	Shape	Slope (ft/ft)	Material	Q_2 (cfs)	Q_{con} (2-year) (cfs)	Surcharging (2-year)	Qcon vs Qcap	Q_{10} (cfs)	Q_{con} (10-year) (cfs)	Surcharging (10-year)	Q_{50} (cfs)	Q_{con} (50-year) (cfs)	Surcharging (50-year)	Q_{100} (cfs)	Q_{con} (100-year) (cfs)	Surcharging (100-year)	
PIPE11629	A3	ZPIP10267	1.5	0	1	CIRCULAR	0.060	RCP	2.0	2.0	None	0.08	3.2	3.2	None	4.7	4.7	None	5.3	5.3	None	
CULV10143	A3	ZCUL13009	7	10	1	RECT_CLOSED	0.010	RCP	235.1	245.1	Both Upstream and Downstream	0.19	445.9	236.1	Both Upstream and Downstream	594.5	250.9	Both Upstream and Downstream	664.7	264.8	Both Upstream and Downstream	
PIPE11956	A3	ZPIP15183	7	10	1	RECT_CLOSED	0.010	RCP	235.3	244.3	Both Upstream and Downstream	0.19	447.0	242.5	Both Upstream and Downstream	596.6	249.9	Both Upstream and Downstream	667.1	263.5	Both Upstream and Downstream	
PIPE11957	A3	ZPIP15184	7	10	1	RECT_CLOSED	0.010	RCP	234.9	243.6	Both Upstream and Downstream	0.19	447.9	243.2	Both Upstream and Downstream	598.1	249.4	Both Upstream and Downstream	668.8	263.0	Both Upstream and Downstream	
PIPE12058	A3	ZPIP17499	2.5	0	1	CIRCULAR	0.011	RCP	3.0	3.0	None	0.07	4.9	5.0	None	7.4	7.5	None	8.5	8.5	None	
CULV10163	A3	ZCUL16633	4	4	1	RECT_CLOSED	0.046	RCP	54.7	27.8	None	0.07	94.5	46.9	None	137.2	69.7	None	147.9	79.6	None	
CULV10164	A3	ZCUL11893	4	10	1	RECT_CLOSED	0.006	RCP	56.5	30.9	None	0.07	93.2	51.9	None	169.3	77.4	None	170.6	91.6	None	
CHAN10225	A3	ZCH10143A	0	0	1	IRREGULAR	0.020	Earthen	111.2	100.1	None	0.1	182.4	144.9	None	234.7	182.5	None	253.9	204.0	None	
CHAN10226	A3	ZCH10143A	0	0	1	IRREGULAR	0.020	Earthen	111.2	100.1	None	0.1	182.4	144.9	None	234.7	182.5	None	253.9	203.9	None	
CHAN10274	A3		0	0	1	IRREGULAR	0.012	Concrete	6.2	6.7	None	0.09	10.1	10.3	None	15.3	14.5	None	17.1	14.9	None	
PIPE11506	A3	ZPIP12685	1.5	0	1	CIRCULAR	0.204	RCP	2.9	2.9	None	0.06	5.1	5.1	None	7.7	7.7	None	8.8	8.8	None	
PIPE11913	A3	ZPIP11322	2	0	1	CIRCULAR	0.029	RCP	2.5	2.9	None	0.07	4.0	4.5	None	6.7	6.6	None	7.6	7.5	None	
PIPE12005	A3	ZPIP15331	2	0	1	CIRCULAR	0.037	RCP	2.8	2.8	None	0.06	4.8	4.9	None	7.3	7.3	None	8.3	8.3	None	
CULV10159	A3	ZCUL16801	4	4	1	RECT_CLOSED	0.046	RCP	54.0	26.1	None	0.07	97.3	44.1	None	133.2	65.5	None	146.3	74.8	None	
CHAN10298	A3	CH043D	4	4	1	TRAPEZOIDAL	0.005	Concrete	83.6	59.6	Both Upstream and Downstream	0.1	121.2	76.8	Both Upstream and Downstream	294.5	103.5	Both Upstream and Downstream	284.8	113.5	Both Upstream and Downstream	
PIPE11544	A3	ZPIP12716	1.5	0	1	CIRCULAR	0.043	RCP	1.5	1.5	None	0.07	2.2	3.1	None	3.1	3.3	None	5.7	3.8	None	
PIPE11789	A3	ZPIP13606	2.5	0	1	CIRCULAR	0.014	RCP	3.0	3.0	None	0.06	5.0	5.0	None	7.5	7.5	None	8.5	8.5	None	
PIPE11611	A3	ZPIP12793	1.5	0	1	CIRCULAR	0.090	RCP	2.1	2.1	None	0.07	3.3	3.3	None	4.7	4.7	None	5.3	5.3	None	
PIPE11869	A3	ZPIP17190	1.5	0	1	CIRCULAR	0.048	RCP	2.0	0.6	Both Upstream and Downstream	0.03	3.6	5.7	Both Upstream and Downstream	0.9	3.8	Both Upstream and Downstream	1.1	4.0	Both Upstream and Downstream	
PIPE11880	A3	ZPIP14533	1.5	0	1	CIRCULAR	0.086	RCP	2.0	2.0	None	0.06	3.2	3.2	None	70.5	4.8	None	80.1	5.4	None	
PIPE12049	A3	ZPIP17469	1.5	0	1	CIRCULAR	0.380	RCP	7.2	4.9	None	0.08	12.2	6.8	None	18.3	8.8	None	20.8	11.1	None	
PIPE12205	A3		6	0	1	CIRCULAR	0.012	RCP	54.7	27.9	None	0.06	93.0	46.9	None	142.2	69.8	None	147.8	79.8	None	
PIPE12206	A3		6	0	1	CIRCULAR	0.013	RCP	55.0	28.5	None	0.06	93.5	47.9	None	146.1	71.3	None	148.3	81.5	None	
PIPE12232	A3	ZPIP17192	7	11	1	RECT_CLOSED	0.003	RCP	66.9	54.9	None	0.06	122.7	115.5	None	203.0	126.7	None	275.9	142.3	None	
PIPE12274	A3	ZPIP11323	2	0	1	CIRCULAR	0.009	RCP	11.1	1.7	Both Upstream and Downstream	0.08	2.8	1.4	Both Upstream and Downstream	4.8	2.8	Both Upstream and Downstream	4.7	3.6	Both Upstream and Downstream	
DTCH10272	A3	DD10036	0	0	1	IRREGULAR	0.073	CONCRETE	443.7	161.9	None	0.05	744.8	272.1	None	1172.0	509.5	None	1360.4	524.7	None	
PIPE11668	A3	ZPIP12996	1.5	0	1	CIRCULAR	0.100	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	4.8	Downstream	0.0	5.4	Both Upstream and Downstream	
PIPE11727	A3	ZPIP13167	1.5	0	1	CIRCULAR	0.042	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	0.7	None	0.0	3.5	None	
PIPE11920	A3	ZPIP14856	1.5	0	1	CIRCULAR	0.079	RCP	1.8	1.8	None	0.06	2.8	2.8	None	4.1	4.1	None	4.7	4.7	None	
PIPE12140	A3	ZPIP12205	3.5	5	1	RECT_OPEN	0.056	RCP	44.1	32.1	None	0.05	69.5	53.3	None	80.7	92.6	None	92.5	97.1	None	
PIPE12204	A3	ZPIP17216	6	0	1	CIRCULAR	0.015	RCP	54.9	28.3	None	0.05	92.1	47.7	None	145.5	70.9	None	148.3	80.9	None	
PIPE11529	A3	ZPIP12707	1.5	0	1	CIRCULAR	0.156	RCP	2.4	2.4	None	0.06	3.9	3.9	None	5.6	5.6	None	6.4	6.4	None	
PIPE11566	A3	ZPIP10228	1.5	0	1	CIRCULAR	0.134	RCP	2.3	2.3	None	0.06	3.6	3.6	None	5.2	5.2	None	5.8	5.8	None	
PIPE12283	A3	ZPIP11571	1.5	0	1	CIRCULAR	0.039	RCP	0.1	1.3	None	0.06	2.4	4.8	Both Upstream and Downstream	1.4	3.4	Both Upstream and Downstream	1.4	3.1	Both Upstream and Downstream	
PIPE11552	A3	ZPIP12721	1.5	0	1	CIRCULAR	0.080	RCP	1.6	1.6	None	0.05	2.5	2.5	None	3.6	3.6	None	4.0	4.0	None	
PIPE11962	A3	ZPIP11518	7	11	1	RECT_CLOSED	0.005	RCP	66.8	55.0	None	0.05	186.0	155.7	None	254.7	134.4	None	295.5	148.0	Downstream	
PIPE12131	A3	ZPIP16081	7	11	1	RECT_CLOSED	0.005	RCP	66.8	54.7	None	0.05	164.7	196.3	None	264.0	138.9	Downstream	274.0	152.2	Both Upstream and Downstream	
PIPE11787	A3	ZPIP10677	2.5	0	1	CIRCULAR	0.028	RCP	3.0	3.0	None	0.04	5.0	5.0	None	7.5	7.5	None	8.5	8.6	None	
PIPE11878	A3	ZPIP17191	7	11	1	RECT_CLOSED	0.006	RCP	66.9	54.9	None	0.05	134.7	121.5	None	219.0	128.1	None	297.0	141.7	None	
PIPE12078	A3	ZPIP15843	2	0	1	CIRCULAR	0.006	HDPE	0.8	0.8	None	0.05	2.2	1.3	None	11.6	1.9	None	9.2	2.2	None	
PIPE12245	A3	ZPIP16982	2.5	0	1	CIRCULAR	0.014	RCP	2.2	2.3	None	0.05	3.7	3.7	None	5.5	5.5	None	6.2	6.2	None	
CHAN10273	A3		0	0	1	IRREGULAR	0.012	Concrete	6.5	6.7	None	0.05	10.4	10.6	None	15.1	15.4	None	16.9	17.2	None	
PIPE12261	A3	ZPIP14001	3	0	1	CIRCULAR	0.239	RCP	15.7	15.7	None	0.05	25.7	25.7	None	38.4	38.4	None	43.7	43.7	None	
CHAN10311	A3	CH062A	6	25	1	TRAPEZOIDAL	0.128	Earthen	1.0	89.2	None	0.02	2.4	349.1	None	4.0	569.1	Downstream	4.7	632.4	Downstream	
PIPE11683	A3	ZPIP10380	3.5	0	1	CIRCULAR	0.010	CIPCP	3.2	3.4	None	0.04	5.2	7.6	None	8.0	9.6	None	9.5	10.8	None	
CHAN10326	A3		0	0	1	IRREGULAR	0.005	EARTHEN	3.2	3.2	None	0.02	11.3	13.4	None	22.1	18.8	None	16.3	20.8	None	
PIPE11614	A3	ZPIP10260	2.75	0	1	CIRCULAR	0.099	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	16.6	None	0.0	18.2	Downstream	
PIPE12062	A3	ZPIP15557	2	0	1	CIRCULAR	0.008	RCP	0.5	0.7	None	0.04	0.8	2.2	None	1.0	2.1	None	1.0	2.3	None	
PIPE12214	A3	ZPIP11045	1.5	0	1	CIRCULAR	0.115	RCP	0.2	0.0	None	0	1.0	2.1	None	2.5	4.9	Both Upstream and Downstream	3.2	4.1	Both Upstream and Downstream	
PIPE11617	A3	ZPIP12803	1.5	0	1	CIRCULAR	0.191	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	0.0	None	0.0	4.5	None	
PIPE11641	A3	ZPIP16767	5.5	0	1	CIRCULAR	0.043	RCP	27.4	27.7	None	0.04	45.2	44.1	None	63.8	82.7	None	73.9	66.8	None	
PIPE12057	A3	ZPIP11690	2.25	0	1	CIRCULAR	0.200	RCP	5.0	5.0	None	0.04	8.1	8.1	None	12.0	12.0	None	13.6	13.6	None	
PIPE12116	A3	ZPIP15880	4	10	1	TRAPEZOIDAL	0.001	CMP	20.3	12.7	None	0.04	21.3	20.1	None	33.4	29.7	None	37.9	33.8	None	
PIPE12221	A3	ZPIP11163	1.5	0	1	CIRCULAR	0.006	RCP	0.3	0.3	None	0.04	0.5	0.5	None	0.7	0.7	None	0.8	0.8	None	
CHAN10219	A3	CH045C	0	0	1	IRREGULAR	0.016	Earthen	32.3	31.7	None	0.07	61.3	44.0	None	97.5	50.0	None	109.0	50.2	None	
CHAN10322	A3	CH062B	6	25	1	TRAPEZOIDAL	0.227	Earthen	2.8	45.8	None	0.01	21.5	260.9	None	53.0	562.6	None	128.1	634.0	None	
PIPE11547	A3	ZPIP12719	1.5	0	1	CIRCULAR	0.793	RCP	3.4	3.4	None	0.04	5.3	5.3	None	7.6	7.6	None	8.6	8.6	None	
PIPE11685	A3	ZPIP13027	1.5	0	1	CIRCULAR	0.025	RCP	0.0	0.0	None	0	0.0	0.4	None	0.3	1.1	None	0.5	1.4	None	
PIPE11790	A3	ZPIP10701	2.5	0	1	CIRCULAR	0.051	RCP	3.0	3.0	None	0.03	4.9	5.0	None	7.4	7.5	None	8.5	8.5	None	
PIPE11915	A3	ZPIP14828	1.5	0	1	CIRCULAR	0.109	RCP	3.7	0.1	None	0	0.4	0.0	None	14.6	3.8	None	11.1	3.3	Both Upstream and Downstream	
PIPE12077	A3	ZPIP15842	1.5	0	1	CIRCULAR	0.048	HDPE	0.9	0.9	None	0.04	1.3	1.3	None	11.6	1.9	None	9.2	2.2	None	
PIPE12130	A3	ZPIP17639	2.5	0	1	CIRCULAR	0.056	RCP	3.0	3.0	None	0.03	4.9	5.0	None	7.4	7.5	None	8.5	8.5	None	
CHAN10275	A3		0	0	1	IRREGULAR	0.012	Concrete	5.8	6.0	None	0.04	9.9	9.7	None	13.4	13.8	None	15.2	14.5	None	
PIPE11752	A3	ZPIP13187	1.5	0	1	CIRCULAR	0.079	RCP	0.7	0.7	None	0.03	1.3	1.3	None	2.0	2.0	None	2.3	2.3	None	
PIPE12027	A3	ZPIP15430	1.5	0	1	CIRCULAR	0.005	RCP	0.4	0.3	None	0.04	0.7	0.4	None	1.1	0.6	None	1.3	0.6	None	
PIPE12153	A3	ZPIP16526	3.75	2.417	1	VERT_ELLIPSE	0.005	RCP	0.8	1.7	None	0.03	2.1	3.0	None	3.6	3.5	None	3.5	3.7	Downstream	
CULV10166	A3	ZCUL070C	2	6	3	RECT_CLOSED	0.004	RCP	7.3	5.6	None	0.03	12.0	12.3	None	19.8	20.3	None	18.4	18.7	None	
CHAN10220	A3	CH045C	0	0	1	IRREGULAR	0.020	Earthen	32.7	30.9	None	0.06	60.3	39.9	None	93.3	43.4	None	103.8	43.1	None	
CHAN10272	A3		0	0	1	IRREGULAR	0.032	Concrete	7.1	7.1	None	0.03	11.2	11.2	None	16.3	16.4	None	18.4	18.6	None	
PIPE11848	A3	ZPIP11033	3	0	1	CIRCULAR	0.013	RCP	1.8	1.9	None	0.03	3.2	3.1	None	3.8	4.5	None	4.6	5.1	None	
PIPE12196	A3	PIP10967	1.5	0	1	CIRCULAR	0.003	PVC	0.2	0.1	None	0.01	0.5	0.2	None	0.5	0.5	None	0.5	0.4	None	
PIPE12303	A3	ZPIP15926	5.5	0	1	CIRCULAR	0.002	RCP	3.2	3.2	None	0.02	5.3	5.3	None	8.1	8.1	None	9.3	9.3	None	
PIPE12309	A3	ZPIP14606	3	0	1	CIRCULAR	0.029	RCP	0.0	0.0	None	0	0.3	0.0	None	25.5	1.5	None	180.2	7.6	None	
DTCH10277	A3	CH063A	0	0	1	IRREGULAR	0.013	Earthen	490.1	139.3	None	0.02	706.4	252.4	Upstream	1400.5	498.5	Both Upstream and Downstream	1700.0	506.2	Both Upstream and Downstream	
PIPE11694	A3	ZPIP13067	1.5	0	1	CIRCULAR	0.017	RCP	0.2	0.1	None	0	0.4	0.1	None	0.4	0.8	None	0.5	0.8	None	
PIPE11881	A3	ZPIP14534	1.5	0	1	CIRCULAR	0.010	RCP	0.0	0.0	None	0	0.0	0.0	None	10.2	0.5	None	4.8	0.6	None	

ATTACHMENT 5
POST-DEVELOPMENT HYDROLOGY EXHIBIT



LEGEND

- HYDRO BASIN BOUNDARY
- SURFACE FLOW
- PIPE FLOW
- (301) NODE NUMBER
- XXX ELEVATION

HYDROLOGY ANALYSIS RESULTS

	PRE	POST	POST MIT.
Q (CFS)	258.68	258.84	258.50
Tc (MIN)	51.74	49.85	49.85
V (FT/S)	15.49	15.49	15.49
A (AC)	170.63	170.63	170.63

SCALE: 1:60

0 60 120 180 240

SOUTH PACIFIC STREET
POST HYDROLOGY EXHIBIT
SHEETS 1 OF 2 ONSITE

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

K:\21\21088\Engineering\Preliminary\Storm Working Files\dwg\21088-Post-Hyd-Onsite.dwg 6/8/2022 11:48 AM ORIGINAL PLOT SIZE: PDF 24X36

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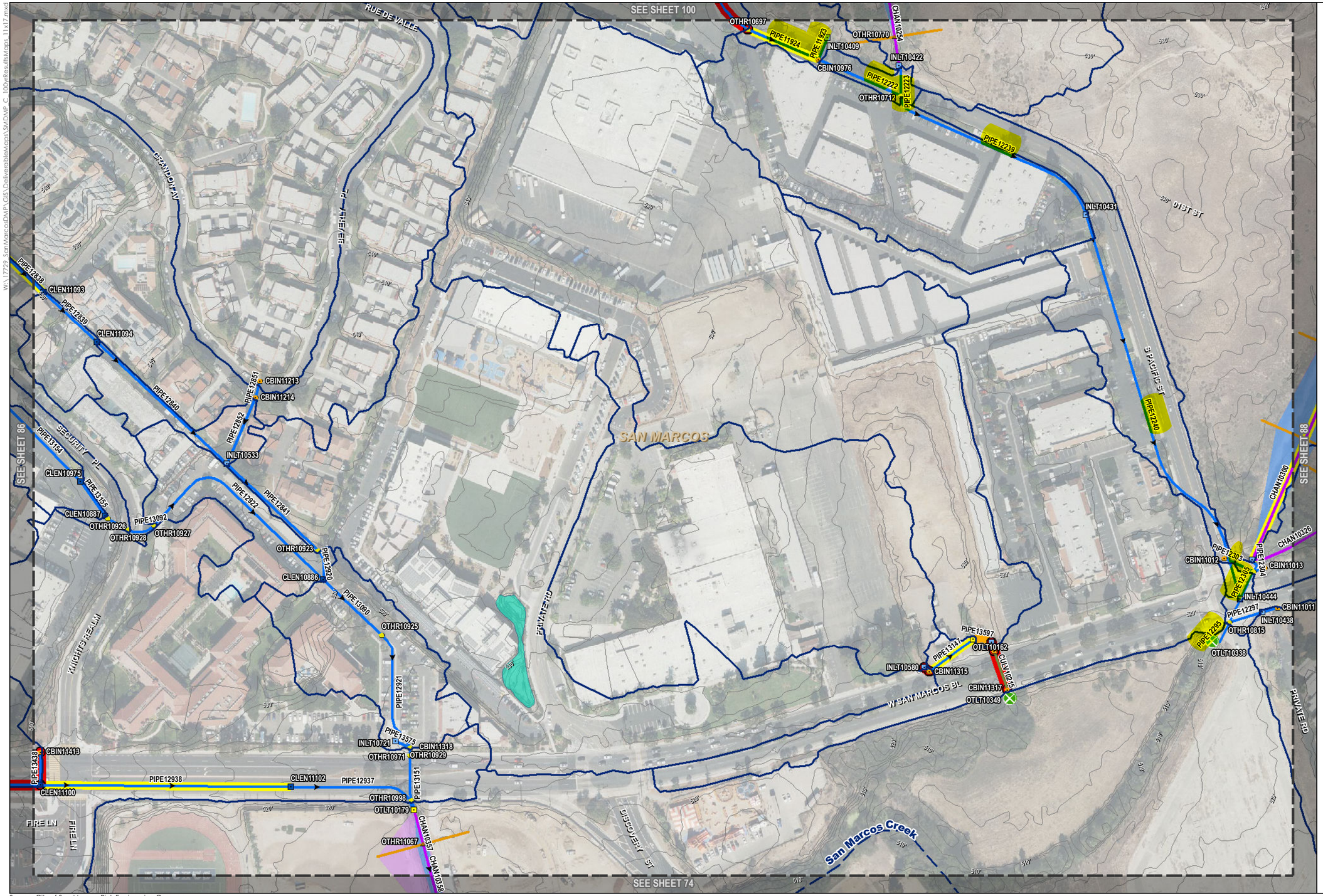

Map Legend

- Major River / Stream
- Sub-Catchments

Existing Inventory

- Channel Confluence
- Cleanout
- Curb Inlet
- Curb Outlet
- Detention Basin
- Inlet
- Outlet
- Other
- Separator
- Outfalls
- Culvert
- Channel wider than 5 ft
- Ditch less than 5 ft wide
- Elliptical
- Natural Channel
- Storm Main
- Channel / Ditch Transects
- 2-YR Flood Inundation
- 50-YR Flood Inundation
- 10-YR Flood Inundation
- 100-YR Flood Inundation
- Storm Detention Basin
- Surcharging Junctions

Surcharging Conduits

- Only Upstream Surcharging
- Only Downstream Surcharging
- Both Upstream and Downstream Surcharging

Source: City of San Marcos, Rick Engineering Company, SANGIS/USGS Aerial Imagery: 11/2014

Scale in Feet: 0 — 200 — 400

North

APPENDIX C

City of San Marcos - Drainage Master Plan

Existing Deficient Systems, 100 Year Results - Sheet 87

April, 2019

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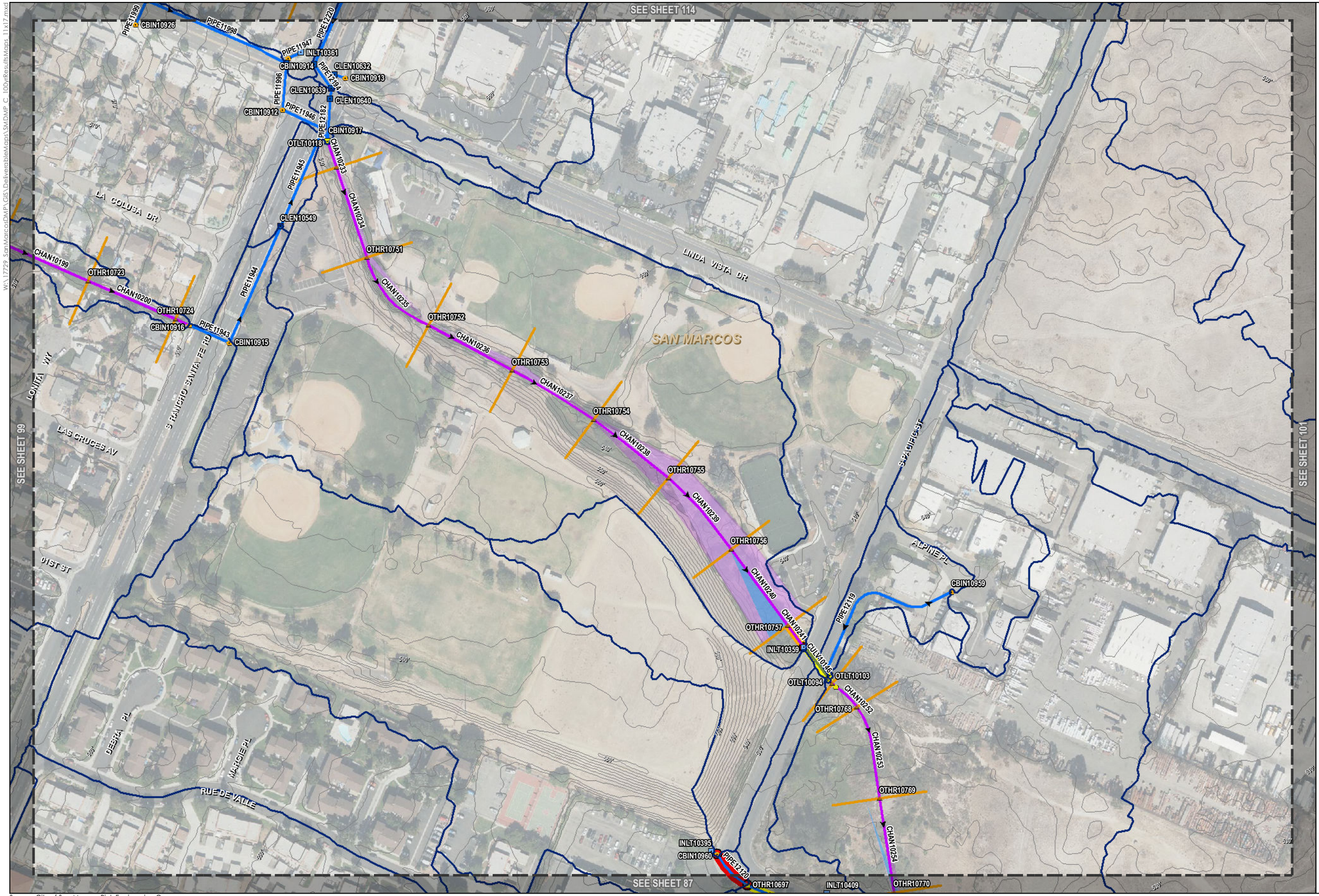

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Surcharging Conduits

- Only Upstream Surcharging
- Only Downstream Surcharging
- Both Upstream and Downstream Surcharging

Source: City of San Marcos, Rick Engineering Company, SANGIS/USGS Aerial Imagery: 11/2014

