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HYDROLOGY AND HYDRAULICS REPORT

VERANO-Rio Vista Village

TTM 38712 & 38713

Cathedral City, CA

Prepared For

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Date Prepared: June 2023
Revised 1 :
Job Number : 4090-01

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City of Cathedral City, CA 92234
Riverside County

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Revision 1 :
Revision 2 :

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1.0 INTRODUCTION

1.1 GEOGRAPHIC SETTING

The proposed Verano project will be part of the master planned community named Rio Vista Village at Cathedral City, California. This report focuses on the portion of the Verano project (herein known as the "project") that is located within Drainage area H4 as identified in the Rio Vista Village Master Plan Drainage Alternative report, dated March 2000, and the Drainage Report Tract 28639-1 for Rio Vista Village, dated May 2001. The project encompasses a portion of TTM 38712, and all of TTM 38713. The total project site is approximately 38.35 acres with a net disturbed area of 38.35 acres. It is bounded by an empty lot to the north, Rio Guadalupe Rd to the east, Morongo Stormwater Channel to the west, and Verona Rd to the south.

The project site is vacant and undeveloped under its existing conditions. Adjacent development surrounding the area site includes single family residences, a stormwater channel, and undeveloped areas. See **Figure 1** below for the project location map.

There is no existing storm drain system on site. There is an existing Retention Basin H4 located north of Verona Rd that will be utilized for this project. The proposed project consists of the construction of various buildings, landscape areas, drive aisles, sidewalks, parking areas, wall, water quality BMPs and wet/dry utilities.

1.2 PURPOSE OF THIS REPORT

The purpose of this report is to accomplish the following objective:

To determine hydrologic impacts resulting from the proposed development. Impacts are determined based on the comparison between the pre-development condition and the post-development condition. This hydrology report will also provide the peak flow rates for 10-year and 100-year at 24hr duration for post development condition and determine if the proposed storm drain system will be sufficient to convey the runoff generated by the proposed improvements. 100yr-24Hr Storm frequency unit Hydrograph will be used to calculate the runoff volume generated at post condition. Post development condition will upgrade the existing Retention Basin H4 to accommodate the runoff volume per the proposed improvement. This will be considered in evaluating the peak flow rate after retention.

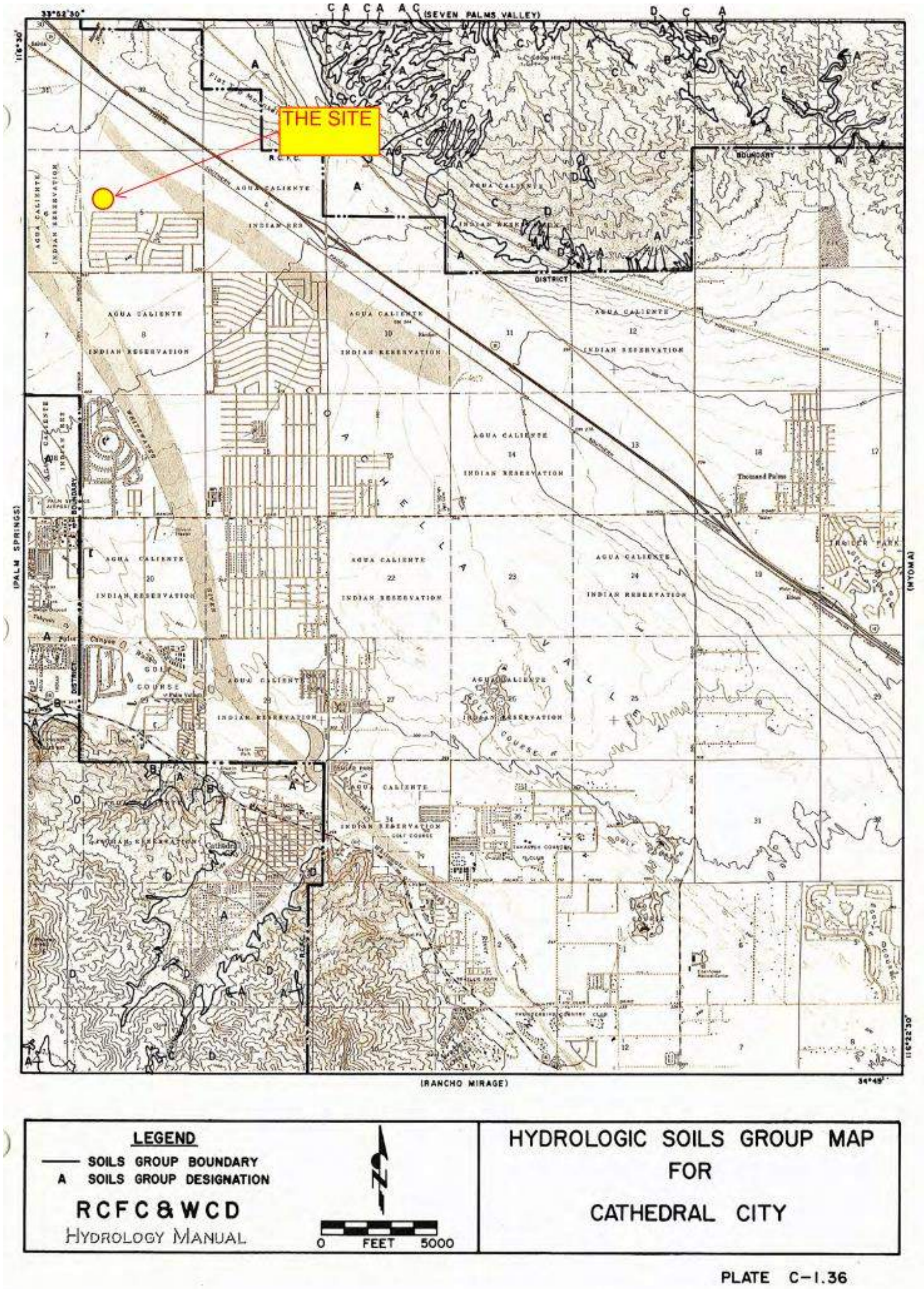
1.3 REFERENCES

- Riverside County Flood Control and Water Conservation District (RCFC & WCD) Hydrology Manual
- Approved Master WQMP (M-WQMP) for Rio Vista Village dated April 29, 2015
- Approved Rio Vista Village Master Plan of Drainage Alternative report dated April 5, 2000
- Approved Drainage Report, Tract 28639-1, Rio Vista Village report dated May 4, 2001

1.4 **PROJECT SITE LOCATION MAP**

Figure 1

1.5 HYDROLOGIC SOILS GROUP MAP FOR CATHEDRAL CITY



2.0 PRE-DEVELOPMENT CONDITION

2.1 PRE-DEVELOPMENT TOPOGRAPHY

The project site is vacant and undeveloped under existing conditions. Adjacent land uses include single family residences, a stormwater channel, and undeveloped property. The pre-development drainage area is approximately 39.11 acres. The overall property moderately slopes downward to the southerly direction towards the existing retention basin.

2.2 PRE-DEVELOPMENT DRAINAGE SYSTEM

The existing site is an undeveloped property with no storm drain system within the site. The project site is located within Drainage areas H4 as identified in the Rio Vista Village Master Plan Drainage Alternative report, dated March 2000, and the Drainage Report Tract 28639-1 for Rio Vista Village, dated May 2001. The storm runoff from the site sheet flows towards the southerly direction to the existing retention basin H4 located north of Verona Rd. These runoffs will be part of the Whitewater watershed area which will drain to Whitewater River then to the Coachella Valley Storm Water Channel.

3.0 POST DEVELOPMENT CONDITION

3.1 POST DEVELOPMENT

The proposed development includes single-family residences, landscape areas, parking lots, and drive aisles. This proposed development will increase the impervious area of the site to 65%. The post-development drainage area for this development is approximately 38.35 acres. This development will upgrade the existing Retention Basin, H4, based on the proposed conditions, for treatment control as well as to address flood control requirements. Per the M-WQMP, the basin was designed with the capacity to retain for the 100-year, 24-hour storm event. This means the design of the existing basin exceed the current NPDES WQMP requirements per Cathedral City Municipal Code Title 8 § 8.24.070 requiring a minimum storage for 100yr-3Hr duration storm event. The Autodesk Civil3D Hydraflow Unit Hydrograph and RCFC & WCD data was utilized to calculate this. Runoff from the proposed development site will sheet flow through the curb and gutters then to the on-site storm drain system and eventually to the proposed retention basin, H4. A catch basin filter insert will be used as pre-filter.

In addition, the improvements will also include installation of appropriate drainage facilities, other dry and wet utilities, and LID BMPs to mitigate water quality objectives.

3.2 PROPOSED DRAINAGE FACILITY

This post development condition will have two drainage areas as shown on the Post Development Drainage Maps. Drainage area P-A will drain to the proposed catch basins then to the on-site storm drain system which will ultimately flow towards the upgraded Retention Basin, H4. Discharge peak flow rates will be calculated per 100yr-24hr storm event. The capacity of the street and catch basins will also be designed per 100-yr storm event. Proposed development must also peak flow rate must not exceed pre-development condition at 100yr-24h4 storm frequency. This will be achieved by the utilization of the existing retention basin.

Proposed drainage structures and pipes are shown in the Hydrology Maps in Appendix 5.

4.0 HYDROLOGY AND HYDRAULIC STUDY

4.1 METHODOLOGY

This study was prepared in conformance with the Riverside County Hydrology Manual. Autodesk Civil3D Hydraflow Unit Hydrograph Calculator with the rainfall intensity and precipitation data from RCFC & WCD was used to determine the hydrograph volume based on 100-year, 24hr storm duration. Soil type "A" was used for the site per the RCFC & WCD Hydrologic Soil Map for Cathedral City (Plate C-1.36) Methodology and supportive data for the hydrologic calculations may be found in this report, and in the "Riverside County Flood Control and Water Conservation District Hydrology Manual".

The results of the analysis are included in this report in Appendix 2 and 4.

5.0 RESULTS AND CONCLUSIONS

The purpose of this drainage analysis is to identify the need to keep the post-development runoff volume and peak flow rate the same as the pre-development condition by utilizing the existing retention basin. Riverside County Flood Control District and Water Conservation District requires that the difference in runoff hydrograph volume between the "post-developed" condition and the "pre-developed" condition for the 100hr-24hr storm frequency must be detained on-site. The rainfall volume for the pre-developed condition is 171,292 C.F. The post developed rainfall volume is 285,709 C.F. Hence, the difference in pre and post developed runoff volume is 114,417 C.F. Meanwhile, the capacity of the upgraded retention basin was calculated to be 150,431 C.F., which is adequate to meet flood control requirements. Furthermore, by utilizing the proposed retention basin, it was noted that the post development peak flow was effectively reduced from 62.87 cfs to 9.83 cfs at 100yr-24hr storm frequency which is below the existing condition of 23.31 cfs. Lastly, it has been determined that the proposed storm drain system can convey runoff generated at 100-year storm events. Therefore, the proposed development meets the WQMP and flood requirements for this project and will not result in an adverse effect to the community.

EXISTING CONDITIONS 10YR-24HR & 100YR-24HR STORM EVENT

ID	Area (acre)	Tc, min	Q10 (cfs)	Q100 (cfs)
EX-A	39.11	57.70	2.70	23.31
TOTAL	**39.11**			

PROPOSED CONDITIONS 10YR-24HR & 100YR-24HR STORM EVENT

ID	Area (acre)	Tc, min	Q10 (cfs)	Q100 (cfs)
P-A1	4.61	56.3	1.50	5.46
P-A2	2.68	46.7	1.00	3.64
P-A3	3.63	38.1	1.53	5.51
P-A4	4.35	41.5	1.73	6.26
P-A5	5.29	48.4	1.89	6.86
P-A6	2.43	29.9	1.26	4.47
P-A7	2.59	31.7	1.25	4.46
P-A8	3.15	29.2	1.63	5.80
P-A9	0.89	16.4	0.66	2.30
P-A10	0.90	16.7	0.67	2.32
P-A11	0.84	15.6	0.64	2.21
P-A12	0.96	16.9	0.65	2.27
P-A13	1.01	16.8	0.68	2.39
P-A14	0.87	16.5	0.65	2.24
P-A15	1.20	20.5	0.74	2.61
P-A16	0.11	18.9	0.07	0.26
P-A17	0.17	14.2	0.13	0.44
P-A18	0.20	18.4	0.13	0.47
P-A19	2.46	45.6	0.92	3.34
TOTAL	**38.35**		**17.73**	**62.87**

REQUIRED STORAGE USING UNIT HYDROGRAPH:

(100 YR-24HR)	Runoff Volume	Remarks
Pre-Development Condition	171,292 cu.ft.	
Post Development Condition	285,709 cu.ft.	
DIFFERENCE – PRE vs POST CONDITION	**114,417 cu.ft.**	
TOTAL PROVIDED STORAGE RETENTION BASIN – (PER M-WQMP FOR RIO VISTA VILLAGE: 100YR-24HR)	**2.10 Ac-ft** **91,476 cu. ft.**	
CAPACITY OF UPGRADED RETENTION BASIN, H4	**150,431 cu.ft.**	**Adequate**

PRE VS POST DEVELOPMENT CONDITION AFTER RETENTION (100YR-24HR)

PRE-CONSTRUCTION VS POST-CONSTRUCTION FLOW SUMMURY BEFORE AND AFTER RETENTION					
Discharge Location	**Total Pre-Development Flow Rate, Q100**	**Total Post-Development Flow Rate (No Retention), Q100**	**Retention Volume Provided**	**Total Post-Development Flow Rate (After Retention), Q100**	**Conclusion**
Retention Basin H4	**23.31 cfs**	**62.87 cfs**	**150,431 cu.ft.**	**9.83 cfs**	**Post development flow decreased.**

SUMMARY OF STORM DRAIN CALCULATIONS (WORST SCENARIO)

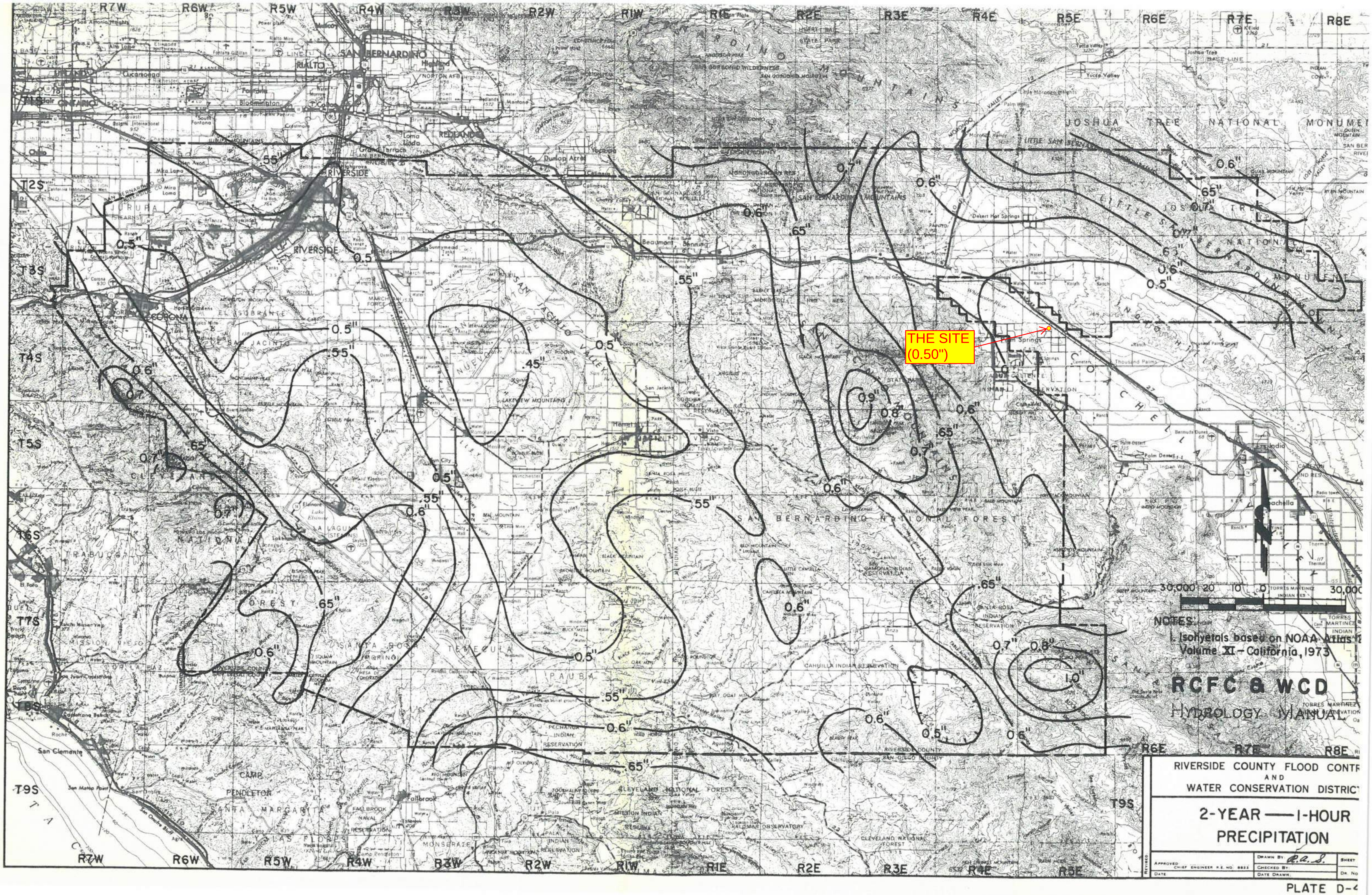
DIAMETER	SLOPE	Q_{100} (cfs)	Depth (ft)	Velocity (ft/s)
18-inch SD	S=0.0050	7.23	1.20	4.77
24-inch SD	S=0.0050	14.60	1.51	5.72
30-inch SD	S=0.0050	29.80	2.12	6.70
36-inch SD	S=0.0050	47.09	2.46	7.58
42-inch SD	S=0.0050	59.53	2.45	8.26

