Appendix F

Drainage Report

PRELIMINARY DRAINAGE REPORT

SOLANA BEACH 101

City of Solana Beach, CA
June 15, 2017

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TABLE OF CONTENTS

1. INTRODUCTION 1

2. PROJECT DESCRIPTION 3

3. EXISTING AND PROPOSED DRAINAGE PATTERNS AND IMPROVEMENTS 3

3.1 Existing Onsite Drainage Patterns 3

3.2 Proposed Drainage Improvements 4

4. HYDROLOGY CRITERIA, METHODOLOGY, AND RESULTS 5

4.1 Hydrology Criteria 5

4.2 Hydrologic Methodology 6

4.3 Description of Hydrologic Modeling Software 7

4.4 Hydrology Results 7

5. HYDRAULIC CRITERIA, METHODOLOGY, AND RESULTS 8

6. CONCLUSION 9

FIGURES

Figure 1: Project Vicinity Map 2

TABLES

Table 1: Hydrology Criteria 6
Table 2: Hydrology Results 8

APPENDICES

1 Supporting Documentation (Isopluvial Maps, Runoff Coefficients, FEMA FIRM Panel)

2 100 Year Existing Conditions Rational Method Computer Output

3 100 Year Proposed Conditions Rational Method Computer Output

4 5, 25, & 50 Year Existing & Proposed Conditions Rational Method Computer Output

5 System 200 Preliminary Detention Calculations

6 Drainage Exhibits

A – Existing Conditions Hydrology Map

B – Proposed Conditions Hydrology Map

1. INTRODUCTION

This preliminary drainage report supports the entitlement package (Development Permit) submittal for the proposed Solana Beach 101 project. The project is located north of Dahlia Drive between Highway 101 and South Sierra Avenue in the city of Solana Beach. The northerly property boundary is adjacent to an existing CVS Pharmacy parking lot.

The project proposes right-of-way dedications along Sierra Avenue and Dahlia Drive. With the dedications, the total project site consists of approximately 1.8 acres. Additional project disturbance area beyond the proposed property boundary includes additional area for proposed frontage improvements. Figure 1 shows the vicinity map for the project.

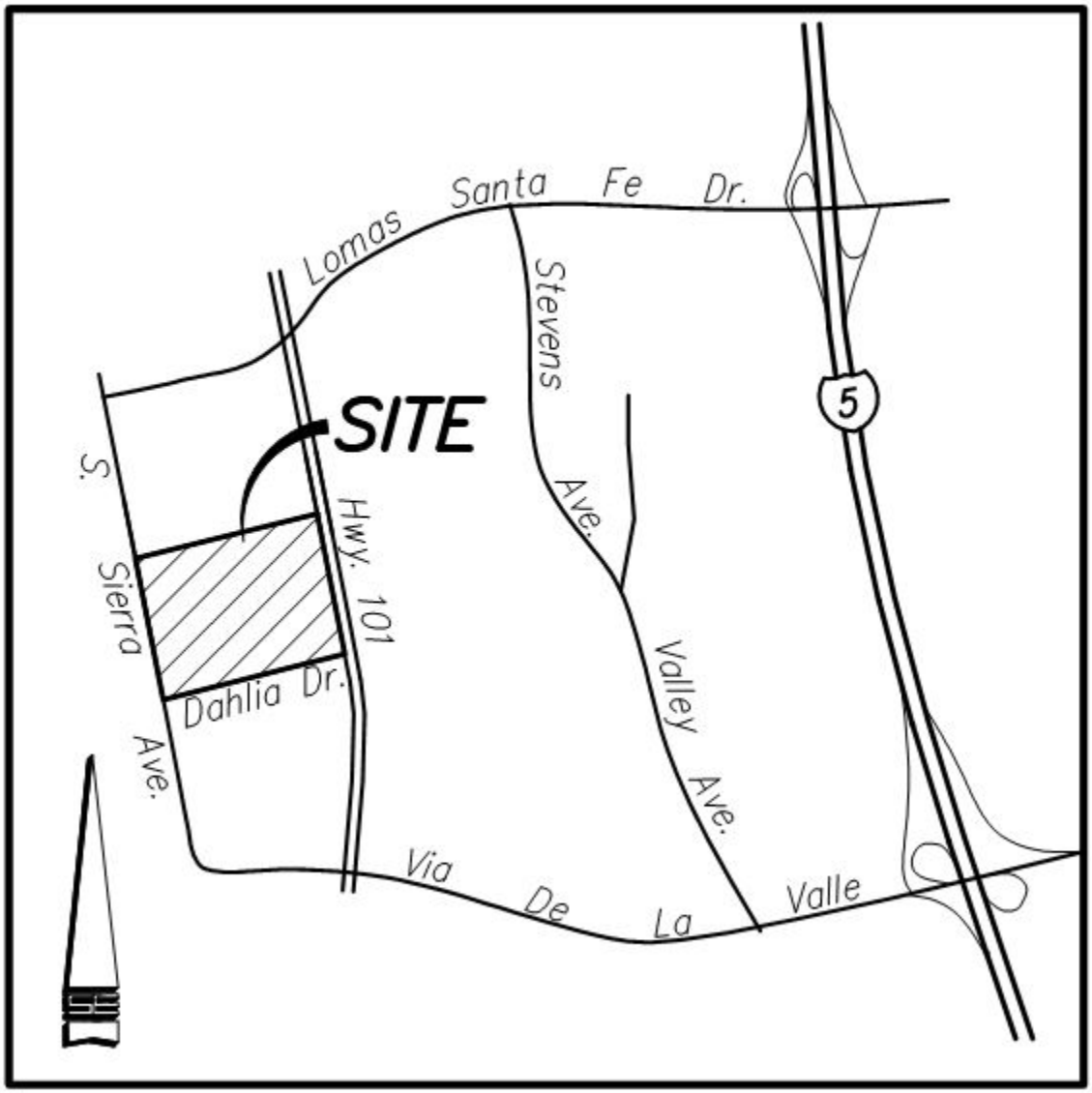


Figure 1: Project Vicinity Map

The purpose of this report is to determine hydrologic impact, if any, to the existing City of Solana Beach storm drain facilities or natural drainage, and provide peak 100-year and 50-year discharge values for existing and proposed conditions. In addition, this report is also intended to analyze project impacts with respect to CEQA guidelines. *Therefore, the purpose of this report submittal is to acquire from the City: 1) concept approval of the proposed storm drain layout, 2) approval of the methodology used in the evaluation of the Project storm drain system hydrology,*

and 3) identification of critical path drainage issues that need to be addressed during final engineering.

The drainage analyses presented herein reflect an entitlement level-of-effort, which include peak 100-year storm event hydrologic analyses using relative street and lot grades. The scope of the drainage analysis included in this report is limited to onsite areas. Hydraulic analyses for detention, inlets, pipe inverts and HGL's will be provided during final engineering.

This site was previously proposed for redevelopment for another developer back in 2013. This project supercedes the previous development scheme that was proposed for the project. The previous drainage study by Stuart Engineering dated June 28, 2013 was used as a reference for this report.

2. PROJECT DESCRIPTION

The Solana Beach 101 project includes demolition of the existing site and redevelopment into a mixed use development. The redevelopment will consist of three two-story office buildings, two two-story restaurants mixed with commercial or retail, two one-story buildings consisting of a retail establishment or a restaurant, two two-story residential buildings, and two levels of subterranean parking. The subterranean parking garage limits extend to the majority of the project property, so the proposed buildings will be built over structure.

3. EXISTING AND PROPOSED DRAINAGE PATTERNS AND IMPROVEMENTS

The following sections provide descriptions of the existing and proposed drainage patterns and improvements for the Project.

3.1 Existing Onsite Drainage Patterns

Under pre-project conditions, the northerly half of the site consisted of a mobile home park. The mobile home park was recently demolished, and at the request of City staff, the pre-project onsite drainage areas were analyzed according to the post-demolition condition.

The easterly portion of the southern half of the project contains commercial uses and the

westerly portion of the southerly half contains abandoned residential homes. Under existing conditions, runoff from the site generally sheet flows in three separate directions. Refer to Exhibit A for the existing condition drainage map. The easterly third of the site sheetflows towards Highway 101 and most of the runoff that drains towards Highway 101 enters a grate inlet that was recently installed near the recently constructed curb pop-out near the northwest corner of the Highway 101/Dahlia Drive intersection. A small portion drains to the gutter downstream of the inlet, and is conveyed southerly along Highway 101 to another inlet south of Dahlia Drive. The inlets connect to a storm drain system that discharges to the railroad corridor just east of Highway 101.

Runoff from the westerly two-thirds of the site sheetflows to the west towards South Sierra Avenue. A high point exists in South Sierra Avenue approximately midway along the site. There is no subterranean storm drain adjacent to the site along South Sierra Avenue. Storm runoff north of the high point is conveyed northerly in the South Sierra Avenue gutter to a curb inlet near Fletcher Cove. The curb inlet connects to a storm drain system that discharges into the Pacific Ocean at Fletcher Cove.

Storm runoff south of the high point is conveyed in a southerly direction along South Sierra Avenue to an inlet approximately 640 feet south of the site. The curb inlet connects to a storm drain system that discharges directly west into the Pacific Ocean.

Due to the varying land uses in the existing condition, the site varies from highly impervious to moderately impervious in the existing condition. The impervious values for the hydrologic modeling were estimated based on the aerial photography and observations from a site visit.

3.2 Proposed Drainage Improvements

The proposed drainage patterns and drainage improvements have been designed to mimic existing drainage patterns. The proposed project will be built over structure, and therefore the majority of the onsite drainage improvements will be designed by the plumbing engineer. Due to the nature of the mixed use development as individual buildings over a large underground parking garage with interconnected walkways and courtyard areas, there is limited opportunity to gravity drain areas towards the adjacent street gutters. Taking into account the stormwater

quality requirements and the additional depth required for treatment, the courtyard areas in between the proposed buildings cannot sheetflow to biofiltration planters and still have the depth for treatment to daylight an underdrain through the curb. Therefore, the proposed biofiltration planters have been positioned along the outside edge of the project, and it is expected that the majority of the project area will have to be pumped to the top of the biofiltration planters for treatment. The proposed planters along Sierra Avenue and Dahlia Drive are raised to accommodate the depth for an underdrain to daylight through the curb via a curb outlet.

Refer to Exhibit B for the proposed conditions hydrology map. System 100 represents the drainage are that drains towards Highway 101, System 200 represents the drainage area that drains to the north along South Sierra Avenue, and System 300 represents the drainage area that drains to the south along South Sierra Avenue. The eastern third of the site (System 100) drains to the biofiltration planters located outside of limits of the underground parking garage and outside of the public right-of-way along Highway 101. Similar to the other locations on the project, the area will be collected via roof drains and area drains throughout the plaza, and will be pumped to the BMP treatment areas. The underdrain and overflow storm drain will connect into the back of the existing grate inlet on Highway 101.

Systems 200 and 300 will also be collected via a combination of roof drains via gravity and pumped discharge to the BMPs and will outlet through the face of curb to mimic existing drainage patterns.

4. HYDROLOGY CRITERIA, METHODOLOGY, AND RESULTS

This section of the report summarizes the drainage criteria that were used in the hydrologic analysis and key elements of the methodology. Also included is a description of the computer model used in the computations.

4.1 Hydrology Criteria

The drainage basins were delineated using available topography and the preliminary proposed grading layout for the project. Table 1 summarizes the key hydrology assumptions and criteria used for the hydrologic modeling. The runoff coefficient for each sub-area in the model was

determined by estimating the percent imperviousness of the sub-area and selecting a corresponding runoff coefficient per Table 3-1 of the County of San Diego Hydrology Manual. (Refer to Appendix 1 for the C values tables for each System analyzed). Note that the NRCS soil maps indicate Soil type B throughout the project site, which represents soil types with moderate infiltration capacity.

Table 1: Hydrology Criteria

Existing and Proposed Hydrology:	100-year storm frequency for storm drain design and 5-, 25-, and 50-year storm frequency for detention. The 100-year, 6- and 24-hour precipitation values are 2.4 and 3.9 inches, respectively.
Soil Type:	Hydrologic Soil Group B
Land Use / Runoff Coefficients:	Based on criteria presented in the 2003 County of San Diego Hydrology Manual.
Rainfall intensity:	Based on intensity duration frequency relationships presented in the 2003 County of San Diego Hydrology Manual.

4.2 Hydrologic Methodology

The Modified Rational Method was used to determine the peak discharge flows for the design of the storm drain improvements. The existing topography and the proposed preliminary grading plan were used to delineate the individual drainage areas for each System. For existing conditions, a variety of runoff coefficients were utilized to represent the variety of imperviousness ratios throughout the site (including single family, commercial, and industrial). For proposed conditions, the land uses within the drainage basins range from approximately 80 to 95 percent impervious.

The goal of the Project hydrology analysis was to:

- Determine existing and design peak 100-year flows for the sizing of the onsite storm drain system gutters, curb outlets, and underground storm drain pipes that convey flow to the discharge locations.

- Verify that the Project does not adversely impact the existing City storm drain improvements or natural drainage. A comparative analysis was performed between the existing peak 50-year discharge and project peak 50-year discharge at various locations. City requirements dictate that projects are required to provide detention for any increases in peak flows for the 5-, 25-, and 50-year storm events.

4.3 Description of Hydrologic Modeling Software

The Modified Rational Method was used to determine the peak storm flow for the design of the storm system. The Advanced Engineering Software (AES) Rational Method Program was used to perform the hydrologic calculations. This section provides a brief explanation of the computational procedure used in the computer model.

The AES Modified Rational Method Hydrology Program is a computer-aided design program where the user develops a node link model of the watershed. Developing independent node link models for each interior watershed and linking these sub-models together at confluence points creates the node link model. The intensity-duration-frequency relationships are applied to each of the drainage areas in the model to get the peak flow rates at each point of interest.

4.4 Hydrology Results

The results of the Rational Method hydrology modeling is provided in Appendices 2 through 4 and the results are summarized in this section. The results will be discussed in terms of the three overall discharge areas. Table 2 summarizes the hydrology results for the project outfalls for the first overall drainage area for existing and proposed conditions.

Table 2: Hydrology Results

	EXISTING CONDITIONS					PROPOSED CONDITIONS				
Outfall of Interest	***Q_{100} (cfs)***	***Q_{50} (cfs)***	***Q_{25} (cfs)***	***Q_{5} (cfs)***	***Contrib. Area (acres)***	***Q_{100} (cfs)***	***Q_{50} (cfs)***	***Q_{25} (cfs)***	***Q_{5} (cfs)***	***Contrib. Area (acres)***
System 100 (To Highway 101)	2.8	2.6	2.2	1.6	0.50	2.8	2.6	2.2	1.6	0.50
System 200 (To S. Sierra - North)	2.0	1.7	1.4	1.0	0.76	4.2	4 undetained, 1.4 detained	3.3 undetained, 1.2 detained	2.5 undetained, 1.0 detained	0.80
System 300 (To S. Sierra - South)	3.5	3.4	2.8	2.1	0.88	3.4	3.2	2.7	2.0	0.80
Total:	**8.3**	**7.7**	**6.4**	**4.7**	**2.1**	**10.4**	**7.2**	**6.1**	**4.6**	**2.1**

Note that undetained peak flows increase over existing conditions for System 200 only. The minor increase in peak flow will be detained to less than the existing peak flow via the detention proposed with the pump that will collect the drainage areas collected from the podium. Therefore, the project will not adversely impact any of the downstream storm drain systems. The sump pump will be included in the bottom floor of the underground parking structure and will be designed by the plumbing engineer for the building. Final detention calculations will be included during final engineering, however, preliminary calculations are included in Appendix 5. During final engineering, the City will require a detention easement over the detention vault area. Maintenance of the detention facility and pumps will be the responsibility of the property owner.

5. HYDRAULIC CRITERIA, METHODOLOGY, AND RESULTS

Hydraulic calculations will be performed during final engineering. The preliminary design for the drainage improvements include curb outlets for the major drainage areas. Inlet, pipe, and curb outlet sizing will be performed during final engineering. Since the post-project condition will not increase flow rates, the downstream conveyance systems do not require analysis for this study. The City drainage policy requires a level of protection equal to the latest San Diego County standards. This standard includes providing adequate storm drain conveyance for the

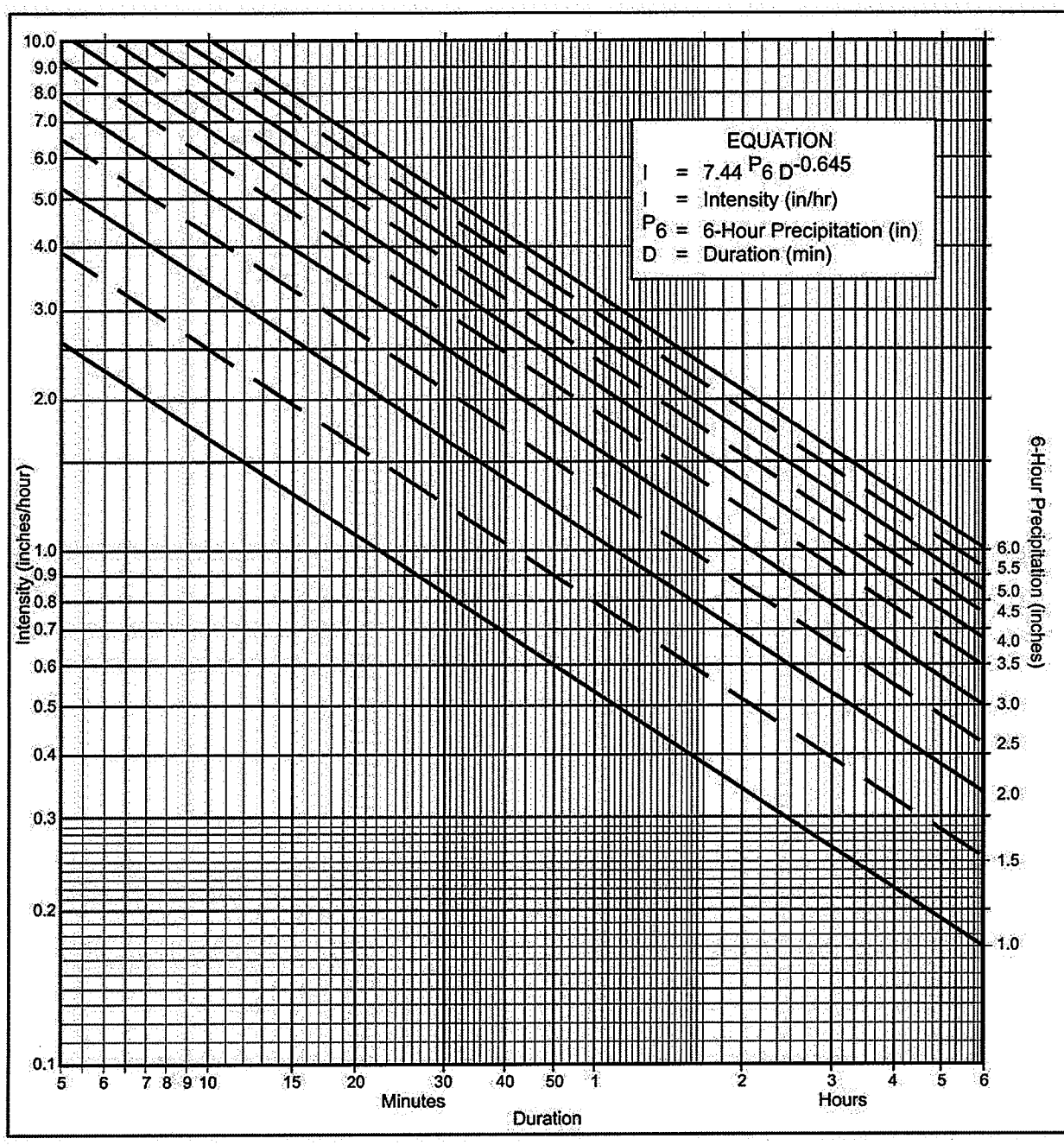
100-year event. The City drainage policy also requires detention for the 5-, 25-, and 50-year storm events.

6. CONCLUSION

This drainage report has been prepared in support of the preliminary design of the storm drain improvements for the entitlement package for Solana Beach 101. The purpose of this report is to provide peak discharges for use in designing the storm drain systems for the project and to verify that the preliminary grading and drainage plan are adequate for the proposed 100-year flows. The storm drain system will be sufficient to satisfy City criteria in the post-development condition. The project will incorporate detention during final engineering to demonstrate that proposed peak flow rates are less than or equal to pre-project peak flow rates. Preliminary estimates included herein indicate that the underground detention vault proposed for the northwest corner of the building will be sufficient to provide the necessary detention for peak events from the 5-, 25-, and 50-year storms.

APPENDIX 1

Supporting Documentation (Isopluvial Maps, Runoff Coefficients, FEMA FIRM Panel)



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 5 year

(b) P_6 = 1.4 in., P_{24} = 2.4, $\frac{P_6}{P_{24}}$ = 58 %(2)

(c) Adjusted P_6(2) = 1.4 in.

(d) t_x = _____ min.

(e) I = _____ in./hr.