Scale in Feet
0 200 400

North

APPENDIX C

City of San Marcos - Drainage Master Plan

Existing Deficient Systems, 100 Year Results - Sheet 100

April, 2019

Existing Condition Storm Conveyance Results Summary Table

Conveyance Info			Dimensions						2-year				10-year				50-year				100-year			
Facility ID	SubWatershed	Original FacilityID	D' or H' (diameter) or (height)	B' (width)	Barrels	Shape	Slope (ft/ft)	Material	Q_2 (cfs)	Q_{con} (2-year) (cfs)	Surcharging (2-year)	Qcon vs Qcap	Q_{10} (cfs)	Q_{con} (10-year) (cfs)	Surcharging (10-year)	Q_{50} (cfs)	Q_{con} (50-year) (cfs)	Surcharging (50-year)	Q_{100} (cfs)	Q_{con} (100-year) (cfs)	Surcharging (100-year)
FLOW10091	A2		0	0	1	DUMMY	0.012	RCP	0.0	98.7	None	0	0.0	167.6	None	0.0	243.8	None	285.8	285.8	None
FLOW10092	A2		0	0	1	DUMMY	0.006	RCP	0.0	98.2	None	0	0.0	167.0	None	0.0	300.2	None	308.0	308.0	None
PIPE11928	A3	ZPIP11347	1.5	0	1	CIRCULAR	0.006	RCP	56.0	40.5	Both Upstream and Downstream	5.17	90.5	52.8	Both Upstream and Downstream	133.4	66.2	Both Upstream and Downstream	153.2	71.9	Both Upstream and Downstream
PIPE11995	A3	ZPIP17423	1.5	0	1	CIRCULAR	0.001	PVC	10.8	9.2	Upstream	3.41	18.0	13.4	Upstream	27.1	18.1	Upstream	30.9	20.1	Upstream
PIPE11871	A3	ZPIP11140	2	0	2	CIRCULAR	0.001	RCP	43.5	44.2	Both Upstream and Downstream	2.56	86.2	75.3	Both Upstream and Downstream	110.5	107.7	Both Upstream and Downstream	126.5	123.9	Both Upstream and Downstream
PIPE11796	A3	ZPIP13803	1.5	0	1	CIRCULAR	0.004	RCP	15.1	14.5	Downstream	2.32	25.8	23.7	Both Upstream and Downstream	39.2	34.9	Both Upstream and Downstream	44.9	39.6	Both Upstream and Downstream
PIPE11654	A3	ZPIP16773	1.083	0	1	CIRCULAR	0.005	CMP	7.2	4.9	Upstream	2.9	12.2	6.8	Upstream	18.3	8.8	Upstream	20.8	9.6	Upstream
PIPE11655	A3	ZPIP16774	1.083	0	1	CIRCULAR	0.006	CMP	7.2	4.9	None	2.68	12.2	6.8	None	18.3	8.8	None	20.8	9.6	None
PIPE12066	A3	ZPIP17503	1.5	0	1	CIRCULAR	0.001	RCP	8.7	9.0	None	2.46	15.3	15.3	None	26.0	17.5	Upstream	28.6	18.7	Upstream
PIPE12202	A3	ZPIP15865	4	0	1	CIRCULAR	0.000	HDPE	30.5	24.7	None	1.84	90.4	52.7	Both Upstream and Downstream	78.8	70.0	Both Upstream and Downstream	85.5	65.0	Both Upstream and Downstream
CULV10154	A3	CUL13262	3.583	2.25	1	ARCH	0.003	CMP	26.3	19.5	None	0.88	50.0	35.5	None	72.3	94.5	Upstream	83.4	106.1	Both Upstream and Downstream
PIPE12290	A3	ZPIP11574	1.5	0	1	CIRCULAR	0.001	RCP	0.1	2.9	None	0.96	0.8	6.0	Both Upstream and Downstream	5.7	15.4	Both Upstream and Downstream	13.0	12.2	Both Upstream and Downstream
PIPE12133	A3	ZPIP16083	1	0	1	CIRCULAR	0.042	CMP	9.0	7.2	Upstream	1.83	15.0	10.5	Upstream	41.0	14.1	Both Upstream and Downstream	43.8	15.9	Both Upstream and Downstream
PIPE12210	A3	ZPIP14864	2	0	1	CIRCULAR	0.003	RCP	15.9	16.1	None	1.4	27.2	27.1	None	41.3	40.1	Upstream	47.3	45.7	Upstream
PIPE12015	A3	ZPIP15401	2.5	0	1	CIRCULAR	0.002	RCP	28.4	34.2	None	2.06	39.2	58.2	None	42.2	64.2	None	45.0	65.2	None
PIPE11801	A3	ZPIP17042	3.25	0	1	CIRCULAR	0.001	RCP	53.2	52.4	None	2.01	89.3	88.0	None	139.5	98.2	Upstream	158.9	100.7	Upstream
PIPE11929	A3	ZPIP14874	2	0	1	CIRCULAR	0.007	RCP	57.8	40.9	Both Upstream and Downstream	2.17	93.9	53.1	Both Upstream and Downstream	138.2	66.6	Both Upstream and Downstream	158.7	72.4	Both Upstream and Downstream
PIPE11898	A3	ZPIP11209	1.5	0	1	CIRCULAR	0.002	RCP	0.0	0.0	None	0	0.0	0.0	None	0.1	0.1	None	0.1	18.1	None
PIPE11799	A3	ZPIP17040	3.5	0	1	CIRCULAR	0.001	RCP	60.6	60.6	None	1.95	100.9	97.3	None	163.9	108.9	None	183.1	112.2	None
PIPE11925	A3	ZPIP14866	2.5	0	1	CIRCULAR	0.003	RCP	27.7	27.6	None	1.18	51.9	48.3	Both Upstream and Downstream	81.3	71.7	Both Upstream and Downstream	93.4	81.6	Both Upstream and Downstream
PIPE11953	A3	ZPIP11498	2.5	0	1	CIRCULAR	0.005	CMP	29.4	27.6	None	1.71	47.5	38.0	Upstream	68.2	48.6	Upstream	77.7	53.3	Upstream
PIPE12156	A3	ZPIP16535	1.5	0	1	CIRCULAR	0.002	RCP	4.9	5.0	None	1.18	8.3	9.0	None	12.5	13.4	None	14.2	13.8	None
PIPE11927	A3	ZPIP11346	2	0	1	CIRCULAR	0.010	RCP	57.8	40.9	Both Upstream and Downstream	1.81	93.9	53.0	Both Upstream and Downstream	138.4	66.5	Both Upstream and Downstream	158.8	72.2	Both Upstream and Downstream
PIPE11931	A3	ZPIP17269	2	0	1	CIRCULAR	0.011	RCP	62.1	42.5	Both Upstream and Downstream	1.8	101.3	55.0	Both Upstream and Downstream	149.3	68.9	Both Upstream and Downstream	171.4	74.8	Both Upstream and Downstream
PIPE11800	A3	ZPIP17041	3	0	1	CIRCULAR	0.001	RCP	31.0	30.2	None	1.37	53.1	56.5	None	82.0	66.9	Both Upstream and Downstream	94.6	68.9	Both Upstream and Downstream
PIPE12302	A3	ZPIP10920	2.5	0	1	CIRCULAR	0.004	RCP	73.4	50.7	None	2.06	110.5	60.3	Upstream	247.7	72.0	Upstream	239.3	77.0	Upstream
PIPE11642	A3	ZPIP16768	3.5	0	1	CIRCULAR	0.005	CIPCP	362.4	182.5	Upstream	2.86	605.4	192.5	Upstream	894.2	196.6	Upstream	998.4	198.3	Upstream
PIPE11782	A3	ZPIP10625	1.5	0	1	CIRCULAR	0.006	RCP	0.1	2.8	None	0.33	0.1	22.3	Both Upstream and Downstream	0.2	24.6	Both Upstream and Downstream	0.2	25.4	Both Upstream and Downstream
PIPE12225	A3		2.5	0	1	CIRCULAR	0.002	RCP	26.4	23.9	None	1.29	48.6	38.0	None	74.9	51.4	None	82.9	54.1	Upstream
PIPE12164	A3	PIP19069	4	0	2	CIRCULAR	0.005	CIPCP	524.9	138.0	None	0.8	903.3	253.2	None	1258.3	482.9	Upstream	1371.1	486.5	Upstream
PIPE11906	A3	ZPIP14764	3	0	1	CIRCULAR	0.004	HDPE	64.5	64.5	None	1.52	102.0	99.8	None	149.7	113.5	None	169.3	116.0	None
PIPE12163	A3	PIP19068	4	0	2	CIRCULAR	0.005	CIPCP	523.5	134.9	None	0.78	896.8	247.9	None	1245.9	471.7	Both Upstream and Downstream	1355.5	471.1	Both Upstream and Downstream
PIPE12161	A3	ZPIP17908	1.5	0	1	CIRCULAR	0.006	RCP	7.7	7.7	None	0.92	12.8	12.8	None	19.5	19.5	None	22.5	22.4	None
PIPE11855	A3	ZPIP14300	3	3	3	RECT_CLOSED	0.009	RCP	1.0	88.5	None	0.36	2.4	346.4	None	4.0	568.2	Upstream	4.6	632.2	Upstream
PIPE12249	A3	ZPIP10627	3.5	0	1	CIRCULAR	0.004	RCP	64.8	79.6	None	1.32	104.1	113.6	Upstream	153.8	143.9	Upstream	172.9	154.5	Upstream
PIPE11602	A3	ZPIP16641	2	0	1	CIRCULAR	0.009	RCP	11.8	11.8	None	0.54	24.0	24.0	None	37.8	37.7	None	44.4	55.5	None
PIPE12176	A3	ZPIP20005	3	0	1	CIRCULAR	0.010	RCP	45.1	65.6	Both Upstream and Downstream	0.98	73.3	103.0	Both Upstream and Downstream	108.0	149.1	Both Upstream and Downstream	124.4	169.7	Both Upstream and Downstream
PIPE11797	A3	ZPIP13804	2.5	0	1	CIRCULAR	0.006	RCP	69.6	45.0	Both Upstream and Downstream	1.42	114.2	58.3	Both Upstream and Downstream	168.1	72.9	Both Upstream and Downstream	192.1	79.3	Both Upstream and Downstream
CULV10155	A3	CUL16010	3.583	2.25	1	ARCH	0.003	CMP	22.2	17.5	None	0.78	45.5	33.7	None	68.7	49.8	None	79.7	55.9	Upstream
PIPE11798	A3	ZPIP17038	2.5	0	1	CIRCULAR	0.006	RCP	67.5	44.5	Both Upstream and Downstream	1.42	110.9	57.5	Both Upstream and Downstream	163.5	71.9	Both Upstream and Downstream	187.6	78.2	Both Upstream and Downstream
PIPE11905	A3	ZPIP14763	3	0	1	CIRCULAR	0.005	HDPE	64.5	64.6	None	1.39	102.0	99.8	None	149.7	113.5	None	172.5	116.0	None
PIPE11794	A3	ZPIP16667	2.5	0	1	CIRCULAR	0.007	RCP	83.0	49.9	None	1.41	136.3	63.7	Upstream	199.8	79.8	Upstream	228.8	86.8	Upstream
PIPE11795	A3	ZPIP13802	2.5	0	1	CIRCULAR	0.007	RCP	83.0	50.4	Upstream	1.43	136.1	63.5	Both Upstream and Downstream	200.6	79.5	Both Upstream and Downstream	228.5	86.4	Both Upstream and Downstream
PIPE11689	A3	ZPIP16844	2.25	0	1	CIRCULAR	0.006	RCP	14.1	26.7	None	1.13	30.4	35.9	None	51.9	62.6	None	59.7	56.8	Upstream
PIPE12016	A3	ZPIP17456	2.5	0	1	CIRCULAR	0.004	RCP	28.0	33.3	None	1.29	38.2	57.2	None	40.3	61.6	Upstream	42.2	62.4	Upstream
PIPE12123	A3	ZPIP15943	1.5	0	1	CIRCULAR	0.016	RCP	0.0	0.7	None	0.05	0.1	0.3	None	0.5	28.1	None	0.6	31.6	None
CHAN10282	A3		0	0	1	IRREGULAR	0.009	Concrete	4.2	4.8	None	0.03	7.2	8.7	None	11.7	12.9	None	13.9	408.5	None
PIPE11780	A3	ZPIP13222	1.5	0	1	CIRCULAR	0.051	RCP	31.7	31.2	None	1.32	50.8	44.6	Upstream	74.8	52.5	Upstream	84.7	56.1	Upstream
PIPE12186	A3	PIP10617	3.5	0	1	CIRCULAR	0.002	RCP	47.7	40.9	None	0.83	111.4	82.0	None	158.6	110.1	None	172.8	117.0	None
PIPE12162	A3	ZPIP17911	1.5	0	1	CIRCULAR	0.023	RCP	39.2	19.0	None	1.19	67.3	26.7	None	103.4	34.2	None	120.9	37.5	Upstream
PIPE12195	A3	PIP10789	4	0	1	CIRCULAR	0.003	RCP	77.4	73.2	None	0.89	152.7	125.2	None	230.6	172.5	None	262.0	192.9	None
PIPE12182	A3	ZPIP11353	4	0	1	CIRCULAR	0.003	RCP	77.4	73.2	None	0.89	152.8	125.2	None	230.7	172.5	None	262.3	192.9	None
PIPE11653	A3	ZPIP16772	1.083	0	1	CIRCULAR	0.004	CMP	2.6	1.9	Both Upstream and Downstream	1.18	4.4	2.6	Both Upstream and Downstream	6.5	3.3	Both Upstream and Downstream	7.4	3.6	Both Upstream and Downstream
PIPE12287	A3	ZPIP15295	1.5	0	1	CIRCULAR	0.002	RCP	0.0	0.1	None	0.02	0.3	2.9	Both Upstream and Downstream	8.1	10.6	Both Upstream and Downstream	7.5	11.1	Both Upstream and Downstream
PIPE11700	A3	ZPIP13073	1.5	0	1	CIRCULAR	0.010	RCP	7.8	7.8	None	0.74	12.8	13.2	None	19.1	20.7	None	21.7	22.8	None
PIPE12264	A3	ZPIP10918	2.5	0	1	CIRCULAR	0.005	RCP	65.1	43.4	None	1.49	99.3	50.3	Both Upstream and Downstream	218.7	59.0	Both Upstream and Downstream	207.3	63.0	Both Upstream and Downstream
PIPE12267	A3	ZPIP17099	2.5	0	1	CIRCULAR	0.004	RCP	56.9	37.7	Both Upstream and Downstream	1.46	95.1	44.6	Both Upstream and Downstream	197.1	52.3	Both Upstream and Downstream	180.8	55.9	Both Upstream and Downstream
PIPE11688	A3	ZPIP16843	6.5	0	1	CIRCULAR	0.006	CIPCP	514.3	484.3	None	1.43	854.7	500.1	None	1228.9	671.7	None	1388.7	715.9	None
PIPE11926	A3	ZPIP11343	2.5	0	1	CIRCULAR	0.013	RCP	38.7	38.6	None	0.84	70.5	61.8	Both Upstream and Downstream	109.0	86.0	Both Upstream and Downstream	124.9	96.7	Both Upstream and Downstream
PIPE12316	A3	ZPIP11344	2.5	0	1	CIRCULAR	0.013	RCP	40.4	40.5	None	0.87	67.9	63.3	Upstream	115.5	86.3	Both Upstream and Downstream	136.0	96.8	Both Upstream and Downstream
PIPE12059	A3	ZPIP17500	3.5	0	1	CIRCULAR	0.006	RCP	77.8	81.3	None	1.06	128.0	117.9	Both Upstream and Downstream	189.7	146.9	Both Upstream and Downstream	213.2	158.1	Both Upstream and Downstream
PIPE11783	A3	ZPIP10626	3.5	0	1	CIRCULAR	0.006	RCP	77.4	79.7	None	1.04	126.4	115.1	Both Upstream and Downstream	185.2	145.0	Both Upstream and Downstream	207.0	155.7	Both Upstream and Downstream
PIPE11806	A3	ZPIP10821	2.5	0	1	CIRCULAR	0.038	CMP	27.5	27.4	None	0.63	48.5	49.9	None	77.3	76.3	None	89.3	87.6	None
PIPE11917	A3	ZPIP11338	1.5	0	1	CIRCULAR	0.008	PVC	5.4	5.4	None	0.59	9.8	9.8	None	15.0	16.2	None	17.2	18.4	None
PIPE12215	A3	ZPIP11046	1.5	0	1	CIRCULAR	0.027	RCP	10.3	10.7	None	0.62	19.8	20.6	None	32.5	31.2	Both Upstream and Downstream	36.9	34.6	Both Upstream and Downstream
PIPE12269	A3	ZPIP17101	2.5	0	1	CIRCULAR	0.006	RCP	63.5	42.2	Upstream	1.37	99.7	49.2	Both Upstream and Downstream	212.9	57.6	Both Upstream and Downstream	201.6	61.6	Both Upstream and Downstream
PIPE12148	A3	ZPIP17847	4	0	1	CIRCULAR	0.000	HDPE	12.1	20.8	None	0.76	17.5	33.3	None	35.9	47.8	None	46.2	53.9	None
PIPE11687	A3	ZPIP13032	6.5	0	1	CIRCULAR	0.005	CIPCP	504.5	354.9	None	1.06	835.8	466.5	None	1202.7	585.1	None	1353.8	645.4	None
PIPE12222	A3	ZPIP11342	2.25	0	1	CIRCULAR	0.004	RCP	10.3	10.3	None	0.51	22.6	22.4	None	36.7	36.3	None	42.7	38.8	None
PIPE12288	A3	ZPIP11572	2	3.167	1	HORIZ_ELLIPSE	0.004	RCP	22.6	22.7	None	0.86	40.3	33.9	Both Upstream and Downstream	86.9	44.4	Both Upstream and Downstream	72.7	50.6	Both Upstream and Downstream
PIPE12301	A3	ZPIP10919	2.5	0	1	CIRCULAR	0.007	RCP	66.1	44.5	None	1.34	98.9	51.3	Both Upstream and Downstream	222.9	60.1	Both Upstream and Downstream	211.7	64.2	Both Upstream and Downstream
PIPE12268	A3	ZPIP17100	2.5	0	1	CIRCULAR	0.005	RCP	59.5	40.1	Both Upstream and Downstream	1.33	96.0	46.0	Both Upstream and Downstream	201.5	54.1	Both Upstream and Downstream	188.9	57.8	Both Upstream and Downstream
CULV10176	A3	CUL063	3	0	2	CIRCULAR	0.038	RCP	528.4	194.0	None	0.74	881.2	262.5	None	1174.1	485.5	Both Upstream and Downstream	1357.4	500.1	Both Upstream and Downstream
PIPE11753	A3	ZPIP13188	1.5	0	1	CIRCULAR	0.026	RCP	12.8	12.9	None	0.76	20.6	20.6	None	30.3	29.2	None	34.2	31.7	None
PIPE12198	A3		6.5	0	1	CIRCULAR	0.005	CIPCP	506.5	351.4	None	1.05	836.5	466.3	None	1204.4	594.6	None	1357.1	623.1	None
PIPE11712	A3	ZPIP13091	6	0	1	CIRCULAR	0.006	CIPCP	492.7	318.8	None	1.12	809.0	435.4	None	1186.6	529.7	None	1342.9	526.7	None

Existing Condition Storm Conveyance Results Summary Table

Conveyance Info			Dimensions						2-year				10-year				50-year				100-year			
Facility ID	SubWatershed	Original FacilityID	D' or H' (diameter) or (height)	B' (width)	Barrels	Shape	Slope (ft/ft)	Material	Q_2 (cfs)	Q_{con} (2-year) (cfs)	Surcharging (2-year)	Qcon vs Qcap	Q_{10} (cfs)	Q_{con} (10-year) (cfs)	Surcharging (10-year)	Q_{50} (cfs)	Q_{con} (50-year) (cfs)	Surcharging (50-year)	Q_{100} (cfs)	Q_{con} (100-year) (cfs)	Surcharging (100-year)
PIPE11667	A3	ZPIP10366	1.5	0	1	CIRCULAR	0.027	RCP	6.0	6.0	None	0.35	9.5	9.5	None	13.9	16.1	None	15.6	21.5	None
PIPE11717	A3	ZPIP10443	2.25	0	1	CIRCULAR	0.011	RCP	16.5	16.5	None	0.52	27.4	26.1	None	41.1	40.0	None	46.9	40.2	None
CULV10137	A3	ZCUL12204	4	8	1	RECT_CLOSED	0.002	RCP	110.6	120.6	None	0.57	168.8	191.2	None	241.4	248.0	None	253.0	267.7	None
PIPE12018	A3	ZPIP11635	3.5	0	1	CIRCULAR	0.004	RCP	44.5	44.4	None	0.66	73.2	91.9	None	111.3	82.4	Both Upstream and Downstream	126.7	84.1	Both Upstream and Downstream
PIPE11840	A3	ZPIP17070	1.5	0	1	CIRCULAR	0.010	RCP	4.5	4.6	None	0.45	7.3	7.5	None	11.2	11.2	None	12.8	12.8	None
PIPE12022	A3	ZPIP15406	3	0	1	CIRCULAR	0.012	RCP	38.5	38.6	None	0.53	63.7	77.0	None	97.3	91.0	Both Upstream and Downstream	110.9	91.2	Both Upstream and Downstream
PIPE12251	A3	ZPIP15290	1.5	0	1	CIRCULAR	0.005	RCP	2.1	6.5	None	0.87	3.4	3.4	Both Upstream and Downstream	6.6	4.7	Both Upstream and Downstream	5.5	9.2	Both Upstream and Downstream
CHAN10221	A3	CH10142C	0	0	1	IRREGULAR	0.005	Earthen	199.0	225.6	None	0.72	314.6	362.0	Upstream	326.2	417.8	Upstream	268.2	388.0	Upstream
DTCH10276	A3	DD055A	0	0	1	IRREGULAR	0.001	CONCRETE	522.0	178.6	None	0.45	921.3	262.3	None	1171.5	485.5	Both Upstream and Downstream	1353.8	500.1	Both Upstream and Downstream
PIPE12017	A3	ZPIP11634	3.5	0	1	CIRCULAR	0.004	RCP	48.0	47.4	None	0.74	79.4	80.9	Downstream	120.4	82.0	Both Upstream and Downstream	136.8	78.8	Both Upstream and Downstream
PIPE12064	A3	ZPIP15559	1.5	0	1	CIRCULAR	0.002	RCP	0.7	3.6	None	0.7	1.1	5.8	None	1.7	5.7	None	1.6	6.3	Downstream
PIPE12124	A3	ZPIP11929	3.5	0	3	CIRCULAR	0.003	RCP	81.4	91.2	None	0.56	127.3	141.7	None	169.9	176.2	None	187.8	200.3	None
PIPE11682	A3	ZPIP10379	6	0	1	CIRCULAR	0.015	CIPCP	499.0	325.6	None	0.72	820.0	444.9	None	1199.0	543.5	None	1362.6	549.8	None
PIPE11804	A3	ZPIP10820	2.5	0	1	CIRCULAR	0.058	CMP	26.5	26.7	None	0.5	41.7	42.1	None	63.3	58.8	None	75.2	65.0	None
PIPE11836	A3	ZPIP13972	2	0	1	CIRCULAR	0.005	RCP	7.2	7.2	None	0.44	11.3	11.4	None	16.5	17.3	None	18.6	19.9	None
CHAN10285	A3	CH050A	0	0	1	IRREGULAR	0.002	Concrete	93.7	112.5	None	0.62	146.9	172.3	None	204.8	206.4	None	228.7	221.7	None
PIPE11588	A3	ZPIP12751	1.5	0	1	CIRCULAR	0.033	RCP	8.6	8.6	None	0.45	13.7	13.7	None	20.2	20.1	None	22.8	23.1	None
PIPE11661	A3	ZPIP12992	1.75	0	1	CIRCULAR	0.096	RCP	27.2	27.3	None	0.56	47.7	47.7	None	72.1	58.0	Upstream	82.3	59.7	Upstream
PIPE12285	A3	ZPIP15293	1.5	0	1	CIRCULAR	0.004	RCP	0.0	0.0	None	0	0.7	2.9	Both Upstream and Downstream	25.6	4.0	Both Upstream and Downstream	7.5	8.4	Both Upstream and Downstream
PIPE11534	A3	ZPIP12709	4.5	0	1	CIRCULAR	0.015	RCP	99.7	100.1	None	0.42	172.8	173.1	None	254.5	255.5	None	281.5	290.4	None
PIPE11681	A3	ZPIP10378	6	0	1	CIRCULAR	0.015	CIPCP	496.1	322.7	None	0.72	814.9	440.6	None	1193.3	526.5	None	1354.6	537.9	None
PIPE11720	A3	ZPIP10446	1.5	0	1	CIRCULAR	0.019	RCP	6.8	6.8	None	0.47	11.1	12.0	None	16.6	18.4	None	18.8	17.4	None
CULV10146	A3	CUL051A	4	0	1	CIRCULAR	0.010	RCP	99.9	89.7	None	0.63	166.3	131.4	Upstream	214.6	160.8	Upstream	232.2	172.0	Upstream
PIPE12197	A3	PIP10825	2	0	1	CIRCULAR	0.025	PVC	32.4	30.5	None	0.85	60.0	39.4	None	91.5	42.5	None	103.3	43.1	None
PIPE11828	A3	ZPIP10855	2.5	0	1	CIRCULAR	0.056	RCP	34.4	34.4	None	0.35	70.7	71.6	None	109.1	107.5	None	127.0	114.5	Upstream
PIPE12051	A3	ZPIP17471	2	0	1	CIRCULAR	0.011	RCP	9.9	9.9	None	0.43	17.0	16.2	None	25.5	23.1	None	29.1	27.4	None
PIPE12199	A3	ZPIP18000	1.5	0	1	CIRCULAR	0.024	RCP	5.7	5.3	None	0.33	9.3	9.2	None	11.0	17.4	None	11.9	19.1	None
PIPE12294	A3	ZPIP15301	2	3.167	2	HORIZ_ELLIPSE	0.004	RCP	34.7	35.1	None	0.67	63.7	50.4	Both Upstream and Downstream	115.5	53.9	Both Upstream and Downstream	107.6	61.3	Both Upstream and Downstream
PIPE11908	A3	ZPIP11288	4	0	1	CIRCULAR	0.005	HDPE	65.7	65.5	None	0.64	104.2	105.2	None	153.0	117.6	None	173.3	119.4	None
PIPE11613	A3	ZPIP10259	7	0	1	CIRCULAR	0.013	CIPCP	314.0	314.6	None	0.49	530.0	518.4	None	784.0	702.8	Upstream	866.9	742.8	Both Upstream and Downstream
PIPE11636	A3	ZPIP10269	2	0	1	CIRCULAR	0.095	RCP	28.2	28.1	None	0.4	46.3	45.1	None	69.5	70.7	Both Upstream and Downstream	79.0	80.5	Both Upstream and Downstream
PIPE11650	A3	ZPIP16769	1.5	0	1	CIRCULAR	0.096	RCP	10.2	10.2	None	0.31	17.1	17.1	None	25.4	30.3	None	28.8	37.7	None
CHAN10218	A3	CH10142B	0	0	1	IRREGULAR	0.005	Earthen	236.3	243.9	Downstream	1.08	417.2	249.5	Downstream	596.3	249.0	Downstream	646.6	262.3	Downstream
PIPE11698	A3	ZPIP10404	3	0	1	CIRCULAR	0.013	RCP	29.5	29.8	None	0.39	50.4	50.2	None	76.0	75.4	None	86.9	88.2	None
PIPE11764	A3	ZPIP10468	3	0	1	CIRCULAR	0.036	RCP	54.4	54.7	None	0.43	91.1	91.1	None	139.1	135.7	None	158.0	145.4	None
PIPE12021	A3	ZPIP15405	3	0	1	CIRCULAR	0.011	RCP	38.7	38.8	None	0.56	64.1	73.9	None	98.0	79.6	Both Upstream and Downstream	111.8	79.4	Both Upstream and Downstream
PIPE11872	A3	ZPIP14488	2	0	2	CIRCULAR	0.058	RCP	43.8	44.2	Both Upstream and Downstream	0.41	86.0	75.3	Both Upstream and Downstream	110.5	108.1	Both Upstream and Downstream	126.5	124.1	Both Upstream and Downstream
PIPE11934	A3	ZPIP14877	2.5	0	1	CIRCULAR	0.020	RCP	30.4	28.3	None	0.49	53.1	44.7	None	83.0	64.5	Downstream	91.2	66.1	Downstream
PIPE11924	A3	ZPIP14863	2.25	0	1	CIRCULAR	0.010	RCP	8.7	8.7	None	0.28	20.1	20.1	None	33.0	32.1	None	38.4	35.3	Upstream
CULV10167	A3	ZCUL13915	4	8	1	RECT_CLOSED	0.003	RCP	112.3	122.8	None	0.5	170.4	196.4	None	248.3	256.4	None	261.4	277.7	None
PIPE12280	A3	ZPIP15285	2	0	1	CIRCULAR	0.009	PVC	7.7	9.1	None	0.41	8.2	14.5	None	24.1	21.2	None	25.7	25.0	None
PIPE11711	A3	ZPIP10415	2.5	0	1	CIRCULAR	0.038	RCP	38.8	39.0	None	0.49	66.2	69.2	None	99.3	87.5	None	112.8	89.1	Upstream
PIPE12007	A3	ZPIP15333	2	0	1	CIRCULAR	0.008	RCP	8.1	8.3	None	0.41	13.4	13.5	None	20.0	19.8	None	22.7	22.9	None
PIPE12247	A3		3	0	1	CIRCULAR	0.011	RCP	46.5	39.1	Both Upstream and Downstream	0.56	74.9	53.5	Both Upstream and Downstream	110.1	70.3	Both Upstream and Downstream	127.1	78.0	Both Upstream and Downstream
PIPE12154	A3	ZPIP16527	3.75	2.417	1	VERT_ELLIPSE	0.005	RCP	19.8	19.2	None	0.39	32.1	32.2	None	48.4	50.0	None	57.6	54.3	Upstream
PIPE12231	A3	ZPIP10469	1.5	0	1	CIRCULAR	0.137	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	31.3	None	0.0	43.3	None
PIPE11984	A3	ZPIP11550	3	0	1	CIRCULAR	0.006	RCP	19.0	19.0	None	0.37	33.0	32.7	None	49.5	49.0	None	56.3	57.3	None
PIPE11713	A3	ZPIP13093	4	0	1	CIRCULAR	0.003	CIPCP	17.6	14.9	None	0.22	23.7	24.4	None	37.1	65.3	None	42.6	72.1	None
PIPE11914	A3	ZPIP14827	7	10	1	RECT_CLOSED	0.002	RCP	551.1	208.0	None	0.41	827.2	334.6	None	1264.2	536.7	None	1392.1	559.2	Downstream
PIPE11986	A3	ZPIP15286	2	0	1	CIRCULAR	0.007	PVC	6.9	7.7	None	0.41	6.7	12.4	None	20.0	18.2	None	21.8	20.4	None
PIPE12065	A3	ZPIP17502	1.5	0	1	CIRCULAR	0.002	RCP	1.9	3.1	None	0.66	4.0	5.5	None	6.7	5.8	Downstream	5.8	5.1	Both Upstream and Downstream
PIPE11846	A3	ZPIP14135	2	3.167	1	HORIZ_ELLIPSE	0.003	RCP	6.6	22.7	None	0.92	13.4	30.5	None	17.3	27.3	Both Upstream and Downstream	19.1	26.8	Both Upstream and Downstream
PIPE11581	A3	ZPIP12745	2	0	1	CIRCULAR	0.024	RCP	15.0	15.1	None	0.43	24.3	24.1	None	35.9	35.7	None	40.8	37.8	None
PIPE11936	A3	ZPIP14879	2.5	0	1	CIRCULAR	0.023	RCP	30.4	28.2	None	0.46	52.6	44.6	None	81.2	64.0	None	88.9	66.0	None
PIPE11985	A3	ZPIP15250	2	0	1	CIRCULAR	0.026	RCP	13.0	13.1	None	0.36	23.3	23.2	None	35.3	34.3	None	40.3	39.2	None
PIPE11994	A3	ZPIP17422	3	0	1	CIRCULAR	0.010	RCP	28.2	27.0	None	0.4	47.9	47.6	None	73.2	64.4	None	83.9	72.2	None
PIPE12035	A3	ZPIP15435	1.5	0	1	CIRCULAR	0.086	RCP	11.7	11.7	None	0.38	19.4	19.4	None	28.9	28.8	None	32.8	32.6	None
PIPE12175	A3	ZPIP20004	1.5	0	1	CIRCULAR	0.018	RCP	0.0	4.7	Both Upstream and Downstream	0.33	0.0	8.3	Both Upstream and Downstream	0.0	12.9	Both Upstream and Downstream	0.0	15.1	Both Upstream and Downstream
PIPE11644	A3	ZPIP10275	2.5	0	1	CIRCULAR	0.027	RCP	20.2	19.7	None	0.29	31.5	36.0	None	49.9	68.1	None	68.3	71.2	None
PIPE11648	A3	ZPIP12830	7	0	1	CIRCULAR	0.017	CIPCP	319.1	309.5	Downstream	0.43	538.4	539.0	Downstream	797.2	720.8	Downstream	879.6	749.1	Downstream
PIPE11686	A3	ZPIP13028	1.5	0	1	CIRCULAR	0.032	RCP	5.2	5.2	None	0.28	8.5	8.4	None	12.5	12.8	None	14.1	19.6	None
PIPE11640	A3	ZPIP16766	7	0	1	CIRCULAR	0.017	CIPCP	316.1	314.2	None	0.44	533.4	546.0	None	790.3	740.0	None	873.7	745.9	Upstream
PIPE11977	A3	ZPIP15245	2	0	1	CIRCULAR	0.019	RCP	10.5	10.6	None	0.33	19.0	19.0	None	28.9	28.0	None	33.1	32.7	None
PIPE11643	A3	ZPIP10274	4.5	0	1	CIRCULAR	0.012	CIPCP	363.5	182.7	None	0.97	607.5	195.5	None	901.5	195.0	None	1001.8	194.5	None
PIPE12052	A3	ZPIP11673	2	0	1	CIRCULAR	0.018	RCP	9.9	9.9	None	0.33	17.0	16.2	None	25.6	27.5	None	29.1	30.9	None
PIPE11757	A3	ZPIP13189	1.75	0	1	CIRCULAR	0.061	RCP	12.5	12.6	None	0.32	22.4	22.4	None	34.0	36.3	None	38.9	39.8	None
PIPE11603	A3	ZPIP12787	4	0	1	CIRCULAR	0.036	RCP	87.6	87.6	None	0.32	148.2	148.4	None	219.2	220.5	None	249.7	276.2	None
PIPE11624	A3	ZPIP12807	3	0	1	CIRCULAR	0.022	RCP	32.3	32.4	None	0.33	57.7	57.8	None	87.9	87.6	None	100.6	99.8	None
PIPE11634	A3	ZPIP16763	2.5	0	1	CIRCULAR	0.029	RCP	27.4	27.5	None	0.4	43.1	43.1	None	62.7	62.4	None	70.6	70.3	None
PIPE11714	A3	ZPIP13141	3	0	1	CIRCULAR	0.008	RCP	24.5	24.1	None	0.41	40.4	38.9	None	60.5	62.0	None	67.3	58.8	None
PIPE12046	A3	ZPIP15481	2.5	0	1	CIRCULAR	0.008	RCP	17.1	14.7	None	0.41	29.4	23.2	None	44.1	35.1	None	50.4	35.5	Downstream
PIPE11707	A3	ZPIP10411	1.5	0	1	CIRCULAR	0.009	RCP	0.0	2.4	None	0.24	0.0	0.6	None	1.3	9.9	None	1.8	9.8	None
PIPE11721	A3	ZPIP13145	1.5	0	1	CIRCULAR	0.021	RCP	5.7	5.7	None	0.38	9.3	9.7	None	14.0	15.6	None	15.9	15.0	None
PIPE11768	A3	ZPIP13198	4	0	1	CIRCULAR	0.014	RCP	59.0	59.2	None	0.35	98.4	97.8	None	149.7	151.6	None	170.0	169.5	None
DTCH10271	A3	DD055B	0	0	1	IRREGULAR	0.006	CONCRETE	438.4	158.5	None	0.3	735.8	267.4	None	1159.7	503.0	None	1345.7	517.5	None
PIPE11517	A3	ZPIP12698	5	0	1	CIRCULAR	0.033	CIPCP	139.3	139.9	None	0.34	242.8	243.5	None	358.2	358.7	None	403.7	402.4	None