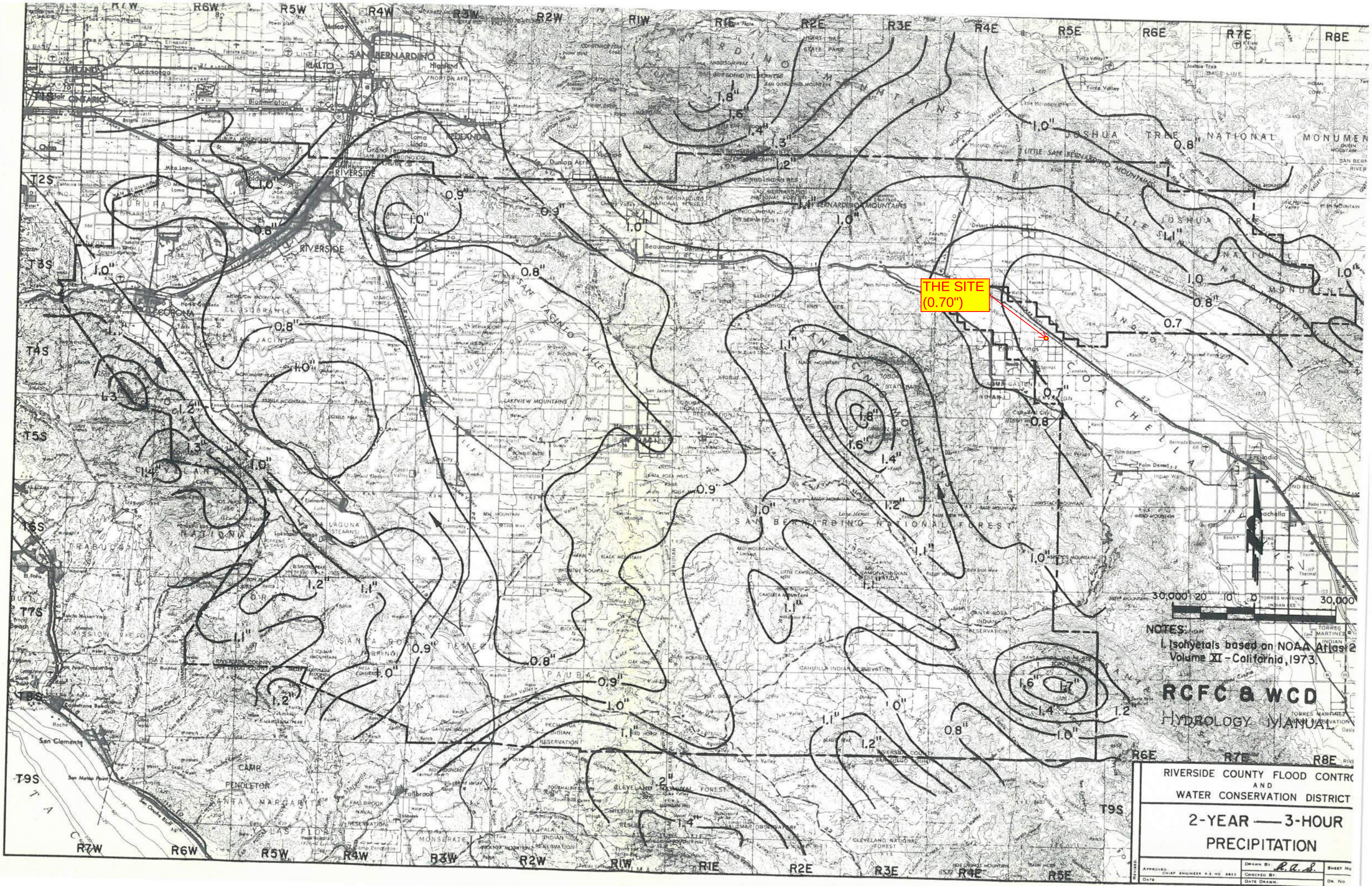
6.0 APPENDICES

Appendix 1	*Riverside County Flood Control Hydrology Manual Excepts.*
Appendix 2	*Unit Hydrograph: Pre and Post Development Conditions for 10yr- and 100yr-24Hr*
Appendix 3	*RCFC & WCD Hydrologic Soil Map (Plate C-1.36)*
Appendix 4	*Autodesk CIVIL3D Hydraflow Unit Hydrograph Calculations (STORAGE) 100yr-24Hr* *a. PRE VS POST Development Unit Hydrograph after Retention*
Appendix 5	*Hydrology Maps-Pre and Post Development Hydrology Map/ SD-Catch Basin Exhibit*
Appendix 6	*Storm Drain Sizing*
Appendix 7	*Excerpts from Approved Master Drainage Report for Tract 28639-1 and M-WQMP- Rio Vista Village (For Reference Only)*
Appendix 8	*Supporting Documents*

APPENDIX 1

RIVERSIDE COUNTY FLOOD CONTROL HYDROLOGY MANUAL EXCEPTS.


THE SITE
(0.50")
NOTES:
1. Isohyetals based on NOAA Atlas 2
Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
2-YEAR —— 1-HOUR
PRECIPITATION
PLATE D-4


THE SITE
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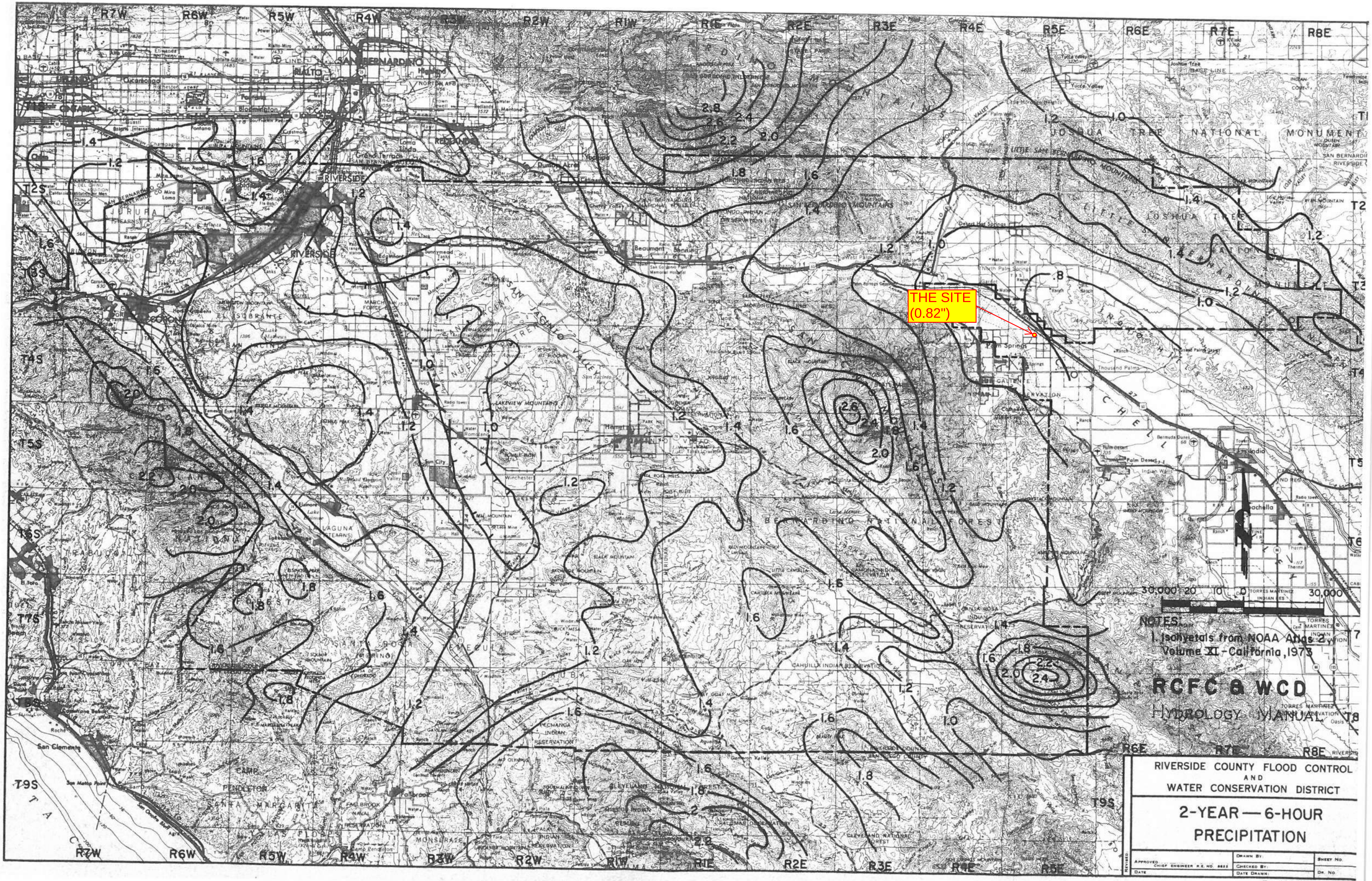
Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
2-YEAR — 3-HOUR
PRECIPITATION

PLATE E-5.1


THE SITE
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NOTES:
1. Isohyetals from NOAA Atlas 2
Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
2-YEAR — 6-HOUR
PRECIPITATION
30,000 20 10 0 30,000

PLATE E-5.3

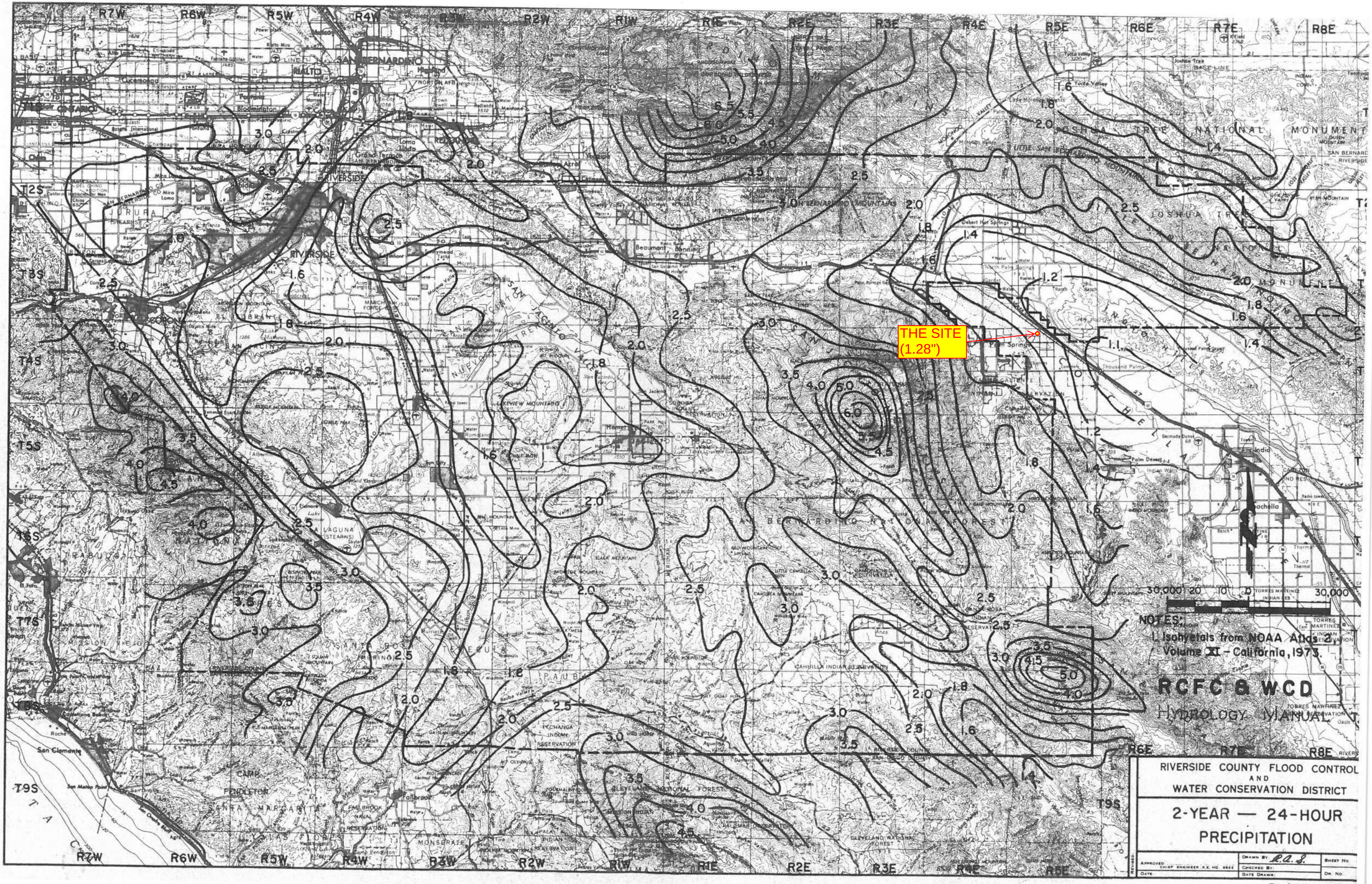
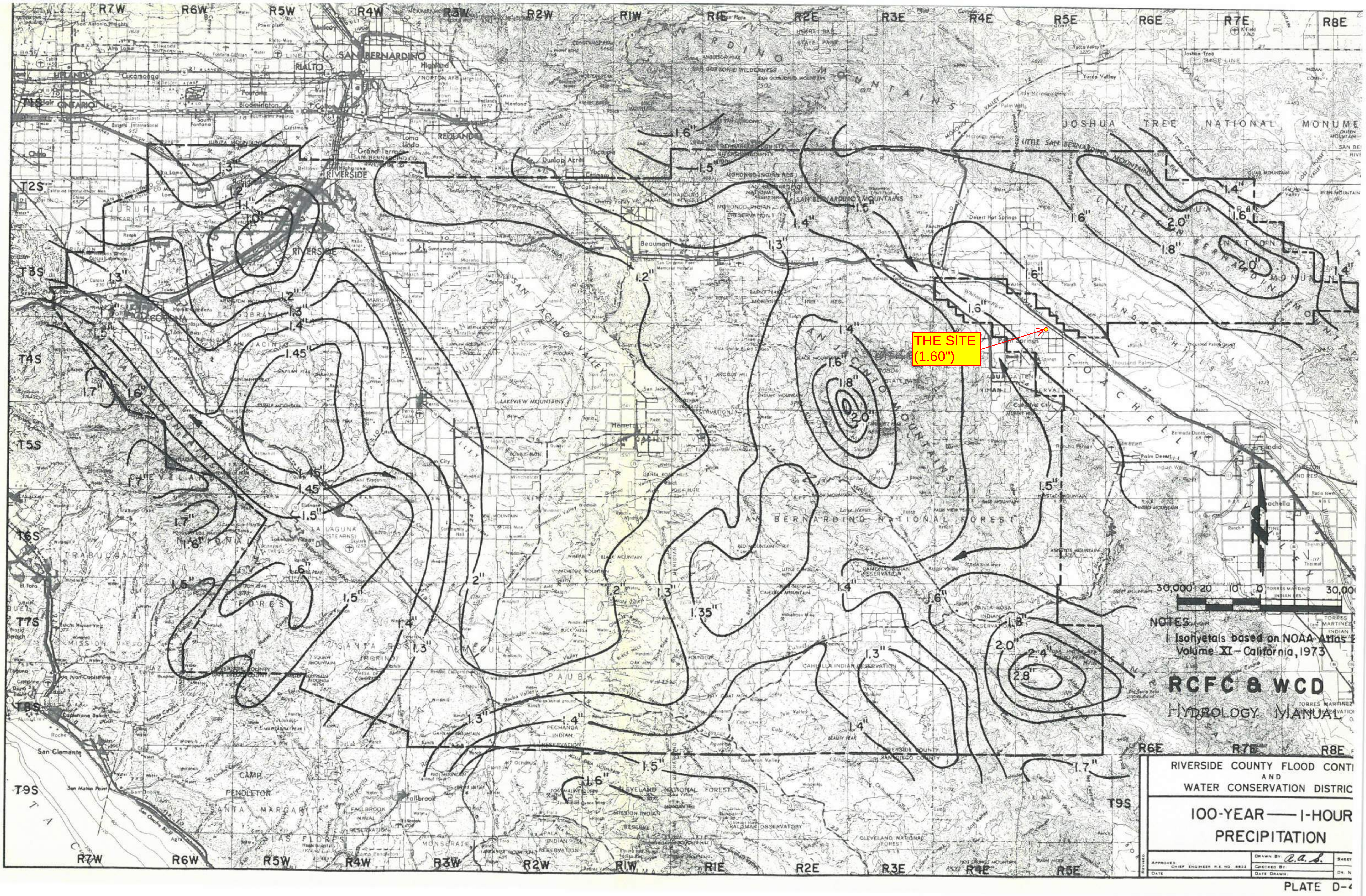

THE SITE
(1.28")
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
2-YEAR — 24-HOUR
PRECIPITATION

PLATE E-5.5


THE SITE
(1.60")
NOTES
1 Isohyetals based on NOAA Atlas 2 Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 1-HOUR PRECIPITATION
PLATE D-4
JOSHUA TREE NATIONAL MONUMENT
SAN BERNARDINO MOUNTAINS
SAN JACINTO MOUNTAINS
SAN BERNARDINO NATIONAL FOREST
COACHELLA VALLEY
SAN JACINTO VALLEY
CLEVELAND NATIONAL FOREST
RIVERSIDE
SAN BERNARDINO
REDLANDS
Beaumont
Hemet
TEMECULA
Indio
Palm Desert
Fallbrook
San Clemente

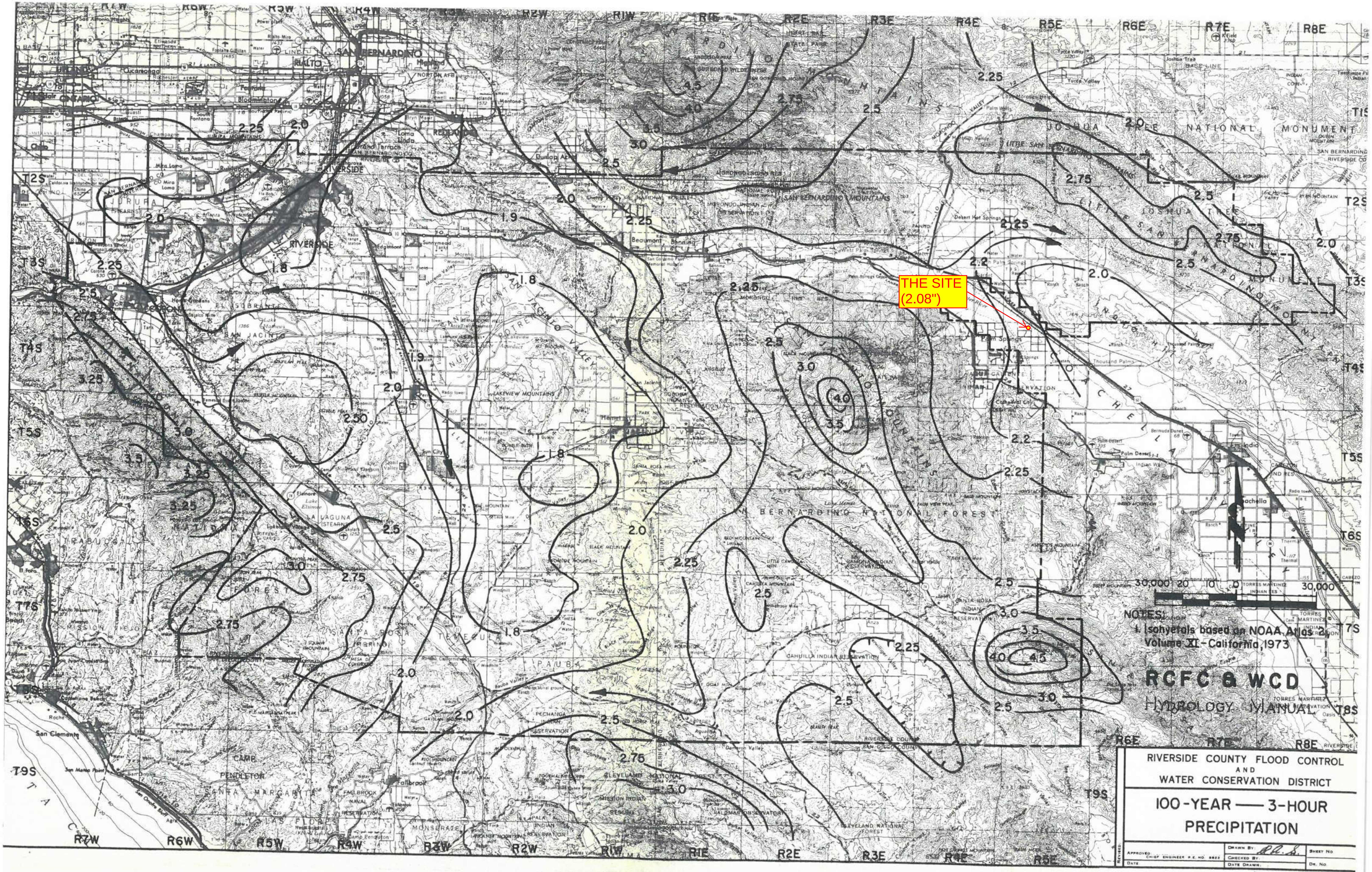

THE SITE
(2.08")
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR —— 3-HOUR
PRECIPITATION