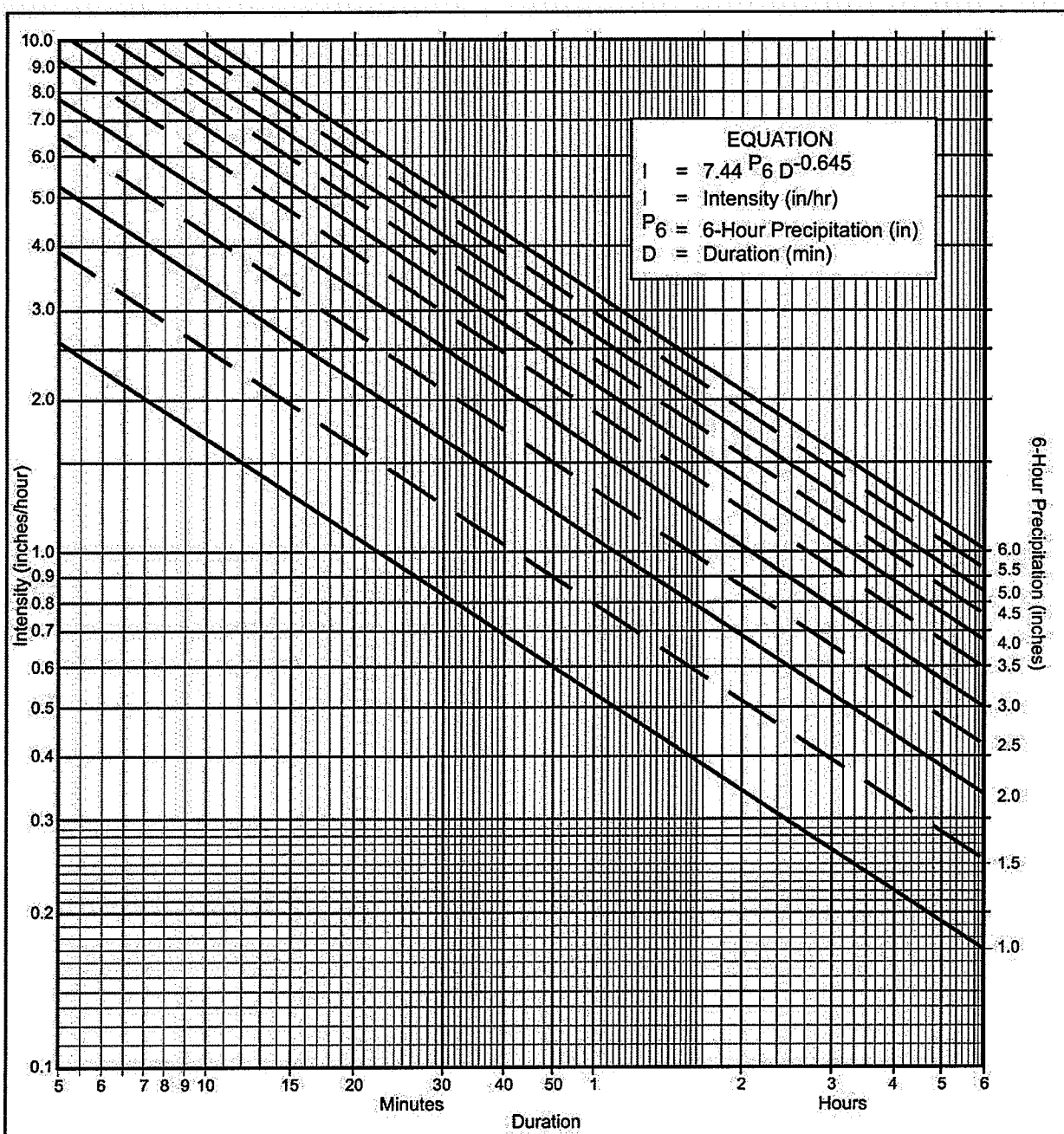
Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

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



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(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 25 year

(b) P_6 = 1.9 in., P_{24} = 3.3 , $\frac{P_6}{P_{24}}$ = 58 %(2)

(c) Adjusted P_6(2) = 1.9 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
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Intensity-Duration Design Chart - Template

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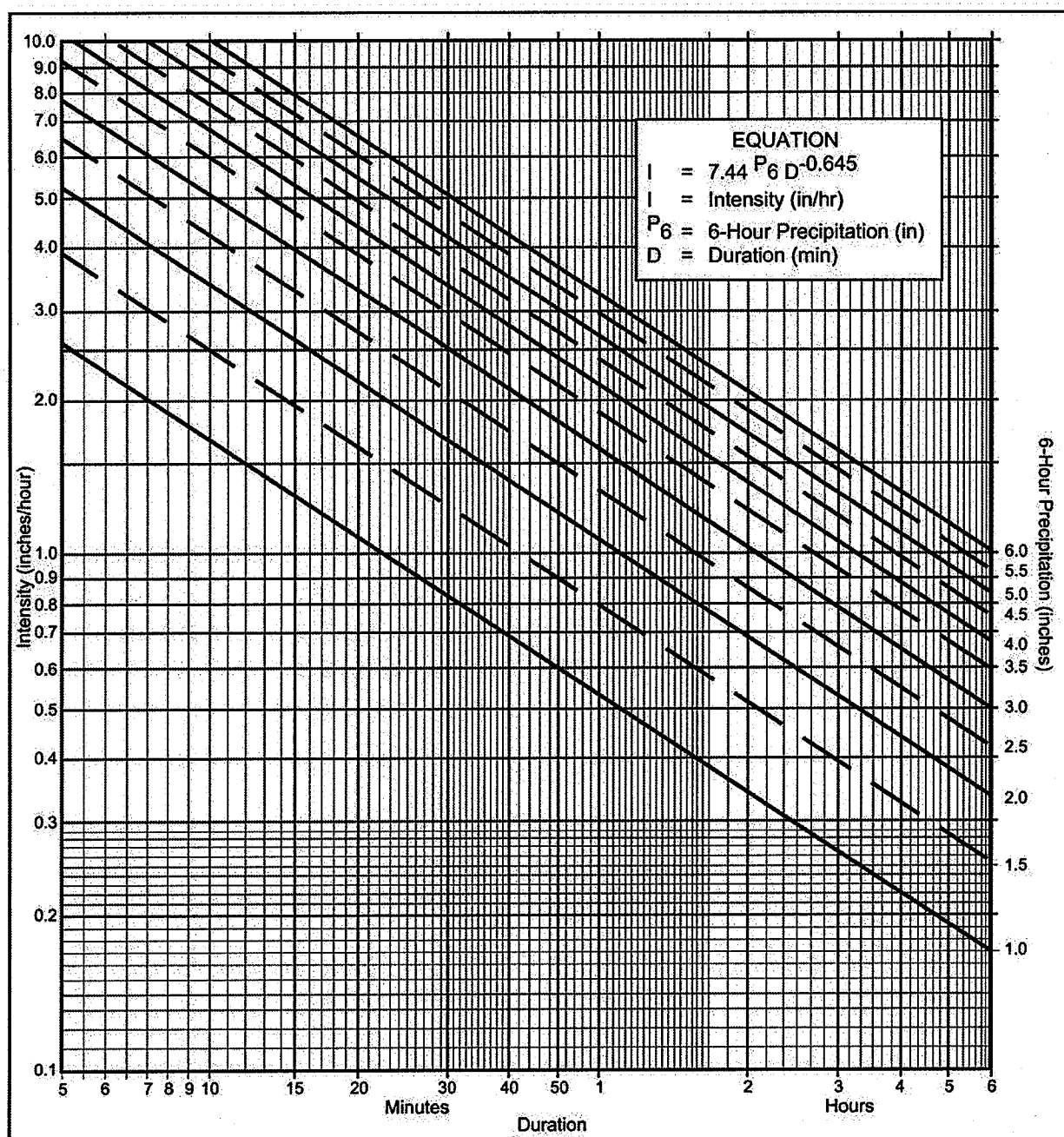
3-1



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(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 50 year

(b) P_6 = 2.3 in., P_{24} = 3.8, $\frac{P_6}{P_{24}}$ = 60 %(2)

(c) Adjusted $P_6^{(2)}$ = 2.3 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
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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
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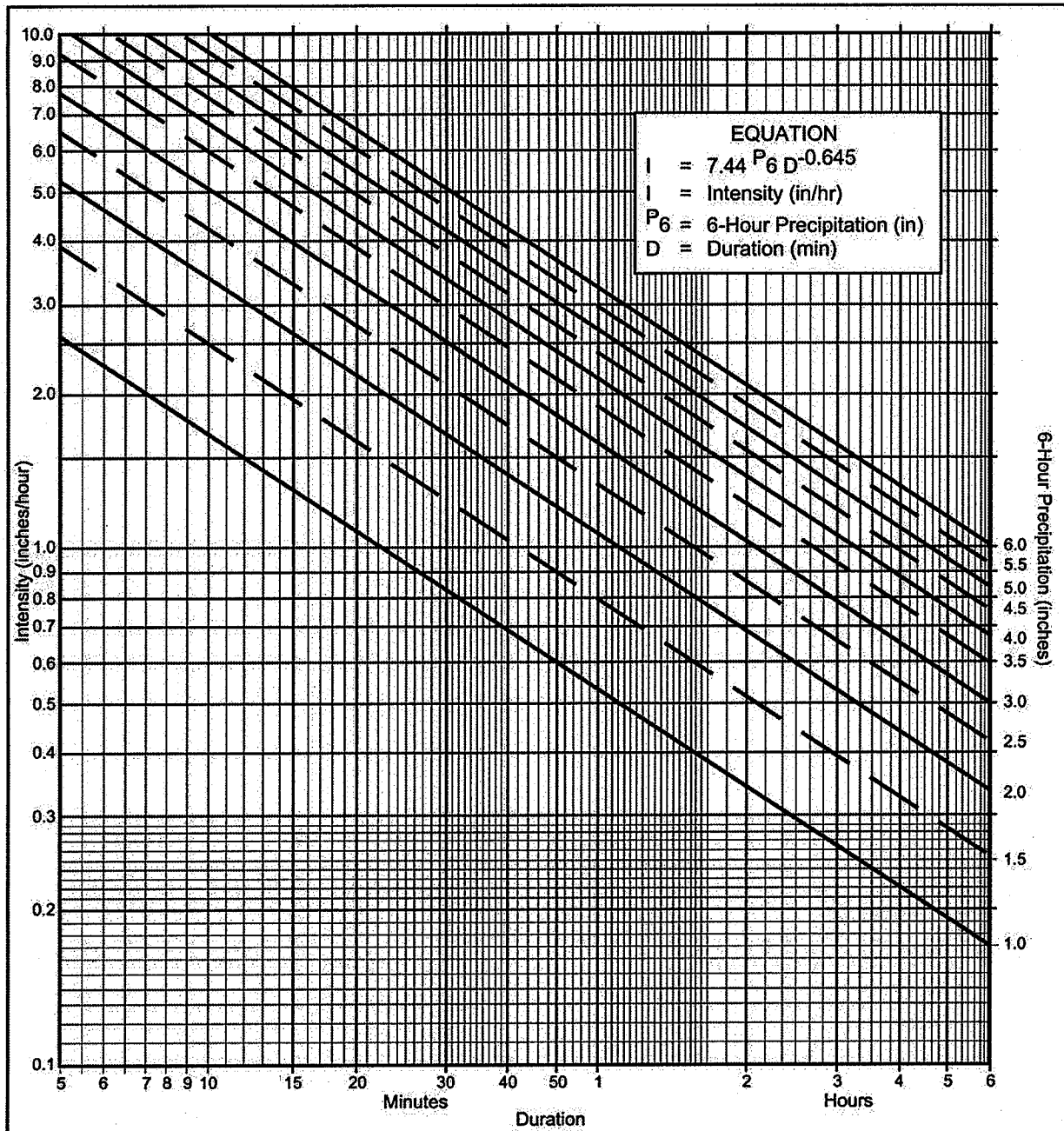
Intensity-Duration Design Chart - Template

FIGURE

3-1



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(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 100 year

(b) P_6 = 2.4 in., P_{24} = 3.9, $\frac{P_6}{P_{24}}$ = 62 %(2)

(c) Adjusted P_6(2) = 2.4 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

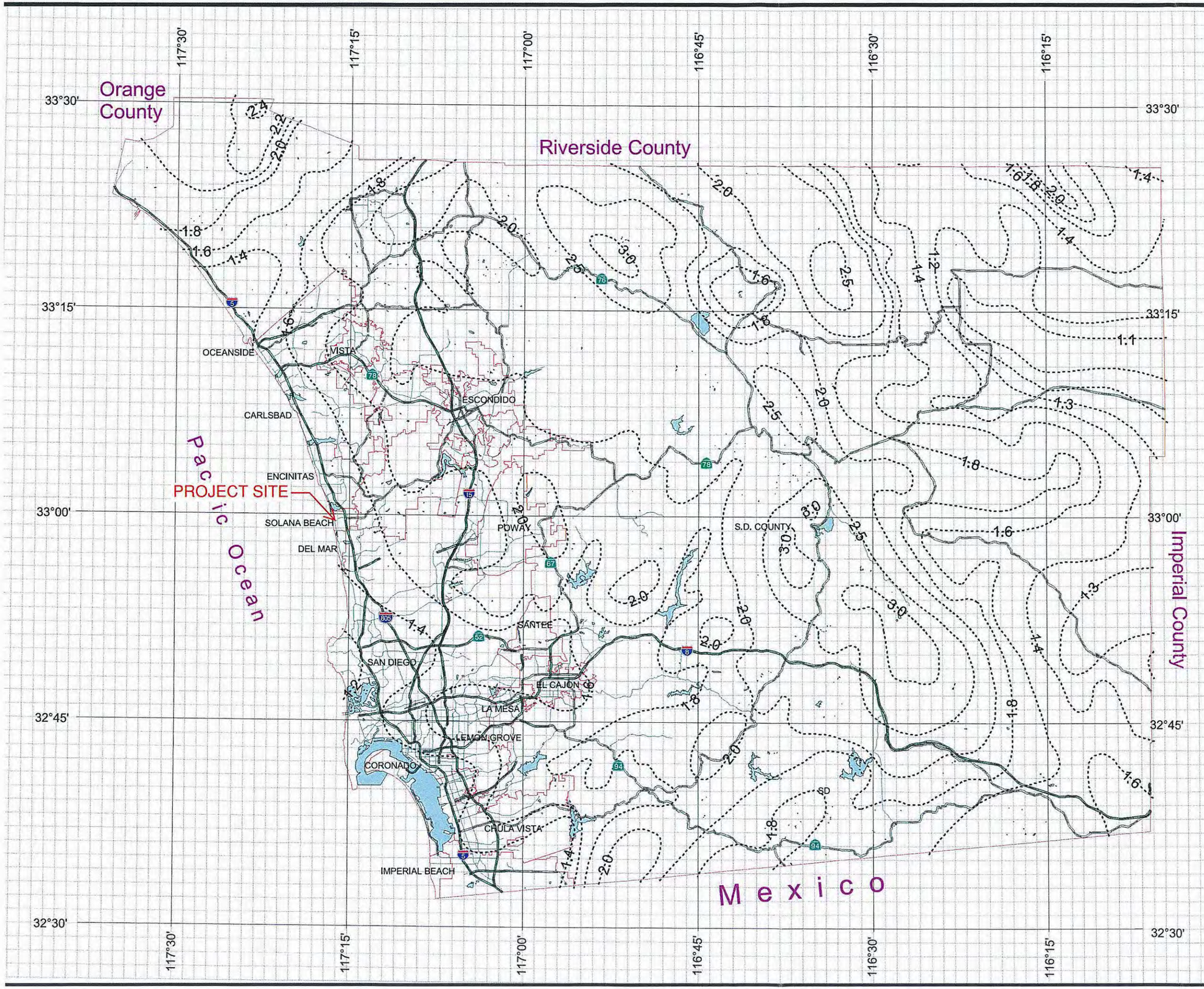
3-1

County of San Diego Hydrology Manual

Rainfall Isopluvials

5 Year Rainfall Event - 6 Hours

Isopluvial (inches)



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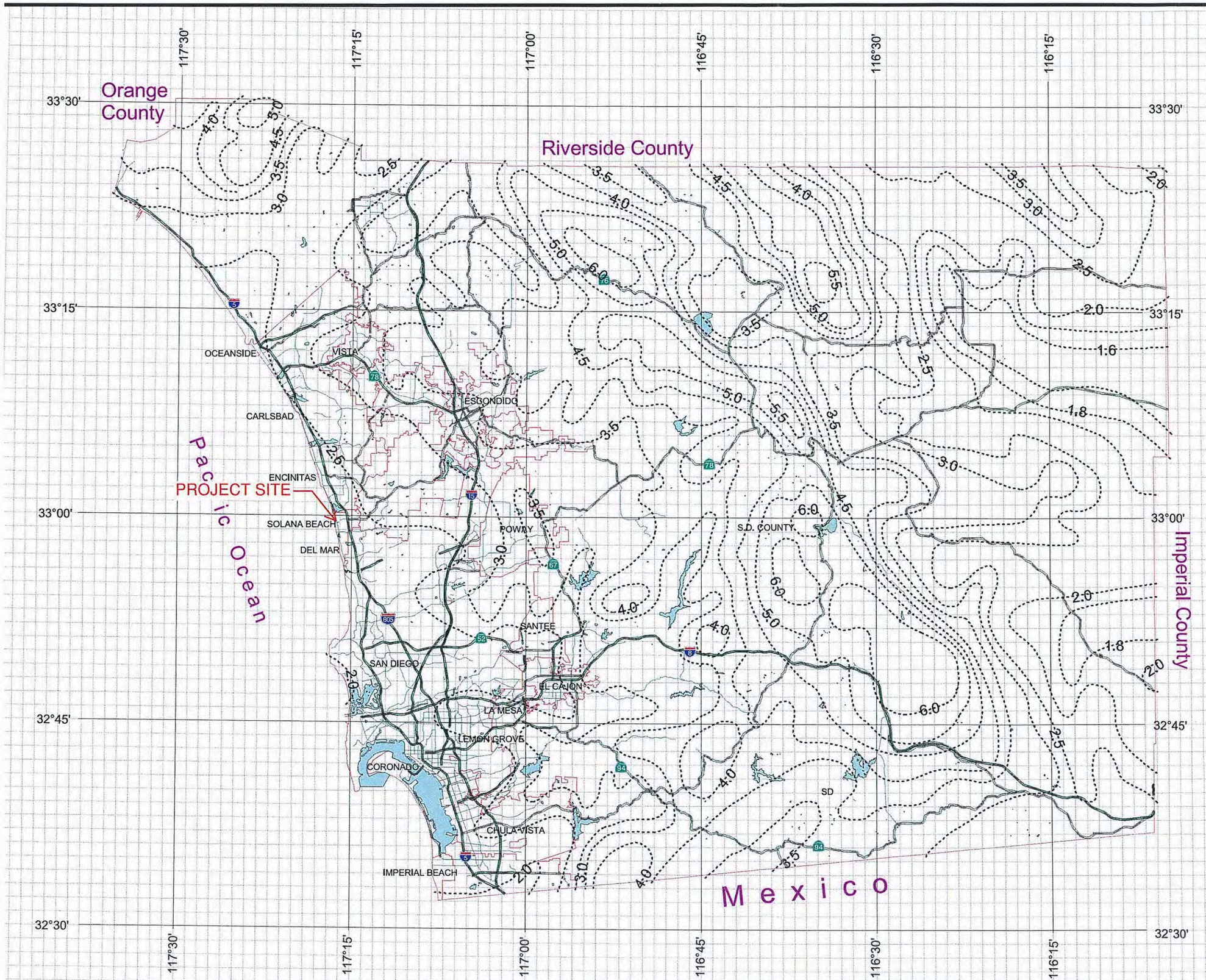
County of San Diego Hydrology Manual

Rainfall Isopluvials

5 Year Rainfall Event - 24 Hours

Isopluvial (inches)



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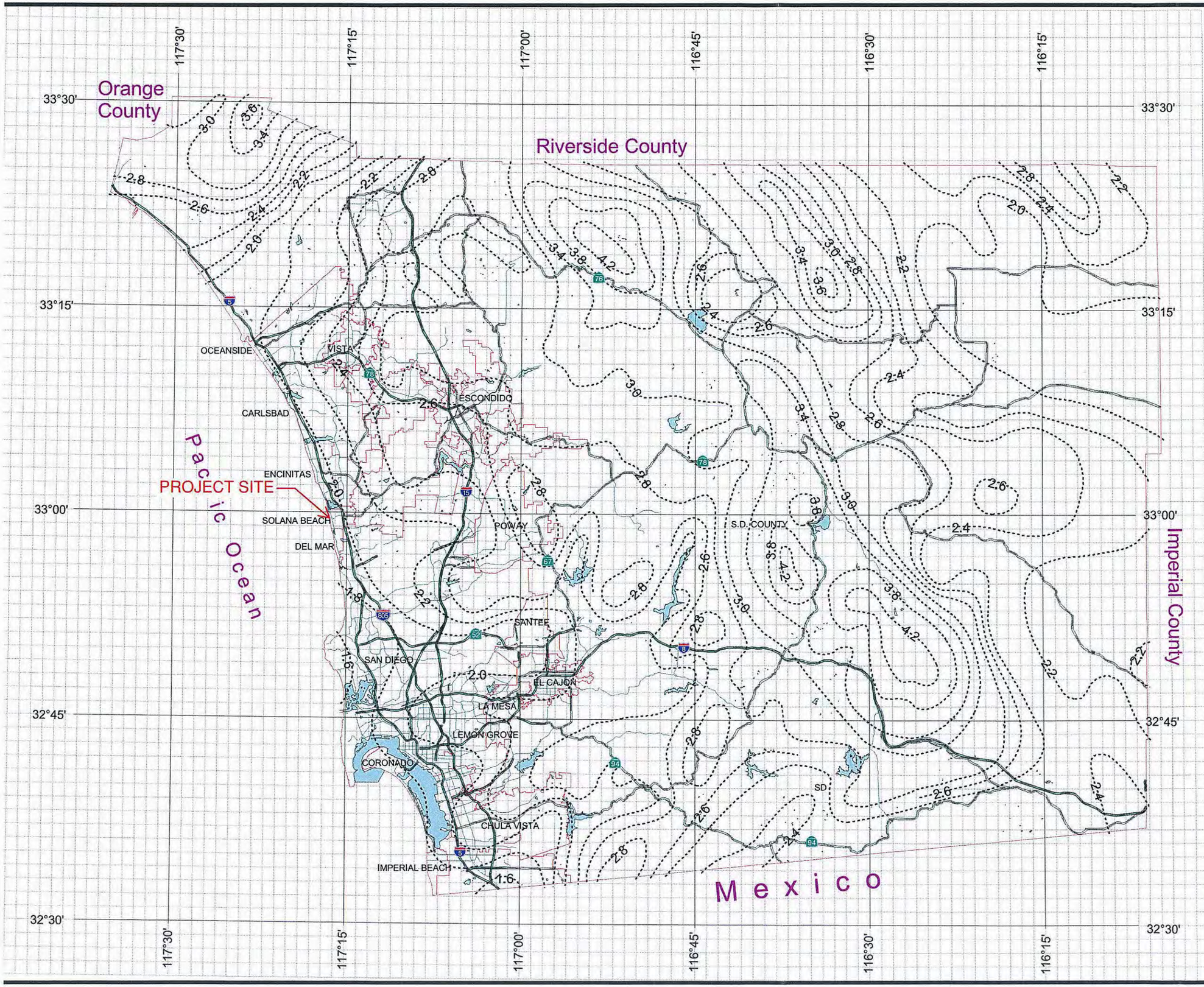
Rainfall Isopluvials