Existing Condition Storm Conveyance Results Summary Table

Conveyance Info			Dimensions						2-year				10-year				50-year				100-year			
Facility ID	SubWatershed	Original FacilityID	D' or H' (diameter) or (height)	B' (width)	Barrels	Shape	Slope (ft/ft)	Material	Q_2 (cfs)	Q_{con} (2-year) (cfs)	Surcharging (2-year)	Qcon vs Qcap	Q_{10} (cfs)	Q_{con} (10-year) (cfs)	Surcharging (10-year)	Q_{50} (cfs)	Q_{con} (50-year) (cfs)	Surcharging (50-year)	Q_{100} (cfs)	Q_{con} (100-year) (cfs)	Surcharging (100-year)	
PIPE11987	A3	ZPIP17409	1.5	0	1	CIRCULAR	0.008	PVC	3.3	3.3	None	0.36	4.1	5.4	None	8.4	8.1	None	9.5	9.2	None	
PIPE12125	A3	ZPIP15995	4	0	3	CIRCULAR	0.005	RCP	102.8	134.6	None	0.44	185.9	208.6	None	285.1	262.1	None	329.3	302.1	None	
PIPE12248	A3		6.5	0	1	CIRCULAR	0.016	CIPCP	502.6	331.7	None	0.58	825.8	462.2	None	1211.3	548.9	None	1371.3	557.8	None	
PIPE11628	A3	ZPIP10266	5	0	1	CIRCULAR	0.032	CIPCP	140.8	141.4	None	0.35	245.3	246.1	None	362.7	365.4	None	405.7	388.1	None	
PIPE11695	A3	ZPIP13072	3	0	1	CIRCULAR	0.018	RCP	29.6	29.8	None	0.33	50.5	50.2	None	76.3	75.5	None	87.4	87.2	None	
PIPE12194	A3	PIP10788	4	0	1	CIRCULAR	0.016	RCP	70.6	66.7	None	0.36	141.3	113.6	None	214.0	158.6	None	243.4	176.3	None	
PIPE12243	A3	ZPIP13176	3	0	1	CIRCULAR	0.052	RCP	52.5	52.8	None	0.35	88.0	88.0	None	134.5	136.2	None	152.8	145.3	None	
PIPE11747	A3	ZPIP13182	1.75	0	1	CIRCULAR	0.016	RCP	5.0	5.1	None	0.25	9.8	9.8	None	15.2	15.2	None	17.5	18.8	None	
PIPE12293	A3	ZPIP15300	2	3.167	2	HORIZ_ELLIPSE	0.004	RCP	34.8	34.1	None	0.65	64.0	52.4	Both Upstream and Downstream	116.6	46.3	Both Upstream and Downstream	107.9	49.9	Both Upstream and Downstream	
PIPE11538	A3	ZPIP12713	1.5	0	1	CIRCULAR	0.018	RCP	5.1	5.1	None	0.36	8.1	8.1	None	11.9	11.9	None	13.4	13.4	None	
PIPE11669	A3	ZPIP12997	1.75	0	1	CIRCULAR	0.092	RCP	15.4	15.5	None	0.32	28.7	28.7	None	44.0	42.9	Downstream	50.4	45.5	Downstream	
PIPE11716	A3	ZPIP13144	1.5	0	1	CIRCULAR	0.010	RCP	1.1	1.1	None	0.1	1.7	2.6	None	2.6	14.7	None	2.9	9.8	None	
PIPE11990	A3	ZPIP11590	2	0	1	CIRCULAR	0.021	RCP	8.6	8.7	None	0.27	16.0	16.0	None	24.4	27.4	None	27.9	30.6	None	
PIPE11750	A3	ZPIP13185	1.5	0	1	CIRCULAR	0.070	RCP	10.4	10.4	None	0.38	16.8	16.8	None	24.8	24.0	None	28.1	25.9	None	
PIPE11841	A3	ZPIP17071	6.5	0	1	CIRCULAR	0.003	RCP	108.7	118.4	None	0.43	167.8	185.5	None	240.2	237.9	None	251.8	255.6	None	
PIPE11842	A3	ZPIP17072	6.5	0	1	CIRCULAR	0.003	RCP	109.3	117.4	None	0.43	175.4	183.7	None	266.5	236.7	None	278.3	253.6	None	
PIPE11843	A3	ZPIP17073	6.5	0	1	CIRCULAR	0.003	RCP	110.4	117.2	None	0.42	179.9	183.9	None	281.8	241.3	None	305.4	261.4	None	
PIPE11941	A3	ZPIP11352	6	0	2	CIRCULAR	0.004	RCP	186.5	229.3	None	0.41	317.1	354.4	None	461.0	451.5	None	523.1	519.2	None	
PIPE12178	A3	ZPIP20007	3.5	0	1	CIRCULAR	0.015	HDPE	62.8	62.9	None	0.52	99.6	109.3	None	146.0	110.9	Both Upstream and Downstream	165.1	113.2	Both Upstream and Downstream	
PIPE11631	A3	ZPIP16760	2.75	0	1	CIRCULAR	0.034	RCP	31.6	31.7	None	0.32	49.6	49.7	None	72.3	84.8	None	81.5	90.6	Downstream	
PIPE11885	A3	ZPIP14599	2	0	1	CIRCULAR	0.016	RCP	9.9	9.9	None	0.35	15.8	15.8	None	23.4	23.2	None	26.5	26.1	None	
PIPE11975	A3	ZPIP15243	1.5	0	1	CIRCULAR	0.013	RCP	3.8	3.8	None	0.32	6.5	6.5	None	9.8	9.8	None	11.1	11.1	None	
PIPE12135	A3	ZPIP11973	2.5	0	1	CIRCULAR	0.116	RCP	58.0	58.0	None	0.41	93.5	174.9	None	676.6	149.6	Both Upstream and Downstream	688.7	129.3	Both Upstream and Downstream	
CULV10169	A3	CUL033B	4	6	1	RECT_CLOSED	0.003	RCP	80.2	55.1	Both Upstream and Downstream	0.32	127.0	67.1	Both Upstream and Downstream	384.3	139.7	Both Upstream and Downstream	371.8	160.7	Both Upstream and Downstream	
PIPE12292	A3	ZPIP15299	2	3.167	2	HORIZ_ELLIPSE	0.004	RCP	39.6	36.8	None	0.71	68.6	52.9	Both Upstream and Downstream	132.4	47.6	Both Upstream and Downstream	122.0	47.9	Both Upstream and Downstream	
PIPE11751	A3	ZPIP13186	1.5	0	1	CIRCULAR	0.084	RCP	10.4	10.4	None	0.34	16.8	16.8	None	24.8	24.8	None	28.1	27.6	None	
PIPE11770	A3	ZPIP13200	4	0	1	CIRCULAR	0.015	RCP	56.5	56.8	None	0.32	94.4	94.2	None	143.8	145.2	None	163.3	159.6	None	
PIPE11919	A3	ZPIP14855	2	0	1	CIRCULAR	0.030	RCP	12.0	12.0	None	0.3	21.0	20.9	None	31.7	31.4	None	36.1	35.7	None	
PIPE11563	A3	ZPIP16736	3.5	0	1	CIRCULAR	0.043	RCP	77.2	74.9	None	0.36	129.7	122.8	None	193.8	169.0	None	220.5	187.6	None	
PIPE11632	A3	ZPIP16761	6.5	0	1	CIRCULAR	0.013	CIPCP	168.7	169.4	None	0.32	290.0	290.3	None	428.4	461.8	Downstream	472.5	472.0	Both Upstream and Downstream	
PIPE11988	A3	ZPIP17410	2	0	1	CIRCULAR	0.007	PVC	6.3	6.3	None	0.34	6.1	10.1	None	15.9	15.0	None	17.6	16.9	None	
PIPE12048	A3	ZPIP15483	1.5	0	1	CIRCULAR	0.015	RCP	7.2	4.9	None	0.39	12.2	6.8	None	18.4	9.4	None	20.9	11.4	None	
PIPE11728	A3	ZPIP13168	2	0	1	CIRCULAR	0.034	RCP	13.2	13.2	None	0.32	21.6	21.6	None	32.7	33.9	Downstream	37.3	37.4	Downstream	
PIPE11763	A3	ZPIP13195	1.5	0	1	CIRCULAR	0.008	RCP	3.1	3.1	None	0.33	4.7	5.3	None	6.0	7.3	None	7.0	8.3	None	
PIPE12032	A3	ZPIP15432	1.5	0	1	CIRCULAR	0.006	RCP	0.1	0.1	None	0.01	0.2	0.2	None	0.3	7.0	None	0.3	7.4	None	
PIPE12146	A3	ZPIP17845	4	0	1	CIRCULAR	0.001	RCP	18.7	15.8	None	0.32	21.3	24.9	None	33.4	37.9	None	37.6	43.9	None	
PIPE12158	A3	ZPIP12240	2	0	1	CIRCULAR	0.032	RCP	12.0	12.0	None	0.3	21.0	20.9	None	31.7	31.3	None	36.1	35.7	None	
PIPE12216	A3	ZPIP15200	6	0	2	CIRCULAR	0.005	RCP	187.2	230.0	None	0.39	318.2	356.3	None	463.0	458.9	None	525.4	520.8	None	
PIPE11626	A3	ZPIP12810	5.5	0	1	CIRCULAR	0.008	RCP	106.7	104.9	None	0.35	176.5	169.5	None	261.0	237.9	None	292.0	265.1	None	
PIPE11670	A3	ZPIP12998	1.75	0	1	CIRCULAR	0.028	RCP	7.3	7.3	None	0.28	13.6	13.6	None	20.9	20.9	None	24.0	23.3	None	
PIPE11672	A3	ZPIP16814	2	0	1	CIRCULAR	0.048	RCP	17.1	17.2	None	0.35	26.9	26.9	None	39.3	38.9	None	44.2	43.8	None	
PIPE11852	A3	ZPIP11038	2	0	1	CIRCULAR	0.005	RCP	5.0	4.9	None	0.31	8.4	8.0	None	12.5	12.6	None	13.1	13.9	None	
CHAN10288	A3	CH050B	0	0	1	IRREGULAR	0.003	Concrete	87.8	111.3	None	0.33	144.8	170.8	None	203.1	206.6	None	228.0	294.7	None	
PIPE11521	A3	ZPIP12702	5	0	1	CIRCULAR	0.039	CIPCP	140.7	141.3	None	0.32	245.6	246.2	None	363.1	369.6	None	404.1	386.8	Downstream	
PIPE11565	A3	ZPIP10227	3.5	0	1	CIRCULAR	0.043	RCP	75.1	72.8	None	0.35	126.4	119.6	None	189.1	164.3	None	215.1	182.3	None	
PIPE12047	A3	ZPIP15482	2.5	0	1	CIRCULAR	0.010	RCP	17.0	14.7	None	0.36	29.3	22.6	None	43.8	35.5	None	49.9	35.5	None	
PIPE12050	A3	ZPIP17470	2	0	1	CIRCULAR	0.017	RCP	9.9	9.9	None	0.34	17.0	16.2	None	25.5	24.3	None	29.1	25.6	None	
PIPE12145	A3	ZPIP16518	4	0	1	CIRCULAR	0.001	HDPE	31.6	15.3	Upstream	0.31	30.0	25.5	Both Upstream and Downstream	52.0	37.8	Both Upstream and Downstream	50.9	42.8	Both Upstream and Downstream	
PIPE12315	A3	ZPIP16492	10	10	1	RECT_OPEN	0.004	RCP	520.0	138.0	None	0.25	899.8	252.9	None	1252.4	483.0	Downstream	1369.1	486.2	Downstream	
PIPE11662	A3	ZPIP12993	1.75	0	1	CIRCULAR	0.086	RCP	15.5	15.5	None	0.33	28.7	28.7	None	44.1	39.8	Both Upstream and Downstream	50.5	40.1	Both Upstream and Downstream	
PIPE11807	A3	ZPIP13885	3	0	1	CIRCULAR	0.023	RCP	85.2	52.4	None	0.52	139.6	64.5	None	202.8	80.7	None	233.8	87.8	Downstream	
PIPE11923	A3	ZPIP11341	1.5	0	1	CIRCULAR	0.005	RCP	1.8	1.8	None	0.24	2.8	2.8	None	4.0	6.5	None	4.5	6.4	None	
PIPE11943	A3	ZPIP14884	3	0	1	CIRCULAR	0.013	RCP	26.7	26.8	None	0.35	41.6	41.7	None	61.7	59.2	None	71.8	65.3	None	
PIPE12227	A3	ZPIP10264	1.5	0	1	CIRCULAR	0.326	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	49.0	None	0.0	51.7	Both Upstream and Downstream	
PIPE12289	A3	ZPIP11573	1.5	0	1	CIRCULAR	0.007	RCP	0.0	0.3	None	0.03	2.0	3.9	Both Upstream and Downstream	16.1	8.7	Both Upstream and Downstream	23.2	7.8	Both Upstream and Downstream	
PIPE11585	A3	ZPIP10234	3.5	0	1	CIRCULAR	0.043	RCP	73.3	70.9	None	0.34	123.4	116.7	None	184.8	160.2	None	210.2	177.8	None	
PIPE11590	A3	ZPIP16743	1.5	0	1	CIRCULAR	0.026	RCP	3.2	3.2	None	0.19	5.1	5.1	None	7.4	7.4	None	8.3	14.2	None	
PIPE11594	A3	ZPIP12781	5.5	0	1	CIRCULAR	0.011	RCP	116.1	115.0	None	0.32	191.5	184.4	None	282.7	307.5	Downstream	317.1	305.4	Both Upstream and Downstream	
PIPE11735	A3	ZPIP13172	1.5	0	1	CIRCULAR	0.036	RCP	6.2	6.3	None	0.31	10.0	10.0	None	14.8	14.9	None	16.8	16.9	None	
PIPE12020	A3	ZPIP11637	3	0	1	CIRCULAR	0.026	RCP	33.0	33.1	None	0.31	54.9	54.9	None	84.3	82.5	Downstream	96.3	92.2	Downstream	
PIPE12029	A3	ZPIP11649	1.5	0	1	CIRCULAR	0.077	RCP	8.9	8.9	None	0.3	14.9	14.8	None	22.1	21.9	None	25.1	24.9	None	
PIPE12181	A3	ZPIP14888	4	0	1	CIRCULAR	0.012	RCP	44.1	44.7	None	0.28	76.6	77.9	None	118.3	119.2	None	134.7	135.4	None	
PIPE12192	A3	PIP10682	4	0	1	CIRCULAR	0.007	RCP	25.1	22.8	None	0.19	56.6	49.9	None	86.9	89.6	None	100.2	103.1	None	
PIPE12219	A3	PIP10784	4	0	1	CIRCULAR	0.009	RCP	30.8	28.8	None	0.21	67.4	59.8	None	101.8	101.2	None	117.2	116.0	None	
PIPE11715	A3	ZPIP13143	2.25	0	1	CIRCULAR	0.027	RCP	17.5	17.5	None	0.35	29.0	27.9	None	43.6	50.0	None	49.7	42.4	None	
PIPE11819	A3	ZPIP10843	2	0	1	CIRCULAR	0.040	RCP	10.9	10.9	None	0.24	21.4	21.3	None	33.3	33.2	None	38.3	38.2	None	
PIPE11991	A3	ZPIP15320	2	0	1	CIRCULAR	0.025	RCP	8.6	8.7	None	0.24	15.9	16.0	None	24.4	24.9	None	28.0	30.1	None	
PIPE12067	A3	ZPIP17504	1.5	0	1	CIRCULAR	0.002	RCP	3.1	3.0	None	0.61	6.4	4.9	None	10.4	4.3	Both Upstream and Downstream	9.4	4.2	Both Upstream and Downstream	
PIPE11731	A3	ZPIP10459	1.5	0	1	CIRCULAR	0.024	RCP	0.0	0.0	None	0	0.0	0.1	None	0.0	12.5	Downstream	0.0	13.3	Both Upstream and Downstream	
PIPE11945	A3	ZPIP14886	3	0	1	CIRCULAR	0.014	RCP	27.2	27.4	None	0.34	42.4	42.5	None	62.8	60.2	None	73.0	66.4	None	
PIPE12191	A3	PIP10681	4	0	1	CIRCULAR	0.008	RCP	25.1	22.8	None	0.18	56.8	49.9	None	87.1	88.6	None	100.3	103.1	None	
PIPE12213	A3	ZPIP12169	2.5	0	1	CIRCULAR	0.015	RCP	9.9	13.4	None	0.27	18.1	25.0	None	34.4	37.4	Both Upstream and Downstream	34.6	41.6	Both Upstream and Downstream	
PIPE11638	A3	ZPIP12818	1.5	0	1	CIRCULAR	0.016	RCP	4.3	4.3	None	0.32	6.6	6.6	None	9.6	9.6	None	10.8	10.8	None	
PIPE11756	A3	ZPIP10467	1.5	0	1	CIRCULAR	0.009	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	4.0	None	0.0	8.1	None	
PIPE11835	A3	ZPIP13971	1.5	0	1	CIRCULAR	0.007	RCP	2.7	2.7	None	0.31	4.3	4.3	None	6.3	6.3	None	7.1	7.1	None	
PIPE11944	A3	ZPIP14885	3	0	1	CIRCULAR	0.014	RCP	26.8	26.9	None	0.34	41.7	41.8	None	61.9	59.3	None	72.0	65.5	None	

Existing Condition Storm Conveyance Results Summary Table

Conveyance Info			Dimensions						2-year				10-year				50-year				100-year			
Facility ID	SubWatershed	Original FacilityID	D' or H' (diameter) or (height)	B' (width)	Barrels	Shape	Slope (ft/ft)	Material	Q_2 (cfs)	Q_{con} (2-year) (cfs)	Surcharging (2-year)	Qcon vs Qcap	Q_{10} (cfs)	Q_{con} (10-year) (cfs)	Surcharging (10-year)	Q_{50} (cfs)	Q_{con} (50-year) (cfs)	Surcharging (50-year)	Q_{100} (cfs)	Q_{con} (100-year) (cfs)	Surcharging (100-year)
PIPE11532	A3	ZPIP10215	4	0	1	CIRCULAR	0.064	RCP	82.2	82.3	None	0.23	139.8	139.9	None	208.0	209.1	None	237.1	238.4	None
PIPE11604	A3	ZPIP12788	4	0	1	CIRCULAR	0.061	RCP	80.5	80.5	None	0.23	136.9	137.0	None	204.4	204.7	None	233.0	233.6	None
PIPE11677	A3	ZPIP13002	2	0	1	CIRCULAR	0.045	RCP	12.4	12.4	None	0.26	19.5	19.4	None	28.4	28.2	None	32.1	31.8	None
PIPE11758	A3	ZPIP13190	1.5	0	1	CIRCULAR	0.010	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	0.2	None	0.0	6.9	None
PIPE12239	A3	ZPIP14861	5.5	0	2	CIRCULAR	0.004	CIPCP	174.1	114.0	None	0.31	189.9	162.3	None	327.6	218.7	None	331.8	244.1	None
CHAN10309	A3	CH062A	6	25	1	TRAPEZOIDAL	0.006	Earthen	0.0	88.4	None	0.09	0.0	353.9	None	0.0	613.3	None	0.0	659.6	None
PIPE12318	A3	PIP16815	2	0	1	CIRCULAR	0.005	RCP	3.6	3.6	Both Upstream and Downstream	0.23	6.8	5.5	Both Upstream and Downstream	10.7	9.0	Both Upstream and Downstream	11.5	10.2	Both Upstream and Downstream
PIPE11530	A3	ZPIP12708	1.5	0	1	CIRCULAR	0.021	RCP	3.7	3.8	None	0.25	6.0	6.0	None	8.7	8.7	None	9.8	9.9	None
PIPE11586	A3	ZPIP10235	2	0	1	CIRCULAR	0.053	RCP	15.2	20.0	None	0.38	24.2	34.1	Downstream	35.5	34.9	Both Upstream and Downstream	40.1	33.9	Both Upstream and Downstream
PIPE11684	A3	ZPIP13026	1.5	0	1	CIRCULAR	0.015	RCP	3.2	2.9	None	0.23	5.8	5.3	None	7.0	7.3	None	9.4	8.2	None
CULV10153	A3	CUL055B	3.583	2.25	1	ARCH	0.046	CMP	16.8	14.5	None	0.16	37.7	28.2	None	48.3	65.5	None	56.1	57.3	None
PIPE12095	A3	ZPIP15866	4	0	1	CIRCULAR	0.005	RCP	32.0	25.6	None	0.25	86.2	42.3	Both Upstream and Downstream	73.0	72.3	Both Upstream and Downstream	88.3	66.9	Both Upstream and Downstream
PIPE12260	A3	ZPIP14000	4.5	0	1	CIRCULAR	0.003	RCP	24.4	24.2	None	0.24	38.7	39.3	None	53.6	56.7	None	51.3	65.5	None
PIPE11519	A3	ZPIP12700	4.5	0	1	CIRCULAR	0.058	RCP	104.6	105.1	None	0.22	180.8	181.2	None	265.6	266.9	None	295.2	305.4	None
PIPE11550	A3	ZPIP10221	3	0	1	CIRCULAR	0.064	RCP	39.8	39.8	None	0.24	64.9	64.9	None	95.3	95.3	None	109.1	109.1	None
PIPE11560	A3	ZPIP12727	1.5	0	1	CIRCULAR	0.021	RCP	3.7	3.7	None	0.24	5.9	5.9	None	8.7	8.6	None	9.7	9.7	None
PIPE11733	A3	ZPIP13170	2	0	1	CIRCULAR	0.020	RCP	5.0	5.0	None	0.16	10.1	10.1	None	18.0	18.0	None	20.5	20.5	None
PIPE11792	A3	ZPIP10786	2	0	2	CIRCULAR	0.018	CMP	8.0	8.0	None	0.24	12.9	13.0	None	15.1	18.3	Downstream	17.2	21.2	Downstream
PIPE12273	A3	ZPIP14484	2	0	1	CIRCULAR	0.005	RCP	3.1	3.6	Both Upstream and Downstream	0.23	6.8	4.9	Both Upstream and Downstream	11.0	8.7	Both Upstream and Downstream	11.5	9.9	Both Upstream and Downstream
CULV10170	A3	ZCUL16855	6	14	1	RECT_CLOSED	0.003	RCP	446.5	172.9	None	0.2	756.3	281.9	None	1554.3	538.0	None	1577.2	556.9	None
PIPE11845	A3	ZPIP10959	2	3.167	1	HORIZ_ELLIPSE	0.004	RCP	5.4	14.3	None	0.56	12.1	20.0	Downstream	18.0	16.4	Both Upstream and Downstream	19.1	15.9	Both Upstream and Downstream
PIPE11989	A3	ZPIP11589	2	0	1	CIRCULAR	0.027	RCP	7.0	7.0	None	0.19	13.1	13.1	None	20.0	20.0	None	23.0	23.4	None
CULV10178	A3	ZCUL069A	3	8	3	RECT_CLOSED	0.008	RCP	478.5	164.8	None	0.22	689.2	249.1	None	1129.6	468.1	Both Upstream and Downstream	1302.5	478.6	Both Upstream and Downstream
CHAN10314	A3	CH062B	6	25	1	TRAPEZOIDAL	0.006	Earthen	0.5	65.3	None	0.06	1.5	311.3	None	2.5	565.8	None	3.0	631.1	None
CHAN10317	A3	CH062B	6	25	1	TRAPEZOIDAL	0.006	Earthen	0.5	53.5	None	0.05	1.3	286.9	None	2.3	563.4	None	2.7	630.1	None
CHAN10319	A3	CH062B	6	25	1	TRAPEZOIDAL	0.006	Earthen	2.3	49.0	None	0.05	5.0	271.5	None	8.5	566.6	None	10.1	634.9	None
CHAN10320	A3	CH062B	6	25	1	TRAPEZOIDAL	0.006	Earthen	1.9	46.5	None	0.05	4.4	261.7	None	11.0	565.2	None	19.7	634.6	None
CHAN10321	A3	CH062B	6	25	1	TRAPEZOIDAL	0.006	Earthen	1.8	45.8	None	0.05	5.0	260.9	None	35.3	562.9	None	86.9	634.1	None
PIPE11536	A3	ZPIP12711	3	0	1	CIRCULAR	0.079	RCP	37.8	37.9	None	0.2	66.8	67.0	None	101.0	101.3	None	115.2	115.9	None
CULV10138	A3	CUL066	3.5	8.5	2	RECT_CLOSED	0.007	RCP	192.7	219.3	None	0.34	333.8	360.2	Both Upstream and Downstream	372.5	421.7	Both Upstream and Downstream	284.3	395.2	Both Upstream and Downstream
PIPE11870	A3	ZPIP11138	2.75	0	1	CIRCULAR	0.051	CSP	14.0	14.1	Both Upstream and Downstream	0.22	27.1	25.9	Both Upstream and Downstream	35.4	34.7	Both Upstream and Downstream	40.6	39.9	Both Upstream and Downstream
CULV10144	A3	ZCUL14827	7	10	1	RECT_CLOSED	0.005	RCP	412.4	230.5	Both Upstream and Downstream	0.25	794.7	363.4	Both Upstream and Downstream	1284.6	530.7	Both Upstream and Downstream	1421.9	564.6	Both Upstream and Downstream
PIPE11888	A3	ZPIP17211	2	0	1	CIRCULAR	0.035	RCP	9.9	9.9	None	0.23	15.8	15.8	None	61.1	23.2	None	148.6	26.1	None
PIPE11952	A3	ZPIP11497	3	0	2	CIRCULAR	0.005	RCP	30.6	26.3	None	0.29	49.6	39.8	None	71.7	50.9	None	81.8	55.8	None
CULV10149	A3	ZCUL16854	6	14	1	RECT_CLOSED	0.003	RCP	447.1	172.8	None	0.2	757.8	282.0	None	1692.2	531.6	None	1373.8	548.0	None
PIPE12088	A3	ZPIP11866	2	0	1	CIRCULAR	0.005	HDPE	3.6	3.6	None	0.23	15.4	5.7	None	15.7	8.4	None	30.3	9.5	None
PIPE12099	A3	ZPIP17587	7	10	1	RECT_CLOSED	0.005	RCP	421.0	235.4	Both Upstream and Downstream	0.26	794.4	385.6	Both Upstream and Downstream	1282.1	533.5	Both Upstream and Downstream	1421.2	569.1	Both Upstream and Downstream
PIPE12117	A3	ZPIP17588	4	0	1	CIRCULAR	0.001	RCP	19.1	10.8	None	0.22	23.1	17.2	None	28.3	25.4	None	31.7	30.3	None
PIPE12211	A3	ZPIP14865	1.5	0	1	CIRCULAR	0.004	RCP	1.5	1.5	None	0.22	2.5	2.5	None	3.7	3.7	None	4.3	4.3	None
CHAN10313	A3	CH062B	6	25	1	TRAPEZOIDAL	0.006	Earthen	0.6	69.6	None	0.07	1.6	328.7	None	2.7	569.3	None	3.2	632.3	None
CHAN10318	A3	CH062B	6	25	1	TRAPEZOIDAL	0.006	Earthen	0.4	50.6	None	0.05	1.2	279.7	None	2.2	562.7	None	2.6	629.8	None
PIPE11612	A3	ZPIP12795	3	0	1	CIRCULAR	0.043	RCP	26.2	26.3	None	0.19	48.0	48.0	None	73.5	73.5	None	84.3	84.4	None
PIPE11860	A3	ZPIP11044	1.5	0	1	CIRCULAR	0.007	RCP	1.8	1.8	None	0.21	4.0	2.9	None	8.7	4.2	None	8.0	5.3	None
CULV10150	A3	ZCUL066	3.5	8.5	2	RECT_CLOSED	0.007	RCP	191.8	218.5	None	0.34	336.2	359.4	Both Upstream and Downstream	380.9	420.2	Both Upstream and Downstream	291.4	393.7	Both Upstream and Downstream
PIPE12094	A3	ZPIP11869	7	10	1	RECT_CLOSED	0.005	RCP	454.8	229.7	None	0.25	789.2	361.4	Both Upstream and Downstream	1271.0	533.2	Both Upstream and Downstream	1410.6	556.9	Both Upstream and Downstream
CHAN10305	A3	CH062A	6	25	1	TRAPEZOIDAL	0.008	Earthen	0.0	117.2	Upstream	0.1	0.0	380.3	Upstream	0.0	631.0	Upstream	0.0	705.0	Upstream
CHAN10316	A3	CH062B	6	25	1	TRAPEZOIDAL	0.006	Earthen	0.5	56.6	None	0.06	1.3	296.5	None	2.3	564.1	None	2.8	630.4	None
PIPE11691	A3	ZPIP16846	1.5	0	1	CIRCULAR	0.019	RCP	1.1	5.1	None	0.35	1.5	4.9	None	1.5	9.5	None	1.6	8.8	Downstream
PIPE11729	A3	ZPIP10457	1.5	0	1	CIRCULAR	0.031	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	9.4	None	0.0	11.0	None
PIPE11765	A3	ZPIP10470	4	0	1	CIRCULAR	0.036	RCP	64.5	64.7	None	0.24	107.2	107.6	None	162.6	160.9	None	184.6	164.3	None
PIPE11767	A3	ZPIP13197	2	0	1	CIRCULAR	0.020	RCP	5.8	5.8	None	0.18	9.4	9.4	None	13.8	16.6	None	15.6	19.2	None
PIPE11963	A3	ZPIP11519	7	10	1	RECT_CLOSED	0.005	RCP	490.7	210.0	None	0.23	820.6	337.7	Downstream	1267.0	529.2	Both Upstream and Downstream	1393.3	550.9	Both Upstream and Downstream
PIPE12044	A3	ZPIP11655	2.5	0	1	CIRCULAR	0.012	RCP	10.0	10.0	None	0.22	16.1	16.2	None	23.8	23.9	None	26.9	27.1	None
PIPE12093	A3	ZPIP11868	7	10	1	RECT_CLOSED	0.005	RCP	483.9	210.8	None	0.23	820.6	336.1	Both Upstream and Downstream	1267.3	527.4	Both Upstream and Downstream	1393.3	547.1	Both Upstream and Downstream
PIPE12098	A3	ZPIP17586	7	10	1	RECT_CLOSED	0.005	RCP	441.8	228.2	Downstream	0.25	789.2	366.1	Both Upstream and Downstream	1271.0	530.8	Both Upstream and Downstream	1410.6	553.8	Both Upstream and Downstream
PIPE12253	A3	ZPIP11134	1.5	0	1	CIRCULAR	0.009	RCP	2.2	2.3	Both Upstream and Downstream	0.23	3.8	3.4	Both Upstream and Downstream	5.9	5.3	Both Upstream and Downstream	6.5	6.1	Both Upstream and Downstream
PIPE12255	A3	ZPIP14860	2	0	1	CIRCULAR	0.007	PVC	4.2	4.2	None	0.22	6.8	6.8	None	10.1	10.1	None	11.4	11.5	None
PIPE11555	A3	ZPIP16733	4	0	1	CIRCULAR	0.075	RCP	94.3	92.0	None	0.23	156.9	149.5	None	233.1	208.1	None	265.1	231.6	None
PIPE11665	A3	ZPIP10364	1.5	0	1	CIRCULAR	0.021	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	0.3	None	0.0	8.9	None
PIPE11704	A3	ZPIP13079	1.5	0	1	CIRCULAR	0.085	RCP	5.9	5.9	None	0.19	10.4	10.4	None	15.7	15.7	None	17.9	17.9	None
PIPE11958	A3	ZPIP17375	7	10	1	RECT_CLOSED	0.006	RCP	447.8	172.9	None	0.18	761.7	282.0	None	1615.7	529.7	None	1314.4	573.4	None
PIPE12277	A3	ZPIP14964	2	0	1	CIRCULAR	0.013	RCP	5.6	5.6	None	0.21	9.1	9.1	None	13.6	13.8	None	15.7	15.6	None
PIPE11510	A3	ZPIP12693	3	0	1	CIRCULAR	0.020	RCP	15.6	15.6	None	0.17	30.5	30.5	None	47.2	47.2	None	54.2	54.2	None
PIPE11516	A3	ZPIP12697	5	0	1	CIRCULAR	0.057	CIPCP	106.7	107.1	None	0.2	184.0	184.5	None	270.2	271.5	None	300.8	312.2	None
PIPE11557	A3	ZPIP10223	4	0	1	CIRCULAR	0.075	RCP	92.7	90.4	None	0.23	154.4	147.1	None	229.4	204.5	None	260.9	227.6	None
PIPE11680	A3	ZPIP13025	3	0	1	CIRCULAR	0.009	RCP	10.2	10.2	None	0.16	17.2	18.2	None	25.6	32.8	None	29.0	37.1	None
PIPE11866	A3	ZPIP11047	1.5	0	1	CIRCULAR	0.032	RCP	0.0	0.0	None	0	0.0	0.0	None	1.0	10.9	None	2.3	10.9	None
PIPE11983	A3	ZPIP11549	3	0	1	CIRCULAR	0.014	RCP	15.6	15.6	None	0.19	27.5	27.5	None	41.6	40.7	None	47.6	46.4	None
PIPE12055	A3	ZPIP11688	2.25	0	1	CIRCULAR	0.015	RCP	4.9	4.9	None	0.13	7.9	7.9	None	11.8	12.1	None	13.4	21.8	None
PIPE12137	A3	ZCUL16847	6	0	1	CIRCULAR	0.030	RCP	162.1	172.5	Downstream	0.24	271.2	287.9	Both Upstream and Downstream	406.4	394.7	Both Upstream and Downstream	464.6	425.8	Both Upstream and Downstream
PIPE12171	A3	PIP19084	3	0	2	CIRCULAR	0.007	RCP	36.2	32.0	None	0.28	59.0	48.8	None	85.8	62.6	None	98.0	65.9	None
PIPE12223	A3	ZPIP14862	5.5	0	2	CIRCULAR	0.004	CIPCP	148.7	113.9	None	0.3	181.5	151.9	None	301.4	196.8	None	291.9	217.3	None
CHAN10283	A3	CH050A	0	0	1	IRREGULAR	0.014	Concrete	100.6	118.1	None	0.31	157.0	176.3	None	217.9	210.1	None	244.1	222.4	None
PIPE11606	A3	ZPIP16756	3	0	1	CIRCULAR	0.084	RCP	40.6	40.6	None	0.21	66.1	66.1	None	96.9	96.9	None	110.9	110.9	None
PIPE11723	A3	ZPIP16887	1.5	0	1	CIRCULAR	0.009	RCP	0.0	0.0	None	0	0.0	0.1	None	0.0	6.1	None	0.0	5.6	None
PIPE11903	A3	ZPIP14622	3	0	2	CIRCULAR	0.006	RCP	31.8	27.6	None	0.27	51.8	41.8	None	75.1	53.3	None	85.8	58.5	None