PLATE E-5.2

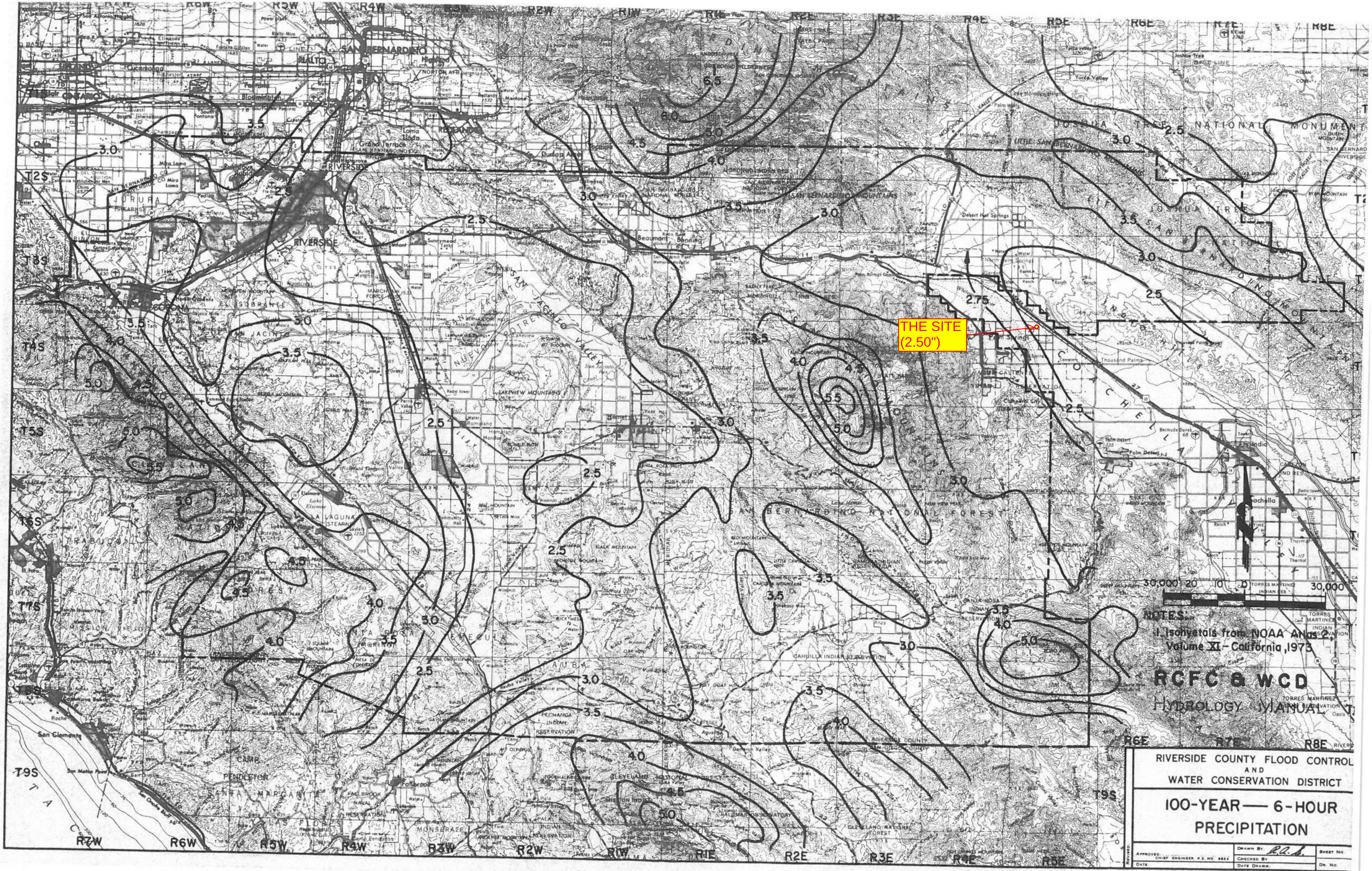
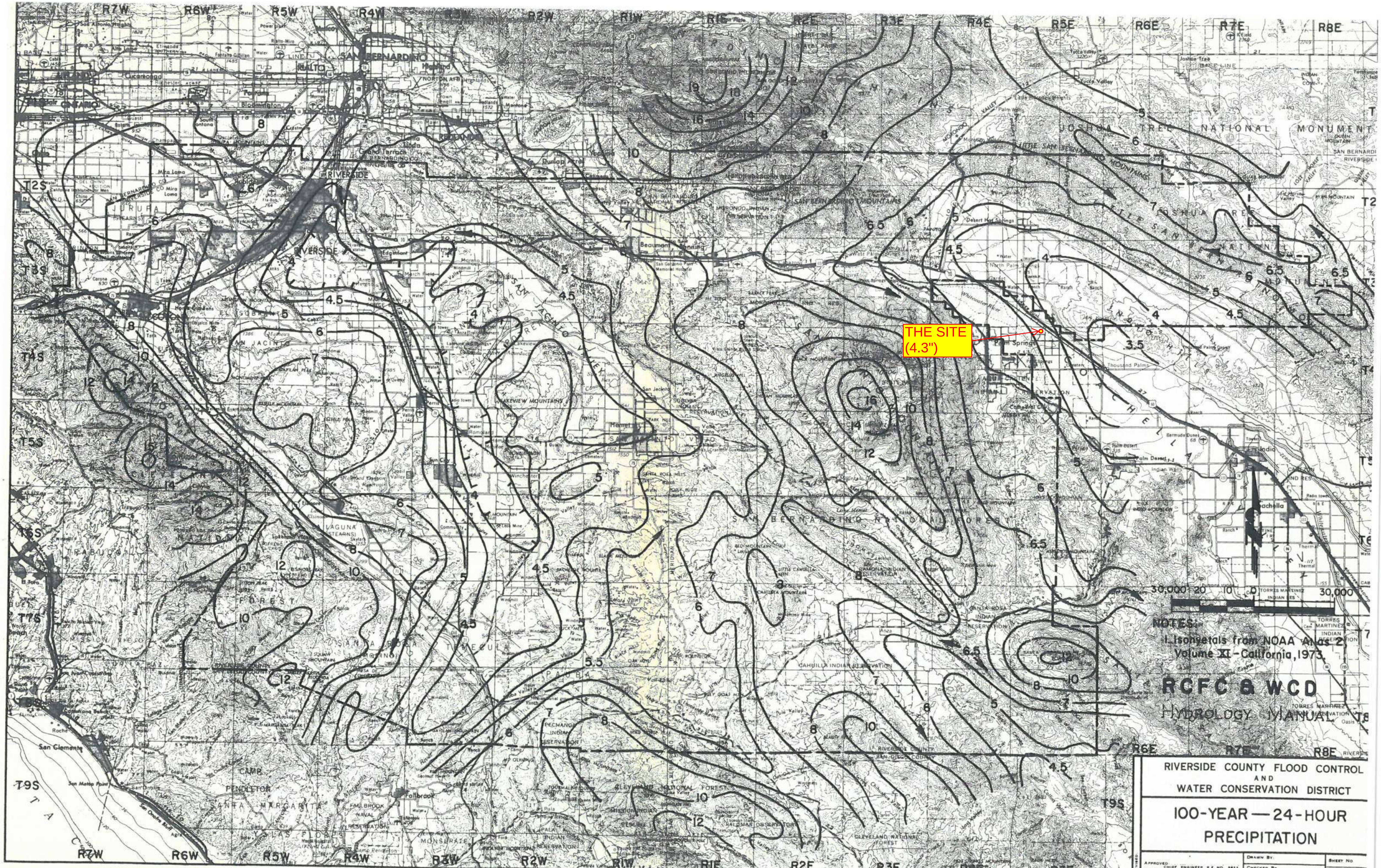

THE SITE
(2.50")
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 6-HOUR
PRECIPITATION

PLATE E-5.4



THE SITE
(4.3")
NOTES:
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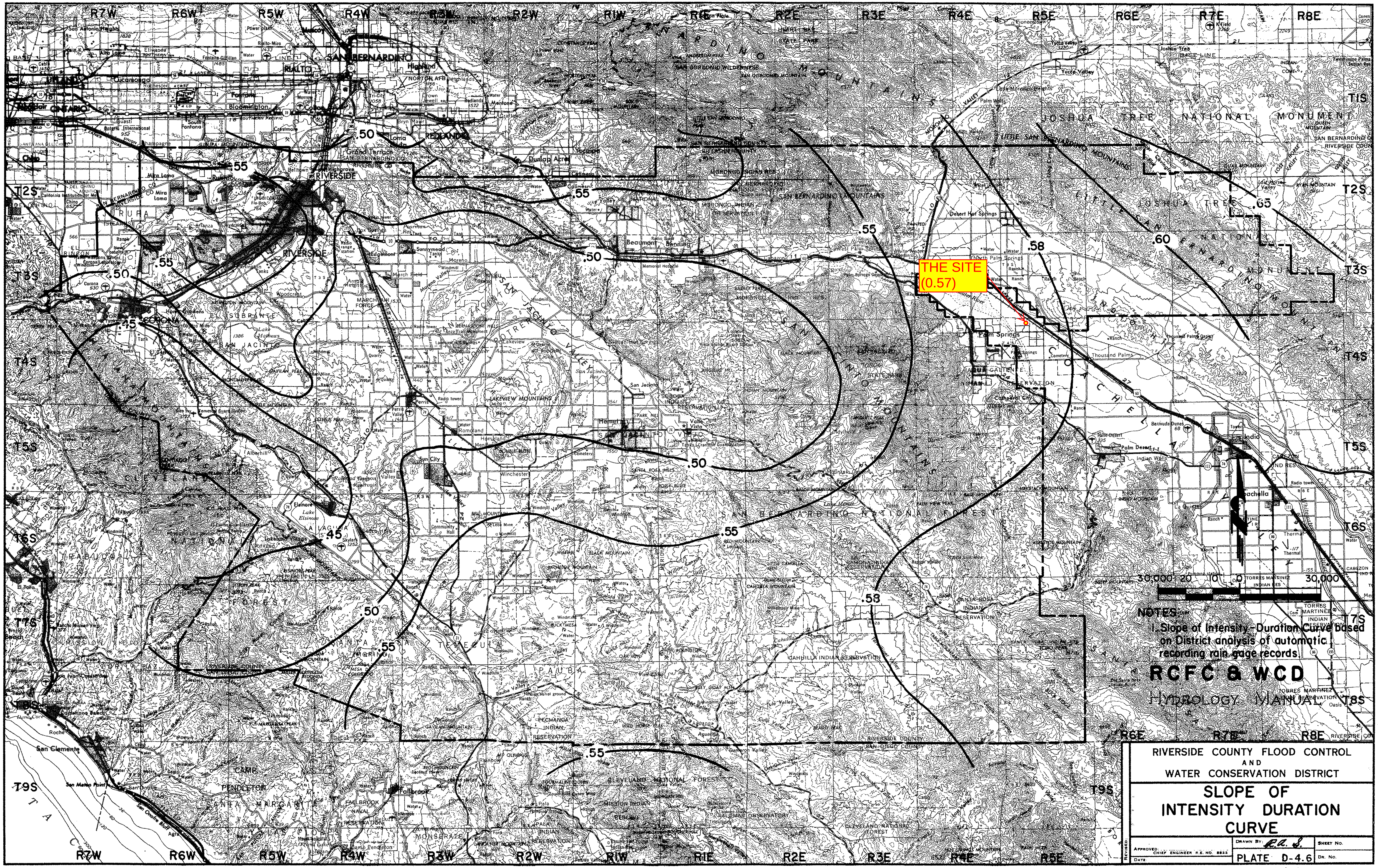
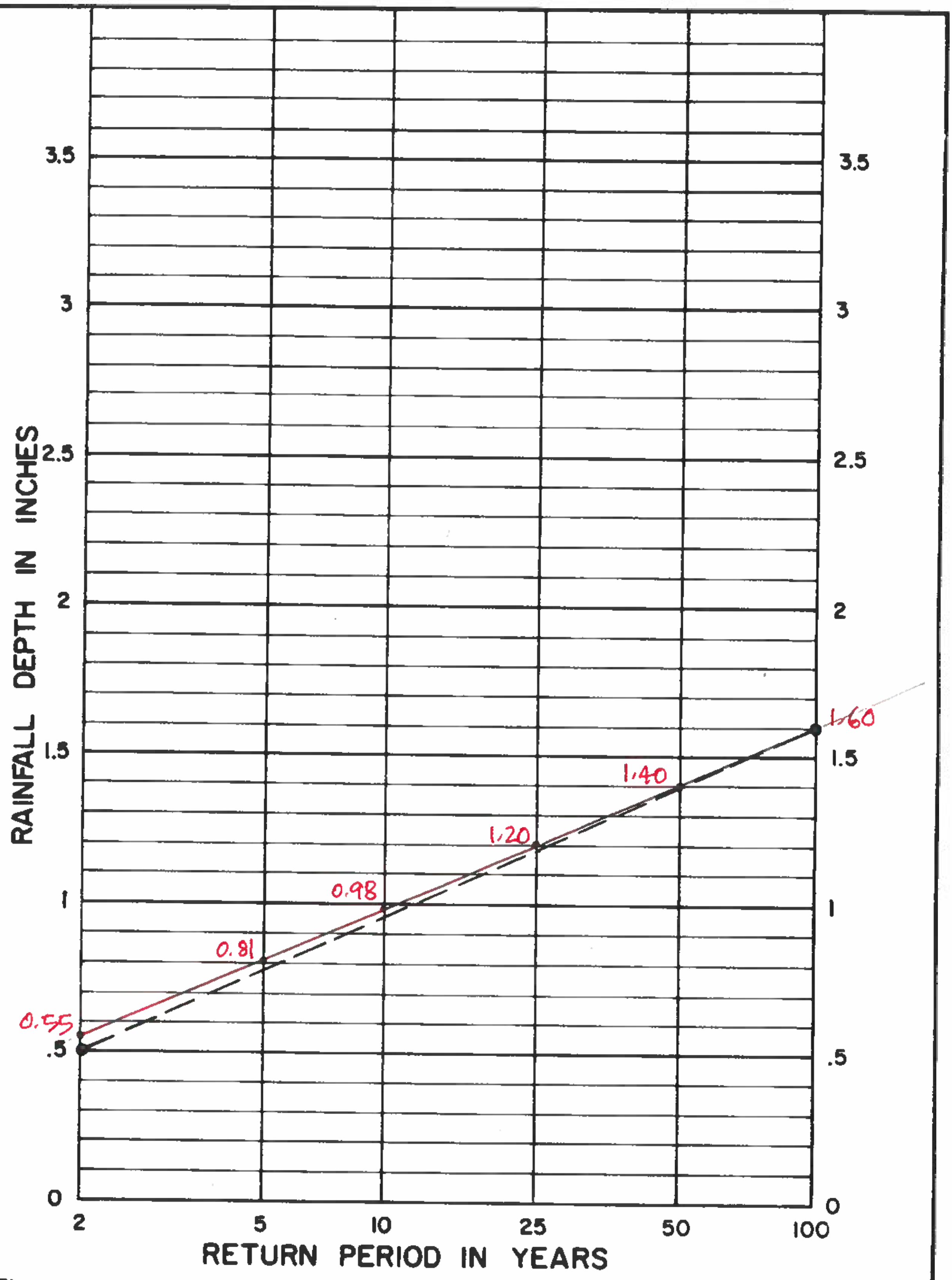
Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR
PRECIPITATION

PLATE E-5.6


THE SITE
(0.57)
NOTES
1. Slope of Intensity-Duration Curve based on District analysis of automatic recording rain gage records.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
SLOPE OF
INTENSITY DURATION
CURVE
PLATE D-4.6



NOTE:

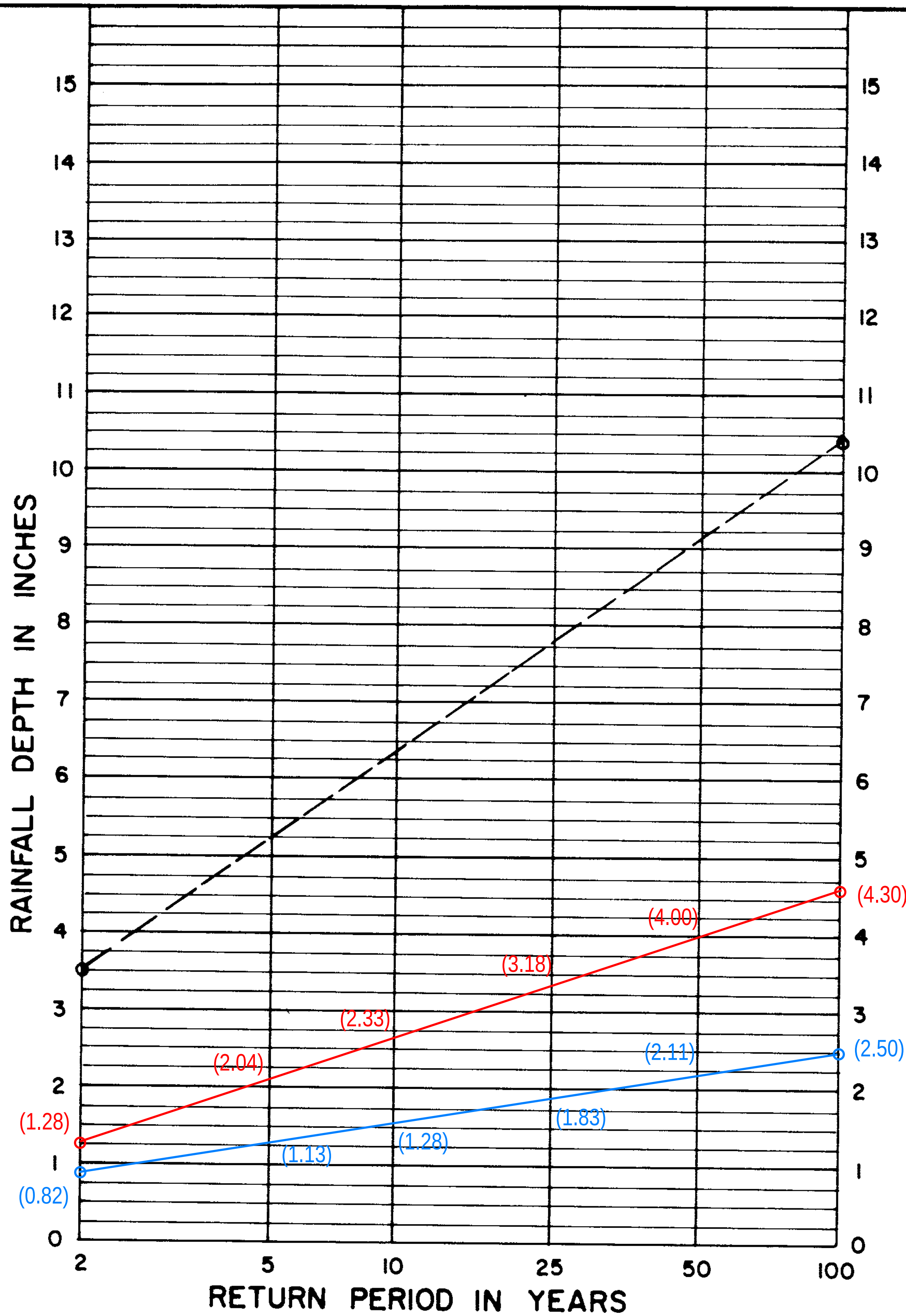
1. For intermediate return periods plot 2-year and 100-year one hour values from maps, then connect points and read value for desired return period. For example given 2-year one hour = .50" and 100-year one hour = 1.60", 25-year one hour = 1.18"

Reference: NOAA Atlas 2, Volume XI - California, 1973.