25 Year Rainfall Event - 6 Hours

Isopluvial (inches)



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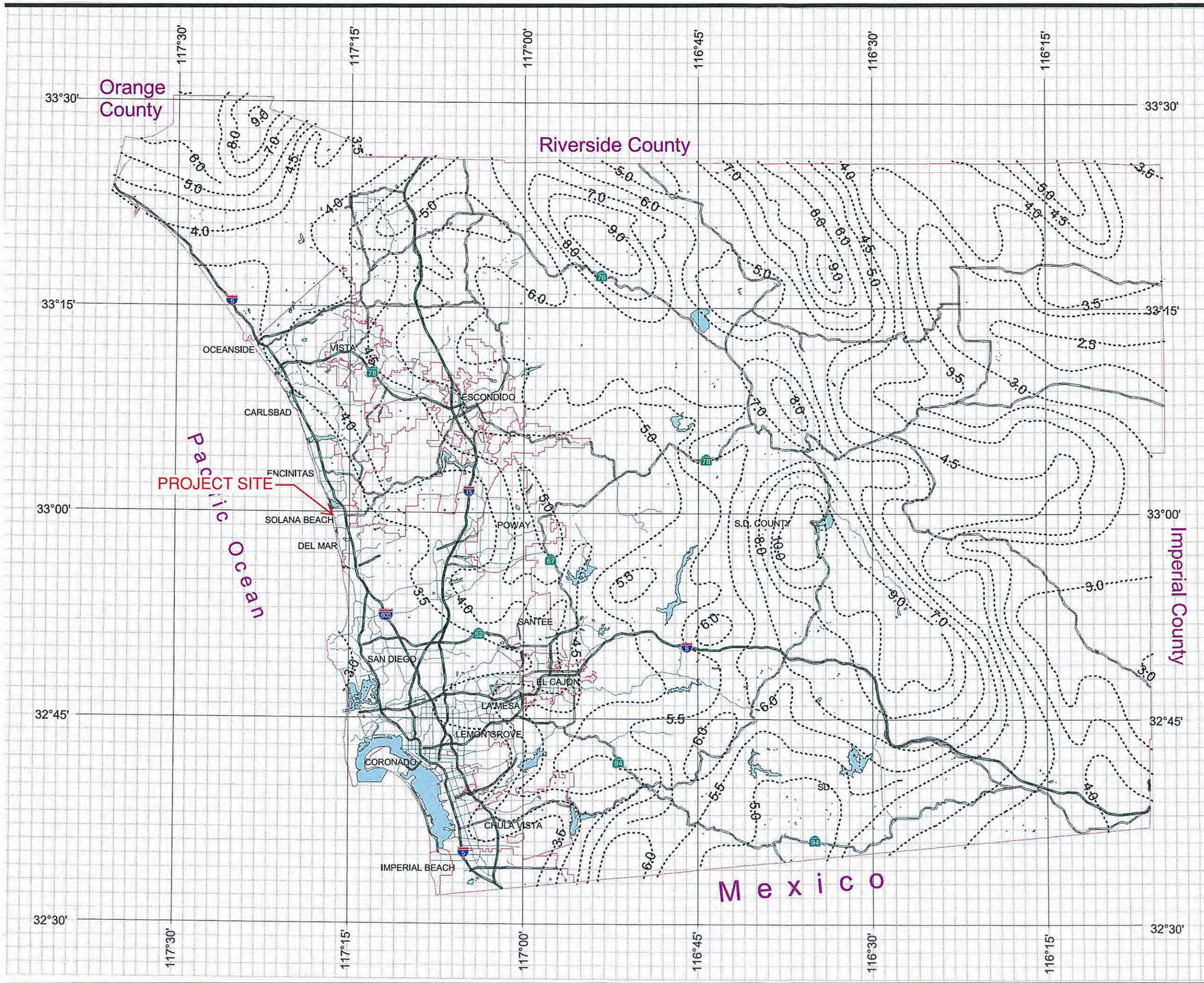
Rainfall Isopluvials

25 Year Rainfall Event - 24 Hours

Isopluvial (inches)



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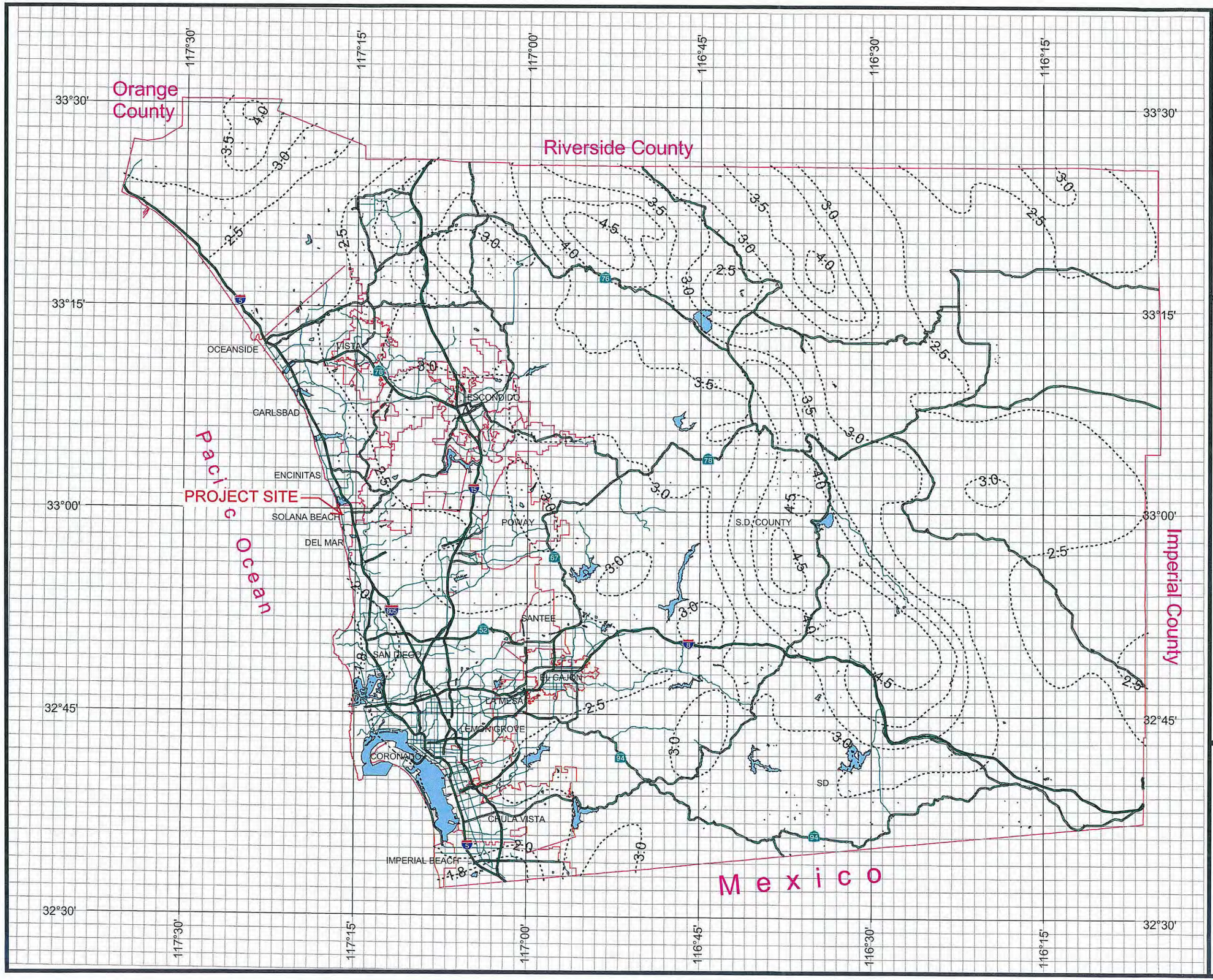
County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 6 Hours

-------- Isopluvial (inches)



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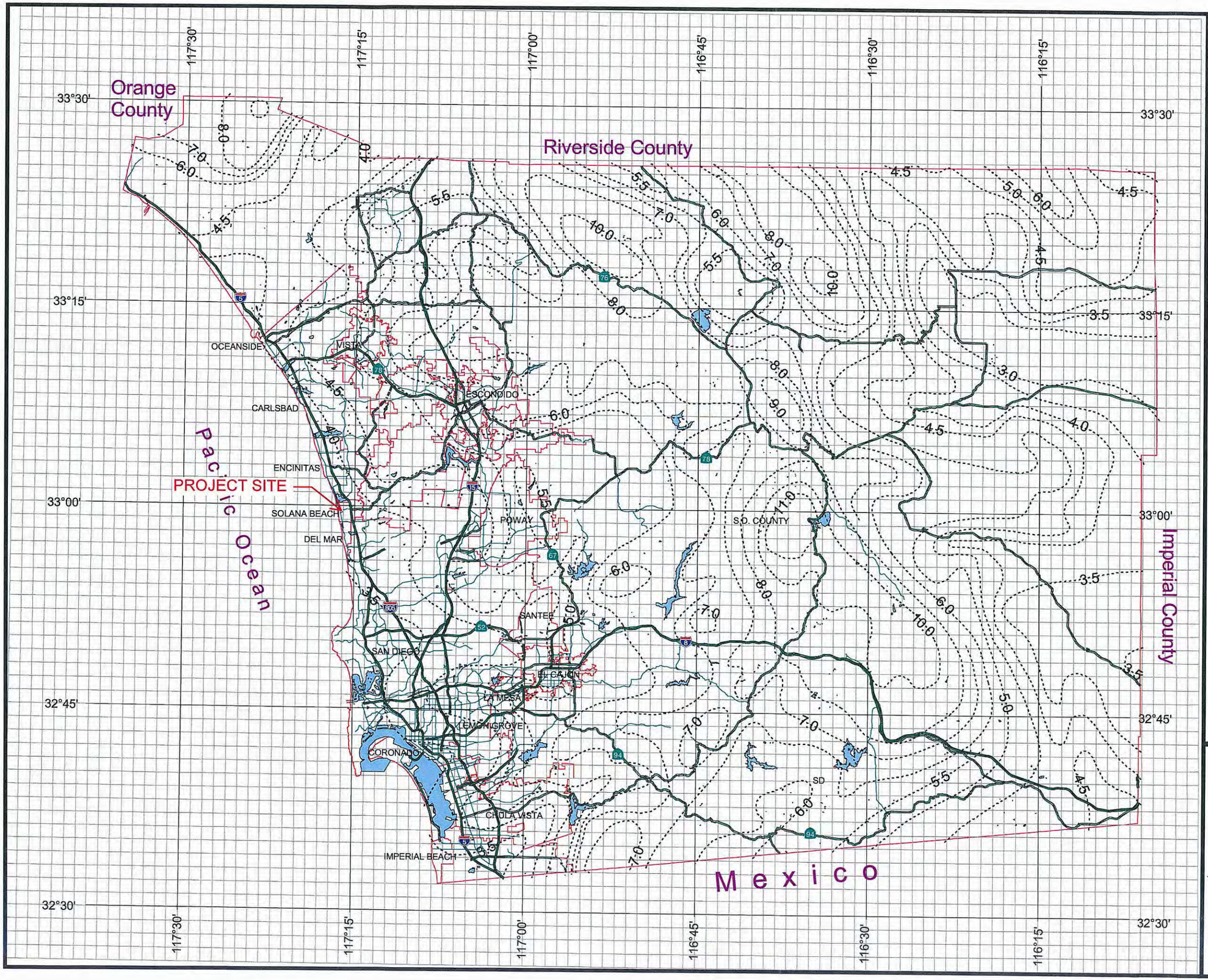
County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 24 Hours

Isopluvial (inches)



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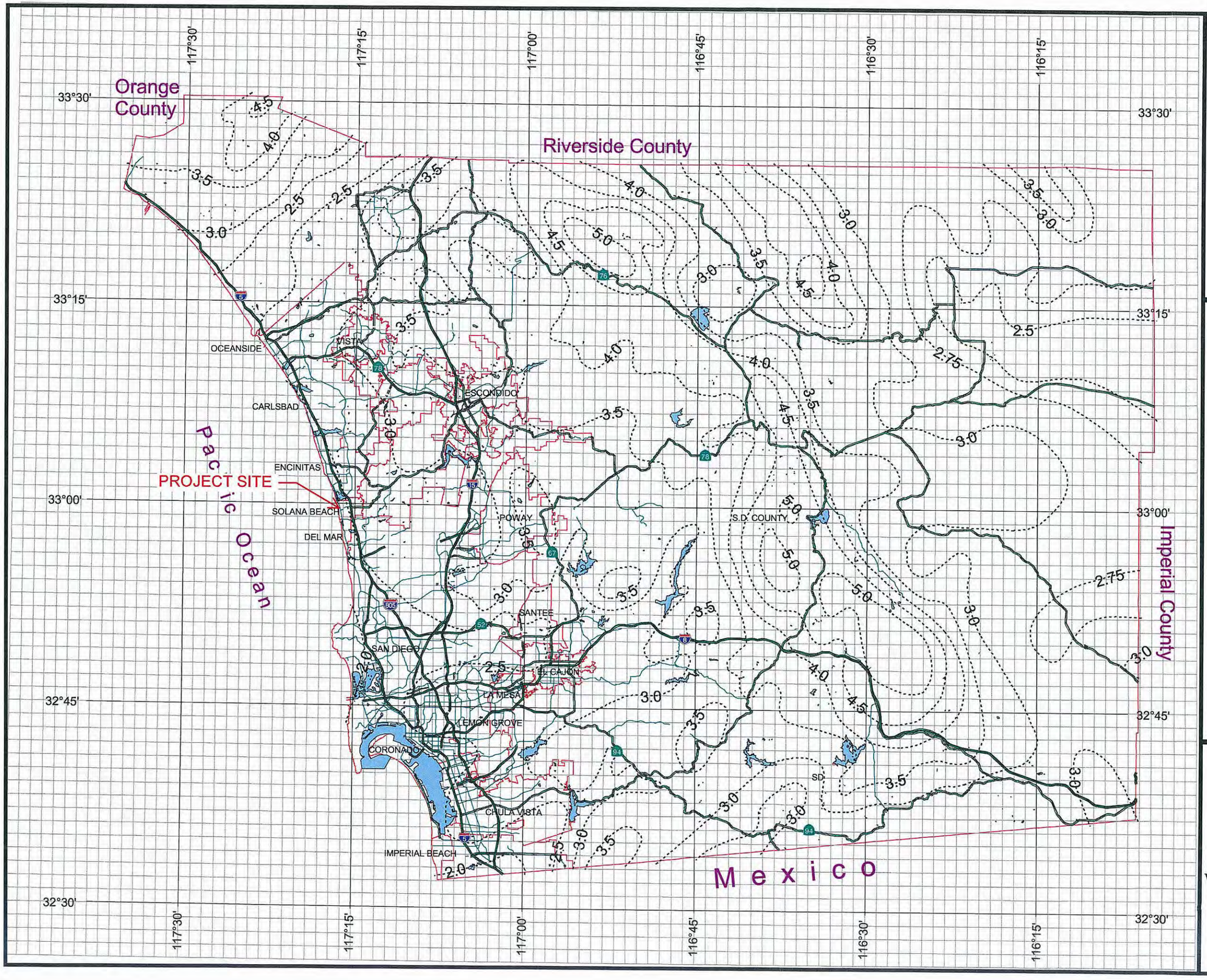
County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)



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Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

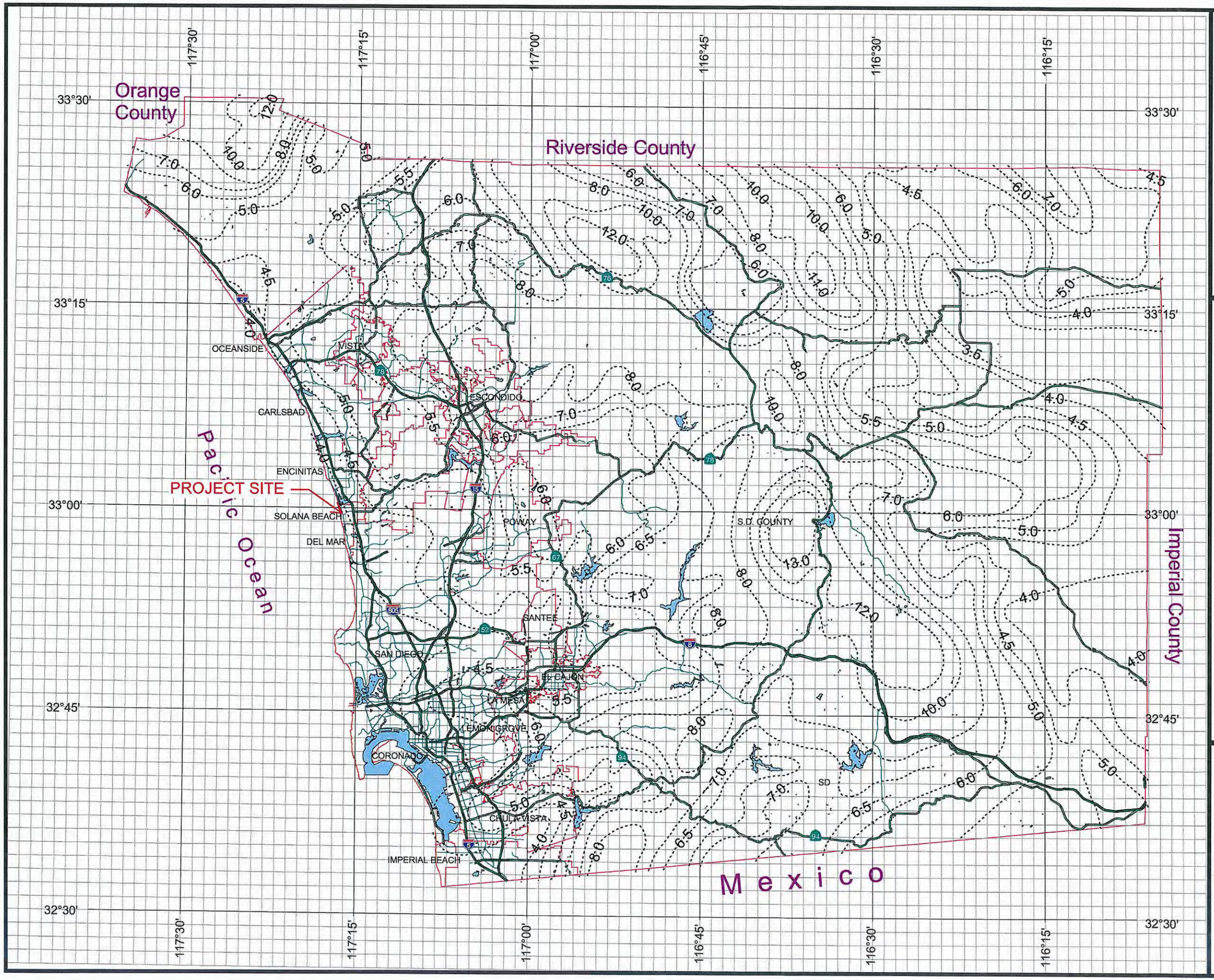

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Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

SYSTEM 100 EXISTING

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

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

SYSTEM 100 PROPOSED

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	$\boxed{0.84}$	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
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Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

SYSTEM 200 EXISTING

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

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SYSTEM 200 PROPOSED

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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
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Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

SYSTEM 300 EXISTING

Land Use		Runoff Coefficient "C"				
			Soil Type			
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Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
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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
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Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
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SYSTEM 300 PROPOSED

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RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
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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

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DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

Hydrologic Soil Group—San Diego County Area, California

Map Scale: 1:816 if printed on A landscape (11" x 8.5") sheet.