Existing Condition Storm Conveyance Results Summary Table

Conveyance Info			Dimensions						2-year				10-year			50-year			100-year		
Facility ID	SubWatershed	Original FacilityID	D' or H' (diameter) or (height)	B' (width)	Barrels	Shape	Slope (ft/ft)	Material	Q_2 (cfs)	Q_{con} (2-year) (cfs)	Surcharging (2-year)	Qcon vs Qcap	Q_{10} (cfs)	Q_{con} (10-year) (cfs)	Surcharging (10-year)	Q_{50} (cfs)	Q_{con} (50-year) (cfs)	Surcharging (50-year)	Q_{100} (cfs)	Q_{con} (100-year) (cfs)	Surcharging (100-year)
PIPE11778	A3	ZPIP10476	1.5	0	1	CIRCULAR	0.074	RCP	3.5	3.5	None	0.12	5.9	5.9	None	8.9	8.9	None	10.1	10.1	None
PIPE11876	A3	ZPIP14493	1.5	0	1	CIRCULAR	0.017	RCP	0.4	0.1	None	0.01	1.2	18.6	Both Upstream and Downstream	10.0	9.3	Both Upstream and Downstream	18.8	4.7	Both Upstream and Downstream
CULV10148	A3	ZCUL13955	7	11	1	RECT_CLOSED	0.005	RCP	133.7	138.2	Both Upstream and Downstream	0.13	261.9	226.6	Both Upstream and Downstream	399.2	370.0	Both Upstream and Downstream	300.2	369.8	Both Upstream and Downstream
PIPE12042	A3	ZPIP15444	2.5	0	1	CIRCULAR	0.008	RCP	4.9	5.0	None	0.13	7.8	7.9	None	11.4	11.5	None	12.8	13.0	None
PIPE12102	A3	ZPIP11872	2	0	1	CIRCULAR	0.005	HDPE	4.8	2.1	None	0.14	15.8	3.3	None	5.9	4.9	None	6.0	5.5	None
PIPE12136	A3	ZPIP11974	5.5	0	1	CIRCULAR	0.013	RCP	58.4	58.4	None	0.15	94.4	195.8	None	664.9	150.4	Both Upstream and Downstream	631.8	134.4	Both Upstream and Downstream
PIPE12177	A3	ZPIP20006	3.5	0	1	CIRCULAR	0.097	RCP	61.0	61.2	None	0.2	97.3	108.2	None	142.8	108.5	Both Upstream and Downstream	161.5	110.9	Both Upstream and Downstream
CULV10162	A3	ZCUL13082	3	5	2	RECT_CLOSED	0.031	RCP	78.6	81.7	None	0.14	127.8	127.6	None	267.5	181.3	None	323.1	198.7	None
PIPE11525	A3	ZPIP12703	2	0	1	CIRCULAR	0.035	RCP	5.6	5.6	None	0.13	8.8	8.8	None	12.8	12.8	None	14.4	14.5	None
PIPE11556	A3	ZPIP16734	1.5	0	1	CIRCULAR	0.012	RCP	1.6	1.6	None	0.13	2.5	2.5	None	3.6	3.6	None	4.0	4.0	None
PIPE11893	A3	ZPIP14610	2	8	1	RECT_CLOSED	0.017	RCP	22.8	23.0	None	0.11	39.8	40.0	None	60.8	60.9	None	69.6	69.8	None
PIPE12084	A3	ZPIP15858	2	0	1	CIRCULAR	0.004	HDPE	1.9	1.8	None	0.13	10.8	2.9	None	17.9	4.3	None	26.2	4.8	None
CULV10161	A3	ZCUL16808B	2	6	3	RECT_CLOSED	0.009	RCP	61.0	61.2	None	0.19	97.3	100.7	None	142.8	108.5	Both Upstream and Downstream	161.5	110.5	Both Upstream and Downstream
PIPE11561	A3	ZPIP12728	2	0	1	CIRCULAR	0.035	RCP	5.4	5.5	None	0.13	8.6	8.6	None	12.5	12.5	None	14.1	14.2	None
PIPE11754	A3	ZPIP10465	2.5	0	1	CIRCULAR	0.206	RCP	20.9	20.9	None	0.11	34.1	34.4	None	50.6	52.4	None	57.4	62.2	None
PIPE11761	A3	ZPIP13193	1.75	0	1	CIRCULAR	0.023	RCP	2.2	2.2	None	0.09	4.4	4.4	None	6.9	6.9	None	7.9	7.9	None
PIPE12023	A3	ZPIP17459	3	0	1	CIRCULAR	0.202	RCP	33.0	33.1	None	0.11	55.0	73.2	None	84.4	99.3	Both Upstream and Downstream	96.3	99.8	Both Upstream and Downstream
PIPE12053	A3	ZPIP17484	2.25	0	1	CIRCULAR	0.017	RCP	4.9	4.9	None	0.12	8.0	8.0	None	11.8	11.8	None	13.4	13.4	None
PIPE12233	A3	ZPIP16084	5.5	0	1	CIRCULAR	0.013	RCP	0.1	1.7	None	0	0.1	126.4	None	15.8	98.2	Both Upstream and Downstream	37.3	125.5	Both Upstream and Downstream
CULV10165	A3	ZCUL16808A	2	6	3	RECT_CLOSED	0.010	RCP	61.6	60.8	None	0.18	96.8	99.5	None	142.2	110.5	Both Upstream and Downstream	160.8	111.0	Both Upstream and Downstream
PIPE11766	A3	ZPIP13196	1.5	0	1	CIRCULAR	0.178	RCP	0.0	0.0	None	0	0.0	0.2	None	0.0	10.8	None	0.0	14.4	None
PIPE11889	A3	ZPIP17212	2	0	1	CIRCULAR	0.037	RCP	5.0	5.0	None	0.12	8.1	8.1	None	12.1	12.1	None	13.7	13.7	None
PIPE12092	A3	ZPIP17584	4	10	1	TRAPEZOIDAL	0.000	CMP	10.0	8.3	None	0.12	17.5	13.1	None	28.3	19.3	None	49.2	21.8	None
CHAN10297	A3	CH043B	4	4	1	TRAPEZOIDAL	0.003	Concrete	77.2	60.2	Both Upstream and Downstream	0.12	122.5	76.3	Both Upstream and Downstream	373.3	138.7	Both Upstream and Downstream	360.0	159.2	Both Upstream and Downstream
PIPE11616	A3	ZPIP12802	2.75	0	1	CIRCULAR	0.034	RCP	1.8	1.8	None	0.02	2.9	2.9	None	4.2	33.1	None	4.8	30.2	None
PIPE11873	A3	ZPIP14489	1.5	0	1	CIRCULAR	0.058	RCP	2.9	2.9	Both Upstream and Downstream	0.11	4.7	4.7	Both Upstream and Downstream	7.1	6.9	Both Upstream and Downstream	8.1	7.9	Both Upstream and Downstream
PIPE12132	A3	ZPIP16082	7	11	1	RECT_CLOSED	0.005	RCP	132.0	120.9	None	0.11	205.5	304.8	Downstream	327.8	294.8	Both Upstream and Downstream	395.8	329.2	Both Upstream and Downstream
PIPE11739	A3	ZPIP10461	3	0	1	CIRCULAR	0.062	RCP	15.7	15.7	None	0.09	27.3	27.4	None	43.6	42.9	None	49.5	49.7	None
PIPE11812	A3	ZPIP13902	1.5	0	1	CIRCULAR	0.010	RCP	1.2	1.2	None	0.11	1.9	1.9	None	2.7	2.7	None	3.1	3.1	None
PIPE11820	A3	ZPIP10844	2.5	0	1	CIRCULAR	0.140	RCP	13.5	13.5	None	0.09	25.7	25.7	None	39.8	39.7	None	45.7	45.6	None
PIPE11832	A3	ZPIP13930	2.5	0	1	CIRCULAR	0.085	RCP	11.1	11.1	None	0.09	20.5	20.5	None	31.4	31.4	None	36.0	36.0	None
CHAN10296	A3	CH060C	0	0	1	IRREGULAR	0.001	Earthen	671.8	437.4	Both Upstream and Downstream	0.15	759.4	596.1	Both Upstream and Downstream	767.1	784.1	Both Upstream and Downstream	1070.9	857.4	Both Upstream and Downstream
PIPE12304	A3	PIP19073	5.5	12	3	RECT_CLOSED	0.005	RCP	186.8	180.1	None	0.08	639.2	607.0	None	763.2	669.2	None	803.3	707.1	None
PIPE12305	A3	PIP19074	5.5	12	3	RECT_CLOSED	0.005	RCP	188.3	181.2	None	0.08	641.3	609.5	None	769.3	673.1	None	812.2	711.6	None
PIPE12085	A3	ZPIP11863	2	0	1	CIRCULAR	0.005	HDPE	1.8	1.8	None	0.11	15.0	2.9	None	17.5	4.2	None	26.0	4.8	None
PIPE11501	A3	ZPIP10191	1.5	0	1	CIRCULAR	0.067	RCP	3.0	3.0	None	0.11	4.7	4.7	None	6.8	6.8	None	7.6	7.6	None
PIPE11537	A3	ZPIP12712	1.5	0	1	CIRCULAR	0.030	RCP	2.0	2.0	None	0.11	3.1	3.1	None	4.5	4.6	None	5.1	5.2	None
PIPE11605	A3	ZPIP16755	2	0	1	CIRCULAR	0.108	RCP	7.7	7.7	None	0.1	12.4	12.4	None	18.4	18.4	None	20.9	20.9	None
PIPE11859	A3	ZPIP11043	1.5	0	1	CIRCULAR	0.029	RCP	1.9	1.9	None	0.11	3.0	3.0	None	4.4	4.4	None	5.0	5.0	None
PIPE12069	A3	ZPIP17579	2.5	0	1	CIRCULAR	0.006	HDPE	3.4	3.4	None	0.11	5.3	5.3	None	10.9	7.7	None	14.1	8.7	None
PIPE12076	A3	ZPIP15840	2.5	0	1	CIRCULAR	0.006	HDPE	3.4	3.4	None	0.11	5.3	5.3	None	10.9	7.8	None	14.1	8.7	None
PIPE12086	A3	ZPIP11864	2	0	1	CIRCULAR	0.006	HDPE	1.8	1.8	None	0.11	13.2	2.8	None	17.6	4.2	None	26.2	4.7	None
PIPE11509	A3	ZPIP12692	3.5	0	1	CIRCULAR	0.072	CIPCP	18.4	18.4	None	0.08	35.4	35.4	None	54.7	54.7	None	62.8	62.8	None
PIPE11554	A3	ZPIP16732	2	0	1	CIRCULAR	0.132	RCP	8.7	8.7	None	0.11	13.6	13.6	None	19.8	19.8	None	22.2	22.3	None
PIPE11769	A3	ZPIP13199	1.5	0	1	CIRCULAR	0.092	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	8.8	None	0.0	8.7	None
PIPE11831	A3	ZPIP13929	1.5	0	1	CIRCULAR	0.162	RCP	0.0	0.0	None	0	0.0	7.5	None	0.0	8.7	Both Upstream and Downstream	0.0	11.6	Both Upstream and Downstream
PIPE11837	A3	ZPIP13973	1.5	0	1	CIRCULAR	0.067	RCP	2.9	2.9	None	0.11	4.5	4.6	None	6.6	6.6	None	7.4	7.4	None
PIPE12037	A3	ZPIP15437	1.5	0	1	CIRCULAR	0.020	RCP	1.2	1.2	None	0.08	2.2	2.2	None	3.5	3.6	None	4.0	4.0	None
PIPE12122	A3	ZPIP17607	3	0	1	CIRCULAR	0.022	RCP	0.0	7.1	None	0.07	1.0	1.9	None	5.1	31.6	None	7.3	26.9	None
PIPE12188	A3	PIP10623	4	0	1	CIRCULAR	0.071	RCP	25.2	22.9	None	0.06	58.1	50.5	None	87.8	91.3	None	100.6	104.3	None
PIPE12218	A3	PIP10826	2	0	2	CIRCULAR	0.380	PVC	40.1	37.8	None	0.14	73.4	55.9	None	111.2	70.4	None	126.0	76.3	None
CHAN10299	A3	CH043C	4	4	1	TRAPEZOIDAL	0.003	Concrete	83.9	62.6	Both Upstream and Downstream	0.12	107.9	81.7	Both Upstream and Downstream	338.2	124.8	Both Upstream and Downstream	321.9	139.1	Both Upstream and Downstream
PIPE11535	A3	ZPIP12710	3	0	1	CIRCULAR	0.084	RCP	16.5	16.5	None	0.09	29.2	29.2	None	44.1	44.1	None	50.2	50.2	None
PIPE11813	A3	ZPIP13903	1.5	0	1	CIRCULAR	0.009	RCP	1.0	1.0	None	0.1	1.6	1.6	None	2.3	2.3	None	2.6	2.6	None
PIPE11868	A3	ZPIP14482	1.5	0	1	CIRCULAR	0.012	RCP	1.2	1.2	None	0.1	1.8	1.8	None	2.6	2.7	None	3.0	3.0	None
PIPE11553	A3	ZPIP12722	1.5	0	1	CIRCULAR	0.086	RCP	2.9	2.9	None	0.1	4.6	4.6	None	6.7	6.7	None	7.6	7.6	None
PIPE11564	A3	ZPIP16737	2.5	0	1	CIRCULAR	0.063	RCP	7.2	7.2	None	0.07	14.3	14.3	None	22.5	22.5	None	26.0	26.2	None
PIPE12155	A3	ZPIP12231	1.5	0	1	CIRCULAR	0.079	RCP	2.8	2.8	None	0.1	4.4	4.4	None	6.5	6.5	None	7.3	7.3	None
PIPE11577	A3	ZPIP16739	2	0	1	CIRCULAR	0.085	RCP	4.2	4.2	None	0.06	8.8	8.8	None	13.9	13.9	None	16.1	16.1	None
PIPE11649	A3	ZPIP12831	5.5	0	1	CIRCULAR	0.008	RCP	25.6	29.5	Downstream	0.1	41.7	47.0	Downstream	63.8	86.8	Downstream	71.3	71.6	Downstream
PIPE11877	A3	ZPIP14495	7	11	1	RECT_CLOSED	0.005	RCP	132.0	120.9	Downstream	0.11	186.8	219.4	Both Upstream and Downstream	328.2	295.3	Both Upstream and Downstream	250.8	262.7	Both Upstream and Downstream
PIPE12038	A3	ZPIP11651	1.5	0	1	CIRCULAR	0.018	RCP	0.0	0.0	None	0	0.0	0.0	None	0.1	3.3	None	0.1	3.3	None
PIPE12091	A3	ZPIP17581	4	10	1	TRAPEZOIDAL	0.000	CMP	13.1	14.8	None	0.09	35.5	24.0	None	43.2	36.2	None	55.6	40.5	None
PIPE12311	A3	ZPIP17214	1.5	0	1	CIRCULAR	0.006	RCP	0.6	0.6	None	0.08	1.1	1.1	None	3.4	1.7	None	60.4	1.9	None
PIPE12033	A3	ZPIP15433	1.5	0	1	CIRCULAR	0.101	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	8.5	None	0.0	7.7	None
PIPE12070	A3	ZPIP17580	3	0	1	CIRCULAR	0.006	HDPE	4.6	4.6	None	0.09	8.8	7.3	None	11.9	10.6	None	16.7	12.0	None
PIPE12082	A3	ZPIP15855	2.333	0	1	CIRCULAR	0.015	HDPE	3.6	3.6	None	0.09	5.7	5.7	None	8.3	8.3	None	9.4	9.4	None
PIPE12265	A3	ZPIP10960	3	0	1	CIRCULAR	0.008	RCP	7.1	11.6	Both Upstream and Downstream	0.19	16.3	15.4	Both Upstream and Downstream	43.3	12.1	Both Upstream and Downstream	26.8	13.9	Both Upstream and Downstream
PIPE11690	A3	ZPIP19000	1.5	0	1	CIRCULAR	0.048	RCP	0.0	1.3	None	0.06	1.5	1.4	None	1.5	4.5	None	1.6	5.0	None
PIPE11851	A3	ZPIP17129	1.5	0	1	CIRCULAR	0.013	RCP	1.0	1.1	None	0.09	1.8	1.7	None	2.4	2.4	Both Upstream and Downstream	2.7	2.7	Both Upstream and Downstream
PIPE12263	A3	ZPIP14003	4.5	0	1	CIRCULAR	0.003	RCP	8.0	8.0	None	0.08	12.7	12.9	None	16.1	19.2	None	17.4	23.2	None
PIPE12281	A3	ZPIP17411	3.167	5	1	HORIZ_ELLIPSE	0.026	RCP	50.2	50.3	Downstream	0.22	86.7	57.9	Both Upstream and Downstream	166.2	49.0	Both Upstream and Downstream	157.5	50.2	Both Upstream and Downstream
PIPE11904	A3	ZPIP14762	1.5	0	1	CIRCULAR	0.081	HDPE	1.3	1.3	None	0.04	3.2	3.2	None	5.3	5.3	None	6.2	6.2	None
PIPE12112	A3	ZPIP11875	1.5	0	1	CIRCULAR	0.024	HDPE	6.4	1.3	None	0.08	5.4	2.1	None	3.4	3.1	None	3.8	3.5	None
PIPE12212	A3	ZPIP14311	2.5	0	1	CIRCULAR	0.016	RCP	3.3	2.9	None	0.05	8.6	4.6	None	10.9	14.4	Downstream	13.1	10.9	Downstream
CHAN10276	A3		0	0	1	IRREGULAR	0.012	Concrete	4.5	5.7	None	0.1	6.8	9.1	None	8.6	12.3	None	9.4	12.7	None

Existing Condition Storm Conveyance Results Summary Table

Conveyance Info			Dimensions						2-year				10-year			50-year			100-year		
Facility ID	SubWatershed	Original FacilityID	D' or H' (diameter) or (height)	B' (width)	Barrels	Shape	Slope (ft/ft)	Material	Q_2 (cfs)	Q_{con} (2-year) (cfs)	Surcharging (2-year)	Qcon vs Qcap	Q_{10} (cfs)	Q_{con} (10-year) (cfs)	Surcharging (10-year)	Q_{50} (cfs)	Q_{con} (50-year) (cfs)	Surcharging (50-year)	Q_{100} (cfs)	Q_{con} (100-year) (cfs)	Surcharging (100-year)
PIPE11960	A3	ZPIP17377	7	10	1	RECT_CLOSED	0.006	RCP	493.0	207.4	None	0.21	832.2	333.5	None	1264.3	536.2	None	1391.8	559.0	None
CULV10172	A3	ZCUL064B	6	14	1	RECT_CLOSED	0.004	RCP	446.1	173.3	None	0.18	755.6	282.1	None	1574.9	537.2	None	1605.6	563.4	None
PIPE11533	A3	ZPIP10216	4	0	1	CIRCULAR	0.095	RCP	85.9	85.8	None	0.19	145.3	145.5	None	215.7	217.2	None	245.8	248.6	None
PIPE11809	A3	ZPIP17062	3	0	1	CIRCULAR	0.058	RCP	29.0	29.0	None	0.18	51.7	51.7	None	78.3	78.4	None	89.5	89.6	None
PIPE11894	A3	ZPIP14612	7	10	1	RECT_CLOSED	0.006	RCP	449.9	175.4	None	0.18	762.4	284.2	None	1335.3	530.6	None	1291.2	549.9	None
PIPE11899	A3	ZPIP14616	3	0	2	CIRCULAR	0.007	RCP	36.1	32.0	None	0.28	59.1	48.9	None	85.6	66.1	Downstream	91.5	63.9	Downstream
PIPE11900	A3	ZPIP14617	3	0	2	CIRCULAR	0.007	RCP	36.0	32.0	None	0.28	57.4	47.8	Downstream	76.1	66.2	Both Upstream and Downstream	82.2	63.9	Both Upstream and Downstream
PIPE11959	A3	ZPIP17376	7	10	1	RECT_CLOSED	0.006	RCP	491.9	204.9	None	0.21	830.7	329.5	None	1263.4	534.9	None	1389.4	557.2	None
PIPE11965	A3	ZPIP11521	7	10	1	RECT_CLOSED	0.006	RCP	491.8	204.7	None	0.21	830.6	329.1	None	1264.7	535.1	None	1389.4	557.2	None
PIPE11966	A3	ZPIP11522	7	10	1	RECT_CLOSED	0.006	RCP	451.3	176.5	None	0.18	764.1	285.1	None	1297.1	532.1	None	1293.8	548.0	None
PIPE11967	A3	ZPIP15192	7	10	1	RECT_CLOSED	0.006	RCP	450.6	175.8	None	0.18	763.2	284.5	None	1292.5	529.6	None	1293.0	549.5	None
PIPE11539	A3	ZPIP12714	3	0	1	CIRCULAR	0.090	RCP	40.1	40.1	None	0.2	65.5	65.5	None	96.1	96.1	None	110.0	110.0	None
PIPE11591	A3	ZPIP16744	2	0	1	CIRCULAR	0.028	RCP	7.9	8.0	None	0.21	12.6	12.6	None	18.3	18.4	None	20.7	20.7	None
PIPE11679	A3	ZPIP13024	3	0	1	CIRCULAR	0.010	RCP	10.1	10.2	None	0.15	17.1	17.3	None	25.7	30.1	None	29.3	36.4	None
PIPE11732	A3	ZPIP13169	1.5	0	1	CIRCULAR	0.057	RCP	5.1	5.2	None	0.2	8.2	8.3	None	12.2	12.3	None	13.8	13.9	None
PIPE11935	A3	ZPIP14878	2.5	0	1	CIRCULAR	0.069	RCP	27.3	24.8	None	0.23	48.6	39.5	None	74.3	57.6	None	83.0	59.0	None
PIPE12108	A3	ZPIP15876	3	0	1	CIRCULAR	0.005	HDPE	14.6	9.4	None	0.21	14.4	15.0	None	25.0	22.2	None	27.7	25.1	None
PIPE12240	A3	ZPIP11525	5.5	0	2	CIRCULAR	0.005	RCP	122.4	118.5	None	0.26	191.8	164.4	None	285.4	225.1	None	320.9	250.7	None
PIPE12242	A3	ZPIP10225	4	0	1	CIRCULAR	0.075	RCP	88.5	86.2	None	0.22	147.7	140.5	None	219.7	195.0	None	249.9	216.8	None
CHAN10224	A3	CH10142D	0	0	1	IRREGULAR	0.014	Earthen	197.4	225.0	Downstream	0.33	278.6	355.6	Downstream	248.2	410.2	Downstream	259.1	380.7	Downstream
PIPE11615	A3	ZPIP12798	3.5	0	1	CIRCULAR	0.050	CIPCP	31.6	31.7	None	0.16	49.6	49.7	None	72.3	104.2	None	81.4	104.8	Both Upstream and Downstream
PIPE11659	A3	ZPIP12990	1.5	0	1	CIRCULAR	0.042	RCP	4.5	4.5	None	0.21	7.1	7.1	None	10.4	10.4	None	11.7	11.7	None
PIPE12006	A3	ZPIP15332	2	0	1	CIRCULAR	0.034	RCP	8.0	8.2	None	0.19	13.4	13.4	None	19.9	19.8	None	22.6	22.8	None
PIPE12119	A3	ZPIP11880	1.75	0	1	CIRCULAR	0.010	RCP	3.1	3.2	None	0.2	5.1	5.1	None	7.5	7.6	None	8.6	8.6	None
PIPE12291	A3	ZPIP15298	2.417	3.75	2	HORIZ_ELLIPSE	0.004	RCP	43.1	35.7	None	0.42	74.3	47.9	Both Upstream and Downstream	144.0	45.5	Both Upstream and Downstream	132.7	45.6	Both Upstream and Downstream
PIPE11545	A3	ZPIP12717	5.5	0	1	CIRCULAR	0.019	RCP	98.5	97.5	None	0.21	163.7	156.4	None	243.1	217.9	None	271.0	242.8	None
PIPE11921	A3	ZPIP14857	1.5	0	1	CIRCULAR	0.007	RCP	1.8	1.8	None	0.2	2.9	2.9	None	4.2	4.2	None	4.7	4.7	None
PIPE11922	A3	ZPIP14858	1.5	0	1	CIRCULAR	0.007	RCP	1.8	1.8	None	0.2	2.9	2.9	None	4.2	4.2	None	4.8	4.8	None
CHAN10310	A3	CH062A	6	25	1	TRAPEZOIDAL	0.008	Earthen	0.0	88.4	None	0.07	0.0	351.4	None	0.0	573.6	None	0.0	630.3	None
PIPE11589	A3	ZPIP12752	2	0	1	CIRCULAR	0.050	RCP	11.1	11.1	None	0.22	17.7	17.9	None	25.9	25.4	Downstream	29.3	26.4	Downstream
PIPE12170	A3	PIP19083	3	0	2	CIRCULAR	0.007	RCP	33.0	28.8	None	0.25	53.7	43.7	None	78.3	55.7	None	89.5	59.9	None
PIPE11946	A3	ZPIP14887	3	0	1	CIRCULAR	0.010	RCP	11.7	12.0	None	0.18	19.5	19.6	None	29.3	29.0	None	33.4	33.5	None
PIPE12087	A3	ZPIP11865	2.5	0	1	CIRCULAR	0.004	HDPE	5.2	5.2	None	0.19	15.3	8.1	None	15.8	11.9	None	33.6	13.4	None
PIPE12107	A3	ZPIP15875	3	0	1	CIRCULAR	0.005	HDPE	16.0	9.4	None	0.19	16.7	15.1	None	25.0	22.3	None	27.8	25.0	None
PIPE12149	A3	ZPIP16522	3.5	0	1	CIRCULAR	0.015	HDPE	22.9	22.5	None	0.18	39.2	38.2	None	57.7	59.2	None	67.4	64.0	None
PIPE12262	A3	ZPIP14002	3	0	1	CIRCULAR	0.016	RCP	15.7	15.7	None	0.18	25.7	25.7	None	38.4	38.2	None	43.2	43.3	None
PIPE11572	A3	ZPIP10229	3.5	0	1	CIRCULAR	0.049	RCP	36.8	36.9	None	0.17	64.9	65.0	None	98.5	98.1	None	112.7	111.5	None
PIPE11663	A3	ZPIP12994	1.5	0	1	CIRCULAR	0.050	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	11.3	Both Upstream and Downstream	0.0	11.8	Both Upstream and Downstream
PIPE11863	A3	ZPIP14305	1.5	0	1	CIRCULAR	0.010	RCP	4.6	1.9	None	0.18	3.7	3.1	None	3.5	4.6	None	3.8	5.2	None
PIPE11901	A3	ZPIP11211	3	0	2	CIRCULAR	0.008	RCP	33.0	28.8	None	0.24	53.7	43.7	None	78.2	55.6	None	89.4	60.9	None
PIPE11961	A3	ZPIP11517	7	10	1	RECT_CLOSED	0.007	RCP	504.6	209.0	None	0.19	820.3	336.1	None	1266.1	534.1	Downstream	1392.7	555.4	Both Upstream and Downstream
PIPE12286	A3	ZPIP15294	1.5	0	1	CIRCULAR	0.010	RCP	0.0	0.0	None	0	1.0	4.5	Both Upstream and Downstream	5.4	4.5	Both Upstream and Downstream	1.7	5.1	Both Upstream and Downstream
PIPE12121	A3	ZPIP11885	1.75	0	1	CIRCULAR	0.168	RCP	7.3	7.3	None	0.11	16.6	16.6	None	27.1	27.1	None	31.5	31.5	Downstream
PIPE12174	A3	ZPIP13075	3	0	1	CIRCULAR	0.073	RCP	29.6	29.8	None	0.17	50.5	50.3	None	76.3	75.5	None	87.4	87.4	None
PIPE12252	A3	ZPIP14483	1.5	0	1	CIRCULAR	0.008	RCP	1.9	1.9	Both Upstream and Downstream	0.2	3.0	2.6	Both Upstream and Downstream	4.5	4.0	Both Upstream and Downstream	5.0	4.6	Both Upstream and Downstream
CHAN10222	A3	CH10142C	0	0	1	IRREGULAR	0.032	Earthen	198.7	225.5	None	0.29	303.6	360.4	Downstream	307.5	415.6	Downstream	265.6	386.1	Downstream
CHAN10278	A3		0	0	1	IRREGULAR	0.012	Concrete	5.6	5.3	None	0.21	7.3	8.7	None	8.7	11.9	None	9.1	12.4	None
PIPE11523	A3	ZPIP10212	1.5	0	1	CIRCULAR	0.032	RCP	3.5	3.5	None	0.19	5.4	5.5	None	7.9	7.9	None	8.9	8.9	None
PIPE11583	A3	ZPIP16740	1.5	0	1	CIRCULAR	0.019	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	6.8	None	0.0	6.9	Downstream
PIPE11660	A3	ZPIP12991	1.5	0	1	CIRCULAR	0.017	RCP	2.3	2.4	None	0.17	3.9	3.9	None	5.8	5.8	None	6.6	6.6	None
PIPE11823	A3	ZPIP13909	3	0	1	CIRCULAR	0.101	RCP	33.3	33.3	None	0.16	58.9	58.9	None	88.9	89.2	None	101.6	102.0	None
PIPE11824	A3	ZPIP13925	4	0	1	CIRCULAR	0.040	RCP	42.3	42.3	None	0.15	84.9	84.9	None	132.1	125.2	None	152.8	136.3	None
CULV10142	A3	ZCUL067B	4	6	3	RECT_CLOSED	0.021	RCP	9.7	45.7	None	0.03	27.7	260.1	None	54.1	562.5	None	128.7	634.5	None
PIPE11896	A3	ZPIP14615	4	0	1	CIRCULAR	0.009	RCP	20.9	20.8	None	0.16	36.8	36.7	None	56.2	56.1	None	64.4	64.4	None
PIPE12008	A3	ZPIP11622	1.5	0	1	CIRCULAR	0.008	RCP	0.6	2.1	None	0.22	0.9	2.9	Downstream	1.3	4.0	Both Upstream and Downstream	1.5	4.4	Both Upstream and Downstream
PIPE11702	A3	ZPIP16860	3	0	1	CIRCULAR	0.078	RCP	29.5	29.8	None	0.16	50.3	50.2	None	76.0	75.4	None	87.1	87.1	None
PIPE11821	A3	ZPIP10845	2.5	0	1	CIRCULAR	0.056	RCP	13.5	13.5	None	0.14	25.7	25.7	None	39.8	39.8	None	45.8	45.7	None
PIPE11822	A3	ZPIP10846	3	0	1	CIRCULAR	0.106	RCP	33.3	33.3	None	0.15	59.2	58.7	None	89.0	89.5	Downstream	101.7	102.0	Downstream
PIPE12089	A3	ZPIP15859	2.5	0	1	CIRCULAR	0.005	HDPE	5.1	5.1	None	0.18	15.0	8.0	None	19.3	11.9	None	38.4	13.5	None
PIPE12234	A3	ZPIP15991	2	0	1	CIRCULAR	0.005	RCP	0.0	2.1	None	0.13	0.0	10.5	Downstream	0.4	11.2	Both Upstream and Downstream	1.0	7.3	Both Upstream and Downstream
CHAN10286	A3	CH050A	0	0	1	IRREGULAR	0.014	Concrete	89.8	110.3	None	0.21	143.7	170.3	None	201.4	204.7	None	225.6	241.8	None
PIPE12310	A3	ZPIP17213	1.5	0	1	CIRCULAR	-0.010	RCP	0.0	0.0	None	0	0.1	0.0	None	9.7	0.1	None	147.3	4.9	None
PIPE11569	A3	ZPIP12735	2	0	1	CIRCULAR	0.081	RCP	8.2	8.2	None	0.13	16.5	16.5	None	25.9	25.9	None	29.9	29.9	None
PIPE11573	A3	ZPIP12739	3	0	1	CIRCULAR	0.080	RCP	27.3	27.4	None	0.14	49.8	49.8	None	76.2	76.2	None	87.3	87.3	None
PIPE11574	A3	ZPIP12740	2.5	0	1	CIRCULAR	0.050	RCP	13.4	13.5	None	0.15	24.3	24.3	None	37.1	37.1	None	42.5	42.4	None
PIPE11576	A3	ZPIP16738	2	0	1	CIRCULAR	0.064	RCP	7.3	7.3	None	0.13	14.4	14.4	None	22.6	22.6	None	26.1	26.1	None
PIPE11706	A3	ZPIP16861	4	0	1	CIRCULAR	0.015	CIPCP	23.9	21.2	Downstream	0.14	36.6	36.4	Downstream	59.6	64.3	Downstream	72.2	70.6	Downstream
PIPE11858	A3	ZPIP11042	1.5	0	1	CIRCULAR	0.010	RCP	1.9	1.9	None	0.17	3.0	3.0	None	4.4	4.4	None	4.9	4.9	None
PIPE11930	A3	ZPIP17268	1.5	0	1	CIRCULAR	0.010	RCP	0.3	2.5	Both Upstream and Downstream	0.24	0.5	2.5	Both Upstream and Downstream	0.7	4.1	Both Upstream and Downstream	0.8	4.7	Both Upstream and Downstream
PIPE12060	A3	ZPIP15543	3	0	1	CIRCULAR	0.005	RCP	6.7	6.7	None	0.14	12.0	12.0	None	18.0	17.9	None	20.5	21.6	None
PIPE12097	A3	ZPIP17585	4	0	1	CIRCULAR	0.004	RCP	32.1	15.0	Downstream	0.17	30.0	25.9	Both Upstream and Downstream	52.9	37.6	Both Upstream and Downstream	51.0	42.0	Both Upstream and Downstream
PIPE12111	A3	ZPIP11874	1.5	0	1	CIRCULAR	0.005	HDPE	2.6	1.3	None	0.18	2.0	2.1	None	3.2	3.1	None	3.6	3.5	None
PIPE12187	A3	PIP10622	3.5	0	1	CIRCULAR	0.030	RCP	38.7	33.2	None	0.19	81.6	60.5	None	118.5	78.4	None	135.4	80.0	None
PIPE12235	A3	ZPIP17446	2.5	0	1	CIRCULAR	0.005	RCP	5.8	8.4	None	0.29	9.3	14.2	Both Upstream and Downstream	14.4	13.8	Both Upstream and Downstream	16.6	13.3	Both Upstream and Downstream
PIPE11568	A3	ZPIP12733	2.5	0	1	CIRCULAR	0.043	RCP	12.0	12.0	None	0.14	22.0	22.0	None	33.7	33.7	None	38.6	38.5	None
PIPE11623	A3	ZPIP12806	3	0	1	CIRCULAR	0.089	RCP	28.4	28.5	None	0.14	51.5	51.6	None	78.8	78.7	None	90.2	90.2	None