RCFC & WCD
HYDROLOGY MANUAL

RAINFALL DEPTH VERSUS RETURN PERIOD FOR PARTIAL DURATION SERIES

VERANO - CATHEDRAL CITY, CA **(ONE HOUR VALUES)** PLATE D-4.5



NOTE:

1. For intermediate return periods plot 2-year and 100-year values from maps for a specific duration, then connect points and read value for desired return period. For example given 2-year 24-hour = 3.50" and 100-year 24-hour = 10.40", 25-year 24-hour = 7.80"

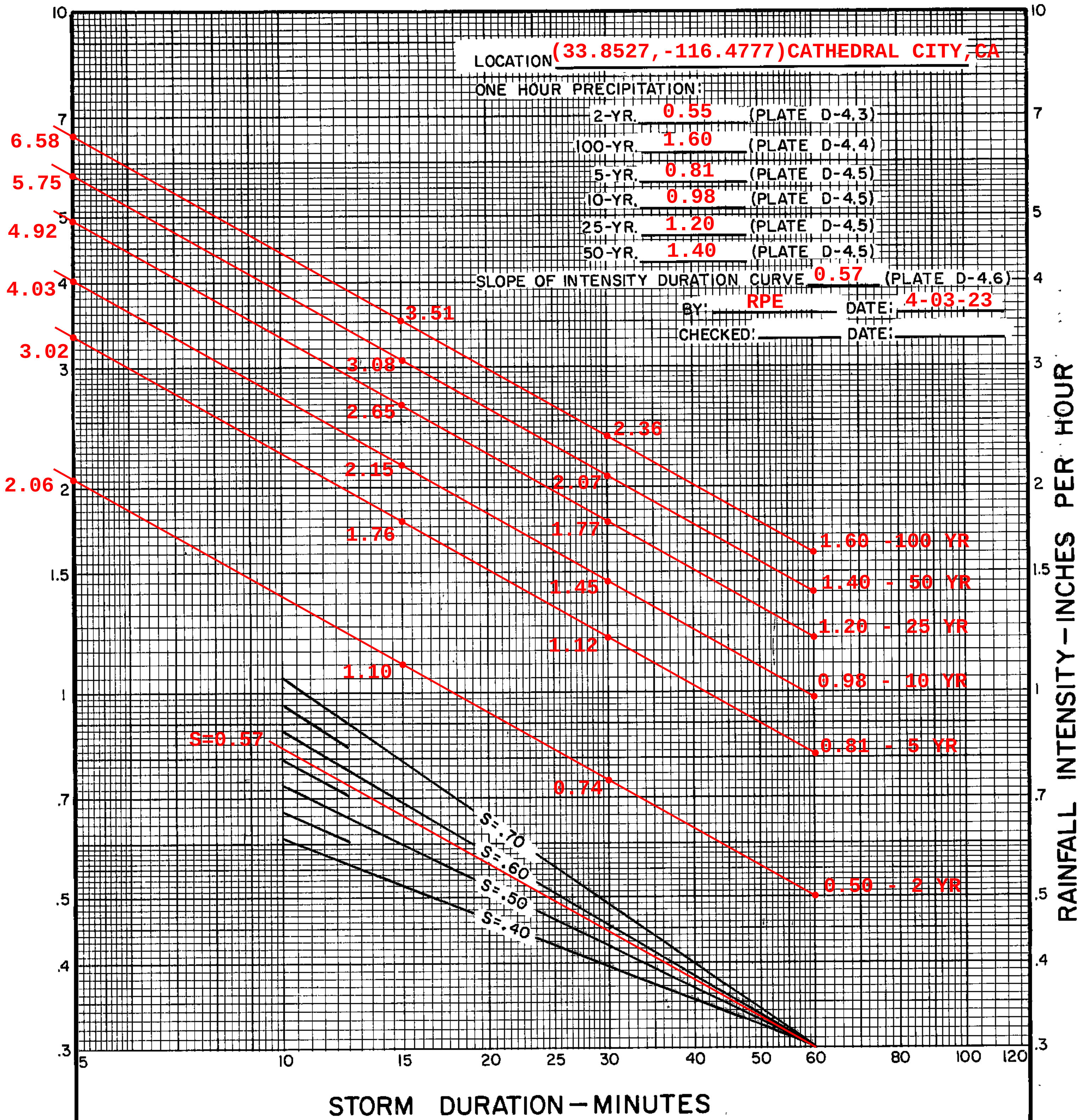
Reference: NOAA Atlas 2, Volume XI-California, 1973.

RCFC & WCD

HYDROLOGY MANUAL

RAINFALL DEPTH VERSUS RETURN PERIOD FOR PARTIAL DURATION SERIES

VERANO-CATHEDRAL CITY, CA (24-HOUR VALUES)
(6-HOUR VALUES)



RCFC & WCD

HYDROLOGY MANUAL

INTENSITY—DURATION CURVES CALCULATION SHEET

RAINFALL INTENSITY-INCHES PER HOUR

CATHEDRAL CITY

DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR
5	4.14	6.76
6	3.73	6.08
7	3.41	5.56
8	3.15	5.15
9	2.95	4.81
10	2.77	4.52
11	2.62	4.28
12	2.49	4.07
13	2.38	3.88
14	2.28	3.72
15	2.19	3.58
16	2.11	3.44
17	2.04	3.32
18	1.97	3.22
19	1.91	3.12
20	1.85	3.03
22	1.75	2.86
24	1.67	2.72
26	1.59	2.60
28	1.52	2.49
30	1.46	2.39
32	1.41	2.30
34	1.36	2.22
36	1.32	2.15
38	1.28	2.09
40	1.24	2.02
45	1.16	1.89
50	1.09	1.78
55	1.03	1.68
60	.98	1.60
65	.94	1.53
70	.90	1.46
75	.86	1.41
80	.83	1.35
85	.80	1.31

SLOPE = .580

CHERRY VALLEY

DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR
5	3.65	5.49
6	3.30	4.97
7	3.03	4.56
8	2.82	4.24
9	2.64	3.97
10	2.49	3.75
11	2.36	3.56
12	2.25	3.39
13	2.16	3.25
14	2.07	3.12
15	1.99	3.00
16	1.92	2.90
17	1.86	2.80
18	1.80	2.71
19	1.75	2.64
20	1.70	2.56
22	1.61	2.43
24	1.54	2.32
26	1.47	2.22
28	1.41	2.13
30	1.36	2.05
32	1.31	1.98
34	1.27	1.91
36	1.23	1.85
38	1.20	1.80
40	1.16	1.75
45	1.09	1.64
50	1.03	1.55
55	.98	1.47
60	.93	1.40
65	.89	1.34
70	.85	1.29
75	.82	1.24
80	.79	1.20
85	.77	1.16

SLOPE = .550

CORONA

DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR
5	3.10	4.78
6	2.84	4.38
7	2.64	4.07
8	2.47	3.81
9	2.34	3.60
10	2.22	3.43
11	2.12	3.27
12	2.04	3.14
13	1.96	3.02
14	1.89	2.92
15	1.83	2.82
16	1.77	2.73
17	1.72	2.66
18	1.68	2.58
19	1.63	2.52
20	1.59	2.46
22	1.52	2.35
24	1.46	2.25
26	1.40	2.17
28	1.36	2.09
30	1.31	2.02
32	1.27	1.96
34	1.23	1.90
36	1.20	1.85
38	1.17	1.81
40	1.14	1.76
45	1.08	1.66
50	1.03	1.58
55	.98	1.51
60	.94	1.45
65	.90	1.40
70	.87	1.35
75	.84	1.30
80	.82	1.26
85	.80	1.23

SLOPE = .480

DESERT HOT SPRINGS

DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR
5	4.39	6.76
6	3.95	6.08
7	3.62	5.56
8	3.35	5.15
9	3.13	4.81
10	2.94	4.52
11	2.78	4.28
12	2.65	4.07
13	2.53	3.88
14	2.42	3.72
15	2.32	3.58
16	2.24	3.44
17	2.16	3.32
18	2.09	3.22
19	2.03	3.12
20	1.97	3.03
22	1.86	2.86
24	1.77	2.72
26	1.69	2.60
28	1.62	2.49
30	1.55	2.39
32	1.50	2.30
34	1.45	2.22
36	1.40	2.15
38	1.36	2.09
40	1.32	2.02
45	1.23	1.89
50	1.16	1.78
55	1.09	1.68
60	1.04	1.60
65	.99	1.53
70	.95	1.46
75	.91	1.41
80	.88	1.35
85	.85	1.31

SLOPE = .580

ELSINORE - WILDOMAR

DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR
5	3.23	4.94
6	2.96	4.53
7	2.75	4.21
8	2.58	3.95
9	2.44	3.73
10	2.32	3.54
11	2.21	3.39
12	2.12	3.25
13	2.04	3.13
14	1.97	3.02
15	1.91	2.92
16	1.85	2.83
17	1.80	2.75
18	1.75	2.67
19	1.70	2.60
20	1.66	2.54
22	1.59	2.43
24	1.52	2.33
26	1.46	2.24
28	1.41	2.16
30	1.37	2.09
32	1.33	2.03
34	1.29	1.97
36	1.25	1.92
38	1.22	1.87
40	1.19	1.82
45	1.13	1.72
50	1.07	1.64
55	1.02	1.56
60	.98	1.50
65	.94	1.44
70	.91	1.39
75	.88	1.35
80	.85	1.31
85	.83	1.27

SLOPE = .480

RCFC & WCD

HYDROLOGY MANUAL

STANDARD INTENSITY-DURATION CURVES DATA

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	Soil Group B	Soil Group C	Soil Group D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

RUNOFF INDEX NUMBERS FOR PERVIOUS AREA

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS (cont.) -					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Deciduous (Apples, apricots, pears, walnuts, etc.)		See Note 4			
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87
Vineyard		See Note 4			

Notes:

1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.

2. Quality of cover definitions:
   Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.
   Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.
   Good-Heavy or dense cover with more than 75 percent of the ground surface protected.

3. See Plate C-2 for a detailed description of cover types.

4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.

5. Reference Bibliography item 17.

RCFC & WCD
HYDROLOGY MANUAL

RUNOFF INDEX NUMBERS FOR PERVIOUS AREA

ACTUAL IMPERVIOUS COVER

Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent (2)
Natural or Agriculture	0 - 10	0
Single Family Residential: (3)		
40,000 S. F. (1 Acre) Lots	10 - 25	20
20,000 S. F. (½ Acre) Lots	30 - 45	40
7,200 - 10,000 S. F. Lots	45 - 55	50
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Park	60 - 85	75
Commercial, Downtown Business or Industrial	80 -100	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.

2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area should always be made, and a review of aerial photos, where available may assist in estimating the percentage of impervious cover in developed areas.

3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

RCFC & WCD
HYDROLOGY MANUAL

IMPERVIOUS COVER FOR DEVELOPED AREAS

Local land use authority	Ordinance	Requirement
Coachella	Ordinance #1014 Municipal Code Section 13.16.110	To minimize the discharge and transport of pollutants, the city requires all new development and redevelopment projects identified as a Priority Project under the newly implemented NPDES permit No. CAS617002 to retain 100% of the stormwater from the 100 year, 24-hour duration storm in order to prevent any deterioration of the water quality which would impair the subsequent or competing uses of water. Projects that retain and infiltrate 100% of the rainfall conditions specified in Section F.1.c.v.4 of the NPDES permit are deemed to comply with the Treatment Control BMP requirements found in that section of the NPDES permit. The NPDES permit establishes acceptable methods and standards for controlling stormwater runoff volumes, rates, and pollutant loading including but not limited to the following: A. Increase Permeable Areas, Avoid placing impervious surfaces in highly porous soil areas; incorporate landscaping and open space into the project design; use porous materials for or near driveways and walkways; incorporate retention basins that can infiltrate Stormwater onsite; and avoid placing pavement and other impervious surfaces in low lying areas. B. Direct Runoff to Permeable Areas. Direct Stormwater runoff away from impermeable areas to swales, berms, green strip filters, gravel beds, and French drains; install rain gutters and orient them toward permeable areas; modify the grade of the property to divert flow to permeable areas and minimize the amount of stormwater runoff leaving the property and when designing curbs, berms and other structures, avoid designs which isolate permeable or landscaped areas. C. Maximize Stormwater Storage for Reuse. Use retention structures, surface areas, cisterns, or other structures to store stormwater
Cathedral City	Municipal Code – Title 8 § 8.24.070	A. Except as noted below, development of all land within the city must include provisions for the management of stormwater runoff from the property which is to be developed. This management shall consist of constructing stormwater storage facilities, which includes detention basins. As a minimum, all development will make provisions to store runoff from rainfall events up to and including the one-hundred-year, three-hour duration event. If a suitable outlet for a detention basin is not available, or if engineering analysis indicates that available outlet systems would be overtaxed by detention basin outflow, a retention basin shall be constructed in lieu of a detention basin. B. The requirement for construction of a detention basin or a retention basin may be waived in the following cases: 1. The runoff has been included in a storage facility at another location. This may include storage facilities proposed as part of the Cathedral City Storm Drain Master Plan; 2. An application for a building permit to construct a single-family residential structure; 3. Development which will drain directly into a floodway or watercourse drainage channel which has been determined by the project review manager, using engineering analyses provided by the development, to have the capacity and be constructed to handle the additional runoff flow without increasing the potential for flood damage on any other downstream property. 4. Development of a parcel under one-half acre in an area where it can be demonstrated by engineering analyses that no significant increase in the potential for flood damage will be created by the development.

APPENDIX 2

UNIT HYDROGRAPH: PRE AND POST DEVELOPMENT CONDITIONS, 10YR- AND 100YR-24HR

UNIT HYDROGRAPH
PRE-DEVELOPMENT 10YR- AND 100YR-24HR

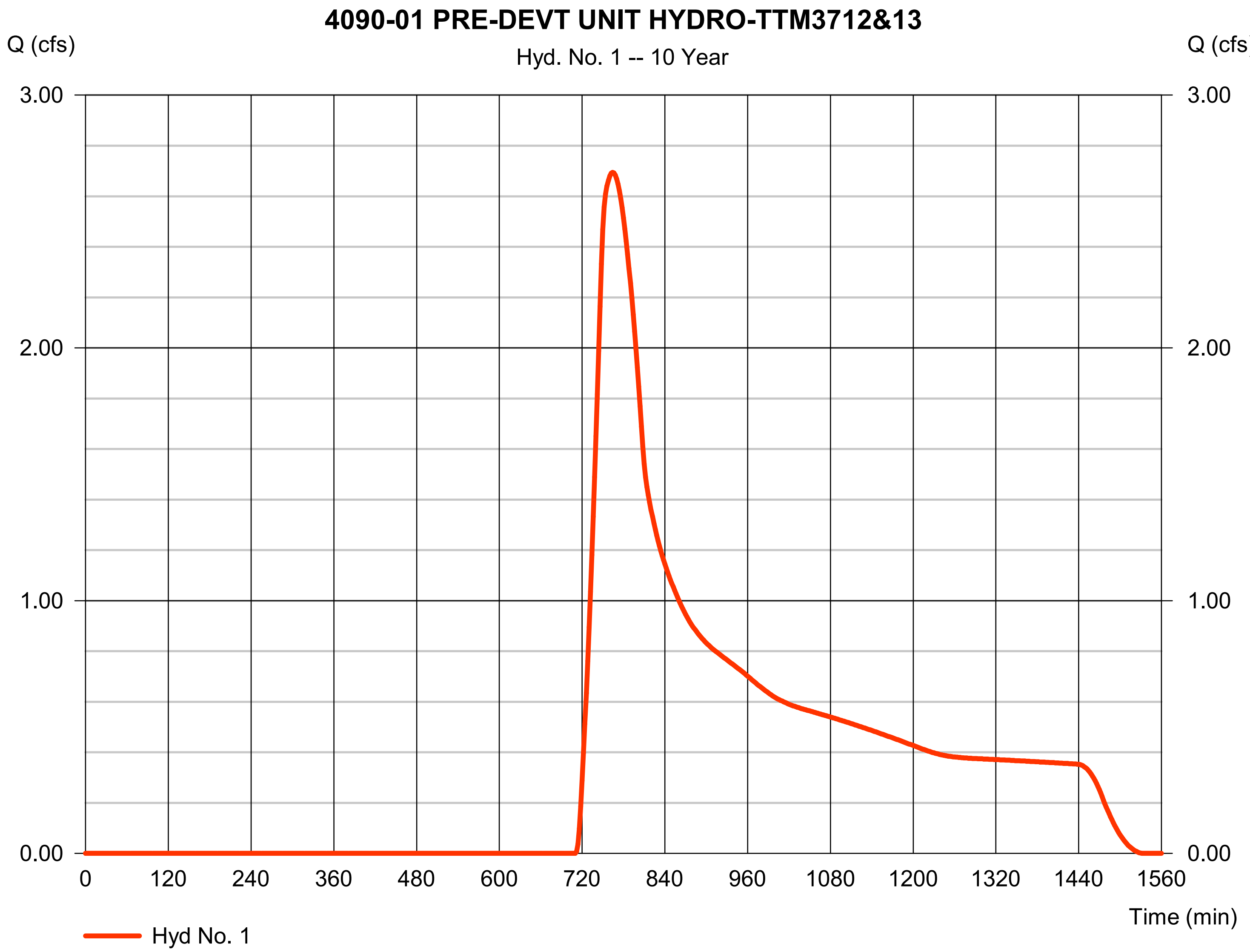
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 1

4090-01 PRE-DEVT UNIT HYDRO-TTM3712&13

Hydrograph type	= SCS Runoff	Peak discharge	= 2.695 cfs
Storm frequency	= 10 yrs	Time to peak	= 764 min
Time interval	= 2 min	Hyd. volume	= 33,569 cuft
Drainage area	= 39.100 ac	Curve number	= 65
Basin Slope	= 1.5 %	Hydraulic length	= 1601 ft
Tc method	= LAG	Time of conc. (Tc)	= 57.70 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