Meters: 0 10 20 40 60

Feet: 0 35 70 140 210

N

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: http://websoilsurvey.nrcs.usda.gov
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 10, Sep 12, 2016

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

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

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — San Diego County Area, California (CA638)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MIC	Marina loamy coarse sand, 2 to 9 percent slopes	B	2.0	100.0%
Totals for Area of Interest			**2.0**	**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

ance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

0 250 500 750 1,000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1307G

FIRM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 1307 OF 2375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DEL MAR, CITY OF	060288	1307	G
ENCINITAS, CITY OF	060726	1307	G
SAN DIEGO, CITY OF	060295	1307	G
SOLANA BEACH, CITY OF	060725	1307	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06073C1307G

MAP REVISED
MAY 16, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

APPENDIX 2

100-Year Existing Conditions Rational Method Computer Output

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                       2003,1985,1981 HYDROLOGY MANUAL
       (c) Copyright 1982-2012 Advanced Engineering Software (aes)
           Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                        Analysis prepared by:


 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                              *
* EXISTING CONDITIONS                                                      *
* SYSTEM 100                                                               *
 ****************************************************************************

  FILE NAME: S100E100.DAT
  TIME/DATE OF STUDY: 17:08 11/28/2016
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ====== =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =     69.20
  DOWNSTREAM ELEVATION(FEET) =     67.00
```

```
ELEVATION DIFFERENCE(FEET) =       2.20
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.787
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =       0.28
TOTAL AREA(ACRES) =       0.05   TOTAL RUNOFF(CFS) =       0.28

****************************************************************************
FLOW PROCESS FROM NODE    105.00 TO NODE    190.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =     67.00  DOWNSTREAM(FEET) =     66.00
CHANNEL LENGTH THRU SUBAREA(FEET) =    53.00   CHANNEL SLOPE =  0.0189
CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  20.000
MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "B"
S.C.S. CURVE NUMBER (AMC II) =  96
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.51
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.63
AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   0.34
Tc(MIN.) =    2.12
SUBAREA AREA(ACRES) =     0.45       SUBAREA RUNOFF(CFS) =    2.48
AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       2.75

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   2.98
LONGEST FLOWPATH FROM NODE    100.00 TO NODE    190.00 =     103.00 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =        0.5  TC(MIN.) =      2.12
PEAK FLOW RATE(CFS)    =       2.75
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2012 Advanced Engineering Software (aes)
            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                          Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                              *
* EXISTING CONDITIONS                                                      *
* SYSTEM 200                                                               *
 ****************************************************************************

  FILE NAME: S200E100.DAT
  TIME/DATE OF STUDY: 17:54 01/16/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5800
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  80
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    66.00
  UPSTREAM ELEVATION(FEET) =     68.90
  DOWNSTREAM ELEVATION(FEET) =     68.00
```

```
  ELEVATION DIFFERENCE(FEET) =       0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =     6.857
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.158
  SUBAREA RUNOFF(CFS) =       0.51
  TOTAL AREA(ACRES) =       0.17   TOTAL RUNOFF(CFS) =       0.51

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    290.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     68.00  DOWNSTREAM(FEET) =     59.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   239.00   CHANNEL SLOPE =  0.0343
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.610
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5800
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  80
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.30
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.06
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   1.30
  Tc(MIN.) =    8.16
  SUBAREA AREA(ACRES) =     0.59       SUBAREA RUNOFF(CFS) =    1.58
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.580
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       2.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   3.53
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    290.00 =     305.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.8  TC(MIN.) =      8.16
  PEAK FLOW RATE(CFS)   =       2.03
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2012 Advanced Engineering Software (aes)
            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                          Analysis prepared by:



 ************************* DESCRIPTION OF STUDY *************************
* 4242 SOLANA                                                           *
* EXISTING CONDITIONS                                                   *
* SYSTEM 300                                                            *
 ************************************************************************

  FILE NAME: S300E100.DAT
  TIME/DATE OF STUDY: 13:55 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    305.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    63.00
  UPSTREAM ELEVATION(FEET) =     68.30
  DOWNSTREAM ELEVATION(FEET) =     67.40
```

```
  ELEVATION DIFFERENCE(FEET) =       0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.918
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =       0.33
  TOTAL AREA(ACRES) =       0.06   TOTAL RUNOFF(CFS) =       0.33

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    315.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   67.40  DOWNSTREAM ELEVATION(FEET) =   66.50
  STREET LENGTH(FEET) =    62.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0175
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.83
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
  STREET FLOW TRAVEL TIME(MIN.) =   0.57   Tc(MIN.) =    3.49
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       1.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.37
  FLOW VELOCITY(FEET/SEC.) =  2.00   DEPTH*VELOCITY(FT*FT/SEC.) =   0.55
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    315.00 =     125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    390.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   66.50  DOWNSTREAM ELEVATION(FEET) =   59.90
  STREET LENGTH(FEET) =   166.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0175
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.54
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.25
  HALFSTREET FLOOD WIDTH(FEET) =    6.20
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.07
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
STREET FLOW TRAVEL TIME(MIN.) =   0.90   Tc(MIN.) =    4.39
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "B"
S.C.S. CURVE NUMBER (AMC II) =  96
AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
SUBAREA AREA(ACRES) =    0.08      SUBAREA RUNOFF(CFS) =    0.44
TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.76

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.65
FLOW VELOCITY(FEET/SEC.) =  3.14   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
LONGEST FLOWPATH FROM NODE    300.00 TO NODE    390.00 =     291.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    320.00 TO NODE    390.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6700
SOIL CLASSIFICATION IS "B"
S.C.S. CURVE NUMBER (AMC II) =  85
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8006
SUBAREA AREA(ACRES) =    0.17   SUBAREA RUNOFF(CFS) =    0.72
TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       2.48
TC(MIN.) =    4.39

****************************************************************************
FLOW PROCESS FROM NODE    325.00 TO NODE    330.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
*USER SPECIFIED(SUBAREA):
RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .3500
S.C.S. CURVE NUMBER (AMC II) =  85
AREA-AVERAGE RUNOFF COEFFICIENT = 0.6193
SUBAREA AREA(ACRES) =    0.33   SUBAREA RUNOFF(CFS) =    0.73
TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.21
TC(MIN.) =    4.39

****************************************************************************
FLOW PROCESS FROM NODE    330.00 TO NODE    390.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "B"
S.C.S. CURVE NUMBER (AMC II) =  96
AREA-AVERAGE RUNOFF COEFFICIENT = 0.6364
SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.33
TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       3.54
TC(MIN.) =    4.39
==============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =        0.9  TC(MIN.) =      4.39
PEAK FLOW RATE(CFS)    =       3.54
==============================================================================
==============================================================================
END OF RATIONAL METHOD ANALYSIS
```

3

APPENDIX 3

100-Year Proposed Conditions Rational Method Computer Output

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2012 Advanced Engineering Software (aes)
             Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                          Analysis prepared by:



 ************************* DESCRIPTION OF STUDY *************************
* 4242 SOLANA                                                           *
* PROPOSED CONDITIONS                                                   *
* SYSTEM 100                                                            *
 ************************************************************************

  FILE NAME: S100P100.DAT
  TIME/DATE OF STUDY: 13:35 12/01/2016
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =     77.40
  DOWNSTREAM ELEVATION(FEET) =     77.00
```

```
  ELEVATION DIFFERENCE(FEET) =      0.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.912
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    53.33
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     67.00  DOWNSTREAM(FEET) =    66.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    53.00   CHANNEL SLOPE =  0.0189
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.82
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.18
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   0.41
  Tc(MIN.) =    4.32
  SUBAREA AREA(ACRES) =     0.17       SUBAREA RUNOFF(CFS) =    0.90
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.840
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       1.27

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   2.44
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =    113.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8400
  SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.42
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.70
  TC(MIN.) =    4.32

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
```

```
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8400
  SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.16
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.86
  TC(MIN.) =    4.32

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8400
  SUBAREA AREA(ACRES) =    0.17   SUBAREA RUNOFF(CFS) =    0.90
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       2.76
  TC(MIN.) =    4.32

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    190.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    64.00  DOWNSTREAM(FEET) =    63.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.32
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.76
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    4.45
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    190.00 =     163.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.5  TC(MIN.) =      4.45
  PEAK FLOW RATE(CFS)    =       2.76
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2012 Advanced Engineering Software (aes)
            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                          Analysis prepared by:


 ************************* DESCRIPTION OF STUDY *************************
* 4242 SOLANA                                                           *
* PROPOSED CONDITIONS                                                   *
* SYSTEM 200                                                            *
 ************************************************************************

  FILE NAME: S200P100.DAT
  TIME/DATE OF STUDY: 15:48 11/29/2016
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8000
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =     73.50
  DOWNSTREAM ELEVATION(FEET) =     73.00
```

```
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.320
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    56.67
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.86

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8000
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8000
  SUBAREA AREA(ACRES) =    0.54   SUBAREA RUNOFF(CFS) =    2.73
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       3.59
  TC(MIN.) =    4.32

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    220.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    62.00  DOWNSTREAM(FEET) =    61.20
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.16
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.59
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    4.33
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =      70.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    290.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   60.70  DOWNSTREAM ELEVATION(FEET) =   59.80
  STREET LENGTH(FEET) =    47.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0175
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.90
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.35
  HALFSTREET FLOOD WIDTH(FEET) =   11.22
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.83
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.99
STREET FLOW TRAVEL TIME(MIN.) =   0.28   Tc(MIN.) =    4.61
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8000
SOIL CLASSIFICATION IS "B"
S.C.S. CURVE NUMBER (AMC II) =  92
AREA-AVERAGE RUNOFF COEFFICIENT =  0.800
SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.61
TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.20

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.57
FLOW VELOCITY(FEET/SEC.) =  2.88   DEPTH*VELOCITY(FT*FT/SEC.) =   1.03
LONGEST FLOWPATH FROM NODE    200.00 TO NODE    290.00 =     117.00 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =        0.8  TC(MIN.) =      4.61
PEAK FLOW RATE(CFS)    =       4.20
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                       2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2012 Advanced Engineering Software (aes)
            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                          Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                              *
* PROPOSED CONDITIONS                                                      *
* SYSTEM 300                                                               *
 ****************************************************************************

  FILE NAME: S300P100.DAT
  TIME/DATE OF STUDY: 14:42 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    305.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =     79.80
  DOWNSTREAM ELEVATION(FEET) =     79.50
```

```
  ELEVATION DIFFERENCE(FEET) =       0.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.187
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.91
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.175
  SUBAREA RUNOFF(CFS) =       0.29
  TOTAL AREA(ACRES) =       0.06   TOTAL RUNOFF(CFS) =       0.29

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    315.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    67.30  DOWNSTREAM(FEET) =    66.60
  FLOW LENGTH(FEET) =    17.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.29
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.25
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    315.00 =      72.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    390.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   67.10  DOWNSTREAM ELEVATION(FEET) =   59.90
  STREET LENGTH(FEET) =   188.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0175
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.06
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.56
  STREET FLOW TRAVEL TIME(MIN.) =   1.16   Tc(MIN.) =    6.42
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.382
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.770
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    0.95
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.20
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.44
  FLOW VELOCITY(FEET/SEC.) =  2.91   DEPTH*VELOCITY(FT*FT/SEC.) =   0.68
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    390.00 =     260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    390.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.382
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.13   SUBAREA RUNOFF(CFS) =    0.54
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.74
  TC(MIN.) =    6.42

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    330.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.382
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.28   SUBAREA RUNOFF(CFS) =    1.16
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.90
  TC(MIN.) =    6.42

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    390.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.382
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.46
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.36
  TC(MIN.) =    6.42
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.8  TC(MIN.) =      6.42
  PEAK FLOW RATE(CFS)   =       3.36
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

4

APPENDIX 4

5, 25, & 50-Year Existing & Proposed Conditions Rational Method Computer Output

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                     2003,1985,1981 HYDROLOGY MANUAL
       (c) Copyright 1982-2012 Advanced Engineering Software (aes)
           Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                     Analysis prepared by:


 ************************* DESCRIPTION OF STUDY *************************
* 4242 SOLANA                                                            *
* EXISTING CONDITIONS                                                    *
* SYSTEM 100                                                             *
 ************************************************************************

  FILE NAME: S100E05.DAT
  TIME/DATE OF STUDY: 15:15 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =   5.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  =====  ====  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =     69.20
  DOWNSTREAM ELEVATION(FEET) =     67.00
  ELEVATION DIFFERENCE(FEET) =      2.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.787
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
```



```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    190.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     67.00  DOWNSTREAM(FEET) =     66.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    53.00   CHANNEL SLOPE =  0.0189
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.88
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.14
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   0.41
  Tc(MIN.) =    2.20
  SUBAREA AREA(ACRES) =     0.45       SUBAREA RUNOFF(CFS) =    1.44
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       1.60

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   2.60
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    190.00 =     103.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.5  TC(MIN.) =      2.20
  PEAK FLOW RATE(CFS)    =       1.60
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

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            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
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            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                        Analysis prepared by:



 ************************* DESCRIPTION OF STUDY *************************
* 4242 SOLANA                                                            *
* EXISTING CONDITIONS                                                    *
* SYSTEM 100                                                             *
 ************************************************************************

  FILE NAME: S100E25.DAT
  TIME/DATE OF STUDY: 15:16 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.900
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =     69.20
  DOWNSTREAM ELEVATION(FEET) =     67.00
  ELEVATION DIFFERENCE(FEET) =      2.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.787
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.006
```



```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    190.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     67.00  DOWNSTREAM(FEET) =     66.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    53.00   CHANNEL SLOPE =  0.0189
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.006
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.35
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   0.38
  Tc(MIN.) =    2.16
  SUBAREA AREA(ACRES) =     0.45       SUBAREA RUNOFF(CFS) =    1.96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       2.18

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =   2.91
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    190.00 =     103.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.5  TC(MIN.) =      2.16
  PEAK FLOW RATE(CFS)    =       2.18
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

□

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

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                     Analysis prepared by:


 ************************* DESCRIPTION OF STUDY *************************
* 4242 SOLANA                                                            *
* EXISTING CONDITIONS                                                    *
* SYSTEM 100                                                             *
 ************************************************************************

  FILE NAME: S100E50.DAT
  TIME/DATE OF STUDY: 13:37 12/01/2016
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  =====  ====  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =     69.20
  DOWNSTREAM ELEVATION(FEET) =     67.00
  ELEVATION DIFFERENCE(FEET) =      2.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.787
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
```



```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =       0.26
  TOTAL AREA(ACRES) =       0.05   TOTAL RUNOFF(CFS) =       0.26

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    190.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     67.00  DOWNSTREAM(FEET) =     66.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    53.00   CHANNEL SLOPE =  0.0189
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.52
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   0.35
  Tc(MIN.) =    2.14
  SUBAREA AREA(ACRES) =     0.45       SUBAREA RUNOFF(CFS) =    2.37
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       2.64

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   3.01
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    190.00 =     103.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      2.14
  PEAK FLOW RATE(CFS)   =       2.64
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
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            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                        Analysis prepared by:


 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                              *
* PROPOSED CONDITIONS                                                      *
* SYSTEM 100                                                               *
 ****************************************************************************

  FILE NAME: S100P05.DAT
  TIME/DATE OF STUDY: 15:20 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =   5.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ====  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =     77.40
  DOWNSTREAM ELEVATION(FEET) =     77.00
  ELEVATION DIFFERENCE(FEET) =      0.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.912
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```



```
          THE MAXIMUM OVERLAND FLOW LENGTH =    53.33
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     67.00  DOWNSTREAM(FEET) =     66.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    53.00   CHANNEL SLOPE =  0.0189
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR = 20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.48
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.89
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.47
  Tc(MIN.) =    4.38
  SUBAREA AREA(ACRES) =     0.17       SUBAREA RUNOFF(CFS) =    0.53
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.840
  TOTAL AREA(ACRES) =        0.2          PEAK FLOW RATE(CFS) =       0.74

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.22
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =     113.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8400
  SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.25
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       0.99
  TC(MIN.) =    4.38

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8400
  SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.09
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.08
```

```
  TC(MIN.) =     4.38

****************************************************************************
  FLOW PROCESS FROM NODE     108.00 TO NODE     110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8400
  SUBAREA AREA(ACRES) =     0.17   SUBAREA RUNOFF(CFS) =     0.53
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       1.61
  TC(MIN.) =     4.38

****************************************************************************
  FLOW PROCESS FROM NODE     110.00 TO NODE     190.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     64.00  DOWNSTREAM(FEET) =     63.00
  FLOW LENGTH(FEET) =     50.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =        1.61
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =     4.53
  LONGEST FLOWPATH FROM NODE     100.00 TO NODE     190.00 =     163.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.5  TC(MIN.) =       4.53
  PEAK FLOW RATE(CFS)    =       1.61
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2012 Advanced Engineering Software (aes)
            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                         Analysis prepared by:


 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                              *
* PROPOSED CONDITIONS                                                      *
* SYSTEM 100                                                               *
 ****************************************************************************

  FILE NAME: S100P25.DAT
  TIME/DATE OF STUDY: 15:18 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.900
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =     77.40
  DOWNSTREAM ELEVATION(FEET) =     77.00
  ELEVATION DIFFERENCE(FEET) =      0.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.912
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```



```
          THE MAXIMUM OVERLAND FLOW LENGTH =    53.33
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.006
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.29
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.29

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     67.00  DOWNSTREAM(FEET) =     66.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    53.00   CHANNEL SLOPE =  0.0189
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.006
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.01
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   0.44
  Tc(MIN.) =    4.35
  SUBAREA AREA(ACRES) =     0.17       SUBAREA RUNOFF(CFS) =    0.71
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.840
  TOTAL AREA(ACRES) =        0.2          PEAK FLOW RATE(CFS) =       1.01

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   2.38
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =     113.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.006
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8400
  SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.34
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.35
  TC(MIN.) =    4.35

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.006
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8400
  SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.13
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.47
```

```
  TC(MIN.) =     4.35

****************************************************************************
  FLOW PROCESS FROM NODE     108.00 TO NODE     110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.006
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8400
  SUBAREA AREA(ACRES) =     0.17   SUBAREA RUNOFF(CFS) =     0.71
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       2.19
  TC(MIN.) =     4.35

****************************************************************************
  FLOW PROCESS FROM NODE     110.00 TO NODE     190.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    64.00  DOWNSTREAM(FEET) =    63.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.19
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    4.49
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    190.00 =     163.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.5  TC(MIN.) =      4.49
  PEAK FLOW RATE(CFS)    =       2.19
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                     2003,1985,1981 HYDROLOGY MANUAL
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           Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                      Analysis prepared by:



 ************************* DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                            *
* PROPOSED CONDITIONS                                                    *
* SYSTEM 100                                                             *
 ************************************************************************

  FILE NAME: S100P50.DAT
  TIME/DATE OF STUDY: 13:39 12/01/2016
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  =====  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = 0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =     77.40
  DOWNSTREAM ELEVATION(FEET) =     77.00
  ELEVATION DIFFERENCE(FEET) =      0.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.912
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```



```
          THE MAXIMUM OVERLAND FLOW LENGTH =    53.33
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.36
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.36

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     67.00  DOWNSTREAM(FEET) =     66.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    53.00   CHANNEL SLOPE =  0.0189
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.15
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   0.41
  Tc(MIN.) =    4.32
  SUBAREA AREA(ACRES) =     0.17       SUBAREA RUNOFF(CFS) =    0.87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.840
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       1.22

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   2.40
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =     113.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8400
  SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.41
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.63
  TC(MIN.) =    4.32

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8400
  SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.15
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.78
```

```
  TC(MIN.) =     4.32

****************************************************************************
  FLOW PROCESS FROM NODE     108.00 TO NODE     110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8400
  SUBAREA AREA(ACRES) =     0.17   SUBAREA RUNOFF(CFS) =     0.87
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       2.65
  TC(MIN.) =     4.32

****************************************************************************
  FLOW PROCESS FROM NODE     110.00 TO NODE     190.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    64.00  DOWNSTREAM(FEET) =    63.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.65
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    4.46
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    190.00 =     163.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      4.46
  PEAK FLOW RATE(CFS)   =       2.65
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

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            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                         Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                            *
* EXISTING CONDITIONS                                                    *
* SYSTEM 200                                                             *
 ****************************************************************************

  FILE NAME: S200E05.DAT
  TIME/DATE OF STUDY: 15:24 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =   5.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    66.00
  UPSTREAM ELEVATION(FEET) =     68.90
  DOWNSTREAM ELEVATION(FEET) =     68.00
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.385
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.868
```



```
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    290.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     68.00  DOWNSTREAM(FEET) =     59.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   239.00   CHANNEL SLOPE =  0.0343
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.542
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.62
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   1.52
  Tc(MIN.) =    8.91
  SUBAREA AREA(ACRES) =     0.59       SUBAREA RUNOFF(CFS) =    0.81
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       1.04

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.84
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    290.00 =     305.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.8  TC(MIN.) =      8.91
  PEAK FLOW RATE(CFS)    =       1.04
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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           Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                        Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                            *
* EXISTING CONDITIONS                                                    *
* SYSTEM 200                                                             *
 ****************************************************************************

  FILE NAME: S200E25.DAT
  TIME/DATE OF STUDY: 15:22 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.900
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    66.00
  UPSTREAM ELEVATION(FEET) =      68.90
  DOWNSTREAM ELEVATION(FEET) =     68.00
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.385
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.893
```



```
  SUBAREA RUNOFF(CFS) =       0.36
  TOTAL AREA(ACRES) =       0.17   TOTAL RUNOFF(CFS) =       0.36

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    290.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     68.00  DOWNSTREAM(FEET) =     59.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   239.00   CHANNEL SLOPE =  0.0343
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.477
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.91
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.82
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   1.41
  Tc(MIN.) =    8.80
  SUBAREA AREA(ACRES) =     0.59       SUBAREA RUNOFF(CFS) =    1.11
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       1.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   3.10
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    290.00 =     305.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.8  TC(MIN.) =      8.80
  PEAK FLOW RATE(CFS)    =       1.43
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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                          2003,1985,1981 HYDROLOGY MANUAL
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             Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                         Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                              *
* EXISTING CONDITIONS                                                      *
* SYSTEM 200                                                               *
 ****************************************************************************

  FILE NAME: S200E50.DAT
  TIME/DATE OF STUDY: 14:13 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    66.00
  UPSTREAM ELEVATION(FEET) =     68.90
  DOWNSTREAM ELEVATION(FEET) =     68.00
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.385
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.712
```



```
  SUBAREA RUNOFF(CFS) =       0.43
  TOTAL AREA(ACRES) =       0.17   TOTAL RUNOFF(CFS) =       0.43

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    290.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     68.00  DOWNSTREAM(FEET) =     59.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   239.00   CHANNEL SLOPE =  0.0343
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.226
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.11
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.94
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   1.36
  Tc(MIN.) =    8.74
  SUBAREA AREA(ACRES) =     0.59       SUBAREA RUNOFF(CFS) =    1.35
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       1.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   3.32
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    290.00 =     305.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.8  TC(MIN.) =      8.74
  PEAK FLOW RATE(CFS)    =       1.73
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                     2003,1985,1981 HYDROLOGY MANUAL
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           Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                     Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                              *
* PROPOSED CONDITIONS                                                      *
* SYSTEM 200                                                               *
 ****************************************************************************