Existing Condition Storm Conveyance Results Summary Table

Conveyance Info			Dimensions						2-year				10-year			50-year			100-year		
Facility ID	SubWatershed	Original FacilityID	D' or H' (diameter) or (height)	B' (width)	Barrels	Shape	Slope (ft/ft)	Material	Q_2 (cfs)	Q_{con} (2-year) (cfs)	Surcharging (2-year)	Qcon vs Qcap	Q_{10} (cfs)	Q_{con} (10-year) (cfs)	Surcharging (10-year)	Q_{50} (cfs)	Q_{con} (50-year) (cfs)	Surcharging (50-year)	Q_{100} (cfs)	Q_{con} (100-year) (cfs)	Surcharging (100-year)
PIPE11818	A3	ZPIP13908	3	0	1	CIRCULAR	0.028	RCP	15.1	15.1	None	0.14	28.1	28.1	None	43.3	43.2	None	49.7	49.6	None
PIPE12068	A3	ZPIP17578	3.5	0	1	CIRCULAR	0.006	HDPE	12.6	12.6	None	0.16	18.6	20.7	None	19.1	30.4	None	36.6	34.6	None
CULV10157	A3	ZCUL11918E	3	5	3	RECT_CLOSED	0.009	RCP	82.6	92.9	None	0.2	129.4	144.3	None	172.7	183.6	None	191.5	211.2	None
CHAN10290	A3	ZCH10206	0	0	1	IRREGULAR	0.031	Concrete	98.7	126.8	None	0.1	164.3	193.3	None	232.4	233.8	Downstream	261.9	556.3	Downstream
PIPE12313	A3	ZPIP15195	2	8	1	RECT_CLOSED	0.013	RCP	24.2	27.9	None	0.15	46.9	47.3	None	164.5	71.8	None	317.3	81.4	None
PIPE11522	A3	ZPIP10211	1.5	0	1	CIRCULAR	0.067	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	0.0	None	0.0	12.1	None
PIPE11743	A3	ZPIP13178	1.5	0	1	CIRCULAR	0.081	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	10.2	None	0.0	13.1	None
PIPE11772	A3	ZPIP10473	1.5	0	1	CIRCULAR	0.029	RCP	0.5	0.9	None	0.05	1.5	5.6	None	1.3	4.9	None	1.6	7.9	None
PIPE11847	A3	ZPIP14230	1.5	0	1	CIRCULAR	0.055	RCP	4.0	4.0	None	0.16	6.5	6.5	None	9.6	9.6	None	11.1	10.9	None
PIPE11865	A3	ZPIP14307	1.5	0	1	CIRCULAR	0.008	RCP	0.9	1.4	None	0.15	2.1	2.4	None	3.5	3.7	None	4.0	4.2	None
CULV10145	A3	ZCUL11918C	3	5	3	RECT_CLOSED	0.009	RCP	82.6	92.9	None	0.2	129.4	144.3	None	172.7	183.6	None	191.5	211.0	None
PIPE12169	A3	PIP19076	3	0	1	CIRCULAR	0.105	RCP	31.8	31.9	None	0.15	53.1	53.0	None	81.5	81.2	None	93.0	95.2	None
PIPE12276	A3	ZPIP14825	1.5	0	1	CIRCULAR	0.007	RCP	9.9	4.0	Both Upstream and Downstream	0.46	2.8	1.9	Both Upstream and Downstream	4.4	3.0	Both Upstream and Downstream	4.7	3.8	Both Upstream and Downstream
PIPE11567	A3	ZPIP12732	1.5	0	1	CIRCULAR	0.037	RCP	3.4	3.4	None	0.17	5.3	5.3	None	7.8	7.8	None	8.7	8.7	None
PIPE11596	A3	ZPIP12783	3.5	0	1	CIRCULAR	0.053	RCP	31.5	31.3	None	0.14	57.5	57.2	None	87.8	87.4	None	100.6	100.0	None
PIPE11657	A3	ZPIP10282	1.5	0	1	CIRCULAR	0.015	ACP	0.0	0.0	None	0	0.1	0.1	None	0.1	3.6	Downstream	0.1	5.5	Both Upstream and Downstream
PIPE11745	A3	ZPIP13180	2	0	1	CIRCULAR	0.034	RCP	7.0	7.0	None	0.17	11.0	11.0	None	16.0	15.7	None	18.1	18.1	None
PIPE11838	A3	ZPIP13974	1.5	0	1	CIRCULAR	0.027	RCP	2.9	2.9	None	0.17	4.5	4.5	None	6.5	6.5	None	7.4	7.4	None
PIPE11998	A3	ZPIP11592	2.5	0	1	CIRCULAR	0.025	RCP	9.8	10.0	None	0.16	16.4	16.5	None	24.4	24.3	None	27.8	27.9	None
PIPE12028	A3	ZPIP11648	3	0	1	CIRCULAR	0.005	RCP	6.7	6.6	None	0.14	12.0	11.9	None	17.8	17.5	None	20.4	20.3	None
PIPE12209	A3	ZPIP14614	4	0	1	CIRCULAR	0.011	RCP	21.0	21.1	None	0.14	36.8	37.0	None	56.2	56.6	None	64.4	64.8	None
PIPE11505	A3	ZPIP12684	1.5	0	1	CIRCULAR	0.084	RCP	4.4	4.4	None	0.14	7.4	7.4	None	11.2	11.2	None	12.8	12.8	None
PIPE11508	A3	ZPIP12691	1.5	0	1	CIRCULAR	0.082	RCP	4.4	4.4	None	0.15	7.4	7.4	None	11.2	11.2	None	12.8	12.8	None
PIPE11697	A3	ZPIP10403	3.5	0	1	CIRCULAR	0.033	RCP	26.1	26.0	None	0.14	43.8	43.9	None	64.1	66.8	None	72.9	76.5	None
PIPE11719	A3	ZPIP10445	1.5	0	1	CIRCULAR	0.019	RCP	0.0	0.0	None	0	0.0	0.9	None	0.0	6.1	None	0.0	6.0	None
PIPE12075	A3	ZPIP15839	2.5	0	1	CIRCULAR	0.005	HDPE	4.6	4.6	None	0.16	7.3	7.3	None	11.5	10.7	None	16.7	12.0	None
PIPE12090	A3	ZPIP15860	2.5	0	1	CIRCULAR	0.006	HDPE	5.2	5.2	None	0.16	15.2	8.1	None	17.0	11.9	None	36.4	13.4	None
CULV10156	A3	ZCUL11918D	3	5	3	RECT_CLOSED	0.009	RCP	81.3	91.1	None	0.19	127.1	141.6	None	169.4	176.2	None	187.6	199.9	None
PIPE12295	A3	ZPIP15928	5.5	12	3	RECT_CLOSED	0.005	RCP	300.1	283.7	None	0.12	821.3	725.2	None	1039.6	896.1	None	1105.3	975.3	None
PIPE12306	A3	PIP19074	5.5	12	3	RECT_CLOSED	0.005	RCP	299.3	285.6	None	0.12	822.2	725.1	None	1041.2	896.1	None	1106.8	975.4	None
PIPE11674	A3	ZPIP10367	1.5	0	1	CIRCULAR	0.009	RCP	1.6	1.6	None	0.16	2.5	2.5	None	3.6	3.6	None	4.1	4.1	None
PIPE11970	A3	ZPIP15198	6	0	2	CIRCULAR	0.022	RCP	186.2	228.5	None	0.18	316.7	354.4	None	459.9	450.0	None	523.1	513.4	None
PIPE12010	A3	ZPIP11631	1.5	0	1	CIRCULAR	0.028	RCP	0.0	0.0	None	0	0.0	5.3	None	0.0	7.4	None	0.0	7.2	None
PIPE12172	A3	PIP19091	3.5	0	1	CIRCULAR	0.036	CIPCP	19.8	19.8	None	0.12	38.2	38.1	None	58.9	58.9	None	67.7	67.7	None
PIPE12173	A3	PIP19092	3.5	0	1	CIRCULAR	0.036	CIPCP	19.8	19.8	None	0.12	38.2	38.2	None	59.0	59.0	None	67.8	67.8	None
PIPE11562	A3	ZPIP16735	3.5	0	1	CIRCULAR	0.006	RCP	11.4	11.5	None	0.15	18.2	18.3	None	26.6	26.8	None	30.3	30.2	None
PIPE11593	A3	ZPIP10250	5.5	0	1	CIRCULAR	0.042	RCP	109.6	107.9	None	0.16	181.3	174.6	None	268.1	252.6	None	300.0	271.3	Downstream
PIPE11864	A3	ZPIP14306	1.5	0	1	CIRCULAR	0.010	RCP	1.2	1.4	None	0.14	2.3	2.4	None	3.7	3.7	None	4.2	4.2	None
PIPE12043	A3	ZPIP11654	2.5	0	1	CIRCULAR	0.038	RCP	11.7	11.8	None	0.15	19.4	19.5	None	28.8	29.4	None	32.6	31.8	None
PIPE12150	A3	ZPIP16523	1.5	0	1	CIRCULAR	0.012	HDPE	0.0	0.0	None	0	0.0	0.0	None	0.0	0.9	None	0.0	4.7	None
PIPE12167	A3	PIP19072	3	0	1	CIRCULAR	0.105	RCP	29.0	29.2	None	0.14	48.8	48.8	None	75.2	75.1	None	85.9	85.8	None
PIPE12168	A3	PIP19075	3	0	1	CIRCULAR	0.105	RCP	29.0	29.1	None	0.13	48.8	48.7	None	75.3	75.0	None	86.0	85.7	None
PIPE12185	A3	PIP10606	3.5	0	1	CIRCULAR	0.051	RCP	41.3	35.9	None	0.16	87.2	66.2	None	129.2	87.3	None	156.8	90.5	None
DTCH10275	A3	DD055A	0	0	1	IRREGULAR	0.001	CONCRETE	471.2	157.6	None	0.12	745.5	270.2	None	1173.0	500.4	Upstream	1352.8	517.6	Upstream
PIPE11600	A3	ZPIP16639	4.5	0	1	CIRCULAR	0.149	RCP	102.2	102.7	None	0.14	176.8	177.1	None	260.0	261.1	None	287.5	297.6	None
PIPE11808	A3	ZPIP17061	1.5	0	1	CIRCULAR	0.041	RCP	2.9	2.9	None	0.14	4.8	4.8	None	7.2	7.2	None	8.2	8.2	None
PIPE12189	A3	PIP10624	4	0	1	CIRCULAR	0.035	RCP	25.1	22.8	None	0.09	57.2	50.0	None	87.4	89.8	None	100.3	104.5	None
PIPE12190	A3	PIP10681	4	0	1	CIRCULAR	0.035	RCP	25.1	22.8	None	0.09	57.4	50.1	None	87.9	90.2	None	100.8	104.2	None
CULV10168	A3	CUL033A	4	6	1	RECT_CLOSED	0.019	RCP	80.2	57.6	Both Upstream and Downstream	0.13	131.8	69.1	Both Upstream and Downstream	396.6	145.9	Both Upstream and Downstream	383.3	168.6	Both Upstream and Downstream
CHAN10315	A3	CH062B	6	25	1	TRAPEZOIDAL	0.015	Earthen	0.5	72.5	None	0.04	1.5	310.0	None	2.5	565.3	None	3.0	630.8	None
PIPE11513	A3	ZPIP10208	3.5	0	1	CIRCULAR	0.079	CIPCP	28.9	28.8	None	0.12	53.4	53.2	None	81.7	81.4	None	93.6	93.3	None
PIPE11673	A3	ZPIP16815	1.5	0	1	CIRCULAR	0.010	RCP	1.5	1.5	None	0.15	2.4	2.5	None	3.5	3.6	None	3.9	4.0	None
PIPE11741	A3	ZPIP13175	3	0	1	CIRCULAR	0.062	RCP	19.9	20.0	None	0.12	34.3	34.4	None	54.1	53.4	None	61.4	62.5	None
PIPE11891	A3	ZPIP11204	2	0	1	CIRCULAR	0.014	RCP	4.0	4.0	None	0.15	6.3	6.3	None	9.2	9.1	None	10.4	10.2	None
PIPE11969	A3	ZPIP15196	2	0	1	CIRCULAR	0.037	RCP	6.1	6.1	None	0.14	9.9	9.9	None	14.6	14.7	None	16.6	16.6	None
PIPE12074	A3	ZPIP15838	2.5	0	1	CIRCULAR	0.006	HDPE	4.6	4.7	None	0.15	7.3	7.3	None	11.5	10.7	None	16.7	12.1	None
PIPE12257	A3	ZPIP11618	1.5	4	1	RECT_CLOSED	0.011	RCP	6.4	6.4	None	0.13	10.4	10.5	None	15.8	15.8	None	17.9	17.9	None
CHAN10289	A3	ZCH10206	0	0	1	IRREGULAR	0.031	Concrete	98.7	126.9	None	0.1	164.3	193.7	None	232.4	234.3	None	262.0	474.5	None
PIPE11528	A3	ZPIP12706	1.5	0	1	CIRCULAR	0.009	RCP	1.4	1.4	None	0.14	2.2	2.2	None	3.2	3.2	None	3.6	3.6	None
PIPE11541	A3	ZPIP10218	3	0	1	CIRCULAR	0.065	RCP	20.8	20.8	None	0.12	36.7	36.7	None	55.5	55.5	None	63.3	63.3	None
PIPE11658	A3	ZPIP12989	1.5	0	1	CIRCULAR	0.038	RCP	2.9	2.9	None	0.14	4.6	4.6	None	6.7	6.8	None	7.6	7.6	None
PIPE11664	A3	ZPIP10363	1.5	0	1	CIRCULAR	0.040	RCP	3.0	3.0	None	0.14	4.7	4.7	None	6.9	6.9	None	7.7	7.8	None
PIPE11996	A3	ZPIP17425	3	0	1	CIRCULAR	0.018	RCP	11.7	11.9	None	0.13	19.3	19.5	None	28.8	28.7	None	32.9	33.2	None
PIPE12013	A3	ZPIP15399	1.5	0	1	CIRCULAR	0.022	RCP	0.0	0.0	None	0	0.0	2.6	None	0.0	6.5	None	0.0	5.8	None
PIPE12056	A3	ZPIP11689	2.25	0	1	CIRCULAR	0.014	RCP	4.9	4.9	None	0.13	7.9	7.9	None	11.8	11.8	None	13.4	13.4	None
PIPE12072	A3	ZPIP11855	4	0	1	CIRCULAR	0.005	HDPE	12.4	13.3	None	0.13	17.2	22.5	None	26.0	34.0	None	43.4	37.0	None
PIPE11815	A3	ZPIP13905	2	0	1	CIRCULAR	0.093	RCP	6.6	6.6	None	0.1	13.4	13.4	None	21.1	21.1	None	24.4	24.5	None
PIPE11964	A3	ZPIP15188	7	11	1	RECT_CLOSED	0.005	RCP	141.9	140.8	Both Upstream and Downstream	0.14	253.4	246.7	Both Upstream and Downstream	394.7	367.5	Both Upstream and Downstream	296.3	366.7	Both Upstream and Downstream
PIPE12104	A3	ZPIP15872	2.5	0	1	CIRCULAR	0.005	HDPE	7.6	4.0	None	0.14	15.3	6.3	None	10.8	9.3	None	11.7	10.6	None
PIPE12134	A3	ZPIP11972	5.5	0	1	CIRCULAR	0.017	RCP	64.8	65.1	None	0.15	107.4	178.2	None	598.7	168.7	Both Upstream and Downstream	623.0	158.3	Both Upstream and Downstream
CULV10160	A3	ZCUL070D	2	6	3	RECT_CLOSED	0.004	RCP	54.2	26.5	None	0.12	91.1	44.6	None	133.6	66.2	None	146.3	75.5	None
PIPE11502	A3	ZPIP16727	1.5	0	1	CIRCULAR	0.042	RCP	2.7	2.7	None	0.12	4.4	4.4	None	6.6	6.6	None	7.5	7.5	None
PIPE11511	A3	ZPIP12694	3.5	0	1	CIRCULAR	0.055	RCP	24.7	24.7	None	0.1	46.4	46.4	None	71.3	71.3	None	81.8	81.8	None
PIPE11549	A3	ZPIP10220	2	0	1	CIRCULAR	0.039	RCP	6.1	6.1	None	0.14	9.5	9.5	None	13.8	13.8	None	15.5	15.6	None
PIPE11558	A3	ZPIP10224	1.5	0	1	CIRCULAR	0.120	RCP	4.9	4.9	None	0.13	7.7	7.7	None	11.3	11.3	None	12.7	12.7	None
PIPE11579	A3	ZPIP10232	3.5	0	1	CIRCULAR	0.036	RCP	36.8	34.2	None	0.18	59.0	51.7	None	87.0	62.1	None	98.5	66.2	None

Existing Condition Storm Conveyance Results Summary Table

Conveyance Info			Dimensions						2-year				10-year				50-year				100-year			
Facility ID	SubWatershed	Original FacilityID	D' or H' (diameter) or (height)	B' (width)	Barrels	Shape	Slope (ft/ft)	Material	Q_2 (cfs)	Q_{con} (2-year) (cfs)	Surcharging (2-year)	Qcon vs Qcap	Q_{10} (cfs)	Q_{con} (10-year) (cfs)	Surcharging (10-year)	Q_{50} (cfs)	Q_{con} (50-year) (cfs)	Surcharging (50-year)	Q_{100} (cfs)	Q_{con} (100-year) (cfs)	Surcharging (100-year)	
PIPE11629	A3	ZPIP10267	1.5	0	1	CIRCULAR	0.060	RCP	2.0	2.0	None	0.08	3.2	3.2	None	4.7	4.7	None	5.3	5.3	None	
CULV10143	A3	ZCUL13009	7	10	1	RECT_CLOSED	0.010	RCP	235.1	245.1	Both Upstream and Downstream	0.19	445.9	236.1	Both Upstream and Downstream	594.5	250.9	Both Upstream and Downstream	664.7	264.8	Both Upstream and Downstream	
PIPE11956	A3	ZPIP15183	7	10	1	RECT_CLOSED	0.010	RCP	235.3	244.3	Both Upstream and Downstream	0.19	447.0	242.5	Both Upstream and Downstream	596.6	249.9	Both Upstream and Downstream	667.1	263.5	Both Upstream and Downstream	
PIPE11957	A3	ZPIP15184	7	10	1	RECT_CLOSED	0.010	RCP	234.9	243.6	Both Upstream and Downstream	0.19	447.9	243.2	Both Upstream and Downstream	598.1	249.4	Both Upstream and Downstream	668.8	263.0	Both Upstream and Downstream	
PIPE12058	A3	ZPIP17499	2.5	0	1	CIRCULAR	0.011	RCP	3.0	3.0	None	0.07	4.9	5.0	None	7.4	7.5	None	8.5	8.5	None	
CULV10163	A3	ZCUL16633	4	4	1	RECT_CLOSED	0.046	RCP	54.7	27.8	None	0.07	94.5	46.9	None	137.2	69.7	None	147.9	79.6	None	
CULV10164	A3	ZCUL11893	4	10	1	RECT_CLOSED	0.006	RCP	56.5	30.9	None	0.07	93.2	51.9	None	169.3	77.4	None	170.6	91.6	None	
CHAN10225	A3	ZCH10143A	0	0	1	IRREGULAR	0.020	Earthen	111.2	100.1	None	0.1	182.4	144.9	None	234.7	182.5	None	253.9	204.0	None	
CHAN10226	A3	ZCH10143A	0	0	1	IRREGULAR	0.020	Earthen	111.2	100.1	None	0.1	182.4	144.9	None	234.7	182.5	None	253.9	203.9	None	
CHAN10274	A3		0	0	1	IRREGULAR	0.012	Concrete	6.2	6.7	None	0.09	10.1	10.3	None	15.3	14.5	None	17.1	14.9	None	
PIPE11506	A3	ZPIP12685	1.5	0	1	CIRCULAR	0.204	RCP	2.9	2.9	None	0.06	5.1	5.1	None	7.7	7.7	None	8.8	8.8	None	
PIPE11913	A3	ZPIP11322	2	0	1	CIRCULAR	0.029	RCP	2.5	2.9	None	0.07	4.0	4.5	None	6.7	6.6	None	7.6	7.5	None	
PIPE12005	A3	ZPIP15331	2	0	1	CIRCULAR	0.037	RCP	2.8	2.8	None	0.06	4.8	4.9	None	7.3	7.3	None	8.3	8.3	None	
CULV10159	A3	ZCUL16801	4	4	1	RECT_CLOSED	0.046	RCP	54.0	26.1	None	0.07	97.3	44.1	None	133.2	65.5	None	146.3	74.8	None	
CHAN10298	A3	CH043D	4	4	1	TRAPEZOIDAL	0.005	Concrete	83.6	59.6	Both Upstream and Downstream	0.1	121.2	76.8	Both Upstream and Downstream	294.5	103.5	Both Upstream and Downstream	284.8	113.5	Both Upstream and Downstream	
PIPE11544	A3	ZPIP12716	1.5	0	1	CIRCULAR	0.043	RCP	1.5	1.5	None	0.07	2.2	3.1	None	3.1	3.3	None	5.7	3.8	None	
PIPE11789	A3	ZPIP13606	2.5	0	1	CIRCULAR	0.014	RCP	3.0	3.0	None	0.06	5.0	5.0	None	7.5	7.5	None	8.5	8.5	None	
PIPE11611	A3	ZPIP12793	1.5	0	1	CIRCULAR	0.090	RCP	2.1	2.1	None	0.07	3.3	3.3	None	4.7	4.7	None	5.3	5.3	None	
PIPE11869	A3	ZPIP17190	1.5	0	1	CIRCULAR	0.048	RCP	2.0	0.6	Both Upstream and Downstream	0.03	3.6	5.7	Both Upstream and Downstream	0.9	3.8	Both Upstream and Downstream	1.1	4.0	Both Upstream and Downstream	
PIPE11880	A3	ZPIP14533	1.5	0	1	CIRCULAR	0.086	RCP	2.0	2.0	None	0.06	3.2	3.2	None	70.5	4.8	None	80.1	5.4	None	
PIPE12049	A3	ZPIP17469	1.5	0	1	CIRCULAR	0.380	RCP	7.2	4.9	None	0.08	12.2	6.8	None	18.3	8.8	None	20.8	11.1	None	
PIPE12205	A3		6	0	1	CIRCULAR	0.012	RCP	54.7	27.9	None	0.06	93.0	46.9	None	142.2	69.8	None	147.8	79.8	None	
PIPE12206	A3		6	0	1	CIRCULAR	0.013	RCP	55.0	28.5	None	0.06	93.5	47.9	None	146.1	71.3	None	148.3	81.5	None	
PIPE12232	A3	ZPIP17192	7	11	1	RECT_CLOSED	0.003	RCP	66.9	54.9	None	0.06	122.7	115.5	None	203.0	126.7	None	275.9	142.3	None	
PIPE12274	A3	ZPIP11323	2	0	1	CIRCULAR	0.009	RCP	11.1	1.7	Both Upstream and Downstream	0.08	2.8	1.4	Both Upstream and Downstream	4.8	2.8	Both Upstream and Downstream	4.7	3.6	Both Upstream and Downstream	
DTCH10272	A3	DD10036	0	0	1	IRREGULAR	0.073	CONCRETE	443.7	161.9	None	0.05	744.8	272.1	None	1172.0	509.5	None	1360.4	524.7	None	
PIPE11668	A3	ZPIP12996	1.5	0	1	CIRCULAR	0.100	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	4.8	Downstream	0.0	5.4	Both Upstream and Downstream	
PIPE11727	A3	ZPIP13167	1.5	0	1	CIRCULAR	0.042	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	0.7	None	0.0	3.5	None	
PIPE11920	A3	ZPIP14856	1.5	0	1	CIRCULAR	0.079	RCP	1.8	1.8	None	0.06	2.8	2.8	None	4.1	4.1	None	4.7	4.7	None	
PIPE12140	A3	ZPIP12205	3.5	5	1	RECT_OPEN	0.056	RCP	44.1	32.1	None	0.05	69.5	53.3	None	80.7	92.6	None	92.5	97.1	None	
PIPE12204	A3	ZPIP17216	6	0	1	CIRCULAR	0.015	RCP	54.9	28.3	None	0.05	92.1	47.7	None	145.5	70.9	None	148.3	80.9	None	
PIPE11529	A3	ZPIP12707	1.5	0	1	CIRCULAR	0.156	RCP	2.4	2.4	None	0.06	3.9	3.9	None	5.6	5.6	None	6.4	6.4	None	
PIPE11566	A3	ZPIP10228	1.5	0	1	CIRCULAR	0.134	RCP	2.3	2.3	None	0.06	3.6	3.6	None	5.2	5.2	None	5.8	5.8	None	
PIPE12283	A3	ZPIP11571	1.5	0	1	CIRCULAR	0.039	RCP	0.1	1.3	None	0.06	2.4	4.8	Both Upstream and Downstream	1.4	3.4	Both Upstream and Downstream	1.4	3.1	Both Upstream and Downstream	
PIPE11552	A3	ZPIP12721	1.5	0	1	CIRCULAR	0.080	RCP	1.6	1.6	None	0.05	2.5	2.5	None	3.6	3.6	None	4.0	4.0	None	
PIPE11962	A3	ZPIP11518	7	11	1	RECT_CLOSED	0.005	RCP	66.8	55.0	None	0.05	186.0	155.7	None	254.7	134.4	None	295.5	148.0	Downstream	
PIPE12131	A3	ZPIP16081	7	11	1	RECT_CLOSED	0.005	RCP	66.8	54.7	None	0.05	164.7	196.3	None	264.0	138.9	Downstream	274.0	152.2	Both Upstream and Downstream	
PIPE11787	A3	ZPIP10677	2.5	0	1	CIRCULAR	0.028	RCP	3.0	3.0	None	0.04	5.0	5.0	None	7.5	7.5	None	8.5	8.6	None	
PIPE11878	A3	ZPIP17191	7	11	1	RECT_CLOSED	0.006	RCP	66.9	54.9	None	0.05	134.7	121.5	None	219.0	128.1	None	297.0	141.7	None	
PIPE12078	A3	ZPIP15843	2	0	1	CIRCULAR	0.006	HDPE	0.8	0.8	None	0.05	2.2	1.3	None	11.6	1.9	None	9.2	2.2	None	
PIPE12245	A3	ZPIP16982	2.5	0	1	CIRCULAR	0.014	RCP	2.2	2.3	None	0.05	3.7	3.7	None	5.5	5.5	None	6.2	6.2	None	
CHAN10273	A3		0	0	1	IRREGULAR	0.012	Concrete	6.5	6.7	None	0.05	10.4	10.6	None	15.1	15.4	None	16.9	17.2	None	
PIPE12261	A3	ZPIP14001	3	0	1	CIRCULAR	0.239	RCP	15.7	15.7	None	0.05	25.7	25.7	None	38.4	38.4	None	43.7	43.7	None	
CHAN10311	A3	CH062A	6	25	1	TRAPEZOIDAL	0.128	Earthen	1.0	89.2	None	0.02	2.4	349.1	None	4.0	569.1	Downstream	4.7	632.4	Downstream	
PIPE11683	A3	ZPIP10380	3.5	0	1	CIRCULAR	0.010	CIPCP	3.2	3.4	None	0.04	5.2	7.6	None	8.0	9.6	None	9.5	10.8	None	
CHAN10326	A3		0	0	1	IRREGULAR	0.005	EARTHEN	3.2	3.2	None	0.02	11.3	13.4	None	22.1	18.8	None	16.3	20.8	None	
PIPE11614	A3	ZPIP10260	2.75	0	1	CIRCULAR	0.099	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	16.6	None	0.0	18.2	Downstream	
PIPE12062	A3	ZPIP15557	2	0	1	CIRCULAR	0.008	RCP	0.5	0.7	None	0.04	0.8	2.2	None	1.0	2.1	None	1.0	2.3	None	
PIPE12214	A3	ZPIP11045	1.5	0	1	CIRCULAR	0.115	RCP	0.2	0.0	None	0	1.0	2.1	None	2.5	4.9	Both Upstream and Downstream	3.2	4.1	Both Upstream and Downstream	
PIPE11617	A3	ZPIP12803	1.5	0	1	CIRCULAR	0.191	RCP	0.0	0.0	None	0	0.0	0.0	None	0.0	0.0	None	0.0	4.5	None	
PIPE11641	A3	ZPIP16767	5.5	0	1	CIRCULAR	0.043	RCP	27.4	27.7	None	0.04	45.2	44.1	None	63.8	82.7	None	73.9	66.8	None	
PIPE12057	A3	ZPIP11690	2.25	0	1	CIRCULAR	0.200	RCP	5.0	5.0	None	0.04	8.1	8.1	None	12.0	12.0	None	13.6	13.6	None	
PIPE12116	A3	ZPIP15880	4	10	1	TRAPEZOIDAL	0.001	CMP	20.3	12.7	None	0.04	21.3	20.1	None	33.4	29.7	None	37.9	33.8	None	
PIPE12221	A3	ZPIP11163	1.5	0	1	CIRCULAR	0.006	RCP	0.3	0.3	None	0.04	0.5	0.5	None	0.7	0.7	None	0.8	0.8	None	
CHAN10219	A3	CH045C	0	0	1	IRREGULAR	0.016	Earthen	32.3	31.7	None	0.07	61.3	44.0	None	97.5	50.0	None	109.0	50.2	None	
CHAN10322	A3	CH062B	6	25	1	TRAPEZOIDAL	0.227	Earthen	2.8	45.8	None	0.01	21.5	260.9	None	53.0	562.6	None	128.1	634.0	None	
PIPE11547	A3	ZPIP12719	1.5	0	1	CIRCULAR	0.793	RCP	3.4	3.4	None	0.04	5.3	5.3	None	7.6	7.6	None	8.6	8.6	None	
PIPE11685	A3	ZPIP13027	1.5	0	1	CIRCULAR	0.025	RCP	0.0	0.0	None	0	0.0	0.4	None	0.3	1.1	None	0.5	1.4	None	
PIPE11790	A3	ZPIP10701	2.5	0	1	CIRCULAR	0.051	RCP	3.0	3.0	None	0.03	4.9	5.0	None	7.4	7.5	None	8.5	8.5	None	
PIPE11915	A3	ZPIP14828	1.5	0	1	CIRCULAR	0.109	RCP	3.7	0.1	None	0	0.4	0.0	None	14.6	3.8	None	11.1	3.3	Both Upstream and Downstream	
PIPE12077	A3	ZPIP15842	1.5	0	1	CIRCULAR	0.048	HDPE	0.9	0.9	None	0.04	1.3	1.3	None	11.6	1.9	None	9.2	2.2	None	
PIPE12130	A3	ZPIP17639	2.5	0	1	CIRCULAR	0.056	RCP	3.0	3.0	None	0.03	4.9	5.0	None	7.4	7.5	None	8.5	8.5	None	
CHAN10275	A3		0	0	1	IRREGULAR	0.012	Concrete	5.8	6.0	None	0.04	9.9	9.7	None	13.4	13.8	None	15.2	14.5	None	
PIPE11752	A3	ZPIP13187	1.5	0	1	CIRCULAR	0.079	RCP	0.7	0.7	None	0.03	1.3	1.3	None	2.0	2.0	None	2.3	2.3	None	
PIPE12027	A3	ZPIP15430	1.5	0	1	CIRCULAR	0.005	RCP	0.4	0.3	None	0.04	0.7	0.4	None	1.1	0.6	None	1.3	0.6	None	
PIPE12153	A3	ZPIP16526	3.75	2.417	1	VERT_ELLIPSE	0.005	RCP	0.8	1.7	None	0.03	2.1	3.0	None	3.6	3.5	None	3.5	3.7	Downstream	
CULV10166	A3	ZCUL070C	2	6	3	RECT_CLOSED	0.004	RCP	7.3	5.6	None	0.03	12.0	12.3	None	19.8	20.3	None	18.4	18.7	None	
CHAN10220	A3	CH045C	0	0	1	IRREGULAR	0.020	Earthen	32.7	30.9	None	0.06	60.3	39.9	None	93.3	43.4	None	103.8	43.1	None	
CHAN10272	A3		0	0	1	IRREGULAR	0.032	Concrete	7.1	7.1	None	0.03	11.2	11.2	None	16.3	16.4	None	18.4	18.6	None	
PIPE11848	A3	ZPIP11033	3	0	1	CIRCULAR	0.013	RCP	1.8	1.9	None	0.03	3.2	3.1	None	3.8	4.5	None	4.6	5.1	None	
PIPE12196	A3	PIP10967	1.5	0	1	CIRCULAR	0.003	PVC	0.2	0.1	None	0.01	0.5	0.2	None	0.5	0.5	None	0.5	0.4	None	
PIPE12303	A3	ZPIP15926	5.5	0	1	CIRCULAR	0.002	RCP	3.2	3.2	None	0.02	5.3	5.3	None	8.1	8.1	None	9.3	9.3	None	
PIPE12309	A3	ZPIP14606	3	0	1	CIRCULAR	0.029	RCP	0.0	0.0	None	0	0.3	0.0	None	25.5	1.5	None	180.2	7.6	None	
DTCH10277	A3	CH063A	0	0	1	IRREGULAR	0.013	Earthen	490.1	139.3	None	0.02	706.4	252.4	Upstream	1400.5	498.5	Both Upstream and Downstream	1700.0	506.2	Both Upstream and Downstream	
PIPE11694	A3	ZPIP13067	1.5	0	1	CIRCULAR	0.017	RCP	0.2	0.1	None	0	0.4	0.1	None	0.4	0.8	None	0.5	0.8	None	
PIPE11881	A3	ZPIP14534	1.5	0	1	CIRCULAR	0.010	RCP	0.0	0.0	None	0	0.0	0.0	None	10.2	0.5	None	4.8	0.6	None	

ATTACHMENT 6
MODIFIED RATIONAL METHOD RUNOFF CALCULATIONS

Steps Taken To Analyze This Condition

The Rational Method Runoff Calculations are followed here. The software that we are using is the "Rational Hydrology Method, San Diego County (2003 Manual)" module of the CIVILCADD/CIVILDESIGN Engineering Software, Version 9.1.

Please see the subsequent pages for the calculations. These calculations are for the Q100. The results are outlined/summarized in Section 6.

6a. CivilD Pre-Development Q100 Calculations

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        San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 05/03/22
--------------------------------------------------------------------------
21088-pre-onsite
user defined initial area


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 6332

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.200
24 hour precipitation(inches) =  5.500
P6/P24 =    58.2%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      104.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
____________________________________________________________________________
User specified 'C' value of 0.790 given for subarea
Rainfall intensity (I) =      1.960(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  48.00 min.  Rain intensity =       1.96(In/Hr)
Total area =      155.500(Ac.)  Total runoff =   240.800(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________________
Depth of flow =   1.312(Ft.), Average velocity =   4.006(Ft/s)
!!Warning: Water is above left or right bank elevations
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.12
    2             75.00              0.00
    3             89.00              3.21
    4            105.20              4.76
Manning's 'N' friction factor =   0.040
------------------------------------------------------------------
Sub-Channel flow  =    240.801(CFS)
  '     '    flow top width =     80.720(Ft.)
  '     '    velocity=    4.006(Ft/s)
  '     '    area =     60.116(Sq.Ft)
  '     '    Froude number =     0.818

Upstream point elevation =   528.920(Ft.)
Downstream point elevation =   519.320(Ft.)
Flow length =   556.000(Ft.)
Travel time  =    2.31 min.
```

```
Time of concentration =   50.31 min.
Depth of flow =   1.312(Ft.)
Average velocity =   4.006(Ft/s)
Total irregular channel flow =   240.800(CFS)
Irregular channel normal depth above invert elev. =   1.312(Ft.)
Average velocity of channel(s) =   4.006(Ft/s)
!!Warning: Water is above left or right bank elevations


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      105.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    155.500(Ac.)
Runoff from this stream =    240.800(CFS)
Time of concentration =   50.31 min.
Rainfall intensity =     1.902(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      701.000 to Point/Station      105.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------------
User specified 'C' value of 0.640 given for subarea
Rainfall intensity (I) =      8.431(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =   5.00 min.  Rain intensity =       8.43(In/Hr)
Total area =        2.141(Ac.)  Total runoff =    11.550(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      105.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.141(Ac.)
Runoff from this stream =     11.550(CFS)
Time of concentration =    5.00 min.
Rainfall intensity =     8.431(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      240.800     50.31             1.902
2       11.550      5.00             8.431
Qmax(1) =
       1.000 *    1.000 *   240.800) +
       0.226 *    1.000 *    11.550) + =     243.405
Qmax(2) =
       1.000 *    0.099 *   240.800) +
       1.000 *    1.000 *    11.550) + =      35.480

Total of 2 streams to confluence:
Flow rates before confluence point:
     240.800      11.550
Maximum flow rates at confluence using above data:
      243.405       35.480
Area of streams before confluence:
      155.500        2.141
Results of confluence:
Total flow rate =    243.405(CFS)
Time of concentration =    50.313 min.
Effective stream area after confluence =    157.641(Ac.)