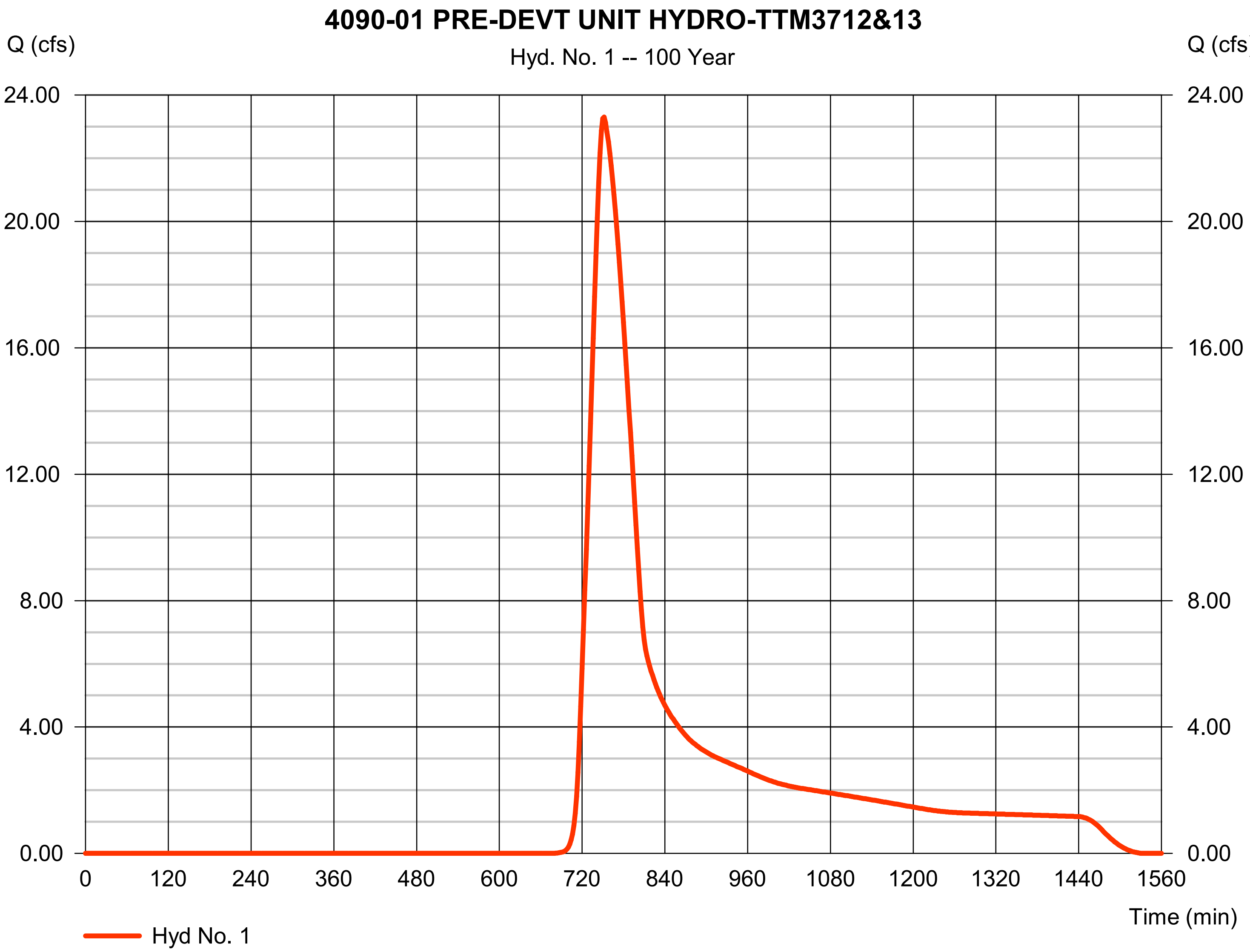
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 1

4090-01 PRE-DEVT UNIT HYDRO-TTM3712&13

Hydrograph type	= SCS Runoff	Peak discharge	= 23.31 cfs
Storm frequency	= 100 yrs	Time to peak	= 752 min
Time interval	= 2 min	Hyd. volume	= 171,292 cuft
Drainage area	= 39.100 ac	Curve number	= 65
Basin Slope	= 1.5 %	Hydraulic length	= 1601 ft
Tc method	= LAG	Time of conc. (Tc)	= 57.70 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

ne: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

UNIT HYDROGRAPH
POST-DEVELOPMENT 10YR- AND 100YR-24HR

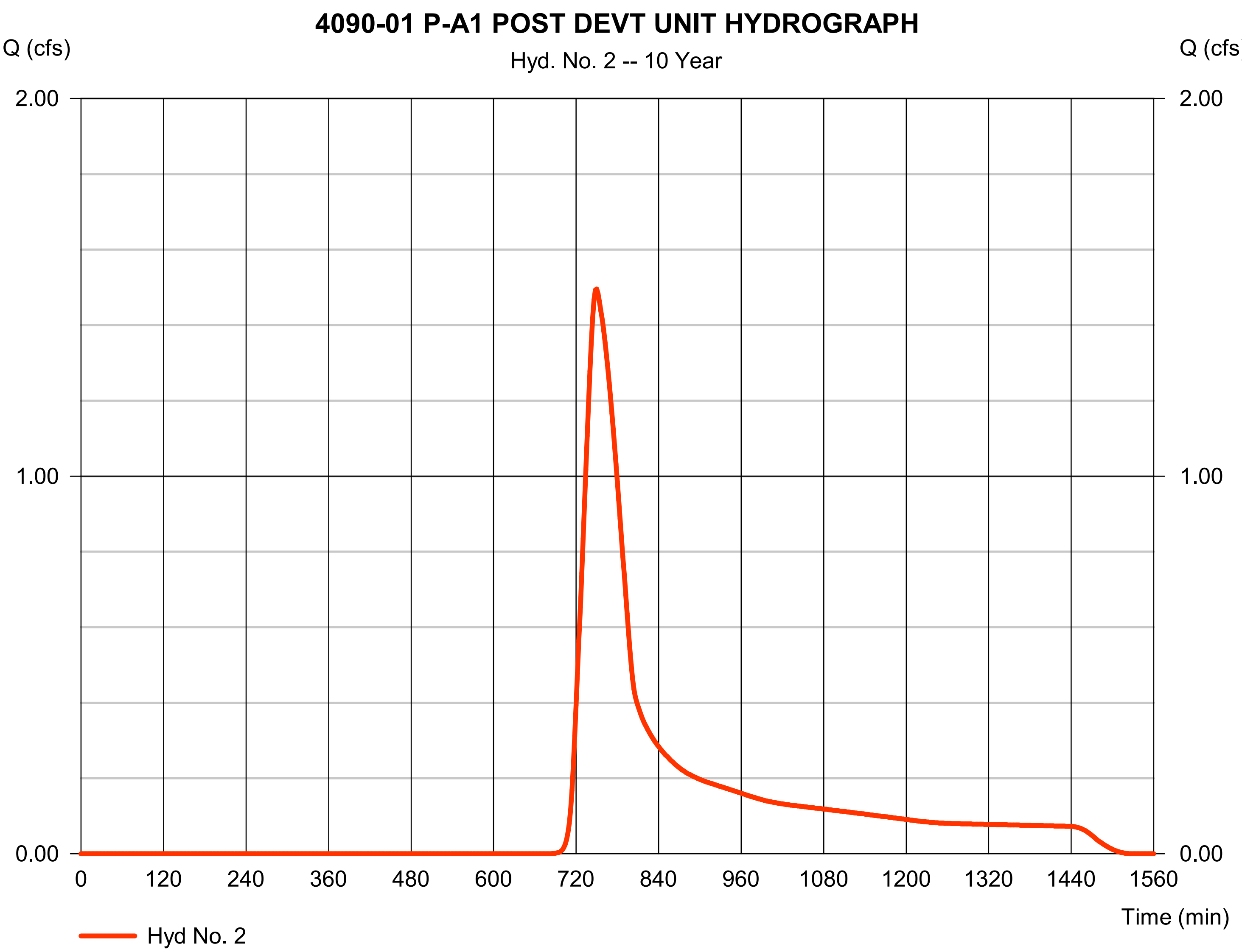
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 2

4090-01 P-A1 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 1.496 cfs
Storm frequency	= 10 yrs	Time to peak	= 750 min
Time interval	= 2 min	Hyd. volume	= 10,565 cuft
Drainage area	= 4.610 ac	Curve number	= 77
Basin Slope	= 0.8 %	Hydraulic length	= 1570 ft
Tc method	= LAG	Time of conc. (Tc)	= 56.30 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



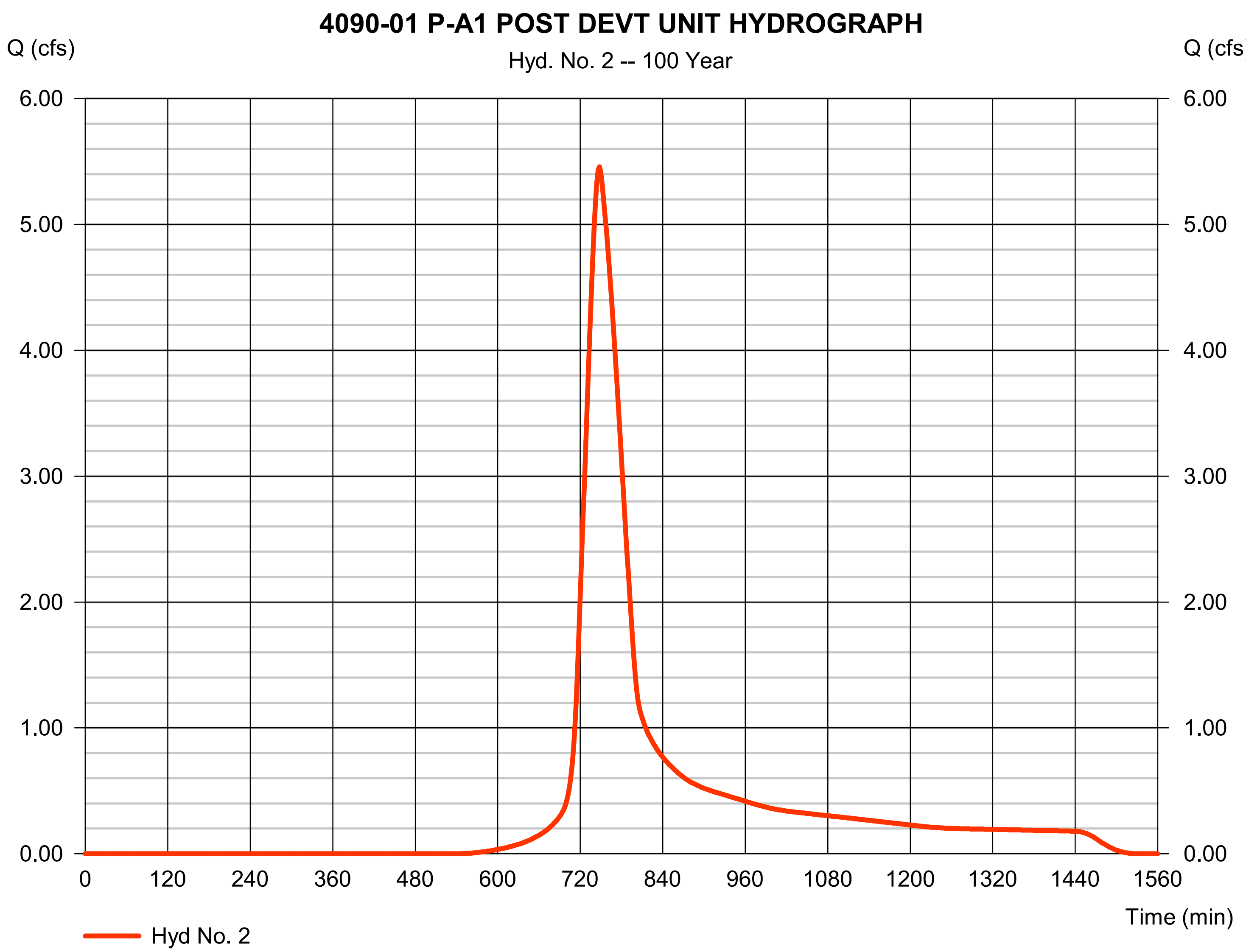
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 | Monday, 06 / 5 / 2023

Hyd. No. 2

4090-01 P-A1 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 5.457 cfs
Storm frequency	= 100 yrs	Time to peak	= 748 min
Time interval	= 2 min	Hyd. volume	= 34,042 cuft
Drainage area	= 4.610 ac	Curve number	= 77
Basin Slope	= 0.8 %	Hydraulic length	= 1570 ft
Tc method	= LAG	Time of conc. (Tc)	= 56.30 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

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Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

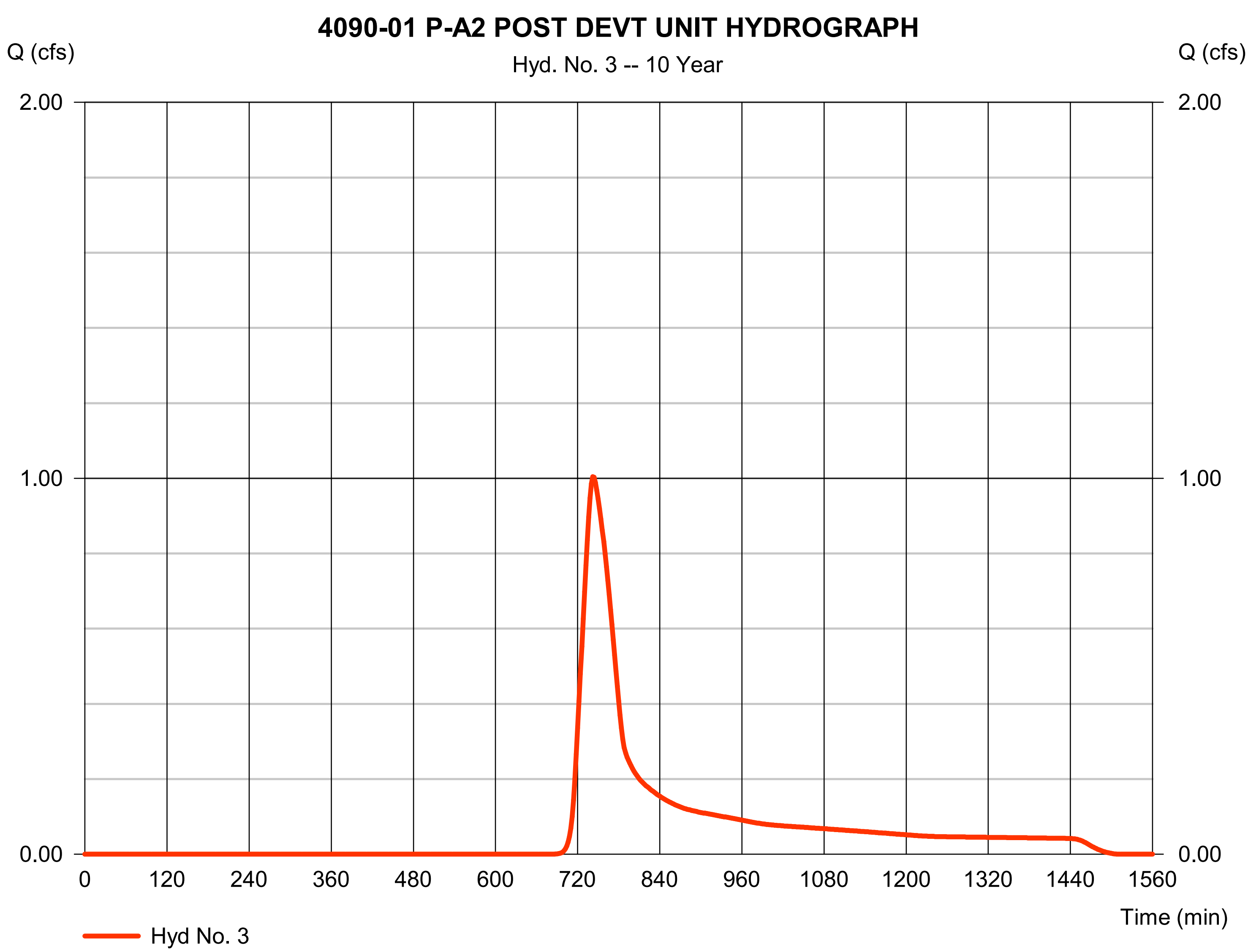
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Monday, 06 / 5 / 2023

Hyd. No. 3

4090-01 P-A2 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 1.004 cfs
Storm frequency	= 10 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 6,132 cuft
Drainage area	= 2.680 ac	Curve number	= 77
Basin Slope	= 1.0 %	Hydraulic length	= 1457 ft
Tc method	= LAG	Time of conc. (Tc)	= 46.67 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

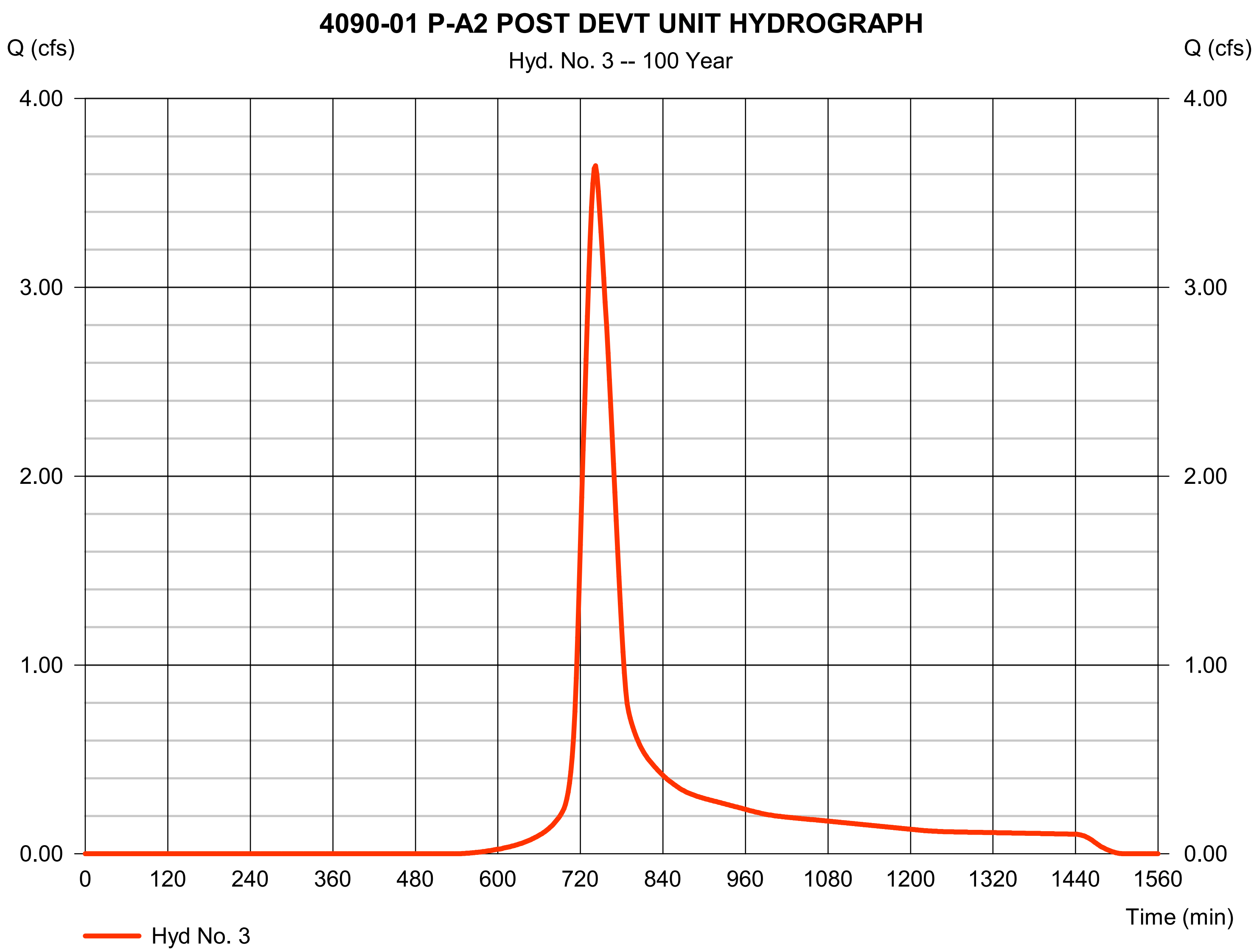


Hydrograph Report

Hyd. No. 3

4090-01 P-A2 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 3.644 cfs
Storm frequency	= 100 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 19,759 cuft
Drainage area	= 2.680 ac	Curve number	= 77
Basin Slope	= 1.0 %	Hydraulic length	= 1457 ft
Tc method	= LAG	Time of conc. (Tc)	= 46.67 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