  FILE NAME: S200P05.DAT
  TIME/DATE OF STUDY: 15:28 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =   5.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8000
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =     73.50
  DOWNSTREAM ELEVATION(FEET) =     73.00
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.320
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```



```
          THE MAXIMUM OVERLAND FLOW LENGTH =    56.67
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8000
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8000
  SUBAREA AREA(ACRES) =    0.54   SUBAREA RUNOFF(CFS) =    1.59
  TOTAL AREA(ACRES) =       0.7   TOTAL RUNOFF(CFS) =      2.10
  TC(MIN.) =    4.32

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    220.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    62.00  DOWNSTREAM(FEET) =    61.20
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.54
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.10
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    4.34
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =      70.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    290.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   60.70  DOWNSTREAM ELEVATION(FEET) =   59.80
  STREET LENGTH(FEET) =    47.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0175
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.90
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.50
```

```
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
STREET FLOW TRAVEL TIME(MIN.) =   0.31   Tc(MIN.) =    4.65
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8000
SOIL CLASSIFICATION IS "B"
S.C.S. CURVE NUMBER (AMC II) =  92
AREA-AVERAGE RUNOFF COEFFICIENT =  0.800
SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.35
TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.45

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.18
FLOW VELOCITY(FEET/SEC.) =  2.55   DEPTH*VELOCITY(FT*FT/SEC.) =   0.79
LONGEST FLOWPATH FROM NODE    200.00 TO NODE    290.00 =     117.00 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)     =        0.8  TC(MIN.) =      4.65
PEAK FLOW RATE(CFS)   =       2.45
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                        Analysis prepared by:


 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                              *
* PROPOSED CONDITIONS                                                      *
* SYSTEM 200                                                               *
 ****************************************************************************

  FILE NAME: S200P25.DAT
  TIME/DATE OF STUDY: 15:27 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.900
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  =====  ====  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8000
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =     73.50
  DOWNSTREAM ELEVATION(FEET) =     73.00
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.320
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```



```
          THE MAXIMUM OVERLAND FLOW LENGTH =    56.67
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.006
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.68
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.68

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.006
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8000
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8000
  SUBAREA AREA(ACRES) =    0.54   SUBAREA RUNOFF(CFS) =    2.16
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =      2.84
  TC(MIN.) =    4.32

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    220.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    62.00  DOWNSTREAM(FEET) =    61.20
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.42
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.84
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    4.34
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =      70.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    290.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   60.70  DOWNSTREAM ELEVATION(FEET) =   59.80
  STREET LENGTH(FEET) =    47.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0175
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.17
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.68
```

```
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =     0.88
STREET FLOW TRAVEL TIME(MIN.) =   0.29   Tc(MIN.) =     4.63
  25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.006
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8000
SOIL CLASSIFICATION IS "B"
S.C.S. CURVE NUMBER (AMC II) =  92
AREA-AVERAGE RUNOFF COEFFICIENT =  0.800
SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.48
TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.32

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.45
FLOW VELOCITY(FEET/SEC.) =  2.75   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
LONGEST FLOWPATH FROM NODE    200.00 TO NODE    290.00 =     117.00 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =        0.8  TC(MIN.) =      4.63
PEAK FLOW RATE(CFS)    =       3.32
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
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            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                          Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                            *
* PROPOSED CONDITIONS                                                    *
* SYSTEM 200                                                             *
 ****************************************************************************

  FILE NAME: S200P50.DAT
  TIME/DATE OF STUDY: 13:41 12/01/2016
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8000
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =     73.50
  DOWNSTREAM ELEVATION(FEET) =     73.00
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.320
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```



```
          THE MAXIMUM OVERLAND FLOW LENGTH =    56.67
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.82
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.82

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8000
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8000
  SUBAREA AREA(ACRES) =    0.54   SUBAREA RUNOFF(CFS) =    2.62
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       3.44
  TC(MIN.) =    4.32

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    220.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    62.00  DOWNSTREAM(FEET) =    61.20
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.01
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.44
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    4.33
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =      70.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    290.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   60.70  DOWNSTREAM ELEVATION(FEET) =   59.80
  STREET LENGTH(FEET) =    47.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0175
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.01
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.81
```

```
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
STREET FLOW TRAVEL TIME(MIN.) =   0.28   Tc(MIN.) =    4.61
  50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8000
SOIL CLASSIFICATION IS "B"
S.C.S. CURVE NUMBER (AMC II) =  92
AREA-AVERAGE RUNOFF COEFFICIENT =  0.800
SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.58
TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.02

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.36
FLOW VELOCITY(FEET/SEC.) =  2.86   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
LONGEST FLOWPATH FROM NODE    200.00 TO NODE    290.00 =     117.00 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =        0.8  TC(MIN.) =      4.61
PEAK FLOW RATE(CFS)    =       4.02
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2012 Advanced Engineering Software (aes)
            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                         Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                              *
* EXISTING CONDITIONS                                                      *
* SYSTEM 300                                                               *
 ****************************************************************************

  FILE NAME: S300E05.DAT
  TIME/DATE OF STUDY: 15:37 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =   5.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    305.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    63.00
  UPSTREAM ELEVATION(FEET) =     68.30
  DOWNSTREAM ELEVATION(FEET) =     67.40
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.918
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
```



```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =       0.19
  TOTAL AREA(ACRES) =       0.06   TOTAL RUNOFF(CFS) =       0.19

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    315.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   67.40  DOWNSTREAM ELEVATION(FEET) =   66.50
  STREET LENGTH(FEET) =    62.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0175
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.48
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.12
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.67
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.35
  STREET FLOW TRAVEL TIME(MIN.) =   0.62   Tc(MIN.) =    3.53
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.58
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       0.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   5.59
  FLOW VELOCITY(FEET/SEC.) =  1.79   DEPTH*VELOCITY(FT*FT/SEC.) =   0.43
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    315.00 =     125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    390.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   66.50  DOWNSTREAM ELEVATION(FEET) =   59.90
  STREET LENGTH(FEET) =   166.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0175
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =        0.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
  STREET FLOW TRAVEL TIME(MIN.) =   0.99   Tc(MIN.) =    4.53
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.08      SUBAREA RUNOFF(CFS) =    0.26
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.03

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   4.93
  FLOW VELOCITY(FEET/SEC.) =  2.84   DEPTH*VELOCITY(FT*FT/SEC.) =   0.64
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    390.00 =     291.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    390.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  85
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8006
  SUBAREA AREA(ACRES) =    0.17   SUBAREA RUNOFF(CFS) =    0.42
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       1.45
  TC(MIN.) =    4.53

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    330.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =  85
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6193
  SUBAREA AREA(ACRES) =    0.33   SUBAREA RUNOFF(CFS) =    0.43
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       1.87
  TC(MIN.) =    4.53

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    390.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6364
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.19
```



```
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.07
  TC(MIN.) =    4.53
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.9  TC(MIN.) =      4.53
  PEAK FLOW RATE(CFS)    =       2.07
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

□

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            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2012 Advanced Engineering Software (aes)
            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                        Analysis prepared by:


 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                              *
* EXISTING CONDITIONS                                                      *
* SYSTEM 300                                                               *
 ****************************************************************************

  FILE NAME: S300E25.DAT
  TIME/DATE OF STUDY: 15:35 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.900
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    305.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    63.00
  UPSTREAM ELEVATION(FEET) =     68.30
  DOWNSTREAM ELEVATION(FEET) =     67.40
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.918
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.006
```



```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =       0.26
  TOTAL AREA(ACRES) =       0.06   TOTAL RUNOFF(CFS) =       0.26

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    315.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   67.40  DOWNSTREAM ELEVATION(FEET) =   66.50
  STREET LENGTH(FEET) =    62.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0175
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.08
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.74
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.40
  STREET FLOW TRAVEL TIME(MIN.) =   0.60   Tc(MIN.) =    3.51
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.006
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.78
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       1.05

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.55
  FLOW VELOCITY(FEET/SEC.) =  1.91   DEPTH*VELOCITY(FT*FT/SEC.) =   0.49
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    315.00 =     125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    390.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   66.50  DOWNSTREAM ELEVATION(FEET) =   59.90
  STREET LENGTH(FEET) =   166.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0175
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =        1.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.44
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.95
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.69
  STREET FLOW TRAVEL TIME(MIN.) =   0.94   Tc(MIN.) =    4.45
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.006
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.08      SUBAREA RUNOFF(CFS) =    0.35
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   5.84
  FLOW VELOCITY(FEET/SEC.) =  3.03   DEPTH*VELOCITY(FT*FT/SEC.) =   0.74
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    390.00 =     291.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    390.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.006
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  85
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8006
  SUBAREA AREA(ACRES) =    0.17   SUBAREA RUNOFF(CFS) =    0.57
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       1.96
  TC(MIN.) =    4.45

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    330.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.006
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =  85
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6193
  SUBAREA AREA(ACRES) =    0.33   SUBAREA RUNOFF(CFS) =    0.58
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       2.54
  TC(MIN.) =    4.45

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    390.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.006
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6364
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.26
```



```
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.80
  TC(MIN.) =    4.45
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.9  TC(MIN.) =      4.45
  PEAK FLOW RATE(CFS)    =       2.80
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

□

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
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            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                        Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                              *
* EXISTING CONDITIONS                                                      *
* SYSTEM 300                                                               *
 ****************************************************************************

  FILE NAME: S300E50.DAT
  TIME/DATE OF STUDY: 14:11 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0   0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    305.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    63.00
  UPSTREAM ELEVATION(FEET) =     68.30
  DOWNSTREAM ELEVATION(FEET) =     67.40
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.918
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
```



```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =       0.32
  TOTAL AREA(ACRES) =       0.06   TOTAL RUNOFF(CFS) =       0.32

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    315.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   67.40  DOWNSTREAM ELEVATION(FEET) =   66.50
  STREET LENGTH(FEET) =    62.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0175
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.43
  STREET FLOW TRAVEL TIME(MIN.) =   0.58   Tc(MIN.) =    3.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.870
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.95
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       1.27

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.21
  FLOW VELOCITY(FEET/SEC.) =  1.98   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    315.00 =     125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    390.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   66.50  DOWNSTREAM ELEVATION(FEET) =   59.90
  STREET LENGTH(FEET) =   166.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0175
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.48
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.05
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =    4.40
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.08      SUBAREA RUNOFF(CFS) =    0.42
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.50
  FLOW VELOCITY(FEET/SEC.) =  3.12   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    390.00 =     291.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    390.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  85
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8006
  SUBAREA AREA(ACRES) =    0.17   SUBAREA RUNOFF(CFS) =    0.69
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       2.38
  TC(MIN.) =    4.40

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    330.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =  85
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6193
  SUBAREA AREA(ACRES) =    0.33   SUBAREA RUNOFF(CFS) =    0.70
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.08
  TC(MIN.) =    4.40

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    390.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  96
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6364
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.32
```



```
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       3.39
  TC(MIN.) =    4.40
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.9  TC(MIN.) =      4.40
  PEAK FLOW RATE(CFS)    =       3.39
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                       2003,1985,1981 HYDROLOGY MANUAL
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            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                        Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                              *
* PROPOSED CONDITIONS                                                      *
* SYSTEM 300                                                               *
 ****************************************************************************

  FILE NAME: S300P05.DAT
  TIME/DATE OF STUDY: 15:41 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =   5.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0   0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    305.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =     79.80
  DOWNSTREAM ELEVATION(FEET) =     79.50
  ELEVATION DIFFERENCE(FEET) =      0.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.187
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```



```
          THE MAXIMUM OVERLAND FLOW LENGTH =    50.91
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.602
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    315.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    67.30  DOWNSTREAM(FEET) =    66.60
  FLOW LENGTH(FEET) =    17.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.17
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    5.27
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    315.00 =      72.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    390.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   67.10  DOWNSTREAM ELEVATION(FEET) =   59.90
  STREET LENGTH(FEET) =   188.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0175
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.44
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.16
    HALFSTREET FLOOD WIDTH(FEET) =    1.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.16
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.49
  STREET FLOW TRAVEL TIME(MIN.) =   0.99   Tc(MIN.) =    6.26
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.191
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.770
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    0.57
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       0.71

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.20   HALFSTREET FLOOD WIDTH(FEET) =   3.81
  FLOW VELOCITY(FEET/SEC.) =  2.71   DEPTH*VELOCITY(FT*FT/SEC.) =   0.55
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    390.00 =     260.00 FEET.

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

```
  FLOW PROCESS FROM NODE    320.00 TO NODE    390.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.191
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.13   SUBAREA RUNOFF(CFS) =    0.32
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.03
  TC(MIN.) =    6.26

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    330.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.191
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.28   SUBAREA RUNOFF(CFS) =    0.69
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       1.72
  TC(MIN.) =    6.26

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    390.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.191
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.27
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       1.99
  TC(MIN.) =    6.26
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.8  TC(MIN.) =      6.26
  PEAK FLOW RATE(CFS)   =       1.99
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                     2003,1985,1981 HYDROLOGY MANUAL
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           Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                     Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                              *
* PROPOSED CONDITIONS                                                      *
* SYSTEM 300                                                               *
 ****************************************************************************

  FILE NAME: S300P25.DAT
  TIME/DATE OF STUDY: 15:39 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.900
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    305.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =     79.80
  DOWNSTREAM ELEVATION(FEET) =     79.50
  ELEVATION DIFFERENCE(FEET) =      0.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.187
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```



```
          THE MAXIMUM OVERLAND FLOW LENGTH =    50.91
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.889
  SUBAREA RUNOFF(CFS) =      0.23
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.23

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    315.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    67.30  DOWNSTREAM(FEET) =    66.60
  FLOW LENGTH(FEET) =    17.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.88
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.23
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.26
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    315.00 =      72.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    390.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   67.10  DOWNSTREAM ELEVATION(FEET) =   59.90
  STREET LENGTH(FEET) =   188.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0175
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.19
    HALFSTREET FLOOD WIDTH(FEET) =    3.30
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
  STREET FLOW TRAVEL TIME(MIN.) =   1.18   Tc(MIN.) =    6.44
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.252
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.770
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    0.75
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       0.95

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   4.72
  FLOW VELOCITY(FEET/SEC.) =  2.78   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    390.00 =     260.00 FEET.

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

```
  FLOW PROCESS FROM NODE    320.00 TO NODE    390.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.252
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.13   SUBAREA RUNOFF(CFS) =    0.43
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.38
  TC(MIN.) =    6.44

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    330.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.252
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.28   SUBAREA RUNOFF(CFS) =    0.92
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.29
  TC(MIN.) =    6.44

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    390.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.252
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.36
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       2.65
  TC(MIN.) =    6.44
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.8  TC(MIN.) =      6.44
  PEAK FLOW RATE(CFS)    =       2.65
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                       2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2012 Advanced Engineering Software (aes)
            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                        Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* 4242 SOLANA                                                              *
* PROPOSED CONDITIONS                                                      *
* SYSTEM 300                                                               *
 ****************************************************************************

  FILE NAME: S300P50.DAT
  TIME/DATE OF STUDY: 14:45 01/21/2017
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    305.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =     79.80
  DOWNSTREAM ELEVATION(FEET) =     79.50
  ELEVATION DIFFERENCE(FEET) =      0.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.187
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```



```
            THE MAXIMUM OVERLAND FLOW LENGTH =    50.91
            (Reference: Table 3-1B of Hydrology Manual)
            THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.918
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    315.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    67.30  DOWNSTREAM(FEET) =    66.60
  FLOW LENGTH(FEET) =    17.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.27
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.26
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    315.00 =      72.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    390.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   67.10  DOWNSTREAM ELEVATION(FEET) =   59.90
  STREET LENGTH(FEET) =   188.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0175
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    3.91
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
  STREET FLOW TRAVEL TIME(MIN.) =   1.16   Tc(MIN.) =    6.42
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.158
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.770
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    0.91
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.15

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.33
  FLOW VELOCITY(FEET/SEC.) =  2.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    390.00 =     260.00 FEET.