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Process from Point/Station      105.000 to Point/Station      106.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

------------------------------------------------------------------------
Depth of flow =   1.397(Ft.), Average velocity =   4.587(Ft/s)
    ******* Irregular Channel Data **********
-------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.50
    2             75.00              0.00
    3             89.00              3.21
    4            105.20              4.76
Manning's 'N' friction factor =   0.040
-------------------------------------------------------------------
Sub-Channel flow  =    243.405(CFS)
  '     '    flow top width =     75.954(Ft.)
  '     '    velocity=    4.587(Ft/s)
  '     '    area =     53.062(Sq.Ft)
  '     '    Froude number =     0.967

Upstream point elevation =   528.300(Ft.)
Downstream point elevation =   519.320(Ft.)
Flow length =   364.000(Ft.)
Travel time  =    1.32 min.
Time of concentration =   51.64 min.
Depth of flow =   1.397(Ft.)
Average velocity =   4.587(Ft/s)
Total irregular channel flow =   243.405(CFS)
Irregular channel normal depth above invert elev. =   1.397(Ft.)
Average velocity of channel(s) =   4.587(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      106.000
**** CONFLUENCE OF MINOR STREAMS ****

------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    157.641(Ac.)
Runoff from this stream =    243.405(CFS)
Time of concentration =   51.64 min.
Rainfall intensity =     1.870(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      302.000
**** INITIAL AREA EVALUATION ****

------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =   50.000(Ft.)
Highest elevation =  530.380(Ft.)
Lowest elevation =  528.790(Ft.)
Elevation difference =    1.590(Ft.) Slope =  3.180 %
Top of Initial Area Slope adjusted by User to  0.032 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of   0.03 %, in a development type of
 Permanent Open Space
In Accordance With Table 3-2
Initial Area Time of Concentration =  13.20 minutes
 (for slope value of   0.50 %)
Rainfall intensity (I) =      4.508(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
```

```
Subarea runoff =      0.131(CFS)
Total initial stream area =        0.083(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      106.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
----------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      1.680(CFS)
Depth of flow =   0.179(Ft.), Average velocity =   1.483(Ft/s)
    ******* Irregular Channel Data **********
----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2             43.00              0.00
    3             71.00              1.00
Manning's 'N' friction factor =   0.030
----------------------------------------------------------------
Sub-Channel flow  =      1.680(CFS)
  '     '    flow top width =     12.687(Ft.)
  '     '    velocity=    1.483(Ft/s)
  '     '    area =      1.134(Sq.Ft)
  '     '    Froude number =     0.874

Upstream point elevation =   528.790(Ft.)
Downstream point elevation =   519.320(Ft.)
Flow length =   422.000(Ft.)
Travel time  =    4.74 min.
Time of concentration =   17.94 min.
Depth of flow =   0.179(Ft.)
Average velocity =   1.483(Ft/s)
Total irregular channel flow =     1.680(CFS)
Irregular channel normal depth above invert elev. =   0.179(Ft.)
Average velocity of channel(s) =   1.483(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      3.698(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      3.698(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      0.848
Subarea runoff =      3.006(CFS) for      2.341(Ac.)
Total runoff =      3.137(CFS)  Total area =       2.424(Ac.)
Depth of flow =   0.226(Ft.), Average velocity =   1.733(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      106.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.424(Ac.)
Runoff from this stream =      3.137(CFS)
Time of concentration =   17.94 min.
Rainfall intensity =     3.698(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      501.000 to Point/Station      106.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
----------------------------------------------------------------------
User specified 'C' value of 0.670 given for subarea
```

```
Rainfall intensity (I) =      5.052(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  11.06 min.  Rain intensity =       5.05(In/Hr)
Total area =        8.629(Ac.)  Total runoff =    29.200(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      106.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      5.052(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =    11.06 min.
Rainfall intensity =      5.052(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.669  CA =      5.795
Subarea runoff =       0.079(CFS) for      0.039(Ac.)
Total runoff =     29.279(CFS)  Total area =       8.668(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      106.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      8.668(Ac.)
Runoff from this stream =     29.279(CFS)
Time of concentration =   11.06 min.
Rainfall intensity =     5.052(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      243.405     51.64             1.870
2        3.137     17.94             3.698
3       29.279     11.06             5.052
Qmax(1) =
       1.000 *    1.000 *   243.405) +
       0.506 *    1.000 *     3.137) +
       0.370 *    1.000 *    29.279) + =     255.829
Qmax(2) =
       1.000 *    0.348 *   243.405) +
       1.000 *    1.000 *     3.137) +
       0.732 *    1.000 *    29.279) + =     109.152
Qmax(3) =
       1.000 *    0.214 *   243.405) +
       1.000 *    0.616 *     3.137) +
       1.000 *    1.000 *    29.279) + =      83.348

Total of 3 streams to confluence:
Flow rates before confluence point:
     243.405       3.137      29.279
Maximum flow rates at confluence using above data:
      255.829      109.152       83.348
Area of streams before confluence:
      157.641        2.424        8.668
Results of confluence:
Total flow rate =    255.829(CFS)
Time of concentration =    51.636 min.
Effective stream area after confluence =    168.733(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   519.320(Ft.)
Downstream point/station elevation =   518.410(Ft.)
Pipe length  =    92.00(Ft.) Slope =   0.0099  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   255.829(CFS)
Given pipe size =     66.00(In.)
Calculated individual pipe flow  =   255.829(CFS)
Normal flow depth in pipe =   43.31(In.)
Flow top width inside pipe =   62.69(In.)
Critical Depth =   53.47(In.)
Pipe flow velocity =     15.49(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    51.73 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    168.733(Ac.)
Runoff from this stream =    255.829(CFS)
Time of concentration =   51.73 min.
Rainfall intensity =     1.868(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station      602.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(14.5 DU/A or Less      )
Impervious value, Ai = 0.500
Sub-Area C Value = 0.630
Initial subarea total flow distance  =  107.000(Ft.)
Highest elevation =  532.000(Ft.)
Lowest elevation =  526.000(Ft.)
Elevation difference =    6.000(Ft.) Slope =  5.607 %
Top of Initial Area Slope adjusted by User to  3.510 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 90.00 (Ft)
for the top area slope value of   3.51 %, in a development type of
 14.5 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   5.28 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.6300)*(  90.000^.5)/(   3.510^(1/3)]=   5.28
Rainfall intensity (I) =      8.139(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.630
Subarea runoff =      0.482(CFS)
Total initial stream area =        0.094(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      602.000 to Point/Station      603.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      3.357(CFS)
Depth of flow =   0.392(Ft.), Average velocity =   1.588(Ft/s)
    ******* Irregular Channel Data ***********
```

```
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              0.60
    2             20.00              0.13
    3             22.00              0.00
    4             22.00              0.50
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
Sub-Channel flow  =      3.357(CFS)
  '     '    flow top width =     13.146(Ft.)
  '     '    velocity=    1.588(Ft/s)
  '     '    area =      2.114(Sq.Ft)
  '     '    Froude number =     0.698

Upstream point elevation =   528.490(Ft.)
Downstream point elevation =   525.660(Ft.)
Flow length =   925.000(Ft.)
Travel time  =    9.71 min.
Time of concentration =   14.99 min.
Depth of flow =   0.392(Ft.)
Average velocity =   1.588(Ft/s)
Total irregular channel flow =     3.357(CFS)
Irregular channel normal depth above invert elev. =   0.392(Ft.)
Average velocity of channel(s) =   1.588(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.153(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[HIGH DENSITY RESIDENTIAL                    ]
(43.0 DU/A or Less      )
Impervious value, Ai = 0.800
Sub-Area C Value = 0.790
Rainfall intensity =      4.153(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.782  CA =      1.480
Subarea runoff =      5.666(CFS) for      1.799(Ac.)
Total runoff =      6.148(CFS)  Total area =       1.893(Ac.)
Depth of flow =   0.474(Ft.), Average velocity =   1.842(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

------------------------------------------------------------------------
Upstream point/station elevation =   521.420(Ft.)
Downstream point/station elevation =   520.730(Ft.)
Pipe length  =    69.00(Ft.) Slope =   0.0100  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.148(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     6.148(CFS)
Normal flow depth in pipe =    9.89(In.)
Flow top width inside pipe =   17.91(In.)
Critical Depth =   11.49(In.)
Pipe flow velocity =      6.18(Ft/s)
Travel time through pipe =    0.19 min.
Time of concentration (TC) =    15.17 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      107.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

------------------------------------------------------------------------
Upstream point/station elevation =   520.730(Ft.)
Downstream point/station elevation =   518.410(Ft.)
Pipe length  =   204.00(Ft.) Slope =   0.0114  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.148(CFS)
```

```
Given pipe size =     27.00(In.)
Calculated individual pipe flow  =     6.148(CFS)
Normal flow depth in pipe =    7.89(In.)
Flow top width inside pipe =   24.56(In.)
Critical Depth =   10.15(In.)
Pipe flow velocity =      6.36(Ft/s)
Travel time through pipe =    0.53 min.
Time of concentration (TC) =    15.71 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.893(Ac.)
Runoff from this stream =      6.148(CFS)
Time of concentration =   15.71 min.
Rainfall intensity =     4.029(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      255.829     51.73             1.868
2        6.148     15.71             4.029
Qmax(1) =
       1.000 *    1.000 *   255.829) +
       0.464 *    1.000 *     6.148) + =     258.679
Qmax(2) =
       1.000 *    0.304 *   255.829) +
       1.000 *    1.000 *     6.148) + =      83.831

Total of 2 streams to confluence:
Flow rates before confluence point:
     255.829       6.148
Maximum flow rates at confluence using above data:
      258.679       83.831
Area of streams before confluence:
      168.733        1.893
Results of confluence:
Total flow rate =    258.679(CFS)
Time of concentration =    51.735 min.
Effective stream area after confluence =    170.626(Ac.)
End of computations, total study area =         170.626 (Ac.)
```

6b. CivilD Post-Development Q100 Calculations

```
            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 05/03/22
--------------------------------------------------------------------------
21088-post-onsite



--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 6332

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.200
24 hour precipitation(inches) =  5.500
P6/P24 =    58.2%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      302.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                         ]
(General Industrial       )
Impervious value, Ai = 0.950
Sub-Area C Value = 0.870
Initial subarea total flow distance  =   67.000(Ft.)
Highest elevation =  532.210(Ft.)
Lowest elevation =  531.880(Ft.)
Elevation difference =    0.330(Ft.) Slope =  0.493 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of   0.49 %, in a development type of
 General Industrial
In Accordance With Figure 3-3
Initial Area Time of Concentration =   3.71 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8700)*(  50.000^.5)/(   0.493^(1/3)]=   3.71
Calculated TC of    3.706 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      8.431(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.870
Subarea runoff =      0.800(CFS)
Total initial stream area =        0.109(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      5.210(CFS)
```

```
Depth of flow =   0.398(Ft.), Average velocity =   2.106(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.30
    2             59.00              0.13
    3             61.00              0.00
    4             61.00              0.50
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
Sub-Channel flow  =      5.210(CFS)
  '     '    flow top width =     15.505(Ft.)
  '     '    velocity=    2.106(Ft/s)
  '     '    area =      2.474(Sq.Ft)
  '     '    Froude number =     0.929

Upstream point elevation =   531.880(Ft.)
Downstream point elevation =   528.870(Ft.)
Flow length =   557.000(Ft.)
Travel time  =    4.41 min.
Time of concentration =    8.11 min.
Depth of flow =   0.398(Ft.)
Average velocity =   2.106(Ft/s)
Total irregular channel flow =     5.210(CFS)
Irregular channel normal depth above invert elev. =   0.398(Ft.)
Average velocity of channel(s) =   2.106(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      6.170(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
(Limited Industrial       )
Impervious value, Ai = 0.900
Sub-Area C Value = 0.850
Rainfall intensity =      6.170(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.851  CA =      1.546
Subarea runoff =      8.738(CFS) for      1.707(Ac.)
Total runoff =      9.537(CFS)  Total area =      1.816(Ac.)
Depth of flow =   0.479(Ft.), Average velocity =   2.443(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      303.000 to Point/Station      304.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   523.870(Ft.)
Downstream point/station elevation =   521.740(Ft.)
Pipe length  =    96.00(Ft.) Slope =   0.0222  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.537(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     9.537(CFS)
Normal flow depth in pipe =   10.15(In.)
Flow top width inside pipe =   17.85(In.)
Critical Depth =   14.30(In.)
Pipe flow velocity =      9.29(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =     8.29 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      304.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.816(Ac.)
```

```
Runoff from this stream =      9.537(CFS)
Time of concentration =    8.29 min.
Rainfall intensity =     6.087(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** INITIAL AREA EVALUATION ****

------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
(General Industrial       )
Impervious value, Ai = 0.950
Sub-Area C Value = 0.870
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  532.210(Ft.)
Lowest elevation =  531.710(Ft.)
Elevation difference =    0.500(Ft.) Slope =  0.500 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of   0.50 %, in a development type of
 General Industrial
In Accordance With Figure 3-3
Initial Area Time of Concentration =   3.69 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8700)*(  50.000^.5)/(   0.500^(1/3)]=   3.69
Calculated TC of    3.688 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      8.431(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.870
Subarea runoff =      0.756(CFS)
Total initial stream area =        0.103(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      1.915(CFS)
Depth of flow =   0.163(Ft.), Average velocity =   2.704(Ft/s)
    ******* Irregular Channel Data ***********
-------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2             20.00              0.00
    3             53.00              1.00
Manning's 'N' friction factor =   0.015
-------------------------------------------------------------------
Sub-Channel flow  =      1.915(CFS)
  '     '    flow top width =      8.664(Ft.)
  '     '    velocity=    2.704(Ft/s)
  '     '    area =      0.708(Sq.Ft)
  '     '    Froude number =     1.667

Upstream point elevation =   531.710(Ft.)
Downstream point elevation =   527.170(Ft.)
Flow length =   216.000(Ft.)
Travel time  =    1.33 min.
Time of concentration =    5.02 min.
Depth of flow =   0.163(Ft.)
Average velocity =   2.704(Ft/s)
Total irregular channel flow =     1.915(CFS)
Irregular channel normal depth above invert elev. =   0.163(Ft.)
Average velocity of channel(s) =   2.704(Ft/s)
 Adding area flow to channel
```

```
Rainfall intensity (I) =      8.410(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[HIGH DENSITY RESIDENTIAL                    ]
(43.0 DU/A or Less      )
Impervious value, Ai = 0.800
Sub-Area C Value = 0.790
Rainfall intensity =      8.410(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.809  CA =      0.358
Subarea runoff =      2.257(CFS) for      0.340(Ac.)
Total runoff =      3.012(CFS)  Total area =      0.443(Ac.)
Depth of flow =   0.194(Ft.), Average velocity =   3.028(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      403.000 to Point/Station      304.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   523.870(Ft.)
Downstream point/station elevation =   521.740(Ft.)
Pipe length  =    96.00(Ft.) Slope =   0.0222  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.012(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     3.012(CFS)
Normal flow depth in pipe =    5.36(In.)
Flow top width inside pipe =   16.46(In.)
Critical Depth =    7.92(In.)
Pipe flow velocity =      6.84(Ft/s)
Travel time through pipe =    0.23 min.
Time of concentration (TC) =     5.25 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      304.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.443(Ac.)
Runoff from this stream =      3.012(CFS)
Time of concentration =    5.25 min.
Rainfall intensity =     8.166(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1         9.537      8.29             6.087
2         3.012      5.25             8.166
Qmax(1) =
       1.000 *    1.000 *     9.537) +
       0.745 *    1.000 *     3.012) + =      11.783
Qmax(2) =
       1.000 *    0.634 *     9.537) +
       1.000 *    1.000 *     3.012) + =       9.059

Total of 2 streams to confluence:
Flow rates before confluence point:
       9.537       3.012
Maximum flow rates at confluence using above data:
       11.783        9.059
Area of streams before confluence:
        1.816        0.443
Results of confluence:
Total flow rate =     11.783(CFS)
Time of concentration =     8.286 min.
```

Effective stream area after confluence = 2.259(Ac.)

++
Process from Point/Station 304.000 to Point/Station 304.000
**** 6 HOUR HYDROGRAPH ****

++
Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003

Time of Concentration = 8.29
Basin Area = 2.26 Acres
6 Hour Rainfall = 3.200 Inches
Runoff Coefficient = 0.843
Peak Discharge = 11.78 CFS

Time (Min)	Discharge (CFS)
0	0.000
8	0.364
16	0.369
24	0.381
32	0.387
40	0.399
48	0.406
56	0.421
64	0.429
72	0.446
80	0.455
88	0.474
96	0.485
104	0.508
112	0.521
120	0.549
128	0.565
136	0.600
144	0.620
152	0.664
160	0.690
168	0.750
176	0.786
184	0.871
192	0.924
200	1.059
208	1.148
216	1.404
224	1.599
232	2.347
240	3.307
248	11.783
256	1.883
264	1.260
272	0.986
280	0.826
288	0.719
296	0.641
304	0.582
312	0.535
320	0.496
328	0.464
336	0.437
344	0.413
352	0.393
360	0.375
368	0.359

++
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 1 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.9	5.9	8.8	11.8
0+ 0	0.0000	0.00	Q	|	|	|	|
0+ 1	0.0001	0.05	Q	|	|	|	|
0+ 2	0.0002	0.09	Q	|	|	|	|
0+ 3	0.0004	0.14	Q	|	|	|	|
0+ 4	0.0006	0.18	Q	|	|	|	|
0+ 5	0.0009	0.23	Q	|	|	|	|
0+ 6	0.0013	0.27	Q	|	|	|	|
0+ 7	0.0018	0.32	VQ	|	|	|	|
0+ 8	0.0023	0.36	VQ	|	|	|	|
0+ 9	0.0028	0.36	VQ	|	|	|	|
0+10	0.0033	0.37	VQ	|	|	|	|
0+11	0.0038	0.37	VQ	|	|	|	|
0+12	0.0043	0.37	VQ	|	|	|	|
0+13	0.0048	0.37	VQ	|	|	|	|
0+14	0.0053	0.37	VQ	|	|	|	|
0+15	0.0058	0.37	VQ	|	|	|	|
0+16	0.0063	0.37	VQ	|	|	|	|
0+17	0.0068	0.37	VQ	|	|	|	|
0+18	0.0073	0.37	VQ	|	|	|	|
0+19	0.0078	0.37	VQ	|	|	|	|
0+20	0.0084	0.37	VQ	|	|	|	|
0+21	0.0089	0.38	VQ	|	|	|	|
0+22	0.0094	0.38	VQ	|	|	|	|
0+23	0.0099	0.38	VQ	|	|	|	|
0+24	0.0104	0.38	VQ	|	|	|	|
0+25	0.0110	0.38	VQ	|	|	|	|
0+26	0.0115	0.38	VQ	|	|	|	|
0+27	0.0120	0.38	VQ	|	|	|	|
0+28	0.0125	0.38	VQ	|	|	|	|
0+29	0.0131	0.38	|Q	|	|	|	|
0+30	0.0136	0.39	|Q	|	|	|	|
0+31	0.0141	0.39	|Q	|	|	|	|
0+32	0.0147	0.39	|Q	|	|	|	|
0+33	0.0152	0.39	|Q	|	|	|	|
0+34	0.0157	0.39	|Q	|	|	|	|
0+35	0.0163	0.39	|Q	|	|	|	|
0+36	0.0168	0.39	|Q	|	|	|	|
0+37	0.0174	0.39	|Q	|	|	|	|
0+38	0.0179	0.40	|Q	|	|	|	|
0+39	0.0185	0.40	|Q	|	|	|	|
0+40	0.0190	0.40	|Q	|	|	|	|
0+41	0.0196	0.40	|Q	|	|	|	|
0+42	0.0201	0.40	|Q	|	|	|	|
0+43	0.0207	0.40	|Q	|	|	|	|
0+44	0.0212	0.40	|Q	|	|	|	|
0+45	0.0218	0.40	|Q	|	|	|	|
0+46	0.0223	0.40	|Q	|	|	|	|
0+47	0.0229	0.41	|Q	|	|	|	|
0+48	0.0235	0.41	|Q	|	|	|	|
0+49	0.0240	0.41	|Q	|	|	|	|
0+50	0.0246	0.41	|Q	|	|	|	|
0+51	0.0251	0.41	|Q	|	|	|	|
0+52	0.0257	0.41	|QV	|	|	|	|
0+53	0.0263	0.42	|QV	|	|	|	|
0+54	0.0269	0.42	|QV	|	|	|	|
0+55	0.0274	0.42	|QV	|	|	|	|
0+56	0.0280	0.42	|QV	|	|	|	|
0+57	0.0286	0.42	|QV	|	|	|	|
0+58	0.0292	0.42	|QV	|	|	|	|
0+59	0.0298	0.42	|QV	|	|	|	|
1+ 0	0.0304	0.42	|QV	|	|	|	|
1+ 1	0.0309	0.43	|QV	|	|	|	|
1+ 2	0.0315	0.43	|QV	|	|	|	|
1+ 3	0.0321	0.43	|QV	|	|	|	|
1+ 4	0.0327	0.43	|QV	|	|	|	|

415	1+ 5	0.0333	0.43	|QV	|	|	|
416	1+ 6	0.0339	0.43	|QV	|	|	|
417	1+ 7	0.0345	0.44	|QV	|	|	|
418	1+ 8	0.0351	0.44	|QV	|	|	|
419	1+ 9	0.0357	0.44	|QV	|	|	|
420	1+10	0.0363	0.44	|QV	|	|	|
421	1+11	0.0369	0.44	|QV	|	|	|
422	1+12	0.0375	0.45	|QV	|	|	|
423	1+13	0.0382	0.45	|Q V	|	|	|
424	1+14	0.0388	0.45	|Q V	|	|	|
425	1+15	0.0394	0.45	|Q V	|	|	|
426	1+16	0.0400	0.45	|Q V	|	|	|
427	1+17	0.0406	0.45	|Q V	|	|	|
428	1+18	0.0413	0.45	|Q V	|	|	|
429	1+19	0.0419	0.45	|Q V	|	|	|
430	1+20	0.0425	0.45	|Q V	|	|	|
431	1+21	0.0431	0.46	|Q V	|	|	|
432	1+22	0.0438	0.46	|Q V	|	|	|
433	1+23	0.0444	0.46	|Q V	|	|	|
434	1+24	0.0450	0.46	|Q V	|	|	|
435	1+25	0.0457	0.47	|Q V	|	|	|
436	1+26	0.0463	0.47	|Q V	|	|	|
437	1+27	0.0470	0.47	|Q V	|	|	|
438	1+28	0.0476	0.47	|Q V	|	|	|
439	1+29	0.0483	0.48	|Q V	|	|	|
440	1+30	0.0490	0.48	|Q V	|	|	|
441	1+31	0.0496	0.48	|Q V	|	|	|
442	1+32	0.0503	0.48	|Q V	|	|	|
443	1+33	0.0509	0.48	|Q V	|	|	|
444	1+34	0.0516	0.48	|Q V	|	|	|
445	1+35	0.0523	0.48	|Q V	|	|	|
446	1+36	0.0529	0.49	|Q V	|	|	|
447	1+37	0.0536	0.49	|Q V	|	|	|
448	1+38	0.0543	0.49	|Q V	|	|	|
449	1+39	0.0550	0.49	|Q V	|	|	|
450	1+40	0.0556	0.50	|Q V	|	|	|
451	1+41	0.0563	0.50	|Q V	|	|	|
452	1+42	0.0570	0.50	|Q V	|	|	|
453	1+43	0.0577	0.51	|Q V	|	|	|
454	1+44	0.0584	0.51	|Q V	|	|	|
455	1+45	0.0591	0.51	|Q V	|	|	|
456	1+46	0.0598	0.51	|Q V	|	|	|
457	1+47	0.0605	0.51	|Q V	|	|	|
458	1+48	0.0612	0.51	|Q V	|	|	|
459	1+49	0.0620	0.52	|Q V	|	|	|
460	1+50	0.0627	0.52	|Q V	|	|	|
461	1+51	0.0634	0.52	|Q V	|	|	|
462	1+52	0.0641	0.52	|Q V	|	|	|
463	1+53	0.0648	0.52	|Q V	|	|	|
464	1+54	0.0656	0.53	|Q V	|	|	|
465	1+55	0.0663	0.53	|Q V	|	|	|
466	1+56	0.0670	0.54	|Q V	|	|	|
467	1+57	0.0678	0.54	|Q V	|	|	|
468	1+58	0.0685	0.54	|Q V	|	|	|
469	1+59	0.0693	0.55	|Q V	|	|	|
470	2+ 0	0.0700	0.55	|Q V	|	|	|
471	2+ 1	0.0708	0.55	|Q V	|	|	|
472	2+ 2	0.0715	0.55	|Q V	|	|	|
473	2+ 3	0.0723	0.56	|Q V	|	|	|
474	2+ 4	0.0731	0.56	|Q V	|	|	|
475	2+ 5	0.0738	0.56	|Q V	|	|	|
476	2+ 6	0.0746	0.56	|Q V	|	|	|
477	2+ 7	0.0754	0.56	|Q V	|	|	|
478	2+ 8	0.0762	0.56	|Q V	|	|	|
479	2+ 9	0.0770	0.57	|Q V	|	|	|
480	2+10	0.0777	0.57	|Q V	|	|	|
481	2+11	0.0785	0.58	|Q V	|	|	|
482	2+12	0.0793	0.58	|Q V	|	|	|
483	2+13	0.0801	0.59	|Q V	|	|	|

484	2+14	0.0810	0.59	| Q V |	|	|	|
485	2+15	0.0818	0.60	| Q V |	|	|	|
486	2+16	0.0826	0.60	| Q V |	|	|	|
487	2+17	0.0834	0.60	| Q V |	|	|	|
488	2+18	0.0843	0.60	| Q V |	|	|	|
489	2+19	0.0851	0.61	| Q V |	|	|	|
490	2+20	0.0859	0.61	| Q V |	|	|	|
491	2+21	0.0868	0.61	| Q V |	|	|	|
492	2+22	0.0876	0.61	| Q V |	|	|	|
493	2+23	0.0885	0.62	| Q V |	|	|	|
494	2+24	0.0893	0.62	| Q V |	|	|	|
495	2+25	0.0902	0.63	| Q V |	|	|	|
496	2+26	0.0911	0.63	| Q V |	|	|	|
497	2+27	0.0919	0.64	| Q V |	|	|	|
498	2+28	0.0928	0.64	| Q V |	|	|	|
499	2+29	0.0937	0.65	| Q V |	|	|	|
500	2+30	0.0946	0.65	| Q V |	|	|	|
501	2+31	0.0955	0.66	| Q V |	|	|	|
502	2+32	0.0964	0.66	| Q V |	|	|	|
503	2+33	0.0974	0.67	| Q V |	|	|	|
504	2+34	0.0983	0.67	| Q V |	|	|	|
505	2+35	0.0992	0.67	| Q V |	|	|	|
506	2+36	0.1002	0.68	| Q V |	|	|	|
507	2+37	0.1011	0.68	| Q V |	|	|	|
508	2+38	0.1020	0.68	| Q V |	|	|	|
509	2+39	0.1030	0.69	| Q V |	|	|	|
510	2+40	0.1039	0.69	| Q V |	|	|	|
511	2+41	0.1049	0.70	| Q V |	|	|	|
512	2+42	0.1059	0.71	| Q V |	|	|	|
513	2+43	0.1068	0.71	| Q V |	|	|	|
514	2+44	0.1078	0.72	| Q V |	|	|	|
515	2+45	0.1088	0.73	| Q V |	|	|	|
516	2+46	0.1098	0.74	| Q V |	|	|	|
517	2+47	0.1109	0.74	| Q V |	|	|	|
518	2+48	0.1119	0.75	| Q V |	|	|	|
519	2+49	0.1129	0.75	| Q V |	|	|	|
520	2+50	0.1140	0.76	| Q V|	|	|	|
521	2+51	0.1150	0.76	| Q V|	|	|	|
522	2+52	0.1161	0.77	| Q V|	|	|	|
523	2+53	0.1172	0.77	| Q V|	|	|	|
524	2+54	0.1182	0.78	| Q V|	|	|	|
525	2+55	0.1193	0.78	| Q V|	|	|	|
526	2+56	0.1204	0.79	| Q V|	|	|	|
527	2+57	0.1215	0.80	| Q V|	|	|	|
528	2+58	0.1226	0.81	| Q V|	|	|	|
529	2+59	0.1237	0.82	| Q V|	|	|	|
530	3+ 0	0.1249	0.83	| Q V|	|	|	|
531	3+ 1	0.1260	0.84	| Q V|	|	|	|
532	3+ 2	0.1272	0.85	| Q V	|	|	|
533	3+ 3	0.1284	0.86	| Q V	|	|	|
534	3+ 4	0.1296	0.87	| Q V	|	|	|
535	3+ 5	0.1308	0.88	| Q V	|	|	|
536	3+ 6	0.1320	0.88	| Q V	|	|	|
537	3+ 7	0.1332	0.89	| Q V	|	|	|
538	3+ 8	0.1345	0.90	| Q V	|	|	|
539	3+ 9	0.1357	0.90	| Q V	|	|	|
540	3+10	0.1370	0.91	| Q V	|	|	|
541	3+11	0.1382	0.92	| Q V	|	|	|
542	3+12	0.1395	0.92	| Q |V	|	|	|
543	3+13	0.1408	0.94	| Q |V	|	|	|
544	3+14	0.1421	0.96	| Q |V	|	|	|
545	3+15	0.1435	0.97	| Q |V	|	|	|
546	3+16	0.1448	0.99	| Q |V	|	|	|
547	3+17	0.1462	1.01	| Q |V	|	|	|
548	3+18	0.1476	1.03	| Q |V	|	|	|
549	3+19	0.1491	1.04	| Q |V	|	|	|
550	3+20	0.1505	1.06	| Q |V	|	|	|
551	3+21	0.1520	1.07	| Q | V	|	|	|
552	3+22	0.1535	1.08	| Q | V	|	|	|

553	3+23	0.1550	1.09	Q	V			
554	3+24	0.1565	1.10	Q	V			
555	3+25	0.1580	1.11	Q	V			
556	3+26	0.1596	1.13	Q	V			
557	3+27	0.1612	1.14	Q	V			
558	3+28	0.1627	1.15	Q	V			
559	3+29	0.1644	1.18	Q	V			
560	3+30	0.1660	1.21	Q	V			
561	3+31	0.1678	1.24	Q	V			
562	3+32	0.1695	1.28	Q	V			
563	3+33	0.1713	1.31	Q	V			
564	3+34	0.1732	1.34	Q	V			
565	3+35	0.1750	1.37	Q	V			
566	3+36	0.1770	1.40	Q	V			
567	3+37	0.1789	1.43	Q	V			
568	3+38	0.1809	1.45	Q	V			
569	3+39	0.1830	1.48	Q	V			
570	3+40	0.1850	1.50	Q	V			
571	3+41	0.1872	1.53	Q	V			
572	3+42	0.1893	1.55	Q	V			
573	3+43	0.1915	1.57	Q	V			
574	3+44	0.1937	1.60	Q	V			
575	3+45	0.1960	1.69	Q	V			
576	3+46	0.1984	1.79	Q	V			
577	3+47	0.2010	1.88	Q	V			
578	3+48	0.2038	1.97	Q	V			
579	3+49	0.2066	2.07	Q	V			
580	3+50	0.2096	2.16	Q	V			
581	3+51	0.2127	2.25	Q	V			
582	3+52	0.2159	2.35	Q	V			
583	3+53	0.2193	2.47	Q	V			
584	3+54	0.2229	2.59	Q	V			
585	3+55	0.2266	2.71	Q	V			
586	3+56	0.2305	2.83	Q	V			
587	3+57	0.2346	2.95	Q	V			
588	3+58	0.2388	3.07	Q	V			
589	3+59	0.2432	3.19	Q	V			
590	4+ 0	0.2477	3.31	Q	V			
591	4+ 1	0.2537	4.37	Q	V			
592	4+ 2	0.2612	5.43	Q	V			
593	4+ 3	0.2702	6.49	VQ				
594	4+ 4	0.2805	7.54	V	Q			
595	4+ 5	0.2924	8.60	V	Q			
596	4+ 6	0.3057	9.66	V	Q			
597	4+ 7	0.3205	10.72	V	Q			
598	4+ 8	0.3367	11.78	V	Q			
599	4+ 9	0.3512	10.55	V	Q			
600	4+10	0.3641	9.31	V	Q			
601	4+11	0.3752	8.07	Q	V			
602	4+12	0.3846	6.83	Q	V			
603	4+13	0.3923	5.60	Q	V			
604	4+14	0.3983	4.36	Q	V			
605	4+15	0.4026	3.12	Q	V			
606	4+16	0.4052	1.88	Q	V			
607	4+17	0.4077	1.80	Q	V			
608	4+18	0.4100	1.73	Q	V			
609	4+19	0.4123	1.65	Q	V			
610	4+20	0.4145	1.57	Q	V			
611	4+21	0.4165	1.49	Q	V			
612	4+22	0.4185	1.42	Q	V			
613	4+23	0.4203	1.34	Q	V			
614	4+24	0.4221	1.26	Q	V			
615	4+25	0.4237	1.23	Q	V			
616	4+26	0.4254	1.19	Q	V			
617	4+27	0.4270	1.16	Q	V			
618	4+28	0.4285	1.12	Q	V			
619	4+29	0.4300	1.09	Q	V			
620	4+30	0.4315	1.05	Q	V			
621	4+31	0.4329	1.02	Q	V			

622	4+32	0.4342	0.99	| Q	|	|	| V	|
623	4+33	0.4356	0.97	| Q	|	|	| V	|
624	4+34	0.4369	0.95	| Q	|	|	| V	|
625	4+35	0.4382	0.93	| Q	|	|	| V	|
626	4+36	0.4394	0.91	| Q	|	|	| V	|
627	4+37	0.4406	0.89	| Q	|	|	| V	|
628	4+38	0.4418	0.87	| Q	|	|	| V	|
629	4+39	0.4430	0.85	| Q	|	|	| V	|
630	4+40	0.4441	0.83	| Q	|	|	| V	|
631	4+41	0.4452	0.81	| Q	|	|	| V	|
632	4+42	0.4463	0.80	| Q	|	|	| V	|
633	4+43	0.4474	0.79	| Q	|	|	| V	|
634	4+44	0.4485	0.77	| Q	|	|	| V	|
635	4+45	0.4495	0.76	| Q	|	|	| V	|
636	4+46	0.4505	0.75	| Q	|	|	| V	|
637	4+47	0.4516	0.73	| Q	|	|	| V	|
638	4+48	0.4525	0.72	| Q	|	|	| V	|
639	4+49	0.4535	0.71	| Q	|	|	| V	|
640	4+50	0.4545	0.70	| Q	|	|	| V	|
641	4+51	0.4554	0.69	| Q	|	|	| V	|
642	4+52	0.4564	0.68	| Q	|	|	| V	|
643	4+53	0.4573	0.67	| Q	|	|	| V	|
644	4+54	0.4582	0.66	| Q	|	|	| V	|
645	4+55	0.4591	0.65	| Q	|	|	| V	|
646	4+56	0.4600	0.64	| Q	|	|	| V	|
647	4+57	0.4609	0.63	| Q	|	|	| V	|
648	4+58	0.4617	0.63	| Q	|	|	| V	|
649	4+59	0.4626	0.62	| Q	|	|	| V	|
650	5+ 0	0.4634	0.61	| Q	|	|	| V	|
651	5+ 1	0.4642	0.60	| Q	|	|	| V	|
652	5+ 2	0.4651	0.60	| Q	|	|	| V	|
653	5+ 3	0.4659	0.59	| Q	|	|	| V	|
654	5+ 4	0.4667	0.58	|Q	|	|	| V	|
655	5+ 5	0.4675	0.58	|Q	|	|	| V	|
656	5+ 6	0.4683	0.57	|Q	|	|	| V	|
657	5+ 7	0.4690	0.56	|Q	|	|	| V	|
658	5+ 8	0.4698	0.56	|Q	|	|	| V	|
659	5+ 9	0.4706	0.55	|Q	|	|	| V	|
660	5+10	0.4713	0.55	|Q	|	|	| V	|
661	5+11	0.4721	0.54	|Q	|	|	| V	|
662	5+12	0.4728	0.53	|Q	|	|	| V	|
663	5+13	0.4735	0.53	|Q	|	|	| V	|
664	5+14	0.4743	0.53	|Q	|	|	| V	|
665	5+15	0.4750	0.52	|Q	|	|	| V	|
666	5+16	0.4757	0.52	|Q	|	|	| V	|
667	5+17	0.4764	0.51	|Q	|	|	| V	|
668	5+18	0.4771	0.51	|Q	|	|	| V	|
669	5+19	0.4778	0.50	|Q	|	|	| V	|
670	5+20	0.4785	0.50	|Q	|	|	| V	|
671	5+21	0.4791	0.49	|Q	|	|	| V	|
672	5+22	0.4798	0.49	|Q	|	|	| V	|
673	5+23	0.4805	0.48	|Q	|	|	| V	|
674	5+24	0.4811	0.48	|Q	|	|	| V	|
675	5+25	0.4818	0.48	|Q	|	|	| V	|
676	5+26	0.4824	0.47	|Q	|	|	| V	|
677	5+27	0.4831	0.47	|Q	|	|	| V	|
678	5+28	0.4837	0.46	|Q	|	|	| V	|
679	5+29	0.4844	0.46	|Q	|	|	| V	|
680	5+30	0.4850	0.46	|Q	|	|	| V	|
681	5+31	0.4856	0.45	|Q	|	|	| V	|
682	5+32	0.4862	0.45	|Q	|	|	| V	|
683	5+33	0.4868	0.45	|Q	|	|	| V	|
684	5+34	0.4875	0.44	|Q	|	|	| V	|
685	5+35	0.4881	0.44	|Q	|	|	| V	|
686	5+36	0.4887	0.44	|Q	|	|	| V	|
687	5+37	0.4893	0.43	|Q	|	|	| V	|
688	5+38	0.4899	0.43	|Q	|	|	| V	|
689	5+39	0.4905	0.43	|Q	|	|	| V	|
690	5+40	0.4910	0.43	|Q	|	|	| V	|