ne: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

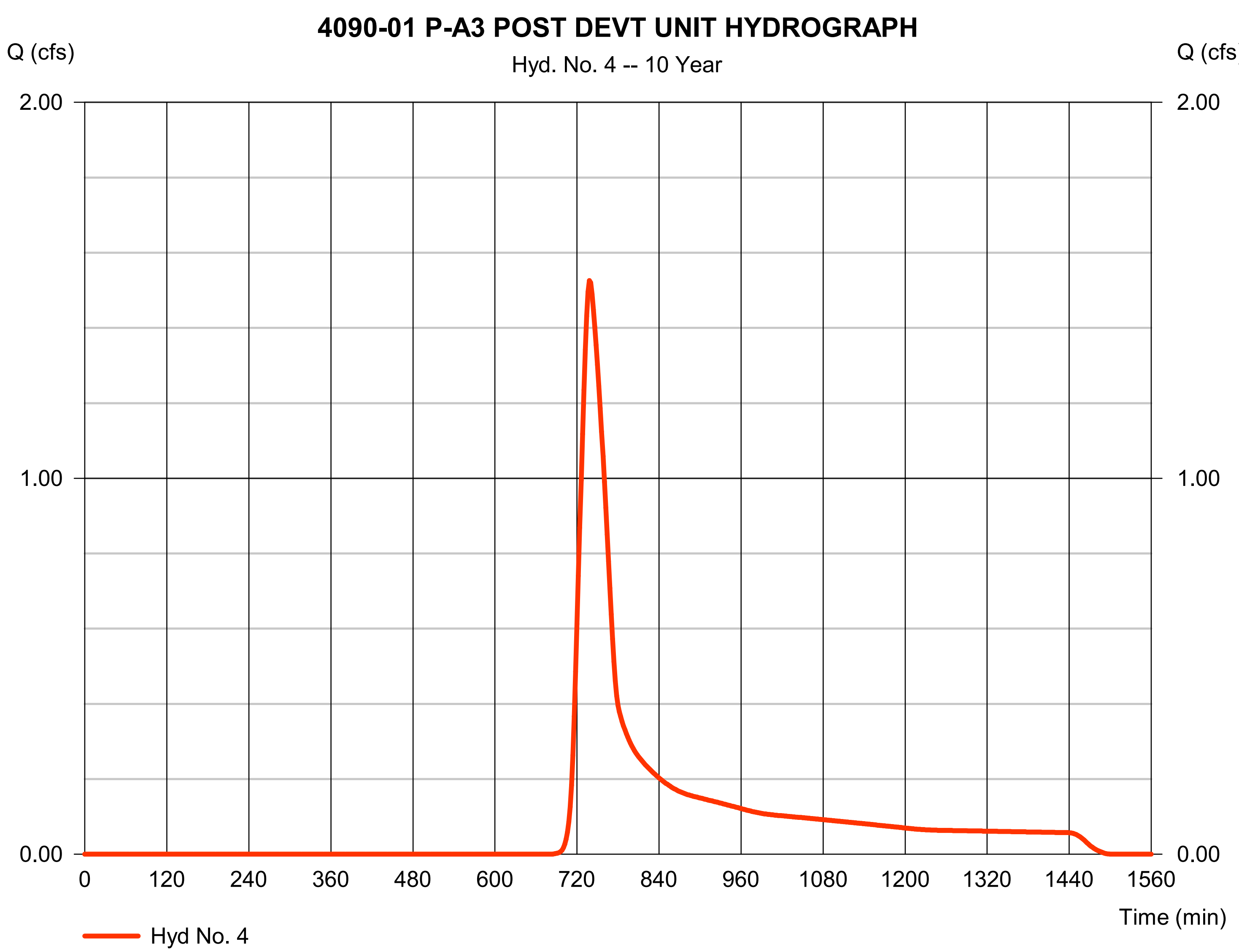
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 4

4090-01 P-A3 POST DEVT UNIT HYDROGRAPH

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.526 cfs
Storm frequency	=	10 yrs	Time to peak	=	738 min
Time interval	=	2 min	Hyd. volume	=	8,381 cuft
Drainage area	=	3.630 ac	Curve number	=	77
Basin Slope	=	0.7 %	Hydraulic length	=	878 ft
Tc method	=	LAG	Time of conc. (Tc)	=	38.12 min
Total precip.	=	2.33 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

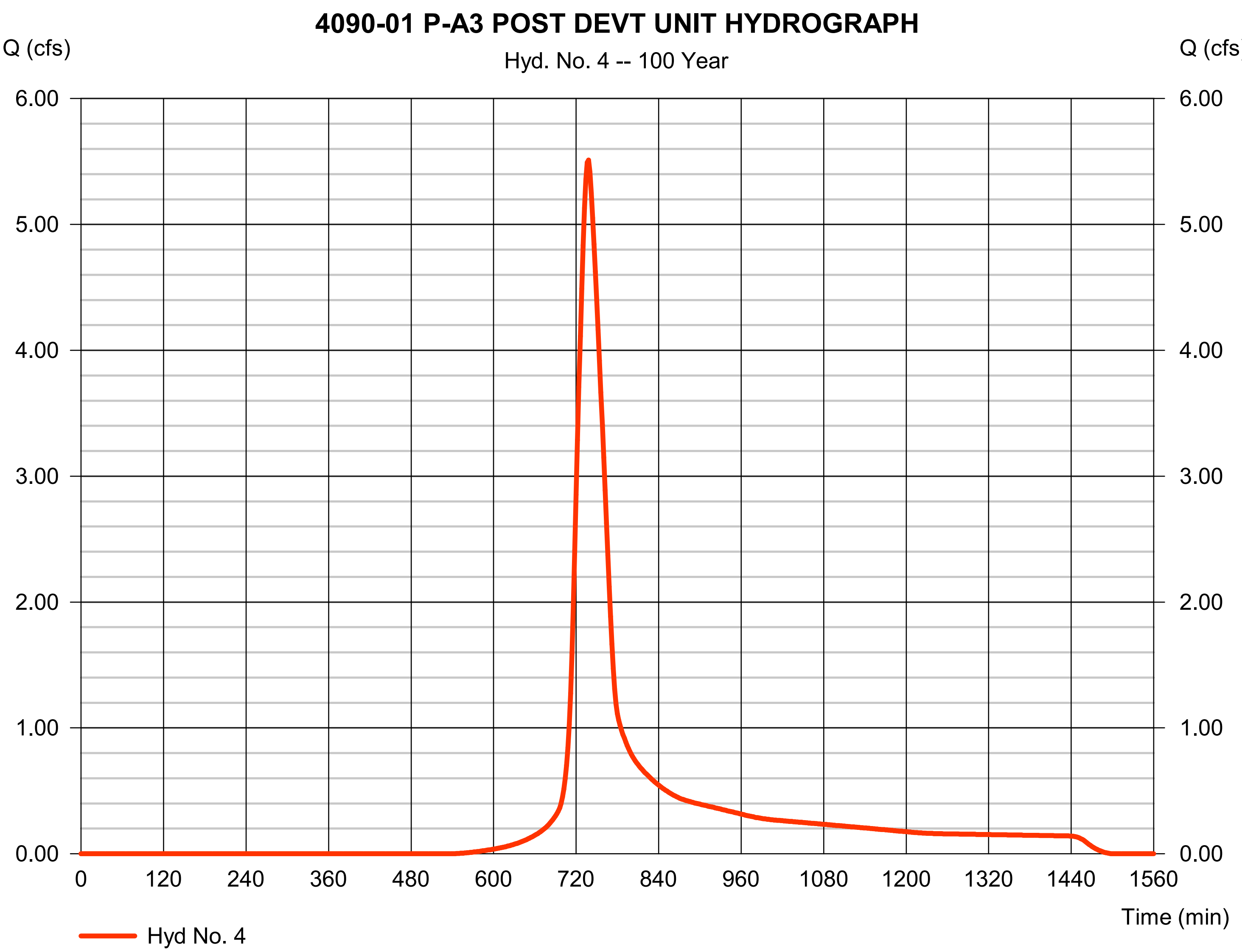


Hydrograph Report

Hyd. No. 4

4090-01 P-A3 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 5.511 cfs
Storm frequency	= 100 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 27,004 cuft
Drainage area	= 3.630 ac	Curve number	= 77
Basin Slope	= 0.7 %	Hydraulic length	= 878 ft
Tc method	= LAG	Time of conc. (Tc)	= 38.12 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

ne: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

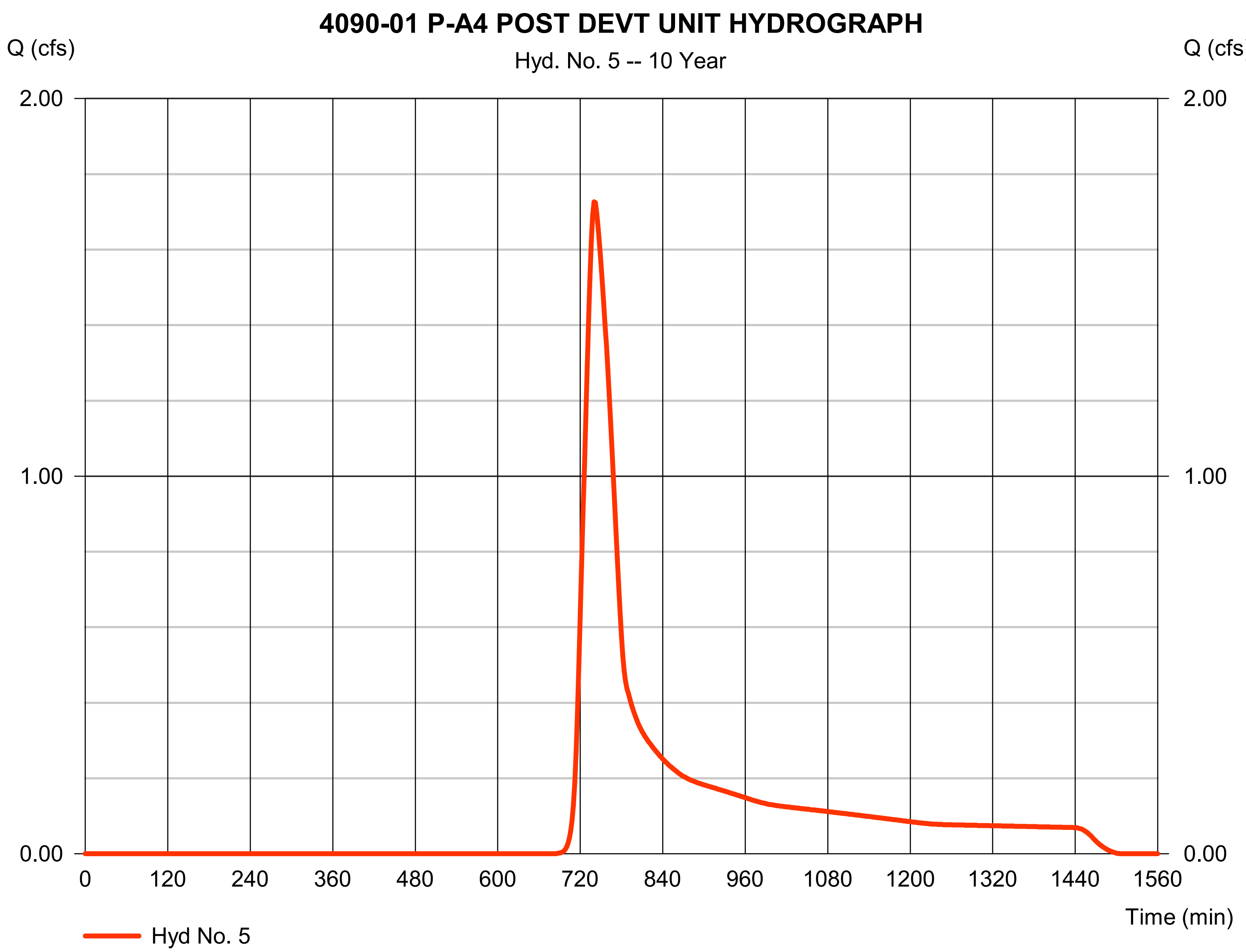
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Monday, 06 / 5 / 2023

Hyd. No. 5

4090-01 P-A4 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 1.726 cfs
Storm frequency	= 10 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 10,140 cuft
Drainage area	= 4.350 ac	Curve number	= 77
Basin Slope	= 0.7 %	Hydraulic length	= 1002 ft
Tc method	= LAG	Time of conc. (Tc)	= 41.46 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

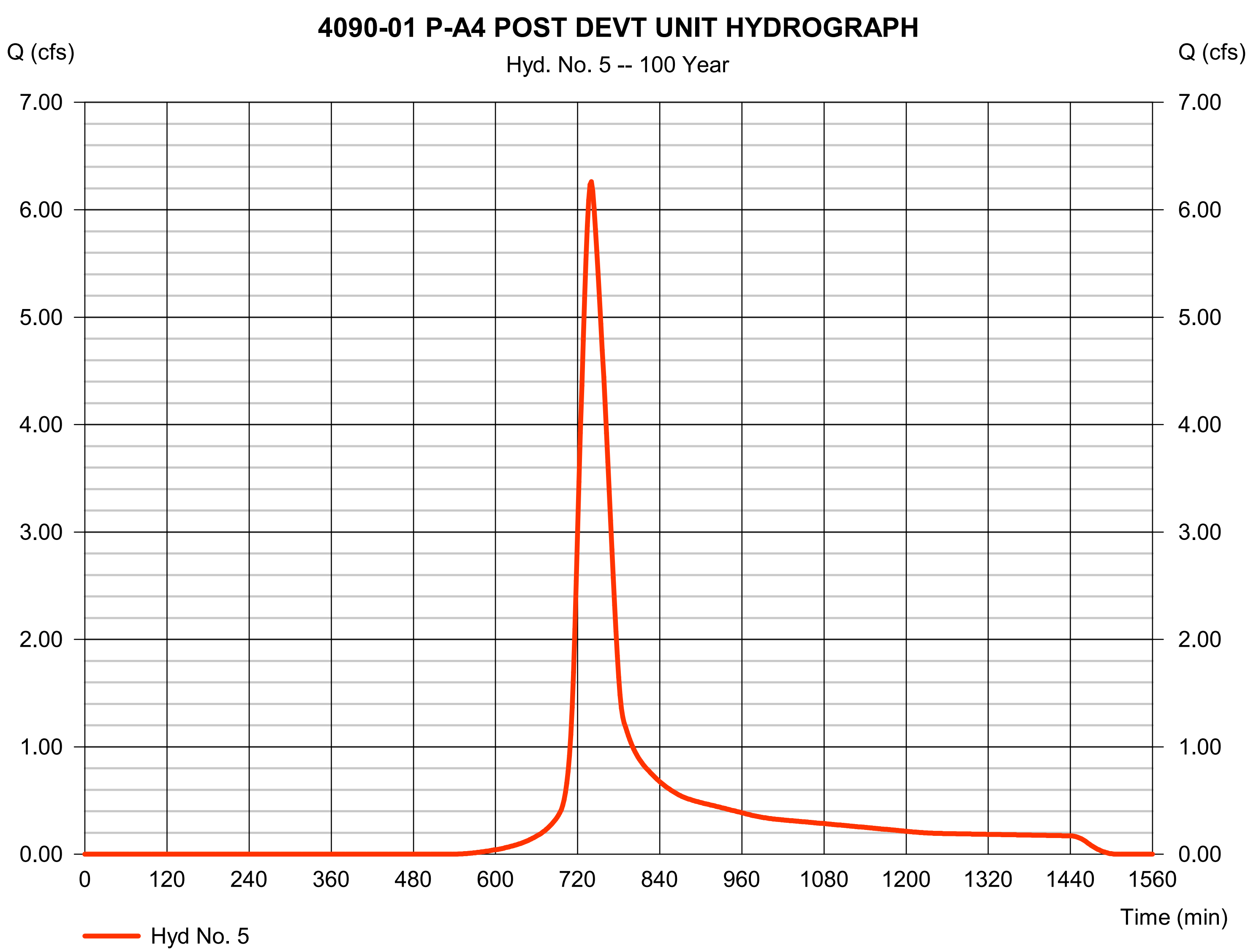


Hydrograph Report

Hyd. No. 5

4090-01 P-A4 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 6.262 cfs
Storm frequency	= 100 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 32,671 cuft
Drainage area	= 4.350 ac	Curve number	= 77
Basin Slope	= 0.7 %	Hydraulic length	= 1002 ft
Tc method	= LAG	Time of conc. (Tc)	= 41.46 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

ne: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

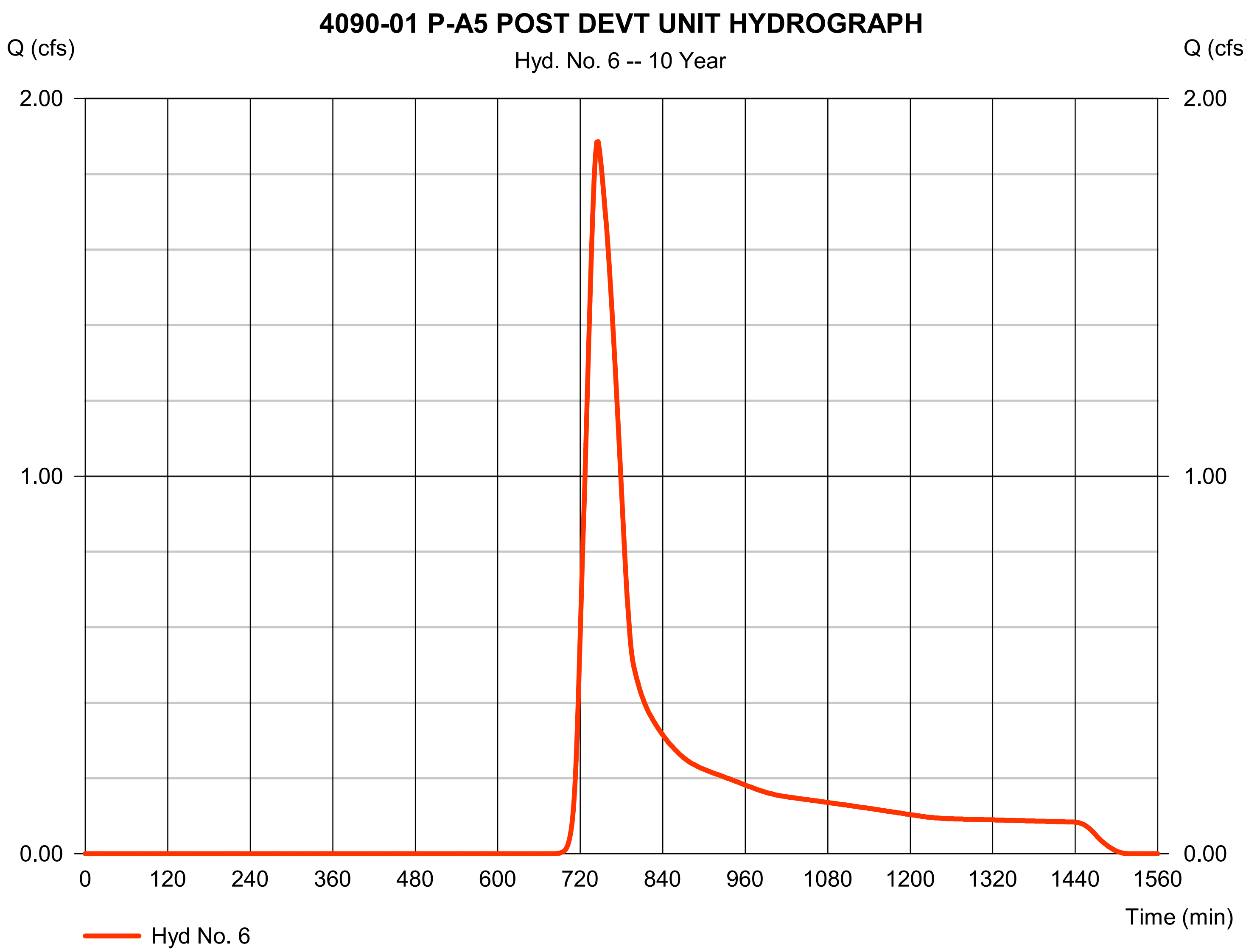
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 | Monday, 06 / 5 / 2023