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

```
  FLOW PROCESS FROM NODE    320.00 TO NODE    390.00 IS CODE =  81
 ----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 ============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.158
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =     0.13   SUBAREA RUNOFF(CFS) =     0.52
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.67
  TC(MIN.) =     6.42

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    330.00 IS CODE =  81
 ----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 ============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.158
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =     0.28   SUBAREA RUNOFF(CFS) =     1.11
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.78
  TC(MIN.) =     6.42

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    390.00 IS CODE =  81
 ----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 ============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.158
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7700
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =     0.11   SUBAREA RUNOFF(CFS) =     0.44
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.22
  TC(MIN.) =     6.42
 ============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.8  TC(MIN.) =       6.42
  PEAK FLOW RATE(CFS)    =       3.22
 ============================================================================
 ============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX 5

System 200 Preliminary Detention Calculations

RATIONAL METHOD HYDROGRAPH PROGRAM
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RUN DATE 1/21/2017
HYDROGRAPH FILE NAME S200P05.TXT
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.4 INCHES
BASIN AREA 0.8 ACRES
RUNOFF COEFFICIENT 0.8
PEAK DISCHARGE 2.45 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.1
TIME (MIN) = 10	DISCHARGE (CFS) = 0.1
TIME (MIN) = 15	DISCHARGE (CFS) = 0.1
TIME (MIN) = 20	DISCHARGE (CFS) = 0.1
TIME (MIN) = 25	DISCHARGE (CFS) = 0.1
TIME (MIN) = 30	DISCHARGE (CFS) = 0.1
TIME (MIN) = 35	DISCHARGE (CFS) = 0.1
TIME (MIN) = 40	DISCHARGE (CFS) = 0.1
TIME (MIN) = 45	DISCHARGE (CFS) = 0.1
TIME (MIN) = 50	DISCHARGE (CFS) = 0.1
TIME (MIN) = 55	DISCHARGE (CFS) = 0.1
TIME (MIN) = 60	DISCHARGE (CFS) = 0.1
TIME (MIN) = 65	DISCHARGE (CFS) = 0.1
TIME (MIN) = 70	DISCHARGE (CFS) = 0.1
TIME (MIN) = 75	DISCHARGE (CFS) = 0.1
TIME (MIN) = 80	DISCHARGE (CFS) = 0.1
TIME (MIN) = 85	DISCHARGE (CFS) = 0.1
TIME (MIN) = 90	DISCHARGE (CFS) = 0.1
TIME (MIN) = 95	DISCHARGE (CFS) = 0.1
TIME (MIN) = 100	DISCHARGE (CFS) = 0.1
TIME (MIN) = 105	DISCHARGE (CFS) = 0.1
TIME (MIN) = 110	DISCHARGE (CFS) = 0.1
TIME (MIN) = 115	DISCHARGE (CFS) = 0.1
TIME (MIN) = 120	DISCHARGE (CFS) = 0.1
TIME (MIN) = 125	DISCHARGE (CFS) = 0.1
TIME (MIN) = 130	DISCHARGE (CFS) = 0.1
TIME (MIN) = 135	DISCHARGE (CFS) = 0.1
TIME (MIN) = 140	DISCHARGE (CFS) = 0.1
TIME (MIN) = 145	DISCHARGE (CFS) = 0.1
TIME (MIN) = 150	DISCHARGE (CFS) = 0.1
TIME (MIN) = 155	DISCHARGE (CFS) = 0.1
TIME (MIN) = 160	DISCHARGE (CFS) = 0.1
TIME (MIN) = 165	DISCHARGE (CFS) = 0.1
TIME (MIN) = 170	DISCHARGE (CFS) = 0.1
TIME (MIN) = 175	DISCHARGE (CFS) = 0.1
TIME (MIN) = 180	DISCHARGE (CFS) = 0.1
TIME (MIN) = 185	DISCHARGE (CFS) = 0.1
TIME (MIN) = 190	DISCHARGE (CFS) = 0.1
TIME (MIN) = 195	DISCHARGE (CFS) = 0.1
TIME (MIN) = 200	DISCHARGE (CFS) = 0.2
TIME (MIN) = 205	DISCHARGE (CFS) = 0.2
TIME (MIN) = 210	DISCHARGE (CFS) = 0.2

TIME (MIN) = 215	DISCHARGE (CFS) = 0.2
TIME (MIN) = 220	DISCHARGE (CFS) = 0.2
TIME (MIN) = 225	DISCHARGE (CFS) = 0.3
TIME (MIN) = 230	DISCHARGE (CFS) = 0.3
TIME (MIN) = 235	DISCHARGE (CFS) = 0.5
TIME (MIN) = 240	DISCHARGE (CFS) = 0.6
TIME (MIN) = 245	DISCHARGE (CFS) = 2.45
TIME (MIN) = 250	DISCHARGE (CFS) = 0.4
TIME (MIN) = 255	DISCHARGE (CFS) = 0.3
TIME (MIN) = 260	DISCHARGE (CFS) = 0.2
TIME (MIN) = 265	DISCHARGE (CFS) = 0.2
TIME (MIN) = 270	DISCHARGE (CFS) = 0.1
TIME (MIN) = 275	DISCHARGE (CFS) = 0.1
TIME (MIN) = 280	DISCHARGE (CFS) = 0.1
TIME (MIN) = 285	DISCHARGE (CFS) = 0.1
TIME (MIN) = 290	DISCHARGE (CFS) = 0.1
TIME (MIN) = 295	DISCHARGE (CFS) = 0.1
TIME (MIN) = 300	DISCHARGE (CFS) = 0.1
TIME (MIN) = 305	DISCHARGE (CFS) = 0.1
TIME (MIN) = 310	DISCHARGE (CFS) = 0.1
TIME (MIN) = 315	DISCHARGE (CFS) = 0.1
TIME (MIN) = 320	DISCHARGE (CFS) = 0.1
TIME (MIN) = 325	DISCHARGE (CFS) = 0.1
TIME (MIN) = 330	DISCHARGE (CFS) = 0.1
TIME (MIN) = 335	DISCHARGE (CFS) = 0.1
TIME (MIN) = 340	DISCHARGE (CFS) = 0.1
TIME (MIN) = 345	DISCHARGE (CFS) = 0.1
TIME (MIN) = 350	DISCHARGE (CFS) = 0.1
TIME (MIN) = 355	DISCHARGE (CFS) = 0.1
TIME (MIN) = 360	DISCHARGE (CFS) = 0.1
TIME (MIN) = 365	DISCHARGE (CFS) = 0

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RUN DATE 1/21/2017
HYDROGRAPH FILE NAME S200P25.TXT
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.9 INCHES
BASIN AREA 0.8 ACRES
RUNOFF COEFFICIENT 0.8
PEAK DISCHARGE 3.32 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.1
TIME (MIN) = 10	DISCHARGE (CFS) = 0.1
TIME (MIN) = 15	DISCHARGE (CFS) = 0.1
TIME (MIN) = 20	DISCHARGE (CFS) = 0.1
TIME (MIN) = 25	DISCHARGE (CFS) = 0.1
TIME (MIN) = 30	DISCHARGE (CFS) = 0.1
TIME (MIN) = 35	DISCHARGE (CFS) = 0.1
TIME (MIN) = 40	DISCHARGE (CFS) = 0.1
TIME (MIN) = 45	DISCHARGE (CFS) = 0.1
TIME (MIN) = 50	DISCHARGE (CFS) = 0.1
TIME (MIN) = 55	DISCHARGE (CFS) = 0.1
TIME (MIN) = 60	DISCHARGE (CFS) = 0.1
TIME (MIN) = 65	DISCHARGE (CFS) = 0.1
TIME (MIN) = 70	DISCHARGE (CFS) = 0.1
TIME (MIN) = 75	DISCHARGE (CFS) = 0.1
TIME (MIN) = 80	DISCHARGE (CFS) = 0.1
TIME (MIN) = 85	DISCHARGE (CFS) = 0.1
TIME (MIN) = 90	DISCHARGE (CFS) = 0.1
TIME (MIN) = 95	DISCHARGE (CFS) = 0.1
TIME (MIN) = 100	DISCHARGE (CFS) = 0.1
TIME (MIN) = 105	DISCHARGE (CFS) = 0.1
TIME (MIN) = 110	DISCHARGE (CFS) = 0.1
TIME (MIN) = 115	DISCHARGE (CFS) = 0.1
TIME (MIN) = 120	DISCHARGE (CFS) = 0.1
TIME (MIN) = 125	DISCHARGE (CFS) = 0.1
TIME (MIN) = 130	DISCHARGE (CFS) = 0.1
TIME (MIN) = 135	DISCHARGE (CFS) = 0.1
TIME (MIN) = 140	DISCHARGE (CFS) = 0.1
TIME (MIN) = 145	DISCHARGE (CFS) = 0.1
TIME (MIN) = 150	DISCHARGE (CFS) = 0.1
TIME (MIN) = 155	DISCHARGE (CFS) = 0.1
TIME (MIN) = 160	DISCHARGE (CFS) = 0.1
TIME (MIN) = 165	DISCHARGE (CFS) = 0.1
TIME (MIN) = 170	DISCHARGE (CFS) = 0.2
TIME (MIN) = 175	DISCHARGE (CFS) = 0.2
TIME (MIN) = 180	DISCHARGE (CFS) = 0.2
TIME (MIN) = 185	DISCHARGE (CFS) = 0.2
TIME (MIN) = 190	DISCHARGE (CFS) = 0.2
TIME (MIN) = 195	DISCHARGE (CFS) = 0.2
TIME (MIN) = 200	DISCHARGE (CFS) = 0.2
TIME (MIN) = 205	DISCHARGE (CFS) = 0.2
TIME (MIN) = 210	DISCHARGE (CFS) = 0.2

TIME (MIN) = 215	DISCHARGE (CFS) = 0.3
TIME (MIN) = 220	DISCHARGE (CFS) = 0.3
TIME (MIN) = 225	DISCHARGE (CFS) = 0.4
TIME (MIN) = 230	DISCHARGE (CFS) = 0.4
TIME (MIN) = 235	DISCHARGE (CFS) = 0.6
TIME (MIN) = 240	DISCHARGE (CFS) = 0.8
TIME (MIN) = 245	DISCHARGE (CFS) = 3.32
TIME (MIN) = 250	DISCHARGE (CFS) = 0.5
TIME (MIN) = 255	DISCHARGE (CFS) = 0.3
TIME (MIN) = 260	DISCHARGE (CFS) = 0.3
TIME (MIN) = 265	DISCHARGE (CFS) = 0.2
TIME (MIN) = 270	DISCHARGE (CFS) = 0.2
TIME (MIN) = 275	DISCHARGE (CFS) = 0.2
TIME (MIN) = 280	DISCHARGE (CFS) = 0.2
TIME (MIN) = 285	DISCHARGE (CFS) = 0.1
TIME (MIN) = 290	DISCHARGE (CFS) = 0.1
TIME (MIN) = 295	DISCHARGE (CFS) = 0.1
TIME (MIN) = 300	DISCHARGE (CFS) = 0.1
TIME (MIN) = 305	DISCHARGE (CFS) = 0.1
TIME (MIN) = 310	DISCHARGE (CFS) = 0.1
TIME (MIN) = 315	DISCHARGE (CFS) = 0.1
TIME (MIN) = 320	DISCHARGE (CFS) = 0.1
TIME (MIN) = 325	DISCHARGE (CFS) = 0.1
TIME (MIN) = 330	DISCHARGE (CFS) = 0.1
TIME (MIN) = 335	DISCHARGE (CFS) = 0.1
TIME (MIN) = 340	DISCHARGE (CFS) = 0.1
TIME (MIN) = 345	DISCHARGE (CFS) = 0.1
TIME (MIN) = 350	DISCHARGE (CFS) = 0.1
TIME (MIN) = 355	DISCHARGE (CFS) = 0.1
TIME (MIN) = 360	DISCHARGE (CFS) = 0.1
TIME (MIN) = 365	DISCHARGE (CFS) = 0

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RUN DATE 1/21/2017
HYDROGRAPH FILE NAME S200P05.TXT
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.4 INCHES
BASIN AREA 0.8 ACRES
RUNOFF COEFFICIENT 0.8
PEAK DISCHARGE 2.45 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.1
TIME (MIN) = 10	DISCHARGE (CFS) = 0.1
TIME (MIN) = 15	DISCHARGE (CFS) = 0.1
TIME (MIN) = 20	DISCHARGE (CFS) = 0.1
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TIME (MIN) = 215	DISCHARGE (CFS) = 0.2
TIME (MIN) = 220	DISCHARGE (CFS) = 0.2
TIME (MIN) = 225	DISCHARGE (CFS) = 0.3
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TIME (MIN) = 250	DISCHARGE (CFS) = 0.4
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TIME (MIN) = 365	DISCHARGE (CFS) = 0

PROJECT DESIGN CONSULTANTS

PLANNING | LANDSCAPE ARCHITECTURE
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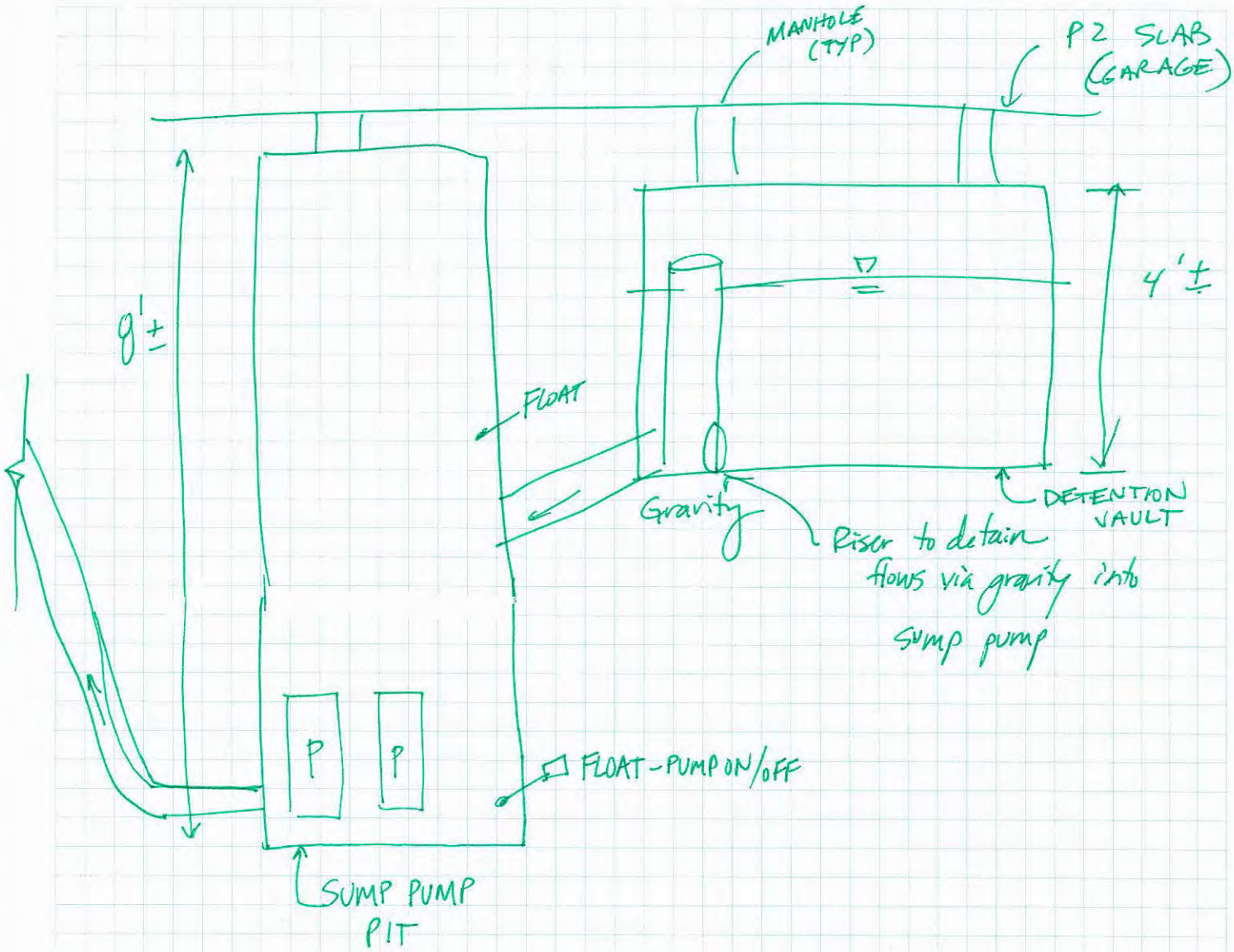
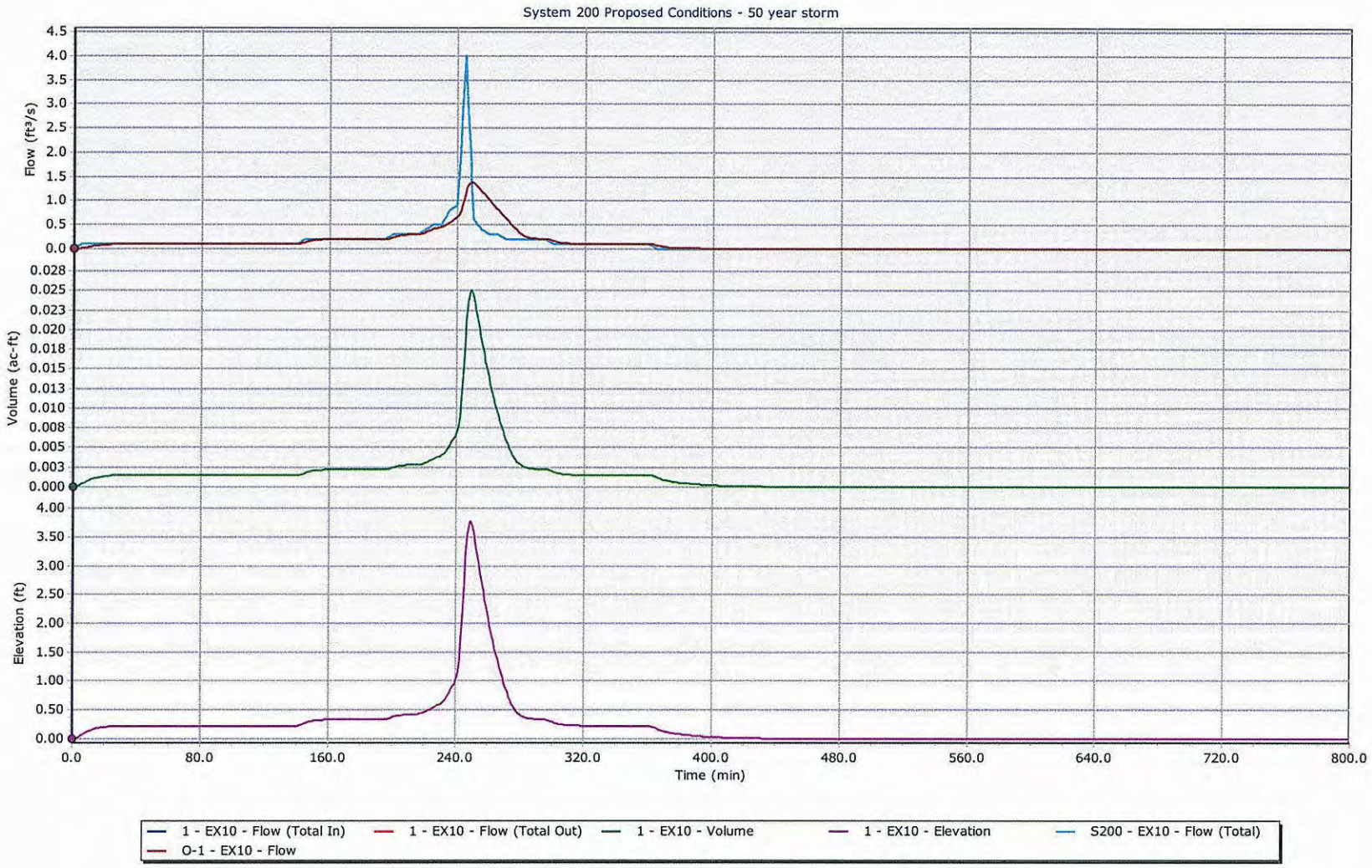
PROJECT: SOLANA 101
SUBJECT: DETENTION SCHEMATIC SECTION - NW CORNER
PAGE: 1 OF 1 JOB NO.: 4242
DRAWN BY: CP DATE: 1/18/17
CHECKED BY: DATE:



SECTION 'A-A'

N.T.S.


System 200 Proposed Conditions - 50 year storm
Flow (ft³/s)
Volume (ac-ft)
Elevation (ft)
Time (min)
1 - EX10 - Flow (Total In)
1 - EX10 - Flow (Total Out)
1 - EX10 - Volume
1 - EX10 - Elevation
S200 - EX10 - Flow (Total)
O-1 - EX10 - Flow

System 200-(50 year)

Project Summary	
Title	SYSTEM 200
Engineer	PDC
Company	PDC
Date	1/21/2017

Notes

System 200-(50 year)

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
S200	EX10	0	0.120	245.0	4.0

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
O-1	EX10	0	0.120	249.0	1.4

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
1 (IN)	EX10	0	0.120	245.0	4.0	(N/A)	(N/A)
1 (OUT)	EX10	0	0.120	249.0	1.4	3.79	0.025

System 200-(50 year)

Subsection: Read Hydrograph
Label: S200

Return Event: 50 years
Storm Event:

Peak Discharge	4.0 ft³/s
Time to Peak	245.0 min
Hydrograph Volume	0.120 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 5.0 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.0	0.0	0.1	0.1	0.1	0.1
25.0	0.1	0.1	0.1	0.1	0.1
50.0	0.1	0.1	0.1	0.1	0.1
75.0	0.1	0.1	0.1	0.1	0.1
100.0	0.1	0.1	0.1	0.1	0.1
125.0	0.1	0.1	0.1	0.1	0.1
150.0	0.2	0.2	0.2	0.2	0.2
175.0	0.2	0.2	0.2	0.2	0.2
200.0	0.3	0.3	0.3	0.3	0.3
225.0	0.5	0.5	0.8	0.9	0.9
250.0	0.6	0.4	0.3	0.3	0.3
275.0	0.2	0.2	0.2	0.2	0.2
300.0	0.1	0.1	0.1	0.1	0.1
325.0	0.1	0.1	0.1	0.1	0.1
350.0	0.1	0.1	0.1	0.1	0.0

Flow (ft³/s)
0.1
0.1
0.1
0.1
0.1
0.2
0.2
0.2
0.4
4.0
0.2
0.2
0.1
0.1
(N/A)

System 200-(50 year)

Subsection: Elevation-Area Volume Curve
Label: 1

Return Event: 50 years
Storm Event:

Elevation (ft)	Planimeter (ft²)	Area (ft²)	A1+A2+sqr(A1*A2) (ft²)
0.00	0.0	289.000	0.000
4.00	0.0	289.000	867.000

Volume (ac-ft)	Volume (Total) (ac-ft)
0.000	0.000
0.027	0.027

System 200-(50 year)

Subsection: Volume Equations
Label: 1

Return Event: 50 years
Storm Event:

Pond Volume Equations
* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

System 200-(50 year)

Subsection: Outlet Input Data
Label: Basin Outlet

Return Event: 50 years
Storm Event:

Requested Pond Water Surface Elevations	
Minimum (Headwater)	0.00 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	4.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	LF1	Forward	TW	0.00	4.0
Tailwater Settings	Tailwater			(N/A)	(N/A

System 200-(50 year)

Subsection: Outlet Input Data
Label: Basin Outlet

Return Event: 50 years
Storm Event:

Structure ID: LF1 Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	0.00 ft
Orifice Diameter	5.0 in
Orifice Coefficient	0.670

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

System 200-(50 year)

Subsection: Composite Rating Curve
Label: Basin Outlet

Return Event: 50 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)
0.00	0.0	(N/A)
0.10	0.0	(N/A)
0.20	0.1	(N/A)
0.30	0.2	(N/A)
0.40	0.3	(N/A)
0.50	0.4	(N/A)
0.60	0.5	(N/A)
0.70	0.5	(N/A)
0.80	0.6	(N/A)
0.90	0.6	(N/A)
1.00	0.7	(N/A)
1.10	0.7	(N/A)
1.20	0.7	(N/A)
1.30	0.8	(N/A)
1.40	0.8	(N/A)
1.50	0.8	(N/A)
1.60	0.9	(N/A)
1.70	0.9	(N/A)
1.80	0.9	(N/A)
1.90	1.0	(N/A)
2.00	1.0	(N/A)
2.10	1.0	(N/A)
2.20	1.0	(N/A)
2.30	1.1	(N/A)
2.40	1.1	(N/A)
2.50	1.1	(N/A)
2.60	1.1	(N/A)
2.70	1.2	(N/A)
2.80	1.2	(N/A)
2.90	1.2	(N/A)
3.00	1.2	(N/A)
3.10	1.2	(N/A)
3.20	1.3	(N/A)
3.30	1.3	(N/A)
3.40	1.3	(N/A)
3.50	1.3	(N/A)
3.60	1.3	(N/A)
3.70	1.4	(N/A)
3.80	1.4	(N/A)
3.90	1.4	(N/A)
4.00	1.4	(N/A)

Convergence Error (ft)	Contributing Structures
0.00	None Contributing

System 200-(50 year)

Subsection: Composite Rating Curve
Label: Basin Outlet

Return Event: 50 years
Storm Event:

Composite Outflow Summary

Convergence Error (ft)	Contributing Structures
0.00	LF1
0.00	LF1
0.00	LF1

System 200-(50 year)

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 50 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	0.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.0 ft^3/s
Flow (Initial Infiltration)	0.0 ft^3/s
Flow (Initial, Total)	0.0 ft^3/s
Time Increment	1.0 min

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (ft^2)	Infiltration (ft^3/s)
0.00	0.0	0.000	289.000	0.0
0.10	0.0	0.001	289.000	0.0
0.20	0.1	0.001	289.000	0.0
0.30	0.2	0.002	289.000	0.0
0.40	0.3	0.003	289.000	0.0
0.50	0.4	0.003	289.000	0.0
0.60	0.5	0.004	289.000	0.0
0.70	0.5	0.005	289.000	0.0
0.80	0.6	0.005	289.000	0.0
0.90	0.6	0.006	289.000	0.0
1.00	0.7	0.007	289.000	0.0
1.10	0.7	0.007	289.000	0.0
1.20	0.7	0.008	289.000	0.0
1.30	0.8	0.009	289.000	0.0
1.40	0.8	0.009	289.000	0.0
1.50	0.8	0.010	289.000	0.0
1.60	0.9	0.011	289.000	0.0