```
     5+41       0.4916      0.42  |Q        |         |         |       V |
     5+42       0.4922      0.42  |Q        |         |         |       V |
     5+43       0.4928      0.42  |Q        |         |         |       V |
     5+44       0.4933      0.41  |Q        |         |         |       V |
     5+45       0.4939      0.41  |Q        |         |         |        V|
     5+46       0.4945      0.41  |Q        |         |         |        V|
     5+47       0.4950      0.41  |Q        |         |         |        V|
     5+48       0.4956      0.40  |Q        |         |         |        V|
     5+49       0.4961      0.40  |Q        |         |         |        V|
     5+50       0.4967      0.40  |Q        |         |         |        V|
     5+51       0.4972      0.40  |Q        |         |         |        V|
     5+52       0.4978      0.39  |Q        |         |         |        V|
     5+53       0.4983      0.39  |Q        |         |         |        V|
     5+54       0.4988      0.39  |Q        |         |         |        V|
     5+55       0.4994      0.39  |Q        |         |         |        V|
     5+56       0.4999      0.38  |Q        |         |         |        V|
     5+57       0.5004      0.38  |Q        |         |         |        V|
     5+58       0.5010      0.38  |Q        |         |         |        V|
     5+59       0.5015      0.38  |Q        |         |         |        V|
     6+ 0       0.5020      0.37  |Q        |         |         |        V|
     6+ 1       0.5025      0.37  |Q        |         |         |        V|
     6+ 2       0.5030      0.37  |Q        |         |         |        V|
     6+ 3       0.5035      0.37  |Q        |         |         |        V|
     6+ 4       0.5040      0.37  |Q        |         |         |        V|
     6+ 5       0.5045      0.36  |Q        |         |         |        V|
     6+ 6       0.5050      0.36  |Q        |         |         |        V|
     6+ 7       0.5055      0.36  |Q        |         |         |        V|
     6+ 8       0.5060      0.36  |Q        |         |         |         V
--------------------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      305.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   521.680(Ft.)
Downstream point/station elevation =   519.940(Ft.)
Pipe length  =    20.56(Ft.) Slope =   0.0846  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.783(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =    11.783(CFS)
Normal flow depth in pipe =    7.76(In.)
Flow top width inside pipe =   17.83(In.)
Critical Depth =   15.65(In.)
Pipe flow velocity =     16.17(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     8.31 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      305.000 to Point/Station      305.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      2.259(Ac.)
Runoff from this stream =     11.783(CFS)
Time of concentration =    8.31 min.
Rainfall intensity =     6.077(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      104.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
______________________________________________________________________
User specified 'C' value of 0.790 given for subarea
```

```
Rainfall intensity (I) =      1.960(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  48.00 min.  Rain intensity =       1.96(In/Hr)
Total area =      155.500(Ac.)  Total runoff =   240.800(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Depth of flow =   2.406(Ft.), Average velocity =   2.420(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              2.50
    2             75.00              0.00
    3             89.00              3.21
    4            105.20              4.76
Manning's 'N' friction factor =   0.040
------------------------------------------------------------------
Sub-Channel flow  =    240.800(CFS)
  '     '    flow top width =     82.688(Ft.)
  '     '    velocity=    2.420(Ft/s)
  '     '    area =     99.492(Sq.Ft)
  '     '    Froude number =     0.389

Upstream point elevation =   528.920(Ft.)
Downstream point elevation =   528.280(Ft.)
Flow length =   192.000(Ft.)
Travel time  =    1.32 min.
Time of concentration =   49.32 min.
Depth of flow =   2.406(Ft.)
Average velocity =   2.420(Ft/s)
Total irregular channel flow =   240.800(CFS)
Irregular channel normal depth above invert elev. =   2.406(Ft.)
Average velocity of channel(s) =   2.420(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      701.000 to Point/Station      105.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      1.926(In/Hr) for a   100.0 year storm
User specified 'C' value of 0.640 given for subarea
The area added to the existing stream causes a
a lower flow rate of Q =    239.269(CFS)
therefore the upstream flow rate of Q =    240.800(CFS) is being used
Time of concentration =    49.32 min.
Rainfall intensity =      1.926(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.788  CA =    124.215
Subarea runoff =      0.000(CFS) for      2.141(Ac.)
Total runoff =    240.800(CFS)  Total area =     157.641(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      801.000 to Point/Station      105.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      1.926(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
```

```
The area added to the existing stream causes a
a lower flow rate of Q =    239.304(CFS)
therefore the upstream flow rate of Q =    240.800(CFS) is being used
Time of concentration =    49.32 min.
Rainfall intensity =      1.926(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.788  CA =    124.233
Subarea runoff =      0.000(CFS) for      0.052(Ac.)
Total runoff =    240.800(CFS)  Total area =     157.693(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      305.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   528.270(Ft.)
Downstream point/station elevation =   519.940(Ft.)
Pipe length  =   332.00(Ft.) Slope =   0.0251  Manning's N = 0.013
No. of pipes = 2  Required pipe flow  =   240.800(CFS)
Given pipe size =     66.00(In.)
Calculated individual pipe flow  =   120.400(CFS)
Normal flow depth in pipe =   21.35(In.)
Flow top width inside pipe =   61.75(In.)
Critical Depth =   36.56(In.)
Pipe flow velocity =     18.10(Ft/s)
Travel time through pipe =    0.31 min.
Time of concentration (TC) =    49.63 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      305.000 to Point/Station      305.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =    157.693(Ac.)
Runoff from this stream =    240.800(CFS)
Time of concentration =   49.63 min.
Rainfall intensity =     1.919(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       11.783      8.31             6.077
2      240.800     49.63             1.919
Qmax(1) =
       1.000 *    1.000 *    11.783) +
       1.000 *    0.167 *   240.800) + =      52.090
Qmax(2) =
       0.316 *    1.000 *    11.783) +
       1.000 *    1.000 *   240.800) + =     244.520

Total of 2 streams to confluence:
Flow rates before confluence point:
      11.783     240.800
Maximum flow rates at confluence using above data:
       52.090      244.520
Area of streams before confluence:
        2.259      157.693
Results of confluence:
Total flow rate =    244.520(CFS)
Time of concentration =    49.628 min.
Effective stream area after confluence =    159.952(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      305.000 to Point/Station      306.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
```

```
898
899       Upstream point/station elevation =   519.940(Ft.)
900       Downstream point/station elevation =   519.320(Ft.)
901       Pipe length  =    84.00(Ft.) Slope =   0.0074  Manning's N = 0.013
902       No. of pipes = 2  Required pipe flow  =   244.520(CFS)
903       Given pipe size =     66.00(In.)
904       Calculated individual pipe flow  =   122.260(CFS)
905       Normal flow depth in pipe =   30.00(In.)
906       Flow top width inside pipe =   65.73(In.)
907       Critical Depth =   36.87(In.)
908       Pipe flow velocity =     11.64(Ft/s)
909       Travel time through pipe =    0.12 min.
910       Time of concentration (TC) =    49.75 min.
911
912
913       ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
914       Process from Point/Station      306.000 to Point/Station      306.000
915       **** CONFLUENCE OF MINOR STREAMS ****
916
917       Along Main Stream number: 1 in normal stream number 1
918       Stream flow area =    159.952(Ac.)
919       Runoff from this stream =    244.520(CFS)
920       Time of concentration =   49.75 min.
921       Rainfall intensity =     1.916(In/Hr)
922
923
924       ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
925       Process from Point/Station      501.000 to Point/Station      502.000
926       **** USER DEFINED FLOW INFORMATION AT A POINT ****
927
928       User specified 'C' value of 0.670 given for subarea
929       Rainfall intensity (I) =      5.052(In/Hr) for a   100.0 year storm
930       User specified values are as follows:
931       TC =  11.06 min.  Rain intensity =       5.05(In/Hr)
932       Total area =        8.629(Ac.)  Total runoff =    11.600(CFS)
933
934
935       ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
936       Process from Point/Station      503.000 to Point/Station      502.000
937       **** SUBAREA FLOW ADDITION ****
938
939       Rainfall intensity (I) =      5.052(In/Hr) for a   100.0 year storm
940       Decimal fraction soil group A = 0.000
941       Decimal fraction soil group B = 0.000
942       Decimal fraction soil group C = 0.000
943       Decimal fraction soil group D = 1.000
944       [INDUSTRIAL area type                        ]
945       (General Industrial       )
946       Impervious value, Ai = 0.950
947       Sub-Area C Value = 0.870
948       Time of concentration =    11.06 min.
949       Rainfall intensity =      5.052(In/Hr) for a   100.0 year storm
950       Effective runoff coefficient used for total area
951       (Q=KCIA) is C = 0.671  CA =      5.820
952       Subarea runoff =     17.804(CFS) for      0.044(Ac.)
953       Total runoff =     29.404(CFS)  Total area =       8.673(Ac.)
954
955
956       ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
957       Process from Point/Station      802.000 to Point/Station      502.000
958       **** SUBAREA FLOW ADDITION ****
959
960       Rainfall intensity (I) =      5.052(In/Hr) for a   100.0 year storm
961       Decimal fraction soil group A = 0.000
962       Decimal fraction soil group B = 0.000
963       Decimal fraction soil group C = 0.000
964       Decimal fraction soil group D = 1.000
965       [UNDISTURBED NATURAL TERRAIN                 ]
966       (Permanent Open Space   )
```

```
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =    11.06 min.
Rainfall intensity =      5.052(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.670  CA =      5.833
Subarea runoff =      0.065(CFS) for      0.037(Ac.)
Total runoff =     29.469(CFS)  Total area =       8.710(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      306.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   522.270(Ft.)
Downstream point/station elevation =   519.320(Ft.)
Pipe length  =    92.00(Ft.) Slope =   0.0321  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    29.469(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    29.469(CFS)
Normal flow depth in pipe =   13.22(In.)
Flow top width inside pipe =   29.79(In.)
Critical Depth =   22.20(In.)
Pipe flow velocity =     14.14(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    11.17 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      306.000 to Point/Station      306.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      8.710(Ac.)
Runoff from this stream =     29.469(CFS)
Time of concentration =   11.17 min.
Rainfall intensity =     5.021(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1      244.520     49.75             1.916
2       29.469     11.17             5.021
Qmax(1) =
       1.000 *    1.000 *   244.520) +
       0.382 *    1.000 *    29.469) + =     255.764
Qmax(2) =
       1.000 *    0.224 *   244.520) +
       1.000 *    1.000 *    29.469) + =      84.364

Total of 2 streams to confluence:
Flow rates before confluence point:
     244.520      29.469
Maximum flow rates at confluence using above data:
      255.764       84.364
Area of streams before confluence:
      159.952        8.710
Results of confluence:
Total flow rate =    255.764(CFS)
Time of concentration =    49.748 min.
Effective stream area after confluence =    168.662(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      306.000 to Point/Station      307.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
```

```
Upstream point/station elevation =   519.320(Ft.)
Downstream point/station elevation =   518.410(Ft.)
Pipe length  =    92.00(Ft.) Slope =   0.0099  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   255.764(CFS)
Given pipe size =     66.00(In.)
Calculated individual pipe flow  =   255.764(CFS)
Normal flow depth in pipe =   43.27(In.)
Flow top width inside pipe =   62.73(In.)
Critical Depth =   53.47(In.)
Pipe flow velocity =     15.49(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    49.85 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      307.000 to Point/Station      307.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    168.662(Ac.)
Runoff from this stream =    255.764(CFS)
Time of concentration =   49.85 min.
Rainfall intensity =     1.913(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station      602.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(14.5 DU/A or Less      )
Impervious value, Ai = 0.500
Sub-Area C Value = 0.630
Initial subarea total flow distance  =  107.000(Ft.)
Highest elevation =  532.000(Ft.)
Lowest elevation =  528.490(Ft.)
Elevation difference =    3.510(Ft.) Slope =  3.280 %
Top of Initial Area Slope adjusted by User to  3.510 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 90.00 (Ft)
for the top area slope value of   3.51 %, in a development type of
 14.5 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   5.28 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.6300)*(  90.000^.5)/(   3.510^(1/3)]=   5.28
Rainfall intensity (I) =      8.139(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.630
Subarea runoff =      0.482(CFS)
Total initial stream area =        0.094(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      602.000 to Point/Station      603.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      2.775(CFS)
Depth of flow =   0.370(Ft.), Average velocity =   1.516(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              0.60
    2             20.00              0.13
    3             22.00              0.00
```

```
        4             22.00              0.50
      Manning's 'N' friction factor =   0.015
      -----------------------------------------------------------------
      Sub-Channel flow  =      2.775(CFS)
        '     '    flow top width =     12.194(Ft.)
        '     '    velocity=    1.516(Ft/s)
        '     '    area =      1.830(Sq.Ft)
        '     '    Froude number =     0.690

      Upstream point elevation =   528.490(Ft.)
      Downstream point elevation =   525.660(Ft.)
      Flow length =   925.000(Ft.)
      Travel time  =   10.17 min.
      Time of concentration =   15.45 min.
      Depth of flow =   0.370(Ft.)
      Average velocity =   1.516(Ft/s)
      Total irregular channel flow =     2.775(CFS)
      Irregular channel normal depth above invert elev. =   0.370(Ft.)
      Average velocity of channel(s) =   1.516(Ft/s)
       Adding area flow to channel
      Rainfall intensity (I) =      4.073(In/Hr) for a   100.0 year storm
      Decimal fraction soil group A = 0.000
      Decimal fraction soil group B = 0.000
      Decimal fraction soil group C = 0.000
      Decimal fraction soil group D = 1.000
      [HIGH DENSITY RESIDENTIAL                    ]
      (43.0 DU/A or Less      )
      Impervious value, Ai = 0.800
      Sub-Area C Value = 0.790
      Rainfall intensity =      4.073(In/Hr) for a   100.0 year storm
      Effective runoff coefficient used for total area
      (Q=KCIA) is C = 0.780  CA =      1.227
      Subarea runoff =      4.515(CFS) for      1.478(Ac.)
      Total runoff =      4.997(CFS)  Total area =      1.572(Ac.)
      Depth of flow =   0.444(Ft.), Average velocity =   1.750(Ft/s)


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
      Process from Point/Station      603.000 to Point/Station      603.000
      **** SUBAREA FLOW ADDITION ****

      ------------------------------------------------------------------------
      Rainfall intensity (I) =      4.073(In/Hr) for a   100.0 year storm
      Decimal fraction soil group A = 0.000
      Decimal fraction soil group B = 0.000
      Decimal fraction soil group C = 0.000
      Decimal fraction soil group D = 1.000
      [INDUSTRIAL area type                        ]
      (Limited Industrial       )
      Impervious value, Ai = 0.900
      Sub-Area C Value = 0.850
      Time of concentration =    15.45 min.
      Rainfall intensity =      4.073(In/Hr) for a   100.0 year storm
      Effective runoff coefficient used for total area
      (Q=KCIA) is C = 0.787  CA =      1.365
      Subarea runoff =      0.564(CFS) for      0.163(Ac.)
      Total runoff =      5.561(CFS)  Total area =      1.735(Ac.)


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
      Process from Point/Station      603.000 to Point/Station      603.000
      **** SUBAREA FLOW ADDITION ****

      ------------------------------------------------------------------------
      Rainfall intensity (I) =      4.073(In/Hr) for a   100.0 year storm
      Decimal fraction soil group A = 0.000
      Decimal fraction soil group B = 0.000
      Decimal fraction soil group C = 0.000
      Decimal fraction soil group D = 1.000
      [INDUSTRIAL area type                        ]
      (Limited Industrial       )
```

```
Impervious value, Ai = 0.900
Sub-Area C Value = 0.850
Time of concentration =    15.45 min.
Rainfall intensity =      4.073(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.794  CA =      1.560
Subarea runoff =      0.793(CFS) for      0.229(Ac.)
Total runoff =      6.354(CFS)  Total area =       1.964(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   521.420(Ft.)
Downstream point/station elevation =   520.730(Ft.)
Pipe length  =    69.00(Ft.) Slope =   0.0100  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.354(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     6.354(CFS)
Normal flow depth in pipe =   10.10(In.)
Flow top width inside pipe =   17.86(In.)
Critical Depth =   11.69(In.)
Pipe flow velocity =      6.23(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =    15.63 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      307.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   520.730(Ft.)
Downstream point/station elevation =   518.410(Ft.)
Pipe length  =   204.00(Ft.) Slope =   0.0114  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.354(CFS)
Given pipe size =     27.00(In.)
Calculated individual pipe flow  =     6.354(CFS)
Normal flow depth in pipe =    8.03(In.)
Flow top width inside pipe =   24.68(In.)
Critical Depth =   10.31(In.)
Pipe flow velocity =      6.42(Ft/s)
Travel time through pipe =    0.53 min.
Time of concentration (TC) =    16.16 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      307.000 to Point/Station      307.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.964(Ac.)
Runoff from this stream =      6.354(CFS)
Time of concentration =   16.16 min.
Rainfall intensity =     3.956(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1      255.764     49.85             1.913
2        6.354     16.16             3.956
Qmax(1) =
       1.000 *    1.000 *   255.764) +
       0.484 *    1.000 *     6.354) + =     258.836
Qmax(2) =
       1.000 *    0.324 *   255.764) +
       1.000 *    1.000 *     6.354) + =      89.281
```

```
 Total of 2 streams to confluence:
 Flow rates before confluence point:
      255.764       6.354
 Maximum flow rates at confluence using above data:
       258.836       89.281
 Area of streams before confluence:
       168.662        1.964
 Results of confluence:
 Total flow rate =    258.836(CFS)
 Time of concentration =    49.847 min.
 Effective stream area after confluence =    170.626(Ac.)
 End of computations, total study area =         170.626 (Ac.)
```

6c. CivilD Mitigated Post-Development Q100 Calculations

```
            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 05/13/22
--------------------------------------------------------------------------
21088-post-onsite



--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 6332

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.200
24 hour precipitation(inches) =  5.500
P6/P24 =    58.2%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      304.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
--------------------------------------------------------------------------
User specified 'C' value of 0.779 given for subarea
Rainfall intensity (I) =      3.919(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  16.40 min.  Rain intensity =       3.92(In/Hr)
Total area =        2.260(Ac.)  Total runoff =     6.898(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      305.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
--------------------------------------------------------------------------
Upstream point/station elevation =   521.680(Ft.)
Downstream point/station elevation =   519.940(Ft.)
Pipe length  =    20.56(Ft.) Slope =   0.0846  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.898(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     6.898(CFS)
Normal flow depth in pipe =    5.81(In.)
Flow top width inside pipe =   16.83(In.)
Critical Depth =   12.19(In.)
Pipe flow velocity =     13.97(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    16.42 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      305.000 to Point/Station      305.000
**** CONFLUENCE OF MINOR STREAMS ****
--------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      2.260(Ac.)
Runoff from this stream =      6.898(CFS)
Time of concentration =   16.42 min.
```

```
Rainfall intensity =     3.915(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      104.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

------------------------------------------------------------------------------
User specified 'C' value of 0.790 given for subarea
Rainfall intensity (I) =      1.960(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  48.00 min.  Rain intensity =       1.96(In/Hr)
Total area =      155.500(Ac.)  Total runoff =   240.800(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

------------------------------------------------------------------------------
Depth of flow =   2.406(Ft.), Average velocity =   2.420(Ft/s)
    ******* Irregular Channel Data ***********
-------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              2.50
    2             75.00              0.00
    3             89.00              3.21
    4            105.20              4.76
Manning's 'N' friction factor =   0.040
-------------------------------------------------------------
Sub-Channel flow  =    240.800(CFS)
  '     '    flow top width =     82.688(Ft.)
  '     '    velocity=    2.420(Ft/s)
  '     '    area =     99.492(Sq.Ft)
  '     '    Froude number =     0.389

Upstream point elevation =   528.920(Ft.)
Downstream point elevation =   528.280(Ft.)
Flow length =   192.000(Ft.)
Travel time  =    1.32 min.
Time of concentration =   49.32 min.
Depth of flow =   2.406(Ft.)
Average velocity =   2.420(Ft/s)
Total irregular channel flow =   240.800(CFS)
Irregular channel normal depth above invert elev. =   2.406(Ft.)
Average velocity of channel(s) =   2.420(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      701.000 to Point/Station      105.000
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------------
Rainfall intensity (I) =      1.926(In/Hr) for a   100.0 year storm
User specified 'C' value of 0.640 given for subarea
The area added to the existing stream causes a
a lower flow rate of Q =    239.269(CFS)
therefore the upstream flow rate of Q =    240.800(CFS) is being used
Time of concentration =    49.32 min.
Rainfall intensity =      1.926(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.788  CA =    124.215
Subarea runoff =      0.000(CFS) for      2.141(Ac.)
Total runoff =    240.800(CFS)  Total area =     157.641(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      801.000 to Point/Station      105.000
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------------
Rainfall intensity (I) =      1.926(In/Hr) for a   100.0 year storm
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
The area added to the existing stream causes a
a lower flow rate of Q =    239.304(CFS)
therefore the upstream flow rate of Q =    240.800(CFS) is being used
Time of concentration =    49.32 min.
Rainfall intensity =      1.926(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.788  CA =    124.233
Subarea runoff =      0.000(CFS) for      0.052(Ac.)
Total runoff =    240.800(CFS)  Total area =     157.693(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      305.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   528.270(Ft.)
Downstream point/station elevation =   519.940(Ft.)
Pipe length  =   332.00(Ft.) Slope =   0.0251  Manning's N = 0.013
No. of pipes = 2  Required pipe flow  =   240.800(CFS)
Given pipe size =     66.00(In.)
Calculated individual pipe flow  =   120.400(CFS)
Normal flow depth in pipe =   21.35(In.)
Flow top width inside pipe =   61.75(In.)
Critical Depth =   36.56(In.)
Pipe flow velocity =     18.10(Ft/s)
Travel time through pipe =    0.31 min.
Time of concentration (TC) =    49.63 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      305.000 to Point/Station      305.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =    157.693(Ac.)
Runoff from this stream =    240.800(CFS)
Time of concentration =   49.63 min.
Rainfall intensity =     1.919(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        6.898     16.42             3.915
2      240.800     49.63             1.919
Qmax(1) =
       1.000 *    1.000 *     6.898) +
       1.000 *    0.331 *   240.800) + =      86.592
Qmax(2) =
       0.490 *    1.000 *     6.898) +
       1.000 *    1.000 *   240.800) + =     244.180

Total of 2 streams to confluence:
Flow rates before confluence point:
       6.898     240.800
Maximum flow rates at confluence using above data:
       86.592      244.180
Area of streams before confluence:
        2.260      157.693
Results of confluence:
```

```
Total flow rate =    244.180(CFS)
Time of concentration =    49.628 min.
Effective stream area after confluence =    159.953(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      305.000 to Point/Station      306.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   519.940(Ft.)
Downstream point/station elevation =   519.320(Ft.)
Pipe length  =    84.00(Ft.) Slope =   0.0074  Manning's N = 0.013
No. of pipes = 2  Required pipe flow  =   244.180(CFS)
Given pipe size =     66.00(In.)
Calculated individual pipe flow  =   122.090(CFS)
Normal flow depth in pipe =   29.95(In.)
Flow top width inside pipe =   65.72(In.)
Critical Depth =   36.82(In.)
Pipe flow velocity =     11.63(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    49.75 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      306.000 to Point/Station      306.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    159.953(Ac.)
Runoff from this stream =    244.180(CFS)
Time of concentration =   49.75 min.
Rainfall intensity =     1.916(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      501.000 to Point/Station      502.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------
User specified 'C' value of 0.670 given for subarea
Rainfall intensity (I) =      5.052(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  11.06 min.  Rain intensity =       5.05(In/Hr)
Total area =       8.629(Ac.)  Total runoff =    11.600(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      502.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      5.052(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
(General Industrial       )
Impervious value, Ai = 0.950
Sub-Area C Value = 0.870
Time of concentration =    11.06 min.
Rainfall intensity =      5.052(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.671  CA =      5.820
Subarea runoff =     17.804(CFS) for      0.044(Ac.)
Total runoff =     29.404(CFS)  Total area =       8.673(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      802.000 to Point/Station      502.000
**** SUBAREA FLOW ADDITION ****
```

```
_____________________________________________________________________
Rainfall intensity (I) =      5.052(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                  ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =    11.06 min.
Rainfall intensity =      5.052(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.670  CA =      5.833
Subarea runoff =      0.065(CFS) for      0.037(Ac.)
Total runoff =     29.469(CFS)  Total area =       8.710(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      306.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
_____________________________________________________________________
Upstream point/station elevation =   522.270(Ft.)
Downstream point/station elevation =   519.320(Ft.)
Pipe length  =    92.00(Ft.) Slope =   0.0321  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    29.469(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    29.469(CFS)
Normal flow depth in pipe =   13.22(In.)
Flow top width inside pipe =   29.79(In.)
Critical Depth =   22.20(In.)
Pipe flow velocity =     14.14(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    11.17 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      306.000 to Point/Station      306.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      8.710(Ac.)
Runoff from this stream =     29.469(CFS)
Time of concentration =   11.17 min.
Rainfall intensity =     5.021(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1      244.180     49.75             1.916
2       29.469     11.17             5.021
Qmax(1) =
       1.000 *    1.000 *   244.180) +
       0.382 *    1.000 *    29.469) + =     255.424
Qmax(2) =
       1.000 *    0.224 *   244.180) +
       1.000 *    1.000 *    29.469) + =      84.288

Total of 2 streams to confluence:
Flow rates before confluence point:
     244.180      29.469
Maximum flow rates at confluence using above data:
      255.424       84.288
Area of streams before confluence:
      159.953        8.710
Results of confluence:
Total flow rate =    255.424(CFS)
```

```
 Time of concentration =    49.748 min.
 Effective stream area after confluence =    168.663(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 Process from Point/Station      306.000 to Point/Station      307.000
 **** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------------
 Upstream point/station elevation =   519.320(Ft.)
 Downstream point/station elevation =   518.410(Ft.)
 Pipe length  =    92.00(Ft.) Slope =   0.0099  Manning's N = 0.013
 No. of pipes = 1  Required pipe flow  =   255.424(CFS)
 Given pipe size =     66.00(In.)
 Calculated individual pipe flow  =   255.424(CFS)
 Normal flow depth in pipe =   43.22(In.)
 Flow top width inside pipe =   62.76(In.)
 Critical Depth =   53.47(In.)
 Pipe flow velocity =     15.49(Ft/s)
 Travel time through pipe =    0.10 min.
 Time of concentration (TC) =    49.85 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 Process from Point/Station      307.000 to Point/Station      307.000
 **** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
 Along Main Stream number: 1 in normal stream number 1
 Stream flow area =    168.663(Ac.)
 Runoff from this stream =    255.424(CFS)
 Time of concentration =   49.85 min.
 Rainfall intensity =     1.913(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 Process from Point/Station      601.000 to Point/Station      602.000
 **** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 [MEDIUM DENSITY RESIDENTIAL                  ]
 (14.5 DU/A or Less      )
 Impervious value, Ai = 0.500
 Sub-Area C Value = 0.630
 Initial subarea total flow distance  =  107.000(Ft.)
 Highest elevation =  532.000(Ft.)
 Lowest elevation =  528.490(Ft.)
 Elevation difference =    3.510(Ft.) Slope =  3.280 %
 Top of Initial Area Slope adjusted by User to  3.510 %
 INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
 The maximum overland flow distance is 90.00 (Ft)
 for the top area slope value of   3.51 %, in a development type of
  14.5 DU/A or Less
 In Accordance With Figure 3-3
 Initial Area Time of Concentration =   5.28 minutes
 TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
 TC = [1.8*(1.1-0.6300)*(  90.000^.5)/(   3.510^(1/3)]=   5.28
 Rainfall intensity (I) =      8.139(In/Hr) for a   100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.630
 Subarea runoff =      0.482(CFS)
 Total initial stream area =        0.094(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 Process from Point/Station      602.000 to Point/Station      603.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------------
 Estimated mean flow rate at midpoint of channel =      2.775(CFS)
```

```
Depth of flow =   0.370(Ft.), Average velocity =   1.516(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              0.60
    2             20.00              0.13
    3             22.00              0.00
    4             22.00              0.50
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
Sub-Channel flow  =      2.775(CFS)
  '     '    flow top width =     12.194(Ft.)
  '     '    velocity=    1.516(Ft/s)
  '     '    area =      1.830(Sq.Ft)
  '     '    Froude number =     0.690

Upstream point elevation =   528.490(Ft.)
Downstream point elevation =   525.660(Ft.)
Flow length =   925.000(Ft.)
Travel time  =   10.17 min.
Time of concentration =   15.45 min.
Depth of flow =   0.370(Ft.)
Average velocity =   1.516(Ft/s)
Total irregular channel flow =     2.775(CFS)
Irregular channel normal depth above invert elev. =   0.370(Ft.)
Average velocity of channel(s) =   1.516(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.073(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[HIGH DENSITY RESIDENTIAL                    ]
(43.0 DU/A or Less      )
Impervious value, Ai = 0.800
Sub-Area C Value = 0.790
Rainfall intensity =      4.073(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.780  CA =      1.227
Subarea runoff =      4.515(CFS) for      1.478(Ac.)
Total runoff =      4.997(CFS)  Total area =       1.572(Ac.)
Depth of flow =   0.444(Ft.), Average velocity =   1.750(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      603.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
Rainfall intensity (I) =      4.073(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
(Limited Industrial       )
Impervious value, Ai = 0.900
Sub-Area C Value = 0.850
Time of concentration =    15.45 min.
Rainfall intensity =      4.073(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.787  CA =      1.365
Subarea runoff =      0.564(CFS) for      0.163(Ac.)
Total runoff =      5.561(CFS)  Total area =       1.735(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      603.000
**** SUBAREA FLOW ADDITION ****
```

```
------------------------------------------------------------------------
Rainfall intensity (I) =      4.073(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
(Limited Industrial       )
Impervious value, Ai = 0.900
Sub-Area C Value = 0.850
Time of concentration =    15.45 min.
Rainfall intensity =      4.073(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.794  CA =      1.560
Subarea runoff =      0.793(CFS) for      0.229(Ac.)
Total runoff =      6.354(CFS)  Total area =       1.964(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   521.420(Ft.)
Downstream point/station elevation =   520.730(Ft.)
Pipe length  =    69.00(Ft.) Slope =   0.0100  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.354(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     6.354(CFS)
Normal flow depth in pipe =   10.10(In.)
Flow top width inside pipe =   17.86(In.)
Critical Depth =   11.69(In.)
Pipe flow velocity =      6.23(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =    15.63 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      307.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   520.730(Ft.)
Downstream point/station elevation =   518.410(Ft.)
Pipe length  =   204.00(Ft.) Slope =   0.0114  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.354(CFS)
Given pipe size =     27.00(In.)
Calculated individual pipe flow  =     6.354(CFS)
Normal flow depth in pipe =    8.03(In.)
Flow top width inside pipe =   24.68(In.)
Critical Depth =   10.31(In.)
Pipe flow velocity =      6.42(Ft/s)
Travel time through pipe =    0.53 min.
Time of concentration (TC) =    16.16 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      307.000 to Point/Station      307.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.964(Ac.)
Runoff from this stream =      6.354(CFS)
Time of concentration =   16.16 min.
Rainfall intensity =     3.956(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)
```

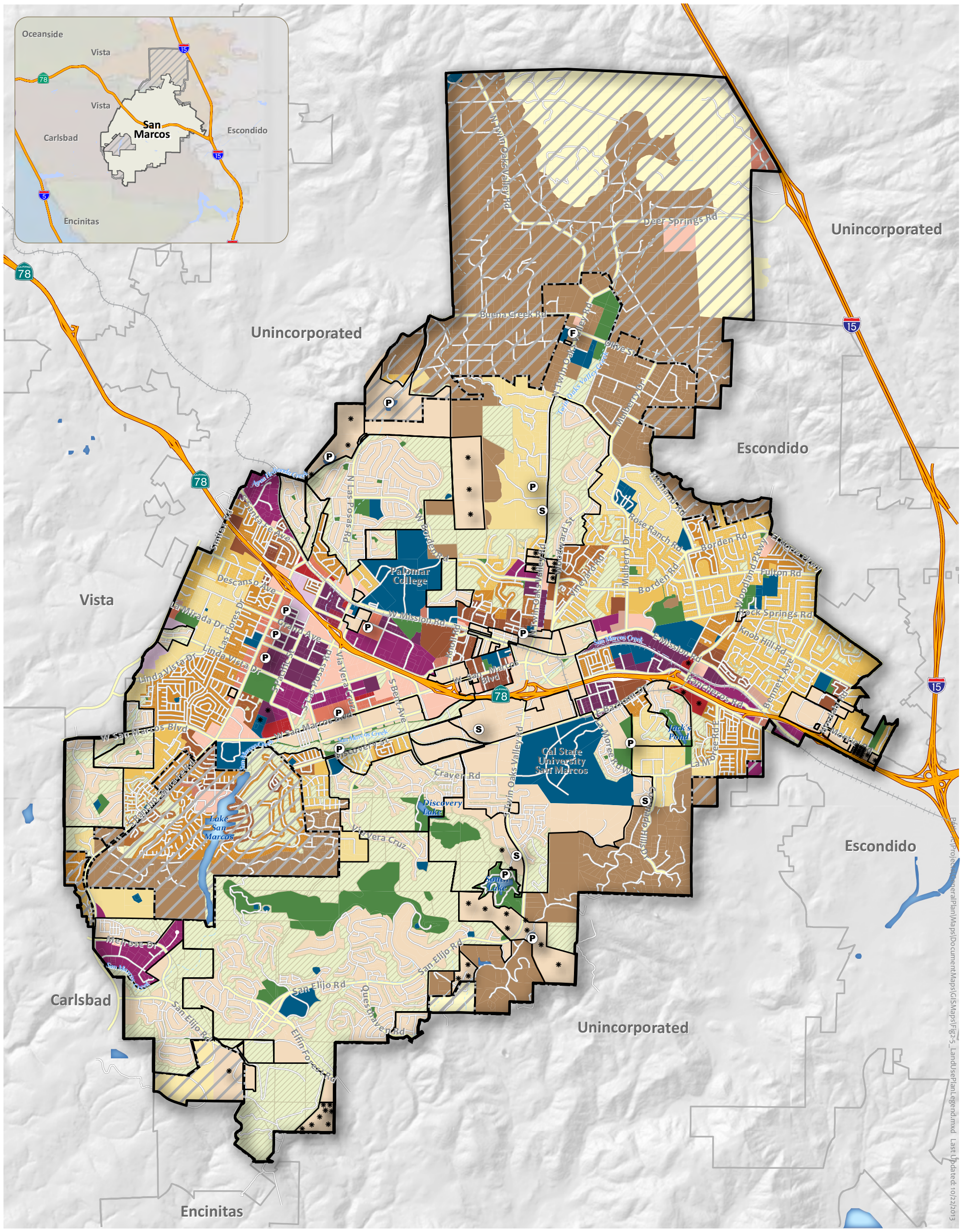
```
      1      255.424     49.85             1.913
      2        6.354     16.16             3.956
      Qmax(1) =
             1.000 *    1.000 *   255.424) +
             0.484 *    1.000 *     6.354) + =     258.497
      Qmax(2) =
             1.000 *    0.324 *   255.424) +
             1.000 *    1.000 *     6.354) + =      89.171