Hyd. No. 6

4090-01 P-A5 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 1.886 cfs
Storm frequency	= 10 yrs	Time to peak	= 746 min
Time interval	= 2 min	Hyd. volume	= 12,214 cuft
Drainage area	= 5.290 ac	Curve number	= 77
Basin Slope	= 0.5 %	Hydraulic length	= 1012 ft
Tc method	= LAG	Time of conc. (Tc)	= 48.37 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



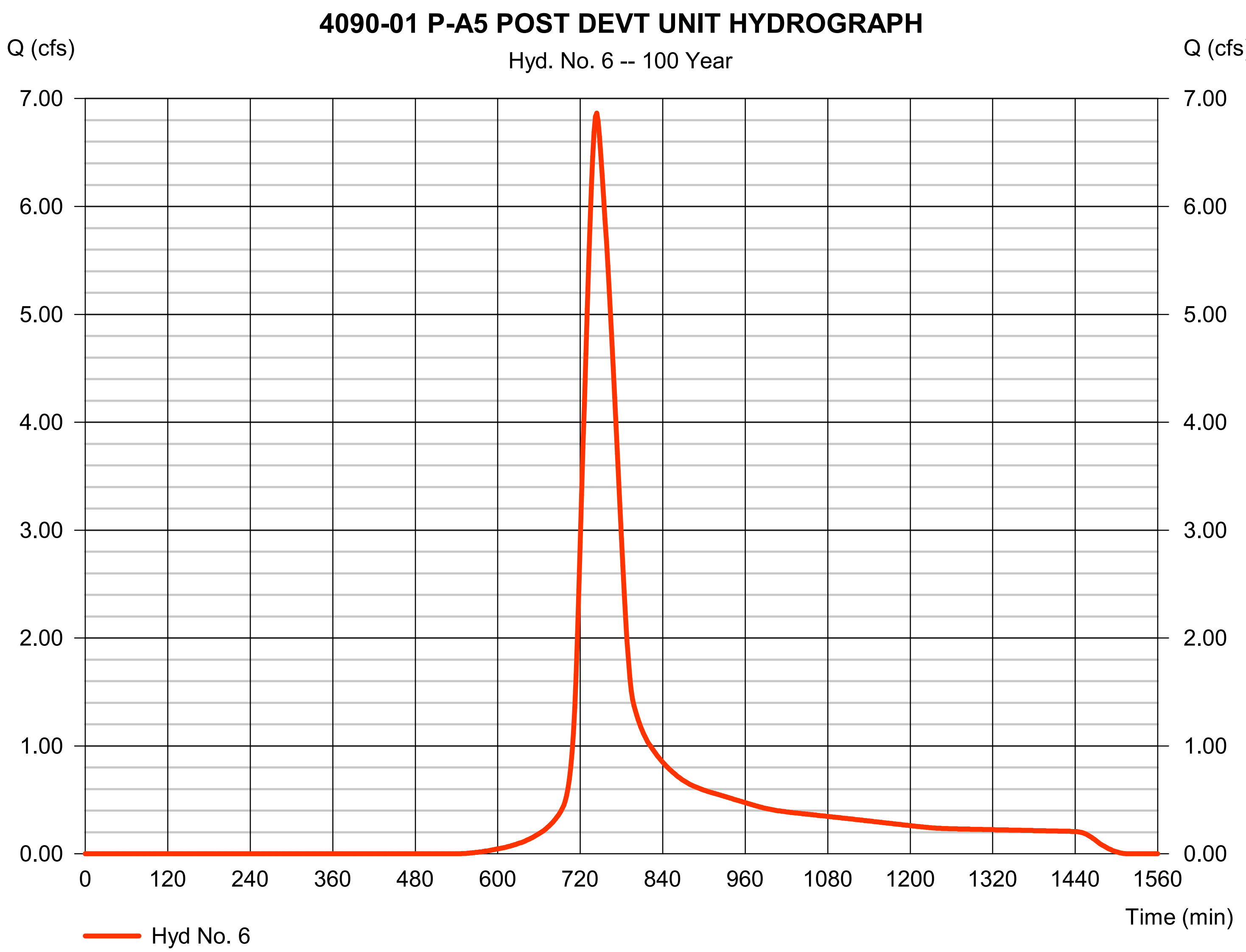
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Monday, 06 / 5 / 2023

Hyd. No. 6

4090-01 P-A5 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 6.864 cfs
Storm frequency	= 100 yrs	Time to peak	= 744 min
Time interval	= 2 min	Hyd. volume	= 39,353 cuft
Drainage area	= 5.290 ac	Curve number	= 77
Basin Slope	= 0.5 %	Hydraulic length	= 1012 ft
Tc method	= LAG	Time of conc. (Tc)	= 48.37 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

e: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

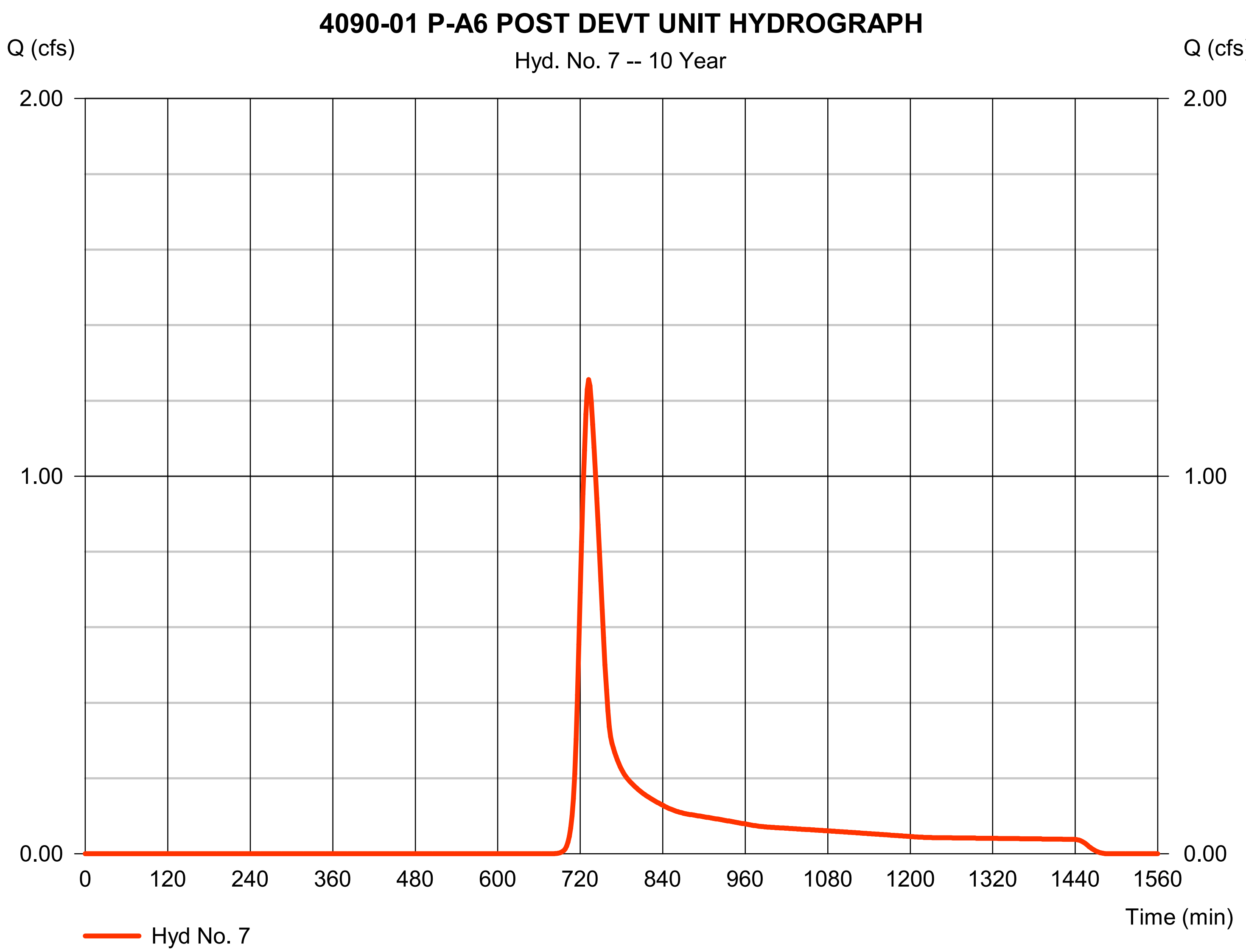
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 7

4090-01 P-A6 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 1.256 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 5,610 cuft
Drainage area	= 2.430 ac	Curve number	= 77
Basin Slope	= 0.8 %	Hydraulic length	= 701 ft
Tc method	= LAG	Time of conc. (Tc)	= 29.92 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



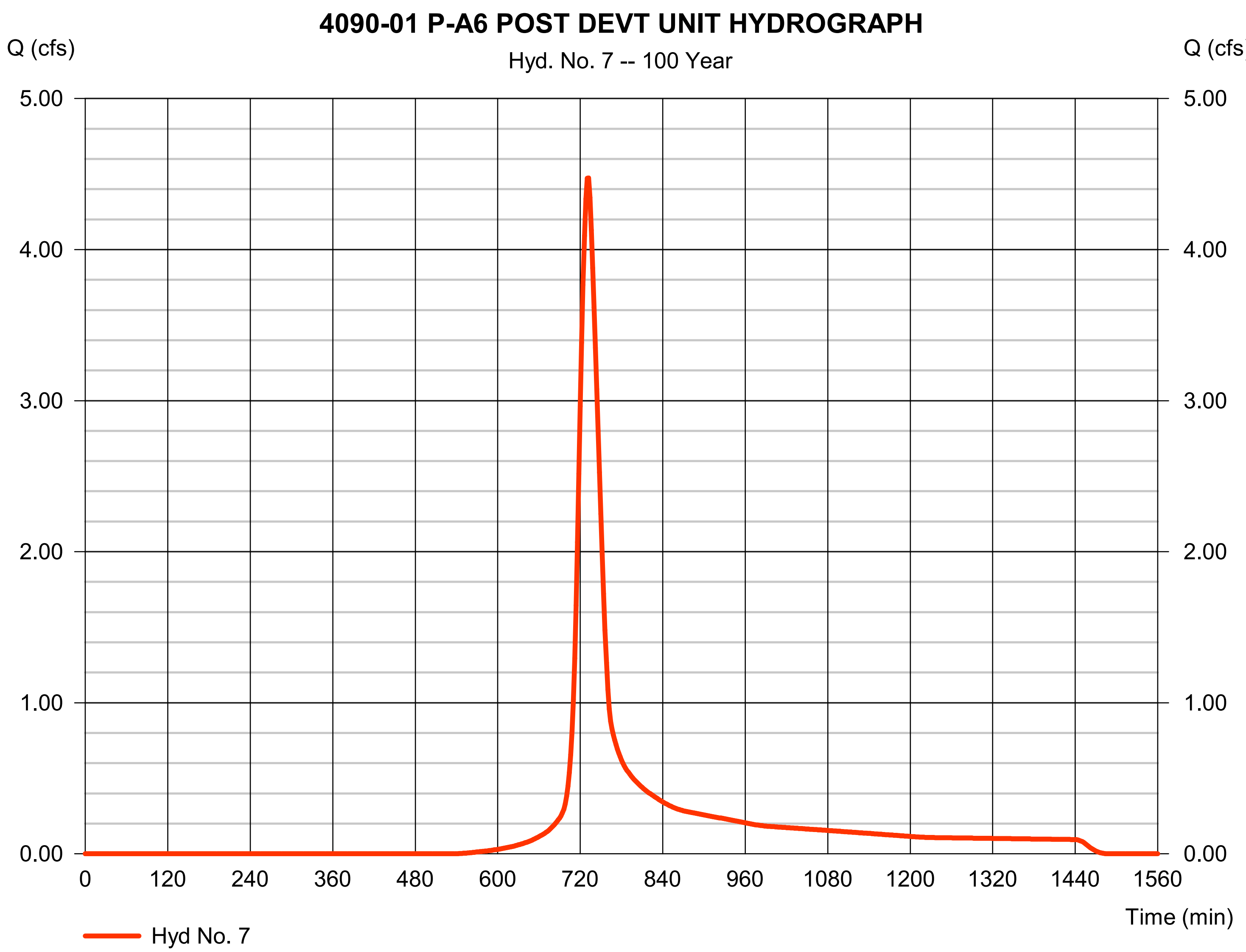
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 | Monday, 06 / 5 / 2023

Hyd. No. 7

4090-01 P-A6 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 4.475 cfs
Storm frequency	= 100 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 18,077 cuft
Drainage area	= 2.430 ac	Curve number	= 77
Basin Slope	= 0.8 %	Hydraulic length	= 701 ft
Tc method	= LAG	Time of conc. (Tc)	= 29.92 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

e: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

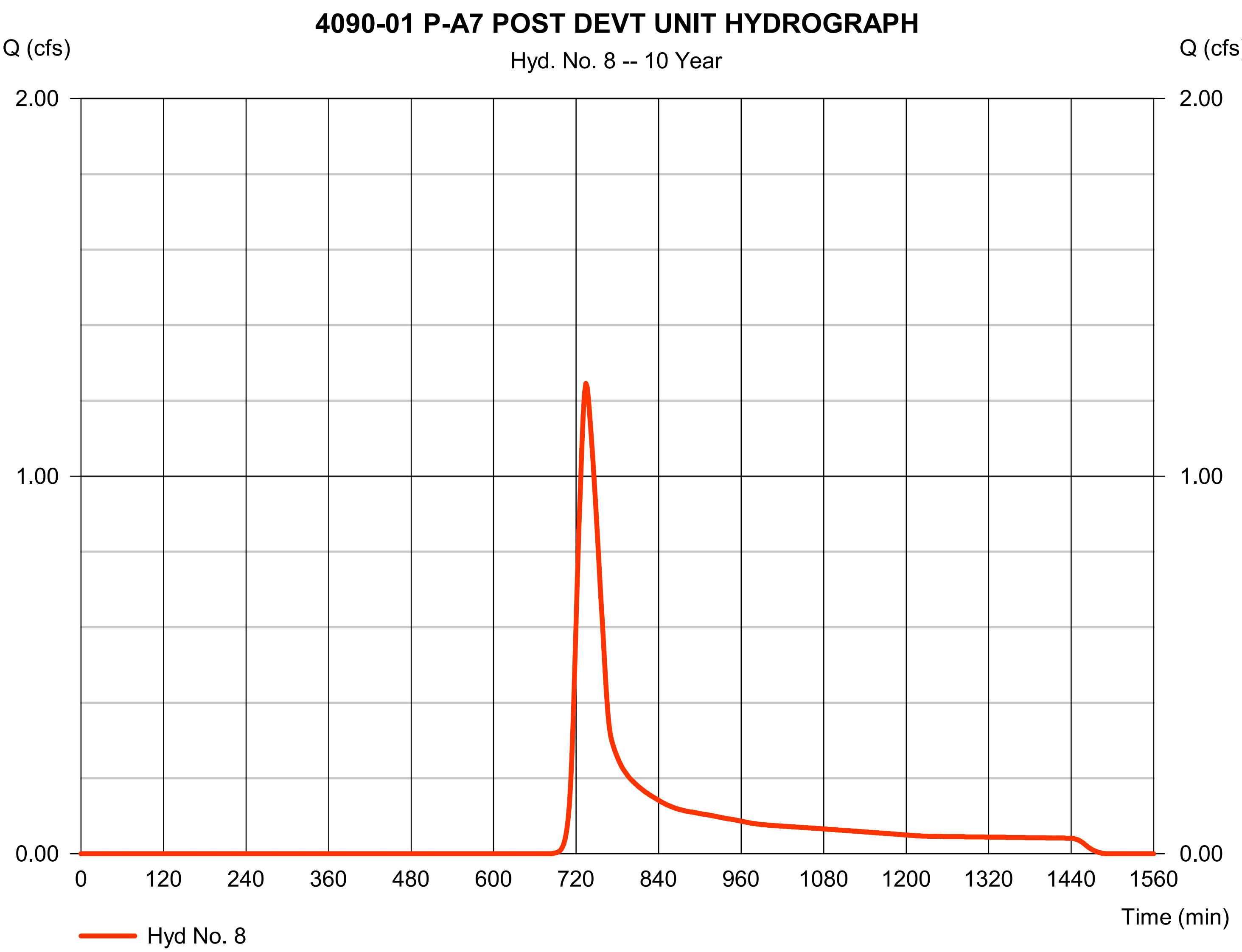
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Monday, 06 / 5 / 2023

Hyd. No. 8

4090-01 P-A7 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 1.246 cfs
Storm frequency	= 10 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 6,055 cuft
Drainage area	= 2.590 ac	Curve number	= 77
Basin Slope	= 0.8 %	Hydraulic length	= 754 ft
Tc method	= LAG	Time of conc. (Tc)	= 31.71 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