1.70	0.9	0.011	289.000	0.0
1.80	0.9	0.012	289.000	0.0
1.90	1.0	0.013	289.000	0.0
2.00	1.0	0.013	289.000	0.0
2.10	1.0	0.014	289.000	0.0
2.20	1.0	0.015	289.000	0.0
2.30	1.1	0.015	289.000	0.0
2.40	1.1	0.016	289.000	0.0
2.50	1.1	0.017	289.000	0.0
2.60	1.1	0.017	289.000	0.0
2.70	1.2	0.018	289.000	0.0
2.80	1.2	0.019	289.000	0.0

System 200-(50 year)

Subsection: Elevation-Volume-Flow Table (Pond) | Return Event: 50 years
Label: 1 | Storm Event:

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)
2.90	1.2	0.019	289.000	0.0
3.00	1.2	0.020	289.000	0.0
3.10	1.2	0.021	289.000	0.0
3.20	1.3	0.021	289.000	0.0
3.30	1.3	0.022	289.000	0.0
3.40	1.3	0.023	289.000	0.0
3.50	1.3	0.023	289.000	0.0
3.60	1.3	0.024	289.000	0.0
3.70	1.4	0.025	289.000	0.0
3.80	1.4	0.025	289.000	0.0
3.90	1.4	0.026	289.000	0.0
4.00	1.4	0.027	289.000	0.0

Flow (Total) (ft³/s)	2S/t + O (ft³/s)
0.0	0.0
0.0	1.0
0.1	2.0
0.2	3.1
0.3	4.1
0.4	5.2
0.5	6.2
0.5	7.3
0.6	8.3
0.6	9.3
0.7	10.3
0.7	11.3
0.7	12.3
0.8	13.3
0.8	14.3
0.8	15.3
0.9	16.3
0.9	17.3
0.9	18.3
1.0	19.3
1.0	20.2
1.0	21.2
1.0	22.2
1.1	23.2
1.1	24.2
1.1	25.2
1.1	26.2
1.2	27.2
1.2	28.2
1.2	29.1

System 200-(50 year)

Subsection: Elevation-Volume-Flow Table (Pond) | Return Event: 50 years
Label: 1 | Storm Event:

Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
1.2	30.1
1.2	31.1
1.3	32.1
1.3	33.1
1.3	34.1
1.3	35.0
1.3	36.0
1.4	37.0
1.4	38.0
1.4	39.0
1.4	40.0

System 200-(50 year)

Subsection: Level Pool Pond Routing Summary
Label: 1 (IN)

Return Event: 50 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	0.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.0 ft^3/s
Flow (Initial Infiltration)	0.0 ft^3/s
Flow (Initial, Total)	0.0 ft^3/s
Time Increment	1.0 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	4.0 ft^3/s	Time to Peak (Flow, In)	245.0 min
Flow (Peak Outlet)	1.4 ft^3/s	Time to Peak (Flow, Outlet)	249.0 min

Elevation (Water Surface, Peak)	3.79 ft
Volume (Peak)	0.025 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	0.120 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	0.120 ac-ft
Volume (Retained)	0.000 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

System 200-(50 year)

Subsection: Pond Routed Hydrograph (total out) | Return Event: 50 years
Label: 1 (OUT) | Storm Event:

Peak Discharge	1.4 ft³/s
Time to Peak	249.0 min
Hydrograph Volume	0.120 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.0 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1.0	0.0	0.0	0.0	0.0
6.0	0.0	0.0	0.0	0.0
11.0	0.0	0.1	0.1	0.1
16.0	0.1	0.1	0.1	0.1
21.0	0.1	0.1	0.1	0.1
26.0	0.1	0.1	0.1	0.1
31.0	0.1	0.1	0.1	0.1
36.0	0.1	0.1	0.1	0.1
41.0	0.1	0.1	0.1	0.1
46.0	0.1	0.1	0.1	0.1
51.0	0.1	0.1	0.1	0.1
56.0	0.1	0.1	0.1	0.1
61.0	0.1	0.1	0.1	0.1
66.0	0.1	0.1	0.1	0.1
71.0	0.1	0.1	0.1	0.1
76.0	0.1	0.1	0.1	0.1
81.0	0.1	0.1	0.1	0.1
86.0	0.1	0.1	0.1	0.1
91.0	0.1	0.1	0.1	0.1
96.0	0.1	0.1	0.1	0.1
101.0	0.1	0.1	0.1	0.1
106.0	0.1	0.1	0.1	0.1
111.0	0.1	0.1	0.1	0.1
116.0	0.1	0.1	0.1	0.1
121.0	0.1	0.1	0.1	0.1
126.0	0.1	0.1	0.1	0.1
131.0	0.1	0.1	0.1	0.1
136.0	0.1	0.1	0.1	0.1
141.0	0.1	0.1	0.1	0.1
146.0	0.1	0.2	0.2	0.2
151.0	0.2	0.2	0.2	0.2
156.0	0.2	0.2	0.2	0.2
161.0	0.2	0.2	0.2	0.2
166.0	0.2	0.2	0.2	0.2
171.0	0.2	0.2	0.2	0.2
176.0	0.2	0.2	0.2	0.2
181.0	0.2	0.2	0.2	0.2

System 200-(50 year)

Subsection: Pond Routed Hydrograph (total out) | Return Event: 50 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.0 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
186.0	0.2	0.2	0.2	0.2
191.0	0.2	0.2	0.2	0.2
196.0	0.2	0.2	0.2	0.2
201.0	0.3	0.3	0.3	0.3
206.0	0.3	0.3	0.3	0.3
211.0	0.3	0.3	0.3	0.3
216.0	0.3	0.3	0.3	0.3
221.0	0.4	0.4	0.4	0.4
226.0	0.4	0.4	0.4	0.4
231.0	0.5	0.5	0.5	0.5
236.0	0.6	0.6	0.6	0.6
241.0	0.7	0.8	0.9	1.0
246.0	1.3	1.3	1.4	1.4
251.0	1.3	1.3	1.3	1.2
256.0	1.2	1.1	1.1	1.0
261.0	1.0	0.9	0.9	0.9
266.0	0.8	0.7	0.7	0.7
271.0	0.6	0.6	0.5	0.5
276.0	0.4	0.4	0.4	0.3
281.0	0.3	0.3	0.2	0.2
286.0	0.2	0.2	0.2	0.2
291.0	0.2	0.2	0.2	0.2
296.0	0.2	0.2	0.2	0.2
301.0	0.2	0.1	0.1	0.1
306.0	0.1	0.1	0.1	0.1
311.0	0.1	0.1	0.1	0.1
316.0	0.1	0.1	0.1	0.1
321.0	0.1	0.1	0.1	0.1
326.0	0.1	0.1	0.1	0.1
331.0	0.1	0.1	0.1	0.1
336.0	0.1	0.1	0.1	0.1
341.0	0.1	0.1	0.1	0.1
346.0	0.1	0.1	0.1	0.1
351.0	0.1	0.1	0.1	0.1
356.0	0.1	0.1	0.1	0.1
361.0	0.1	0.1	0.1	0.1
366.0	0.1	0.1	0.0	0.0
371.0	0.0	0.0	0.0	0.0
376.0	0.0	0.0	0.0	0.0
381.0	0.0	0.0	0.0	0.0
386.0	0.0	0.0	0.0	0.0
391.0	0.0	0.0	0.0	0.0

System 200-(50 year)

Subsection: Pond Routed Hydrograph (total out) | Return Event: 50 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.0 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
396.0	0.0	0.0	0.0	0.0
401.0	0.0	0.0	0.0	0.0
406.0	0.0	0.0	0.0	0.0
411.0	0.0	0.0	0.0	0.0
416.0	0.0	0.0	0.0	0.0
421.0	0.0	0.0	0.0	0.0
426.0	0.0	0.0	0.0	0.0
431.0	0.0	0.0	0.0	0.0
436.0	0.0	0.0	0.0	0.0
441.0	0.0	0.0	0.0	0.0

Flow (ft³/s)
0.0
0.0
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.2

System 200-(50 year)

Subsection: Pond Routed Hydrograph (total out) | Return Event: 50 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.0 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.2
0.2
0.2
0.2
0.2
0.2
0.2
0.2
0.2
0.2
0.3
0.3
0.3
0.3
0.4
0.5
0.5
0.7
1.2
1.4
1.2
1.0
0.8
0.6
0.5
0.3
0.2
0.2
0.2
0.2
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1

System 200-(50 year)

Subsection: Pond Routed Hydrograph (total out) | Return Event: 50 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.0 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.1
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
(N/A)

System 200-(50 year)

Subsection: Pond Inflow Summary | Return Event: 50 years
Label: 1 (IN) | Storm Event:

Summary for Hydrograph Addition at '1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	S200

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	S200	0.120	245.0	4.0
Flow (In)	1	0.120	245.0	4.0

System 200-(25 year)

Project Summary	
Title	SYSTEM 200
Engineer	PDC
Company	PDC
Date	1/21/2017

Notes

System 200-(25 year)

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
S200	EX10	0	0.101	245.0	3.3

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
O-1	EX10	0	0.101	249.0	1.2

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
1 (IN)	EX10	0	0.101	245.0	3.3	(N/A)	(N/A)
1 (OUT)	EX10	0	0.101	249.0	1.2	3.00	0.020

System 200-(25 year)

Subsection: Read Hydrograph
Label: S200

Return Event: 25 years
Storm Event:

Peak Discharge	3.3 ft³/s
Time to Peak	245.0 min
Hydrograph Volume	0.101 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 5.0 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.0	0.0	0.1	0.1	0.1
25.0	0.1	0.1	0.1	0.1
50.0	0.1	0.1	0.1	0.1
75.0	0.1	0.1	0.1	0.1
100.0	0.1	0.1	0.1	0.1
125.0	0.1	0.1	0.1	0.1
150.0	0.1	0.1	0.1	0.1
175.0	0.2	0.2	0.2	0.2
200.0	0.2	0.2	0.2	0.3
225.0	0.4	0.4	0.6	0.8
250.0	0.5	0.3	0.3	0.2
275.0	0.2	0.2	0.1	0.1
300.0	0.1	0.1	0.1	0.1
325.0	0.1	0.1	0.1	0.1
350.0	0.1	0.1	0.1	0.0

Flow (ft³/s)
0.1
0.1
0.1
0.1
0.1
0.1
0.2
0.2
0.3
3.3
0.2
0.1
0.1
0.1
(N/A)

System 200-(25 year)

Subsection: Elevation-Area Volume Curve
Label: 1

Return Event: 25 years
Storm Event:

Elevation (ft)	Planimeter (ft²)	Area (ft²)	A1+A2+sqr(A1*A2) (ft²)
0.00	0.0	289.000	0.000
4.00	0.0	289.000	867.000

Volume (ac-ft)	Volume (Total) (ac-ft)
0.000	0.000
0.027	0.027

System 200-(25 year)

Subsection: Volume Equations
Label: 1

Return Event: 25 years
Storm Event:

Pond Volume Equations
* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

System 200-(25 year)

Subsection: Outlet Input Data
Label: Basin Outlet

Return Event: 25 years
Storm Event:

Requested Pond Water Surface Elevations	
Minimum (Headwater)	0.00 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	4.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	LF1	Forward	TW	0.00	4.0
Tailwater Settings	Tailwater			(N/A)	(N/A

System 200-(25 year)

Subsection: Outlet Input Data
Label: Basin Outlet

Return Event: 25 years
Storm Event:

Structure ID: LF1 Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	0.00 ft
Orifice Diameter	5.0 in
Orifice Coefficient	0.670

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

System 200-(25 year)

Subsection: Composite Rating Curve
Label: Basin Outlet

Return Event: 25 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)
0.00	0.0	(N/A)
0.10	0.0	(N/A)
0.20	0.1	(N/A)
0.30	0.2	(N/A)
0.40	0.3	(N/A)
0.50	0.4	(N/A)
0.60	0.5	(N/A)
0.70	0.5	(N/A)
0.80	0.6	(N/A)
0.90	0.6	(N/A)
1.00	0.7	(N/A)
1.10	0.7	(N/A)
1.20	0.7	(N/A)
1.30	0.8	(N/A)
1.40	0.8	(N/A)
1.50	0.8	(N/A)
1.60	0.9	(N/A)
1.70	0.9	(N/A)
1.80	0.9	(N/A)
1.90	1.0	(N/A)
2.00	1.0	(N/A)
2.10	1.0	(N/A)
2.20	1.0	(N/A)
2.30	1.1	(N/A)
2.40	1.1	(N/A)
2.50	1.1	(N/A)
2.60	1.1	(N/A)
2.70	1.2	(N/A)
2.80	1.2	(N/A)
2.90	1.2	(N/A)
3.00	1.2	(N/A)
3.10	1.2	(N/A)
3.20	1.3	(N/A)
3.30	1.3	(N/A)
3.40	1.3	(N/A)
3.50	1.3	(N/A)
3.60	1.3	(N/A)
3.70	1.4	(N/A)
3.80	1.4	(N/A)
3.90	1.4	(N/A)
4.00	1.4	(N/A)

Convergence Error (ft)	Contributing Structures
0.00	None Contributing

System 200-(25 year)

Subsection: Composite Rating Curve
Label: Basin Outlet

Return Event: 25 years
Storm Event:

Composite Outflow Summary

Convergence Error (ft)	Contributing Structures
0.00	LF1
0.00	LF1
0.00	LF1

System 200-(25 year)

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 25 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	0.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.0 ft³/s
Flow (Initial Infiltration)	0.0 ft³/s
Flow (Initial, Total)	0.0 ft³/s
Time Increment	1.0 min

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)
0.00	0.0	0.000	289.000	0.0
0.10	0.0	0.001	289.000	0.0
0.20	0.1	0.001	289.000	0.0
0.30	0.2	0.002	289.000	0.0
0.40	0.3	0.003	289.000	0.0
0.50	0.4	0.003	289.000	0.0
0.60	0.5	0.004	289.000	0.0
0.70	0.5	0.005	289.000	0.0
0.80	0.6	0.005	289.000	0.0
0.90	0.6	0.006	289.000	0.0
1.00	0.7	0.007	289.000	0.0
1.10	0.7	0.007	289.000	0.0
1.20	0.7	0.008	289.000	0.0
1.30	0.8	0.009	289.000	0.0
1.40	0.8	0.009	289.000	0.0
1.50	0.8	0.010	289.000	0.0
1.60	0.9	0.011	289.000	0.0
1.70	0.9	0.011	289.000	0.0
1.80	0.9	0.012	289.000	0.0
1.90	1.0	0.013	289.000	0.0
2.00	1.0	0.013	289.000	0.0
2.10	1.0	0.014	289.000	0.0
2.20	1.0	0.015	289.000	0.0
2.30	1.1	0.015	289.000	0.0
2.40	1.1	0.016	289.000	0.0
2.50	1.1	0.017	289.000	0.0
2.60	1.1	0.017	289.000	0.0
2.70	1.2	0.018	289.000	0.0
2.80	1.2	0.019	289.000	0.0

System 200-(25 year)

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 25 years
Storm Event:

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)
2.90	1.2	0.019	289.000	0.0
3.00	1.2	0.020	289.000	0.0
3.10	1.2	0.021	289.000	0.0
3.20	1.3	0.021	289.000	0.0
3.30	1.3	0.022	289.000	0.0
3.40	1.3	0.023	289.000	0.0
3.50	1.3	0.023	289.000	0.0
3.60	1.3	0.024	289.000	0.0
3.70	1.4	0.025	289.000	0.0
3.80	1.4	0.025	289.000	0.0
3.90	1.4	0.026	289.000	0.0
4.00	1.4	0.027	289.000	0.0

Flow (Total) (ft³/s)	2S/t + O (ft³/s)
0.0	0.0
0.0	1.0
0.1	2.0
0.2	3.1
0.3	4.1
0.4	5.2
0.5	6.2
0.5	7.3
0.6	8.3
0.6	9.3
0.7	10.3
0.7	11.3
0.7	12.3
0.8	13.3
0.8	14.3
0.8	15.3
0.9	16.3
0.9	17.3
0.9	18.3
1.0	19.3
1.0	20.2
1.0	21.2
1.0	22.2
1.1	23.2
1.1	24.2
1.1	25.2
1.1	26.2
1.2	27.2
1.2	28.2
1.2	29.1

System 200-(25 year)

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 25 years
Storm Event:

Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
1.2	30.1
1.2	31.1
1.3	32.1
1.3	33.1
1.3	34.1
1.3	35.0
1.3	36.0
1.4	37.0
1.4	38.0
1.4	39.0
1.4	40.0

System 200-(25 year)

Subsection: Level Pool Pond Routing Summary
Label: 1 (IN)

Return Event: 25 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	0.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.0 ft^3/s
Flow (Initial Infiltration)	0.0 ft^3/s
Flow (Initial, Total)	0.0 ft^3/s
Time Increment	1.0 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	3.3 ft^3/s	Time to Peak (Flow, In)	245.0 min
Flow (Peak Outlet)	1.2 ft^3/s	Time to Peak (Flow, Outlet)	249.0 min

Elevation (Water Surface, Peak)	3.00 ft
Volume (Peak)	0.020 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	0.101 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	0.101 ac-ft
Volume (Retained)	0.000 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

System 200-(25 year)

Subsection: Pond Routed Hydrograph (total out) | Return Event: 25 years
Label: 1 (OUT) | Storm Event:

Peak Discharge	1.2 ft³/s
Time to Peak	249.0 min
Hydrograph Volume	0.101 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.0 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1.0	0.0	0.0	0.0	0.0
6.0	0.0	0.0	0.0	0.0
11.0	0.0	0.1	0.1	0.1
16.0	0.1	0.1	0.1	0.1
21.0	0.1	0.1	0.1	0.1
26.0	0.1	0.1	0.1	0.1
31.0	0.1	0.1	0.1	0.1
36.0	0.1	0.1	0.1	0.1
41.0	0.1	0.1	0.1	0.1
46.0	0.1	0.1	0.1	0.1
51.0	0.1	0.1	0.1	0.1
56.0	0.1	0.1	0.1	0.1
61.0	0.1	0.1	0.1	0.1
66.0	0.1	0.1	0.1	0.1
71.0	0.1	0.1	0.1	0.1
76.0	0.1	0.1	0.1	0.1
81.0	0.1	0.1	0.1	0.1
86.0	0.1	0.1	0.1	0.1
91.0	0.1	0.1	0.1	0.1
96.0	0.1	0.1	0.1	0.1
101.0	0.1	0.1	0.1	0.1
106.0	0.1	0.1	0.1	0.1
111.0	0.1	0.1	0.1	0.1
116.0	0.1	0.1	0.1	0.1
121.0	0.1	0.1	0.1	0.1
126.0	0.1	0.1	0.1	0.1
131.0	0.1	0.1	0.1	0.1
136.0	0.1	0.1	0.1	0.1
141.0	0.1	0.1	0.1	0.1
146.0	0.1	0.1	0.1	0.1
151.0	0.1	0.1	0.1	0.1
156.0	0.1	0.1	0.1	0.1
161.0	0.1	0.1	0.1	0.1
166.0	0.1	0.1	0.1	0.1
171.0	0.1	0.2	0.2	0.2
176.0	0.2	0.2	0.2	0.2
181.0	0.2	0.2	0.2	0.2

System 200-(25 year)

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 25 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.0 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
186.0	0.2	0.2	0.2	0.2
191.0	0.2	0.2	0.2	0.2