      Total of 2 streams to confluence:
      Flow rates before confluence point:
           255.424       6.354
      Maximum flow rates at confluence using above data:
            258.497       89.171
      Area of streams before confluence:
            168.663        1.964
      Results of confluence:
      Total flow rate =    258.497(CFS)
      Time of concentration =    49.847 min.
      Effective stream area after confluence =    170.627(Ac.)
      End of computations, total study area =         170.627 (Ac.)
```

ATTACHMENT 7
CITY OF SAN MARCOS LAND USE PLAN

FIGURE 2-5

City of San Marcos

Land Use Plan



0 0.25 0.5 1 Miles

SOURCES OF DATA:
City of San Marcos 3/13 and AECOM, 12/11

- San Marcos City Limits
- Sphere of Influence
- Planning Area
- Major Hydrologic Features
- Creeks
- Railroad
- Freeway
- Highway
- Major Road
- Minor Road
- (F) Future Fire Station
- (S) Future School
- (P) Future Park
- (H) Future Floating Hotel
- Specific Plan Area (SPA)

General Plan Planned Land Use Types

Agricultural/Residential
- Agricultural/Residential, AG (0.125 - 1 du/ac)

Residential
- County Rural Residential, COUNTY RR
- Hillside Residential 1, HR1 (0.05 - 0.25 du/ac)
- Hillside Residential 2, HR2 (0.25 - 0.5 du/ac)
- Rural Residential, RR (1 - 2 du/ac)
- Very Low Density Residential, VLDR (2.1 - 4.0 du/ac)
- Low Density Residential, LDR (4.1 - 8.0 du/ac)
- Low Medium Density Residential, LMDR (8.1 - 12.0 du/ac)
- Medium Density Residential 1, MDR1 (12.1 - 15.0 du/ac)
- Medium Density Residential 2, MDR2 (15.1 - 20.0 du/ac)
- Medium High Density Residential, MHDR (20.1 - 30.0 du/ac)
- High Density Residential, HDR (30.1 - 45.0 du/ac)

Mixed Use
- Mixed Use 1, MU1 (20.1 - 30.0 du/ac)
- Mixed Use 2, MU2 (30.1 - 45 du/ac)
- Mixed Use 3, MU3
- Mixed Use 4, MU4

Commercial
- Commercial, C
- Neighborhood Commercial, NC
- Office Professional, OP

Industrial
- Business Park, BP
- Light Industrial, LI
- Industrial, I

Public/Institutional
- Public/Institutional, PI

Recreation
- Parks, P
- Open Space, OS

Specific Plan Area (SPA)
- Specific Plan Area, SPA (For more information regarding specific plans, refer to Figure 2-3 and Appendix D, Table D-3 in General Plan
- ✱ Identifies Land Use Special Conditions areas as it applies to specific parcels, refer to Appendix D, Table D-2 for details on those special conditions

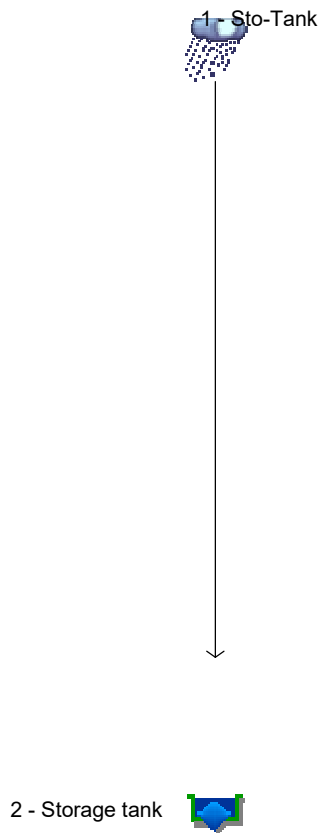
Note 1: Contact the County of San Diego Land Use & Planning Department to verify the "County Land Use Designations" for all properties that fall within the San Marco Sphere of Influence.
Note 2: Refer to Appendix D, Figure D-4 regarding the color coded properties represented on an exhibit portraying a "snap shot" in time where each recognized "transitional zone" property is located. Each property shall ultimately be removed from this exhibit pending a Rezone approval matching the adopted General Plan Land Use designation as represented on Figure 2-5.

Every effort has been made to assure the accuracy of the maps and data provided; however, some information may not be accurate or current. The City of San Marcos assumes no responsibility arising from use of this information and incorporates by reference its disclaimer regarding the lack of any warranties, whether expressed or implied, concerning the use of the same. For additional information, see the Disclaimer of the City's website.

ATTACHMENT 8
HYDROGRAPH

8a. Hydrograph Report

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	Manual	Sto-Tank
2	Reservoir	Storage tank

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

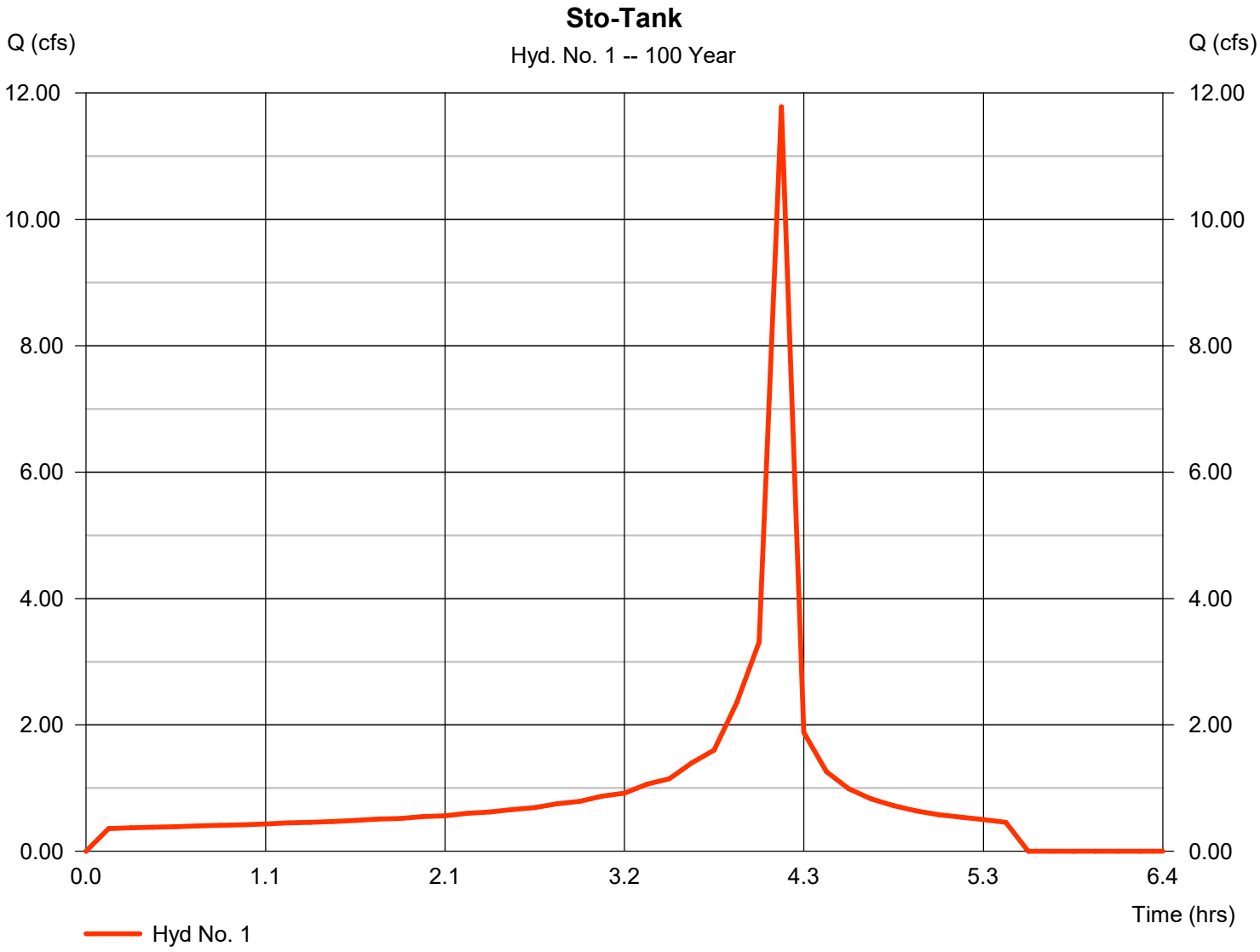
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Manual	11.78	8	248	21,178	------	------	------	Sto-Tank
2	Reservoir	6.898	8	256	21,169	1	525.60	4,867	Storage tank

Hydrograph Report

Hyd. No. 1

Sto-Tank

Hydrograph type	= Manual	Peak discharge	= 11.78 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.13 hrs
Time interval	= 8 min	Hyd. volume	= 21,178 cuft



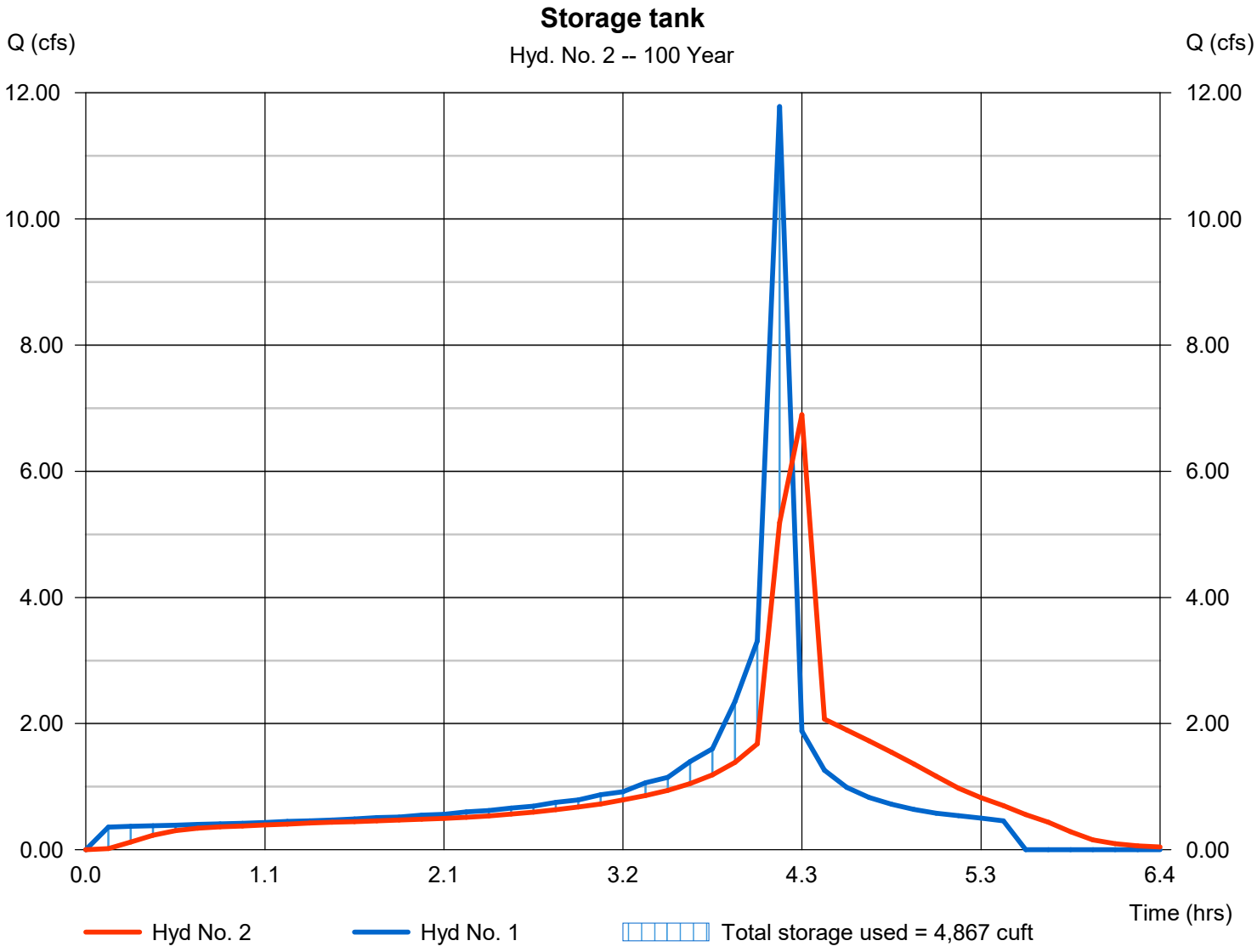
Hydrograph Report

Hyd. No. 2

Storage tank

Hydrograph type	=	Reservoir	Peak discharge	=	6.898 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.27 hrs
Time interval	=	8 min	Hyd. volume	=	21,169 cuft
Inflow hyd. No.	=	1 - Sto-Tank	Max. Elevation	=	525.60 ft
Reservoir name	=	STO TANK	Max. Storage	=	4,867 cuft

Storage Indication method used.



Pond No. 3 - STO TANK

Pond Data

UG Chambers -Invert elev. = 523.17 ft, Rise x Span = 4.00 x 4.00 ft, Barrel Len = 305.00 ft, No. Barrels = 2, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	523.17	n/a	0	0
0.40	523.57	n/a	400	400
0.80	523.97	n/a	692	1,092
1.20	524.37	n/a	843	1,935
1.60	524.77	n/a	929	2,864
2.00	525.17	n/a	970	3,834
2.40	525.57	n/a	970	4,805
2.80	525.97	n/a	928	5,733
3.20	526.37	n/a	843	6,576
3.60	526.77	n/a	693	7,269
4.00	527.17	n/a	398	7,667

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	6.00	6.00	0.00
Span (in)	= 24.00	6.00	6.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 523.17	523.17	523.70	0.00
Length (ft)	= 6.00	0.00	0.00	0.00
Slope (%)	= 5.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 16.00	4.00	Inactive	0.00
Crest El. (ft)	= 528.17	525.00	526.50	0.00
Weir Coeff.	= 3.33	2.60	2.60	3.33
Weir Type	= 1	Broad	Broad	---
Multi-Stage	= Yes	Yes	Yes	No

Exfil.(in/hr) = 0.000 (by Wet area)

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	Clv 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	523.17	0.00	0.00	0.00	---	0.00	0.00	0.00	---	---	---	0.000
0.04	40	523.21	0.00 ic	0.00 ic	0.00	---	0.00	0.00	0.00	---	---	---	0.005
0.08	80	523.25	0.02 ic	0.02 ic	0.00	---	0.00	0.00	0.00	---	---	---	0.018
0.12	120	523.29	0.04 ic	0.04 ic	0.00	---	0.00	0.00	0.00	---	---	---	0.038
0.16	160	523.33	0.06 ic	0.06 ic	0.00	---	0.00	0.00	0.00	---	---	---	0.065
0.20	200	523.37	0.11 ic	0.10 ic	0.00	---	0.00	0.00	0.00	---	---	---	0.099
0.24	240	523.41	0.15 ic	0.14 ic	0.00	---	0.00	0.00	0.00	---	---	---	0.138
0.28	280	523.45	0.18 ic	0.18 ic	0.00	---	0.00	0.00	0.00	---	---	---	0.184
0.32	320	523.49	0.24 ic	0.23 ic	0.00	---	0.00	0.00	0.00	---	---	---	0.232
0.36	360	523.53	0.29 ic	0.28 ic	0.00	---	0.00	0.00	0.00	---	---	---	0.282
0.40	400	523.57	0.35 ic	0.33 ic	0.00	---	0.00	0.00	0.00	---	---	---	0.335
0.44	469	523.61	0.39 ic	0.38 ic	0.00	---	0.00	0.00	0.00	---	---	---	0.385
0.48	538	523.65	0.44 ic	0.44 ic	0.00	---	0.00	0.00	0.00	---	---	---	0.437
0.52	608	523.69	0.48 ic	0.47 ic	0.00	---	0.00	0.00	0.00	---	---	---	0.472
0.56	677	523.73	0.52 ic	0.50 ic	0.00 ic	---	0.00	0.00	0.00	---	---	---	0.501
0.60	746	523.77	0.56 ic	0.52 ic	0.02 ic	---	0.00	0.00	0.00	---	---	---	0.539
0.64	815	523.81	0.60 ic	0.55 ic	0.04 ic	---	0.00	0.00	0.00	---	---	---	0.585
0.68	885	523.85	0.64 ic	0.57 ic	0.07 ic	---	0.00	0.00	0.00	---	---	---	0.636
0.72	954	523.89	0.69 ic	0.59 ic	0.10 ic	---	0.00	0.00	0.00	---	---	---	0.691
0.76	1,023	523.93	0.78 ic	0.60 ic	0.14 ic	---	0.00	0.00	0.00	---	---	---	0.749
0.80	1,092	523.97	0.84 ic	0.63 ic	0.19 ic	---	0.00	0.00	0.00	---	---	---	0.820
0.84	1,177	524.01	0.89 ic	0.64 ic	0.24 ic	---	0.00	0.00	0.00	---	---	---	0.889
0.88	1,261	524.05	0.96 ic	0.66 ic	0.30 ic	---	0.00	0.00	0.00	---	---	---	0.956
0.92	1,345	524.09	1.07 ic	0.67 ic	0.35 ic	---	0.00	0.00	0.00	---	---	---	1.023
0.96	1,430	524.13	1.13 ic	0.69 ic	0.40 ic	---	0.00	0.00	0.00	---	---	---	1.094
1.00	1,514	524.17	1.20 ic	0.71 ic	0.45 ic	---	0.00	0.00	0.00	---	---	---	1.156
1.04	1,598	524.21	1.21 ic	0.73 ic	0.48 ic	---	0.00	0.00	0.00	---	---	---	1.209
1.08	1,683	524.25	1.27 ic	0.75 ic	0.52 ic	---	0.00	0.00	0.00	---	---	---	1.266
1.12	1,767	524.29	1.34 ic	0.77 ic	0.55 ic	---	0.00	0.00	0.00	---	---	---	1.316
1.16	1,851	524.33	1.41 ic	0.78 ic	0.58 ic	---	0.00	0.00	0.00	---	---	---	1.363
1.20	1,935	524.37	1.41 ic	0.80 ic	0.61 ic	---	0.00	0.00	0.00	---	---	---	1.414
1.24	2,028	524.41	1.48 ic	0.82 ic	0.64 ic	---	0.00	0.00	0.00	---	---	---	1.459

Continues on next page...

STO TANK

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv 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
1.28	2,121	524.45	1.50 ic	0.83 ic	0.67 ic	---	0.00	0.00	0.00	---	---	---	1.502
1.32	2,214	524.49	1.56 ic	0.85 ic	0.69 ic	---	0.00	0.00	0.00	---	---	---	1.548
1.36	2,307	524.53	1.64 ic	0.87 ic	0.72 ic	---	0.00	0.00	0.00	---	---	---	1.587
1.40	2,400	524.57	1.64 ic	0.89 ic	0.74 ic	---	0.00	0.00	0.00	---	---	---	1.632
1.44	2,493	524.61	1.73 ic	0.90 ic	0.77 ic	---	0.00	0.00	0.00	---	---	---	1.669
1.48	2,586	524.65	1.73 ic	0.92 ic	0.79 ic	---	0.00	0.00	0.00	---	---	---	1.711
1.52	2,678	524.69	1.75 ic	0.93 ic	0.81 ic	---	0.00	0.00	0.00	---	---	---	1.747
1.56	2,771	524.73	1.81 ic	0.95 ic	0.83 ic	---	0.00	0.00	0.00	---	---	---	1.787
1.60	2,864	524.77	1.82 ic	0.97 ic	0.86 ic	---	0.00	0.00	0.00	---	---	---	1.823
1.64	2,961	524.81	1.90 ic	0.98 ic	0.88 ic	---	0.00	0.00	0.00	---	---	---	1.859
1.68	3,058	524.85	1.90 ic	1.00 ic	0.90 ic	---	0.00	0.00	0.00	---	---	---	1.897
1.72	3,155	524.89	1.99 ic	1.01 ic	0.92 ic	---	0.00	0.00	0.00	---	---	---	1.928
1.76	3,252	524.93	1.99 ic	1.03 ic	0.94 ic	---	0.00	0.00	0.00	---	---	---	1.965
1.80	3,349	524.97	2.00 ic	1.04 ic	0.95 ic	---	0.00	0.00	0.00	---	---	---	1.999
1.84	3,446	525.01	2.08 ic	1.06 ic	0.97 ic	---	0.00	0.01	0.00	---	---	---	2.041
1.88	3,543	525.05	2.18 ic	1.07 ic	0.99 ic	---	0.00	0.12	0.00	---	---	---	2.175
1.92	3,640	525.09	2.38 ic	1.07 ic	1.01 ic	---	0.00	0.28	0.00	---	---	---	2.362
1.96	3,737	525.13	2.59 ic	1.08 ic	1.03 ic	---	0.00	0.49	0.00	---	---	---	2.590
2.00	3,834	525.17	2.92 ic	1.08 ic	1.04 ic	---	0.00	0.73	0.00	---	---	---	2.848
2.04	3,931	525.21	3.15 ic	1.08 ic	1.06 ic	---	0.00	1.00	0.00	---	---	---	3.141
2.08	4,028	525.25	3.52 ic	1.08 ic	1.08 ic	---	0.00	1.30	0.00	---	---	---	3.454
2.12	4,125	525.29	3.78 ic	1.08 ic	1.08 ic	---	0.00	1.62	0.00	---	---	---	3.781
2.16	4,222	525.33	4.17 ic	1.08 ic	1.08 ic	---	0.00	1.97	0.00	---	---	---	4.127
2.20	4,319	525.37	4.58 ic	1.08 ic	1.08 ic	---	0.00	2.34	0.00	---	---	---	4.490
2.24	4,417	525.41	4.88 ic	1.08 ic	1.08 ic	---	0.00	2.73	0.00	---	---	---	4.882
2.28	4,514	525.45	5.31 ic	1.08 ic	1.08 ic	---	0.00	3.14	0.00	---	---	---	5.290
2.32	4,611	525.49	5.76 ic	1.07 ic	1.07 ic	---	0.00	3.57	0.00	---	---	---	5.711
2.36	4,708	525.53	6.17 oc	1.07 ic	1.07 ic	---	0.00	4.01	0.00	---	---	---	6.150
2.40	4,805	525.57	6.61 oc	1.06 ic	1.06 ic	---	0.00	4.48	0.00	---	---	---	6.597
2.44	4,897	525.61	7.15 oc	1.04 ic	1.04 ic	---	0.00	4.95	0.00	---	---	---	7.044
2.48	4,990	525.65	7.56 oc	1.04 ic	1.04 ic	---	0.00	5.45	0.00	---	---	---	7.522
2.52	5,083	525.69	8.06 oc	1.02 ic	1.02 ic	---	0.00	5.96	0.00	---	---	---	8.002
2.56	5,176	525.73	8.53 oc	1.01 ic	1.01 ic	---	0.00	6.49	0.00	---	---	---	8.499
2.60	5,269	525.77	9.04 oc	0.99 ic	0.99 ic	---	0.00	7.03	0.00	---	---	---	9.000
2.64	5,362	525.81	9.56 oc	0.96 ic	0.96 ic	---	0.00	7.58	0.00	---	---	---	9.507
2.68	5,455	525.85	10.06 oc	0.94 ic	0.94 ic	---	0.00	8.15	0.00	---	---	---	10.02
2.72	5,547	525.89	10.56 oc	0.90 ic	0.90 ic	---	0.00	8.73	0.00	---	---	---	10.53
2.76	5,640	525.93	10.92 oc	0.86 ic	0.86 ic	---	0.00	9.20 s	0.00	---	---	---	10.92
2.80	5,733	525.97	11.28 oc	0.84 ic	0.84 ic	---	0.00	9.61 s	0.00	---	---	---	11.28
2.84	5,817	526.01	11.82 oc	0.84 ic	0.84 ic	---	0.00	10.14 s	0.00	---	---	---	11.82
2.88	5,902	526.05	12.37 oc	0.85 ic	0.85 ic	---	0.00	10.67 s	0.00	---	---	---	12.37
2.92	5,986	526.09	12.91 oc	0.85 ic	0.85 ic	---	0.00	11.21 s	0.00	---	---	---	12.90
2.96	6,070	526.13	13.44 oc	0.85 ic	0.85 ic	---	0.00	11.74 s	0.00	---	---	---	13.44
3.00	6,154	526.17	13.98 oc	0.85 ic	0.85 ic	---	0.00	12.27 s	0.00	---	---	---	13.98
3.04	6,239	526.21	14.51 oc	0.86 ic	0.86 ic	---	0.00	12.80 s	0.00	---	---	---	14.51
3.08	6,323	526.25	15.04 oc	0.86 ic	0.86 ic	---	0.00	13.32 s	0.00	---	---	---	15.04
3.12	6,407	526.29	15.56 oc	0.86 ic	0.86 ic	---	0.00	13.85 s	0.00	---	---	---	15.56
3.16	6,492	526.33	16.08 oc	0.86 ic	0.86 ic	---	0.00	14.37 s	0.00	---	---	---	16.08
3.20	6,576	526.37	16.59 oc	0.85 ic	0.85 ic	---	0.00	14.88 s	0.00	---	---	---	16.59
3.24	6,645	526.41	17.10 oc	0.85 ic	0.85 ic	---	0.00	15.39 s	0.00	---	---	---	17.10
3.28	6,714	526.45	17.60 oc	0.85 ic	0.85 ic	---	0.00	15.90 s	0.00	---	---	---	17.60
3.32	6,784	526.49	18.10 oc	0.85 ic	0.85 ic	---	0.00	16.40 s	0.00	---	---	---	18.10
3.36	6,853	526.53	18.59 oc	0.85 ic	0.85 ic	---	0.00	16.90 s	0.00	---	---	---	18.59
3.40	6,922	526.57	19.08 oc	0.84 ic	0.84 ic	---	0.00	17.39 s	0.00	---	---	---	19.08
3.44	6,991	526.61	19.47 ic	0.84 ic	0.84 ic	---	0.00	17.80 s	0.00	---	---	---	19.47
3.48	7,061	526.65	19.82 ic	0.83 ic	0.83 ic	---	0.00	18.17 s	0.00	---	---	---	19.82
3.52	7,130	526.69	20.16 ic	0.81 ic	0.81 ic	---	0.00	18.53 s	0.00	---	---	---	20.16
3.56	7,199	526.73	20.49 ic	0.80 ic	0.80 ic	---	0.00	18.88 s	0.00	---	---	---	20.49
3.60	7,269	526.77	20.82 ic	0.79 ic	0.79 ic	---	0.00	19.23 s	0.00	---	---	---	20.82
3.64	7,308	526.81	21.13 ic	0.78 ic	0.78 ic	---	0.00	19.57 s	0.00	---	---	---	21.13
3.68	7,348	526.85	21.44 ic	0.77 ic	0.77 ic	---	0.00	19.89 s	0.00	---	---	---	21.44
3.72	7,388	526.89	21.74 ic	0.76 ic	0.76 ic	---	0.00	20.21 s	0.00	---	---	---	21.74
3.76	7,428	526.93	22.04 ic	0.75 ic	0.75 ic	---	0.00	20.53 s	0.00	---	---	---	22.04
3.80	7,468	526.97	22.33 ic	0.74 ic	0.74 ic	---	0.00	20.84 s	0.00	---	---	---	22.33
3.84	7,508	527.01	22.61 ic	0.74 ic	0.74 ic	---	0.00	21.14 s	0.00	---	---	---	22.61
3.88	7,547	527.05	22.89 ic	0.73 ic	0.73 ic	---	0.00	21.43 s	0.00	---	---	---	22.88
3.92	7,587	527.09	23.16 ic	0.72 ic	0.72 ic	---	0.00	21.72 s	0.00	---	---	---	23.16
3.96	7,627	527.13	23.42 ic	0.71 ic	0.71 ic	---	0.00	22.00 s	0.00	---	---	---	23.42
4.00	7,667	527.17	23.68 ic	0.70 ic	0.70 ic	---	0.00	22.28 s	0.00	---	---	---	23.68

...End

8b. Runoff Coefficient C After Detention Structure Calculations

CALCULATION AFTER THE DETENTION STRUCTURE

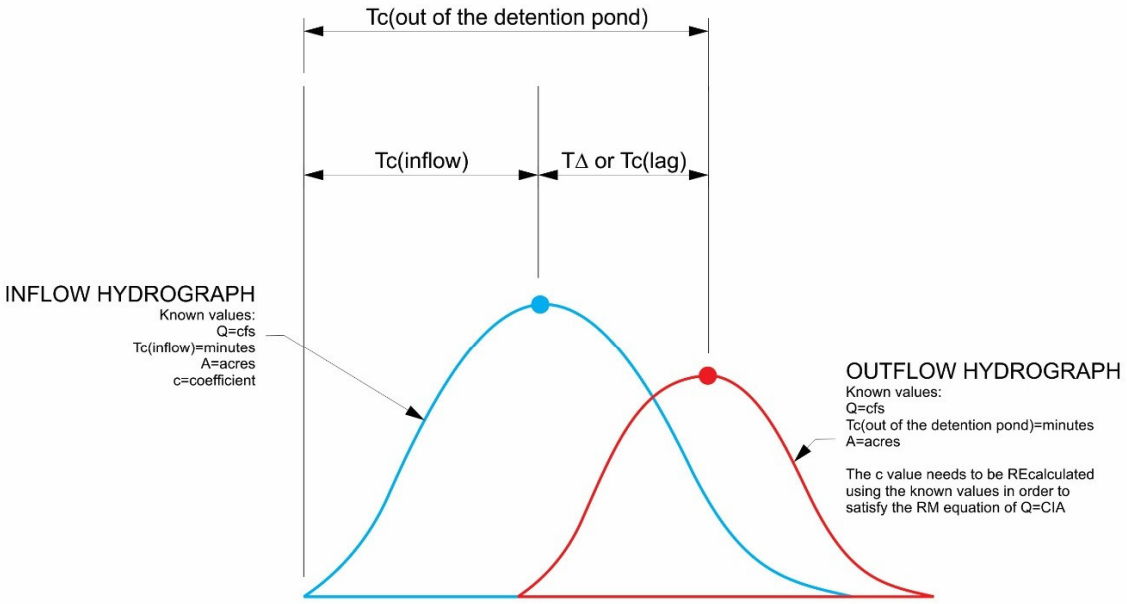
The purpose of the detention structure is to alter the peak flow and or time to peak of a given storm so it will not have a negative impact on the downstream facilities. There are different methods on how to use the resulting values of the outflow hydrograph.

For the purposes of this example there will be an association of the following values:

Q_{in} = Is equal to the inflow value that will enter the basin before storage
Q_{out} = Is equal to the outflow value that will exit the basin after storage
Tc_{in} = Is equal to the Time of Concentration flowing into the basin before detention
Tc_{out} = Is equal to the Time of Concentration exiting the basin after detention
A = Area of the tributary area being examined; (This value does not change)
c_{inflow} = The runoff coefficient going into the basin for detention
c_{out} = The runoff coefficient recalculated taking into account water stored in pond for detention

One method is to keep the value of c(inflow) and solve for the I=intensity & Tc(outflow). In this interpretation, we will get a Tc that will not match the value of the $Tc_{(\text{out of the detention structure})}$ of the outflow hydrograph that was calculated using the detention pond. The Tc Using this method shows a disruption on the oneness & continuity of the outflow hydrograph & the formula Q=cIA.

The second method; that is the method we are using is to recalculate the c=coefficient based on the fix values of the outflow hydrograph to achieve a c_{out} . This value uses the c_{inflow} from the flow into the detention basin and then is recalculated by the output of the hydrograph software using Q=cIA; translated as c=Q/IA. This method preserves the formula Q=cIA & does not alter the $Tc_{(\text{out of the detention structure})}$. This method shows that in order to maintain mathematical integrity of the rational equation (Q=CIA), the detention structure alters the runoff coefficient which is the only unknown in the equation. It is noted that the designer feels it is important to hold the value of Tc and the Q values that are calculated from the hydrograph.



GRAPHICAL DIAGRAM OF THE HYDROGRAPH COMING OUT OF THE DETENTION POND

The routing of the runoff through the detention structure gives us the $Q_{(\text{out of the detention structure})}$ and TΔ time lag between $Q_{(\text{inflow})}$ & $Q_{(\text{out of the detention structure})}$.

The known fix values coming out of the detention structure are:

- Q = cfs
- $Tc_{(\text{out of the detention structure})}$ = minutes
- A = acres
- *Please note that c=coefficient is not given directly from the resulting hydrograph coming out of the detention pond.*

In order to satisfy the rational equation of Q=CIA (see Section 3 of the 2003 San Diego County Hydrology Manual) coming out of the detention structure, we will calculate the only unknown value of the equation which is the outlet runoff coefficient, $C_{(\text{outlet})}$. By using the $Tc_{(\text{out of the detention structure})}$ we can solve for the intensity, I. With the intensity (I) value calculated, we can solve for the outlet runoff coefficient, $C_{(\text{outlet})}$.

The following equations are used in this stage: $Q = CIA$

$I = 7.44P_6D^{-0.645}$

Where:

$Q_{(\text{out of the detention structure})}$ = runoff (cfs), known value

$Tc_{(\text{inflow})}$ = detention structure inflow time of concentration (D) (minutes)

TΔ = time lag between $Q_{(\text{inflow})}$ & $Q_{(\text{out of the detention structure})}$

(minutes) $Tc_{(\text{out of the detention structure})} = Tc_{(\text{inflow})} + T\Delta$ (minutes)
P_6 = 6 hour precipitation (inches), known value.
I = intensity (inches/hour), calculated based on the value of $Tc_{(\text{out of the detention structure})}$
A = tributary area of the detention structure (acres),
known value $C_{(\text{outflow})}$ = runoff coefficient (unitless),
value to be solved

STO TANK (TC LAG FROM HYDRAFLOW HYDROGRAPH)			
LINE	**ITEM**	**STORAGE PIPE**	**REMARKS**
1	P6 inch	3.2	KNOWN VALUE
2	TC (inflow) mins	8	KNOWN VALUE
3	TC (lag) mins	8.4	FROM THE OUTFLOW HYDROGRAPH
4	TC (ouflow) mins	16.4	LINE 2+3
5	I inches/hour	3.919	FROM THE INTENSITY FORMULA
6	Q(outflow)	6.898	KNOWN VALUE
7	A (inflow=outflow)	2.26	KNOWN VALUE
8	c(inflow)	0.84	KNOWN VALUE FROM THE CONTRIBUTING BASIN(S)
9	c(outflow)	0.779	CALCULATED FROM C=Q/IA

The preceding highlighted data are then used to continue the calculations downstream of the detention structure.

In summary these are the steps of the calculations presented here:

1. Hydrologic methods of calculation as laid out in the 2003 San Diego Hydrology Manual was used upstream of the detention structure. These includes the methods of determining c, Tc and confluence of a junction. The c values used in the proposed conditions range from “undisturbed natural terrain” to “low & high density residential” whichever is appropriate for the contributing basin.
2. At the outflow of the detention structure, the c value was recalculated using the resulting values of the outflow hydrograph. This method preserves the values of $Tc_{(\text{out of the detention structure})}$, A & $Q_{(\text{outflow})}$. Methods and software satisfy the formula Q=cIA & the 2003 San Diego Hydrology Manual. This step shows that in order to maintain mathematical integrity of the rational equation (Q=CIA), the detention structure alters the runoff coefficient which is the only unknown in the equation.
3. The values determined in step 2 were used in the continuation of the calculations using the Hydrologic methods of calculation as laid out in the 2003 San Diego Hydrology Manual downstream of the detention structure. These includes the methods of determining c, Tc and confluence of a junction. The c values used in the proposed conditions range from “undisturbed natural terrain” to “low & high density residential” whichever is appropriate for the contributing basin.