196.0	0.2	0.2	0.2	0.2
201.0	0.2	0.2	0.2	0.2
206.0	0.2	0.2	0.2	0.2
211.0	0.2	0.2	0.2	0.2
216.0	0.3	0.3	0.3	0.3
221.0	0.3	0.3	0.3	0.3
226.0	0.4	0.4	0.4	0.4
231.0	0.4	0.4	0.4	0.4
236.0	0.5	0.5	0.5	0.5
241.0	0.6	0.7	0.8	0.9
246.0	1.1	1.2	1.2	1.2
251.0	1.2	1.1	1.1	1.1
256.0	1.0	0.9	0.9	0.9
261.0	0.8	0.8	0.7	0.7
266.0	0.6	0.6	0.5	0.5
271.0	0.4	0.4	0.4	0.3
276.0	0.3	0.3	0.3	0.2
281.0	0.2	0.2	0.2	0.2
286.0	0.2	0.1	0.1	0.1
291.0	0.1	0.1	0.1	0.1
296.0	0.1	0.1	0.1	0.1
301.0	0.1	0.1	0.1	0.1
306.0	0.1	0.1	0.1	0.1
311.0	0.1	0.1	0.1	0.1
316.0	0.1	0.1	0.1	0.1
321.0	0.1	0.1	0.1	0.1
326.0	0.1	0.1	0.1	0.1
331.0	0.1	0.1	0.1	0.1
336.0	0.1	0.1	0.1	0.1
341.0	0.1	0.1	0.1	0.1
346.0	0.1	0.1	0.1	0.1
351.0	0.1	0.1	0.1	0.1
356.0	0.1	0.1	0.1	0.1
361.0	0.1	0.1	0.1	0.1
366.0	0.1	0.1	0.0	0.0
371.0	0.0	0.0	0.0	0.0
376.0	0.0	0.0	0.0	0.0
381.0	0.0	0.0	0.0	0.0
386.0	0.0	0.0	0.0	0.0
391.0	0.0	0.0	0.0	0.0

System 200-(25 year)

Subsection: Pond Routed Hydrograph (total out) | Return Event: 25 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.0 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
396.0	0.0	0.0	0.0	0.0
401.0	0.0	0.0	0.0	0.0
406.0	0.0	0.0	0.0	0.0
411.0	0.0	0.0	0.0	0.0
416.0	0.0	0.0	0.0	0.0
421.0	0.0	0.0	0.0	0.0
426.0	0.0	0.0	0.0	0.0
431.0	0.0	0.0	0.0	0.0
436.0	0.0	0.0	0.0	0.0
441.0	0.0	0.0	0.0	0.0

Flow (ft³/s)
0.0
0.0
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1

System 200-(25 year)

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 25 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.0 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.1
0.1
0.1
0.1
0.2
0.2
0.2
0.2
0.2
0.2
0.2
0.2
0.2
0.3
0.3
0.4
0.4
0.6
1.0
1.2
1.0
0.8
0.7
0.5
0.3
0.2
0.2
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1

System 200-(25 year)

Subsection: Pond Routed Hydrograph (total out) | Return Event: 25 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 1.0 min
Time on left represents time for first value in each row.

Flow (ft^3/s)
0.1
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
(N/A)

System 200-(25 year)

Subsection: Pond Inflow Summary
Label: 1 (IN)

Return Event: 25 years
Storm Event:

Summary for Hydrograph Addition at '1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	S200

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	S200	0.101	245.0	3.3
Flow (In)	1	0.101	245.0	3.3

System 200-(5 year)

Project Summary	
Title	SYSTEM 200
Engineer	PDC
Company	PDC
Date	1/21/2017

Notes

System 200-(5 year)

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
S200	EX10	0	0.083	245.0	2.5

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
O-1	EX10	0	0.083	249.0	1.0

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
1 (IN)	EX10	0	0.083	245.0	2.5	(N/A)	(N/A)
1 (OUT)	EX10	0	0.083	249.0	1.0	2.10	0.014

System 200-(5 year)

Subsection: Read Hydrograph
Label: S200

Return Event: 5 years
Storm Event:

Peak Discharge	2.5 ft³/s
Time to Peak	245.0 min
Hydrograph Volume	0.083 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 5.0 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.0	0.0	0.1	0.1	0.1	0.1
25.0	0.1	0.1	0.1	0.1	0.1
50.0	0.1	0.1	0.1	0.1	0.1
75.0	0.1	0.1	0.1	0.1	0.1
100.0	0.1	0.1	0.1	0.1	0.1
125.0	0.1	0.1	0.1	0.1	0.1
150.0	0.1	0.1	0.1	0.1	0.1
175.0	0.1	0.1	0.1	0.1	0.1
200.0	0.2	0.2	0.2	0.2	0.2
225.0	0.3	0.3	0.5	0.6	0.6
250.0	0.4	0.3	0.2	0.2	0.2
275.0	0.1	0.1	0.1	0.1	0.1
300.0	0.1	0.1	0.1	0.1	0.1
325.0	0.1	0.1	0.1	0.1	0.1
350.0	0.1	0.1	0.1	0.1	0.0

Flow (ft³/s)
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.2
2.5
0.1
0.1
0.1
0.1
(N/A)

System 200-(5 year)

Subsection: Elevation-Area Volume Curve
Label: 1

Return Event: 5 years
Storm Event:

Elevation (ft)	Planimeter (ft²)	Area (ft²)	A1+A2+sqr(A1*A2) (ft²)
0.00	0.0	289.000	0.000
4.00	0.0	289.000	867.000

Volume (ac-ft)	Volume (Total) (ac-ft)
0.000	0.000
0.027	0.027

System 200-(5 year)

Subsection: Volume Equations | Return Event: 5 years
Label: 1 | Storm Event:

Pond Volume Equations
* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

System 200-(5 year)

Subsection: Outlet Input Data
Label: Basin Outlet

Return Event: 5 years
Storm Event:

Requested Pond Water Surface Elevations	
Minimum (Headwater)	0.00 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	4.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular Tailwater Settings	LF1 Tailwater	Forward	TW	0.00 (N/A)	4.0 (N/A

System 200-(5 year)

Subsection: Outlet Input Data
Label: Basin Outlet

Return Event: 5 years
Storm Event:

Structure ID: LF1 Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	0.00 ft
Orifice Diameter	5.0 in
Orifice Coefficient	0.670

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

System 200-(5 year)

Subsection: Composite Rating Curve
Label: Basin Outlet

Return Event: 5 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)
0.00	0.0	(N/A)
0.10	0.0	(N/A)
0.20	0.1	(N/A)
0.30	0.2	(N/A)
0.40	0.3	(N/A)
0.50	0.4	(N/A)
0.60	0.5	(N/A)
0.70	0.5	(N/A)
0.80	0.6	(N/A)
0.90	0.6	(N/A)
1.00	0.7	(N/A)
1.10	0.7	(N/A)
1.20	0.7	(N/A)
1.30	0.8	(N/A)
1.40	0.8	(N/A)
1.50	0.8	(N/A)
1.60	0.9	(N/A)
1.70	0.9	(N/A)
1.80	0.9	(N/A)
1.90	1.0	(N/A)
2.00	1.0	(N/A)
2.10	1.0	(N/A)
2.20	1.0	(N/A)
2.30	1.1	(N/A)
2.40	1.1	(N/A)
2.50	1.1	(N/A)
2.60	1.1	(N/A)
2.70	1.2	(N/A)
2.80	1.2	(N/A)
2.90	1.2	(N/A)
3.00	1.2	(N/A)
3.10	1.2	(N/A)
3.20	1.3	(N/A)
3.30	1.3	(N/A)
3.40	1.3	(N/A)
3.50	1.3	(N/A)
3.60	1.3	(N/A)
3.70	1.4	(N/A)
3.80	1.4	(N/A)
3.90	1.4	(N/A)
4.00	1.4	(N/A)

Convergence Error (ft)	Contributing Structures
0.00	None Contributing

System 200-(5 year)

Subsection: Composite Rating Curve
Label: Basin Outlet

Return Event: 5 years
Storm Event:

Composite Outflow Summary

Convergence Error (ft)	Contributing Structures
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1
0.00	LF1

System 200-(5 year)

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 5 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	0.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.0 ft³/s
Flow (Initial Infiltration)	0.0 ft³/s
Flow (Initial, Total)	0.0 ft³/s
Time Increment	1.0 min

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)
0.00	0.0	0.000	289.000	0.0
0.10	0.0	0.001	289.000	0.0
0.20	0.1	0.001	289.000	0.0
0.30	0.2	0.002	289.000	0.0
0.40	0.3	0.003	289.000	0.0
0.50	0.4	0.003	289.000	0.0
0.60	0.5	0.004	289.000	0.0
0.70	0.5	0.005	289.000	0.0
0.80	0.6	0.005	289.000	0.0
0.90	0.6	0.006	289.000	0.0
1.00	0.7	0.007	289.000	0.0
1.10	0.7	0.007	289.000	0.0
1.20	0.7	0.008	289.000	0.0
1.30	0.8	0.009	289.000	0.0
1.40	0.8	0.009	289.000	0.0
1.50	0.8	0.010	289.000	0.0
1.60	0.9	0.011	289.000	0.0
1.70	0.9	0.011	289.000	0.0
1.80	0.9	0.012	289.000	0.0
1.90	1.0	0.013	289.000	0.0
2.00	1.0	0.013	289.000	0.0
2.10	1.0	0.014	289.000	0.0
2.20	1.0	0.015	289.000	0.0
2.30	1.1	0.015	289.000	0.0
2.40	1.1	0.016	289.000	0.0
2.50	1.1	0.017	289.000	0.0
2.60	1.1	0.017	289.000	0.0
2.70	1.2	0.018	289.000	0.0
2.80	1.2	0.019	289.000	0.0

System 200-(5 year)

Subsection: Elevation-Volume-Flow Table (Pond) | Return Event: 5 years
Label: 1 | Storm Event:

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)
2.90	1.2	0.019	289.000	0.0
3.00	1.2	0.020	289.000	0.0
3.10	1.2	0.021	289.000	0.0
3.20	1.3	0.021	289.000	0.0
3.30	1.3	0.022	289.000	0.0
3.40	1.3	0.023	289.000	0.0
3.50	1.3	0.023	289.000	0.0
3.60	1.3	0.024	289.000	0.0
3.70	1.4	0.025	289.000	0.0
3.80	1.4	0.025	289.000	0.0
3.90	1.4	0.026	289.000	0.0
4.00	1.4	0.027	289.000	0.0

Flow (Total) (ft³/s)	2S/t + O (ft³/s)
0.0	0.0
0.0	1.0
0.1	2.0
0.2	3.1
0.3	4.1
0.4	5.2
0.5	6.2
0.5	7.3
0.6	8.3
0.6	9.3
0.7	10.3
0.7	11.3
0.7	12.3
0.8	13.3
0.8	14.3
0.8	15.3
0.9	16.3
0.9	17.3
0.9	18.3
1.0	19.3
1.0	20.2
1.0	21.2
1.0	22.2
1.1	23.2
1.1	24.2
1.1	25.2
1.1	26.2
1.2	27.2
1.2	28.2
1.2	29.1

System 200-(5 year)

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 5 years
Storm Event:

Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
1.2	30.1
1.2	31.1
1.3	32.1
1.3	33.1
1.3	34.1
1.3	35.0
1.3	36.0
1.4	37.0
1.4	38.0
1.4	39.0
1.4	40.0

System 200-(5 year)

Subsection: Level Pool Pond Routing Summary
Label: 1 (IN)

Return Event: 5 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	0.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.0 ft^3/s
Flow (Initial Infiltration)	0.0 ft^3/s
Flow (Initial, Total)	0.0 ft^3/s
Time Increment	1.0 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	2.5 ft^3/s	Time to Peak (Flow, In)	245.0 min
Flow (Peak Outlet)	1.0 ft^3/s	Time to Peak (Flow, Outlet)	249.0 min

Elevation (Water Surface, Peak)	2.10 ft
Volume (Peak)	0.014 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	0.083 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	0.083 ac-ft
Volume (Retained)	0.000 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

System 200-(5 year)

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 5 years
Storm Event:

Peak Discharge	1.0 ft³/s
Time to Peak	249.0 min
Hydrograph Volume	0.083 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.0 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1.0	0.0	0.0	0.0	0.0
6.0	0.0	0.0	0.0	0.0
11.0	0.0	0.1	0.1	0.1
16.0	0.1	0.1	0.1	0.1
21.0	0.1	0.1	0.1	0.1
26.0	0.1	0.1	0.1	0.1
31.0	0.1	0.1	0.1	0.1
36.0	0.1	0.1	0.1	0.1
41.0	0.1	0.1	0.1	0.1
46.0	0.1	0.1	0.1	0.1
51.0	0.1	0.1	0.1	0.1
56.0	0.1	0.1	0.1	0.1
61.0	0.1	0.1	0.1	0.1
66.0	0.1	0.1	0.1	0.1
71.0	0.1	0.1	0.1	0.1
76.0	0.1	0.1	0.1	0.1
81.0	0.1	0.1	0.1	0.1
86.0	0.1	0.1	0.1	0.1
91.0	0.1	0.1	0.1	0.1
96.0	0.1	0.1	0.1	0.1
101.0	0.1	0.1	0.1	0.1
106.0	0.1	0.1	0.1	0.1
111.0	0.1	0.1	0.1	0.1
116.0	0.1	0.1	0.1	0.1
121.0	0.1	0.1	0.1	0.1
126.0	0.1	0.1	0.1	0.1
131.0	0.1	0.1	0.1	0.1
136.0	0.1	0.1	0.1	0.1
141.0	0.1	0.1	0.1	0.1
146.0	0.1	0.1	0.1	0.1
151.0	0.1	0.1	0.1	0.1
156.0	0.1	0.1	0.1	0.1
161.0	0.1	0.1	0.1	0.1
166.0	0.1	0.1	0.1	0.1
171.0	0.1	0.1	0.1	0.1
176.0	0.1	0.1	0.1	0.1
181.0	0.1	0.1	0.1	0.1

System 200-(5 year)

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 5 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.0 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
186.0	0.1	0.1	0.1	0.1
191.0	0.1	0.1	0.1	0.1
196.0	0.1	0.1	0.1	0.1
201.0	0.1	0.2	0.2	0.2
206.0	0.2	0.2	0.2	0.2
211.0	0.2	0.2	0.2	0.2
216.0	0.2	0.2	0.2	0.2
221.0	0.2	0.2	0.2	0.2
226.0	0.3	0.3	0.3	0.3
231.0	0.3	0.3	0.3	0.4
236.0	0.4	0.4	0.4	0.5
241.0	0.5	0.6	0.7	0.7
246.0	0.9	1.0	1.0	1.0
251.0	1.0	0.9	0.9	0.9
256.0	0.8	0.7	0.7	0.7
261.0	0.6	0.6	0.5	0.5
266.0	0.4	0.4	0.3	0.3
271.0	0.2	0.2	0.2	0.2
276.0	0.1	0.1	0.1	0.1
281.0	0.1	0.1	0.1	0.1
286.0	0.1	0.1	0.1	0.1
291.0	0.1	0.1	0.1	0.1
296.0	0.1	0.1	0.1	0.1
301.0	0.1	0.1	0.1	0.1
306.0	0.1	0.1	0.1	0.1
311.0	0.1	0.1	0.1	0.1
316.0	0.1	0.1	0.1	0.1
321.0	0.1	0.1	0.1	0.1
326.0	0.1	0.1	0.1	0.1
331.0	0.1	0.1	0.1	0.1
336.0	0.1	0.1	0.1	0.1
341.0	0.1	0.1	0.1	0.1
346.0	0.1	0.1	0.1	0.1
351.0	0.1	0.1	0.1	0.1
356.0	0.1	0.1	0.1	0.1
361.0	0.1	0.1	0.1	0.1
366.0	0.1	0.1	0.0	0.0
371.0	0.0	0.0	0.0	0.0
376.0	0.0	0.0	0.0	0.0
381.0	0.0	0.0	0.0	0.0
386.0	0.0	0.0	0.0	0.0
391.0	0.0	0.0	0.0	0.0

System 200-(5 year)

Subsection: Pond Routed Hydrograph (total out) | Return Event: 5 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.0 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
396.0	0.0	0.0	0.0	0.0
401.0	0.0	0.0	0.0	0.0
406.0	0.0	0.0	0.0	0.0
411.0	0.0	0.0	0.0	0.0
416.0	0.0	0.0	0.0	0.0
421.0	0.0	0.0	0.0	0.0
426.0	0.0	0.0	0.0	0.0
431.0	0.0	0.0	0.0	0.0
436.0	0.0	0.0	0.0	0.0
441.0	0.0	0.0	0.0	0.0

Flow (ft³/s)
0.0
0.0
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1

System 200-(5 year)

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 5 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.0 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.2
0.2
0.2
0.2
0.2
0.3
0.4
0.5
0.8
1.0
0.8
0.6
0.5
0.3
0.2
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1

System 200-(5 year)

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 5 years
Storm Event:

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 1.0 min
Time on left represents time for first value in each row.

Flow (ft^3/s)
0.1
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
(N/A)

System 200-(5 year)

Subsection: Pond Inflow Summary | Return Event: 5 years
Label: 1 (IN) | Storm Event:

Summary for Hydrograph Addition at '1'

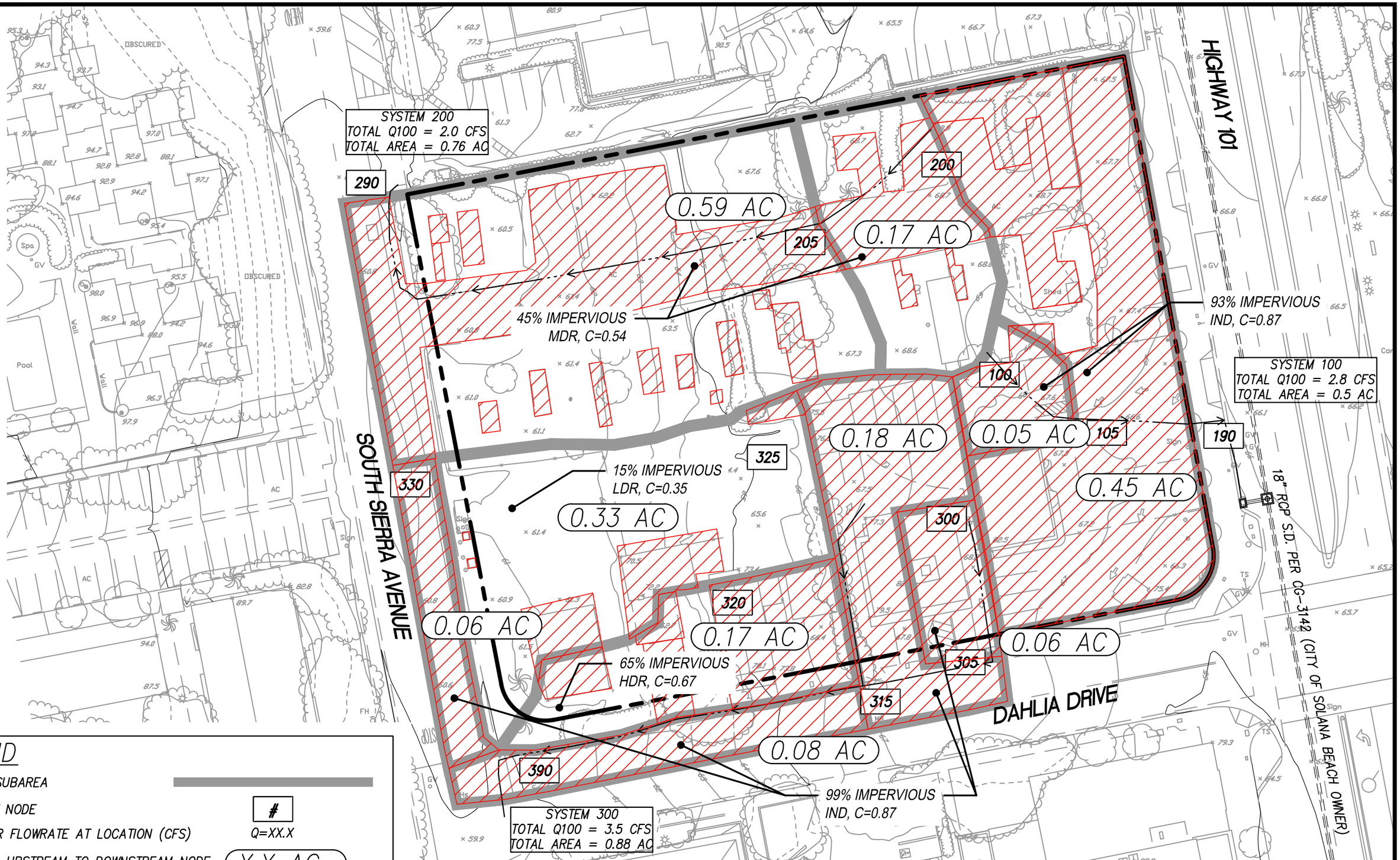
Upstream Link	Upstream Node
<Catchment to Outflow Node>	S200

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	S200	0.083	245.0	2.5
Flow (In)	1	0.083	245.0	2.5

APPENDIX 6

Drainage Exhibits



LEGEND

DRAINAGE SUBAREA	
HYDROLOGY NODE	#
PEAK 100YR FLOWRATE AT LOCATION (CFS)	Q=XX.X
AREA FROM UPSTREAM TO DOWNSTREAM NODE	X.X AC
DRAINAGE FLOWPATH	
IMPERVIOUS AREAS	

SCALE:	1"=40'
JOB #:	4242
CREATED:	11/23/16

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Engineering | Survey

701 B Street, Suite 800
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CITY OF SOLANA BEACH

SOLANA BEACH 101

DRAINAGE MAP
EXISTING CONDITIONS
EXHIBIT A

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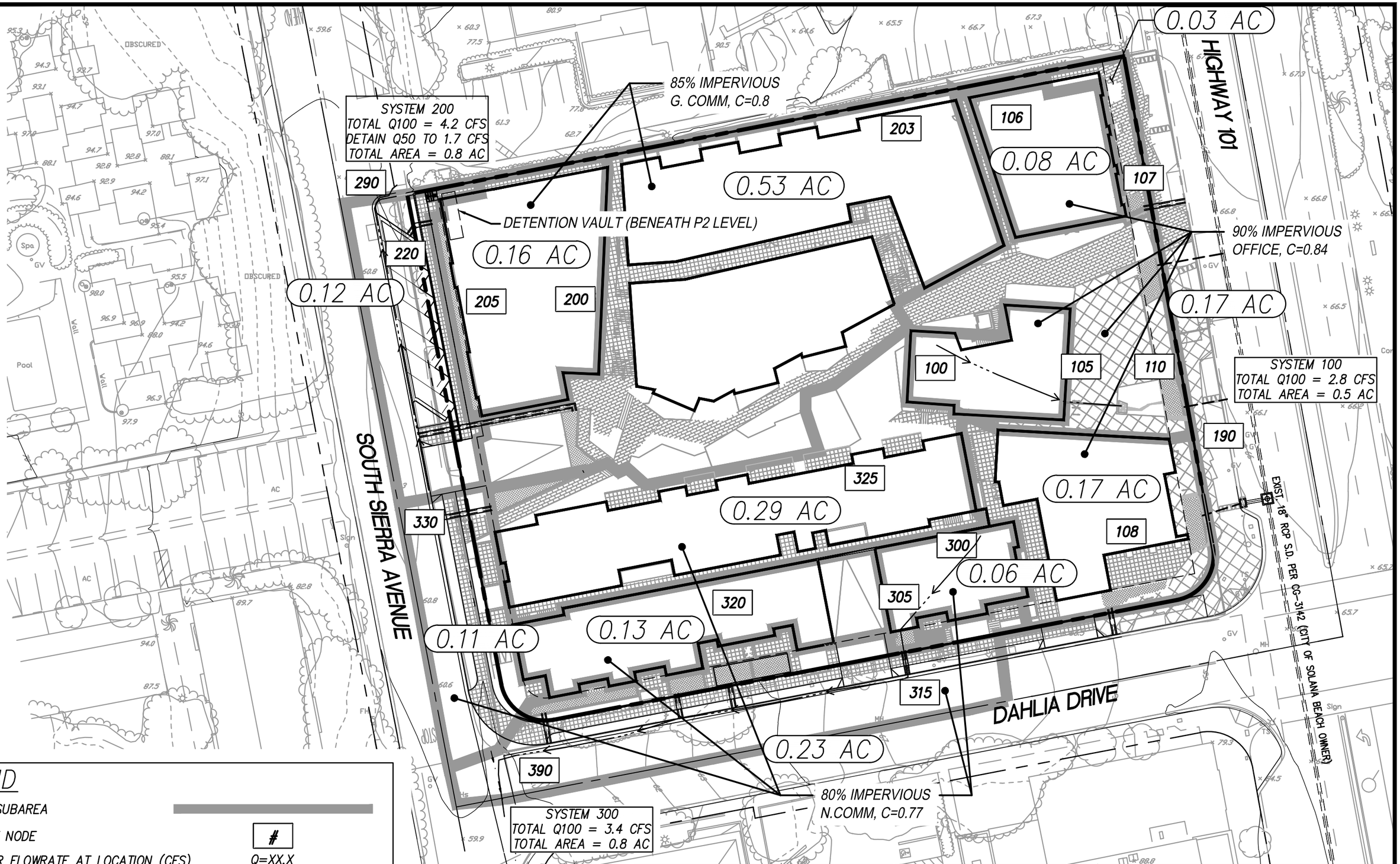

LEGEND

DRAINAGE SUBAREA	
HYDROLOGY NODE	#
PEAK 100YR FLOWRATE AT LOCATION (CFS)	Q=XX.X
AREA FROM UPSTREAM TO DOWNSTREAM NODE	X.X AC
DRAINAGE FLOWPATH	

NOTE: ALL OUTLETS AND CURB UNDER DRAINS ARE PRIVATE AND OWNED BY ZEPHYR PARTNERS

SCALE:	1"=40'
JOB #:	4242
CREATED:	11/23/16

PREPARED BY:

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CITY OF SOLANA BEACH

SOLANA BEACH 101

DRAINAGE MAP
PROPOSED CONDITIONS
EXHIBIT B

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