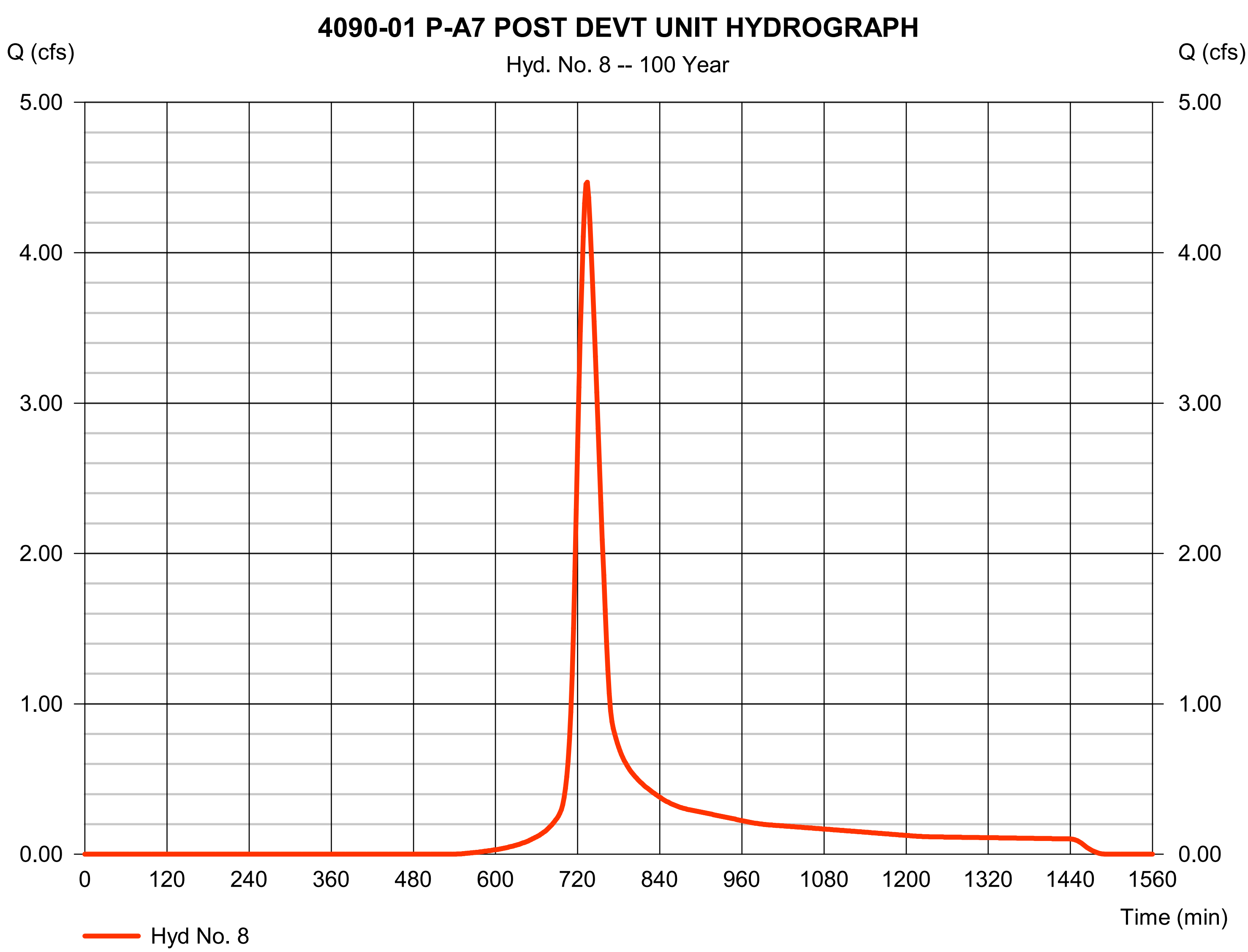
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 8

4090-01 P-A7 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 4.468 cfs
Storm frequency	= 100 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 19,508 cuft
Drainage area	= 2.590 ac	Curve number	= 77
Basin Slope	= 0.8 %	Hydraulic length	= 754 ft
Tc method	= LAG	Time of conc. (Tc)	= 31.71 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

e: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

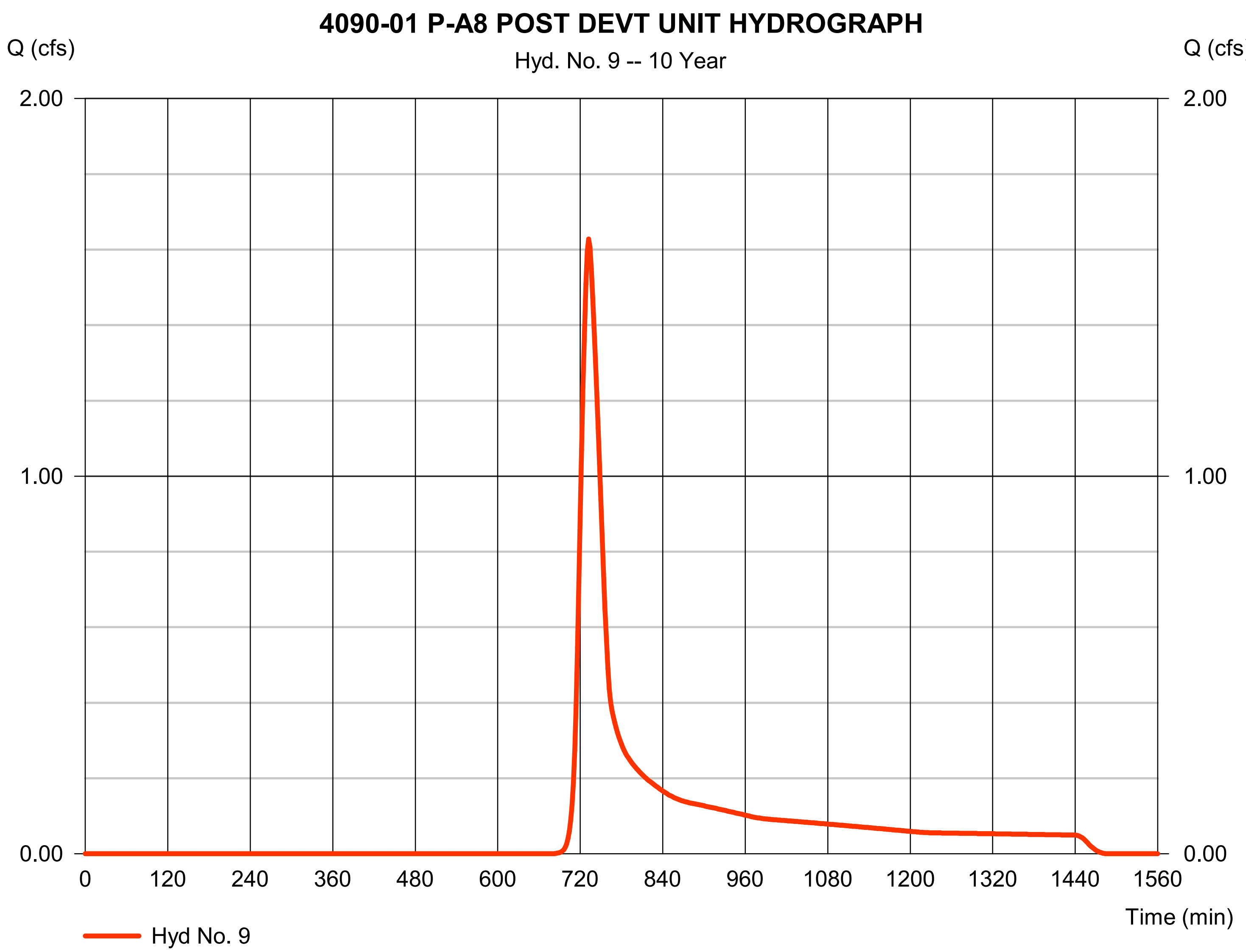
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 9

4090-01 P-A8 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 1.628 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 7,273 cuft
Drainage area	= 3.150 ac	Curve number	= 77
Basin Slope	= 0.8 %	Hydraulic length	= 714 ft
Tc method	= LAG	Time of conc. (Tc)	= 29.24 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



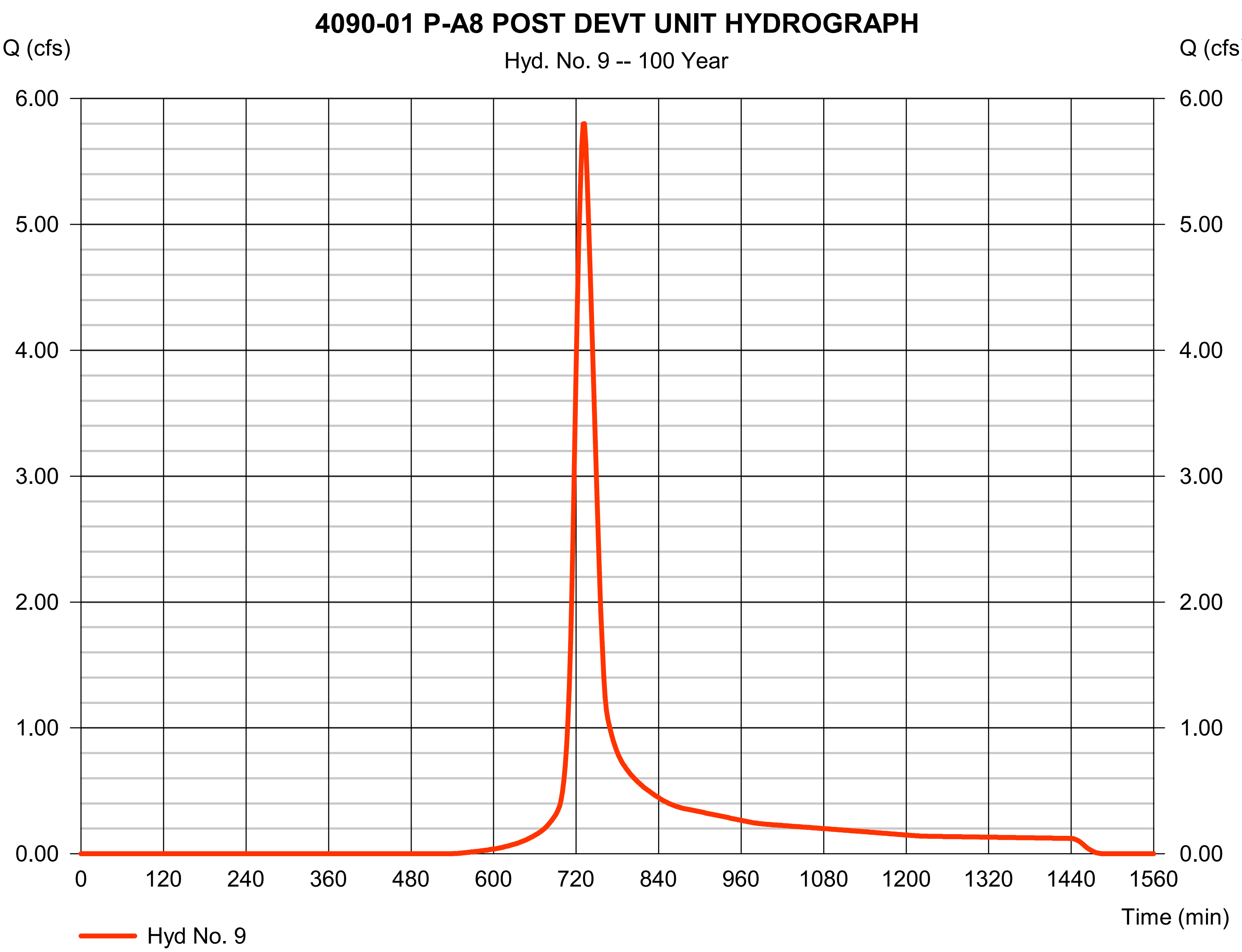
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 9

4090-01 P-A8 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 5.800 cfs
Storm frequency	= 100 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 23,433 cuft
Drainage area	= 3.150 ac	Curve number	= 77
Basin Slope	= 0.8 %	Hydraulic length	= 714 ft
Tc method	= LAG	Time of conc. (Tc)	= 29.24 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

e: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

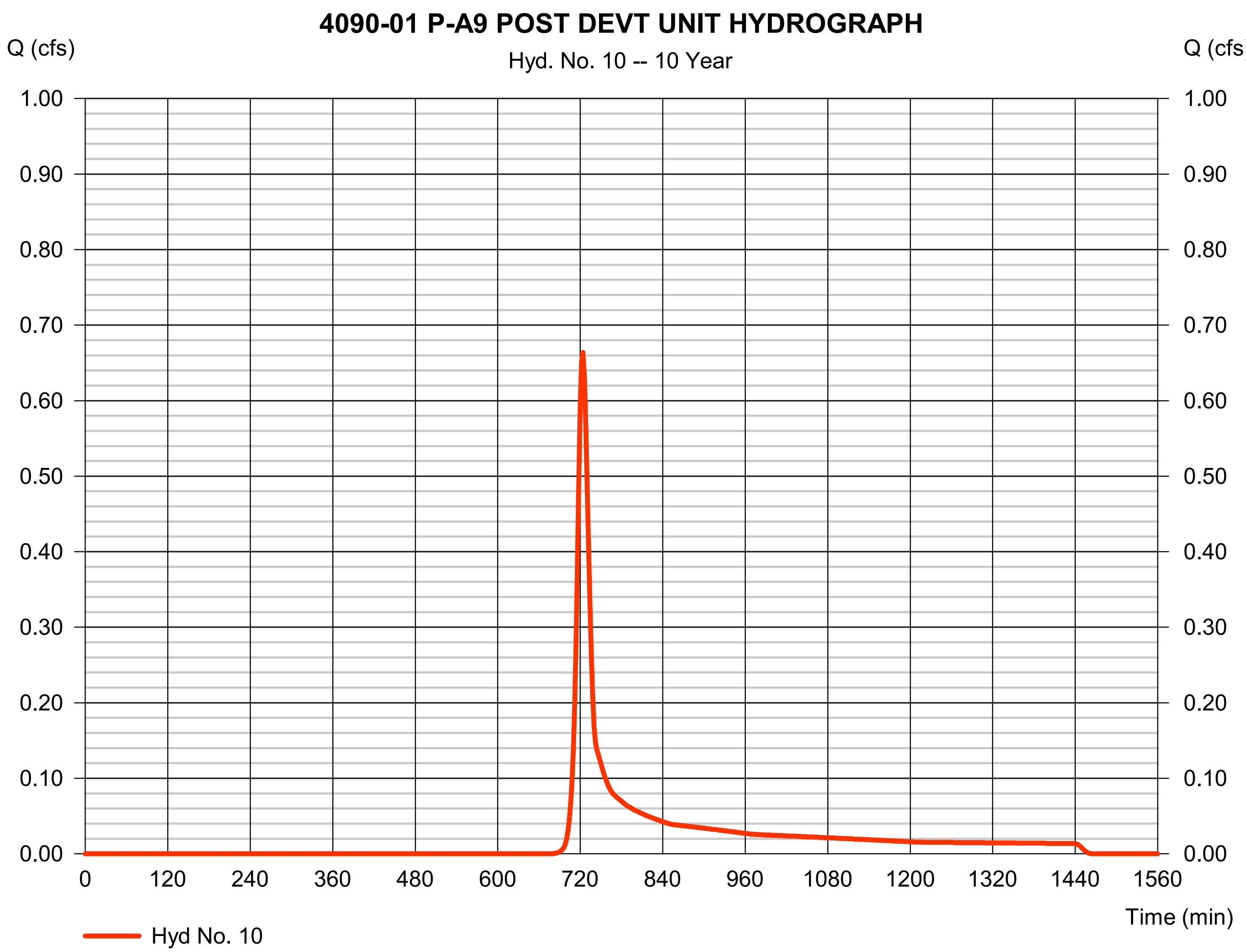
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 10

4090-01 P-A9 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 0.664 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 2,003 cuft
Drainage area	= 0.890 ac	Curve number	= 77
Basin Slope	= 0.9 %	Hydraulic length	= 369 ft
Tc method	= LAG	Time of conc. (Tc)	= 16.38 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

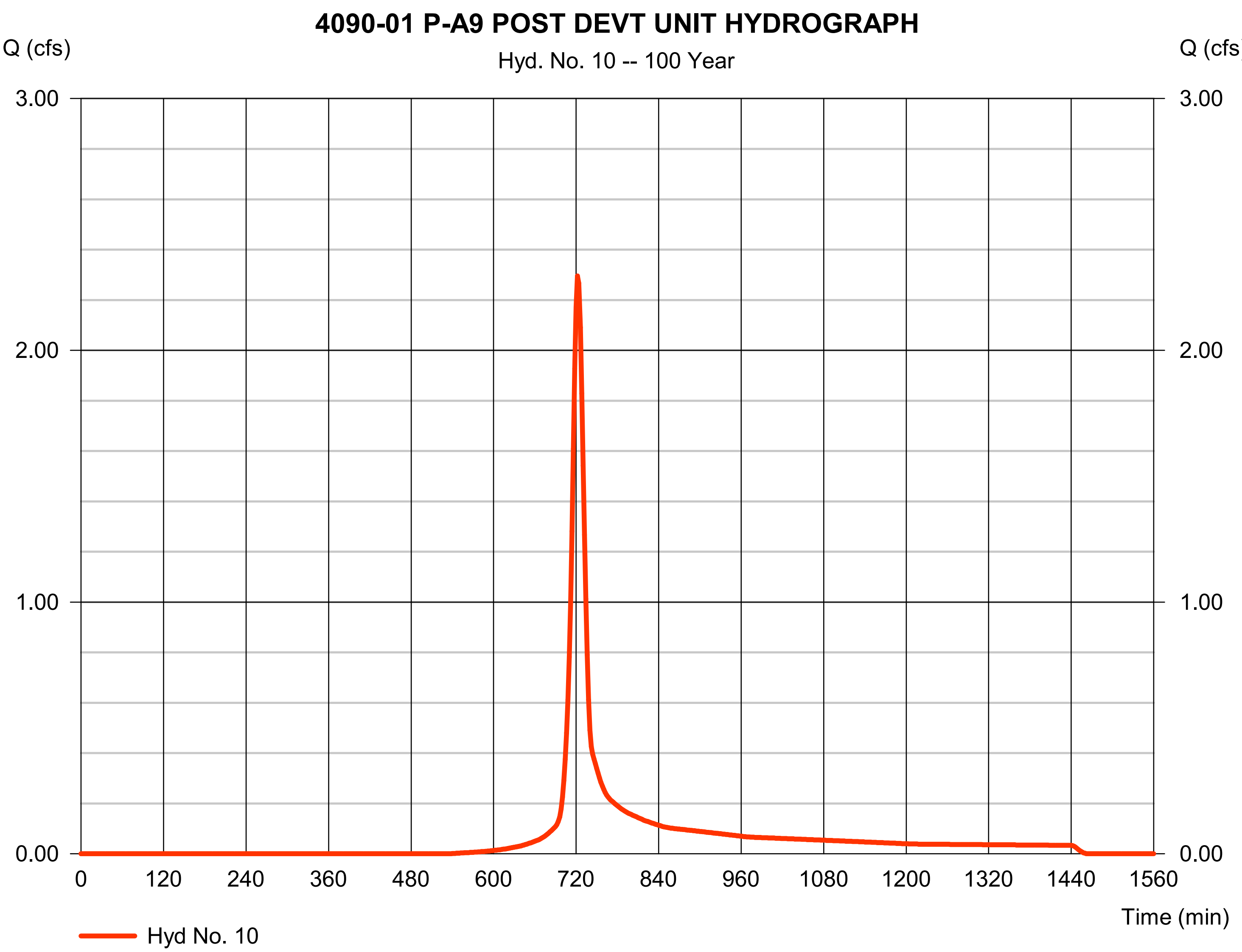


Hydrograph Report

Hyd. No. 10

4090-01 P-A9 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 2.296 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 6,455 cuft
Drainage area	= 0.890 ac	Curve number	= 77
Basin Slope	= 0.9 %	Hydraulic length	= 369 ft
Tc method	= LAG	Time of conc. (Tc)	= 16.38 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

ne: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

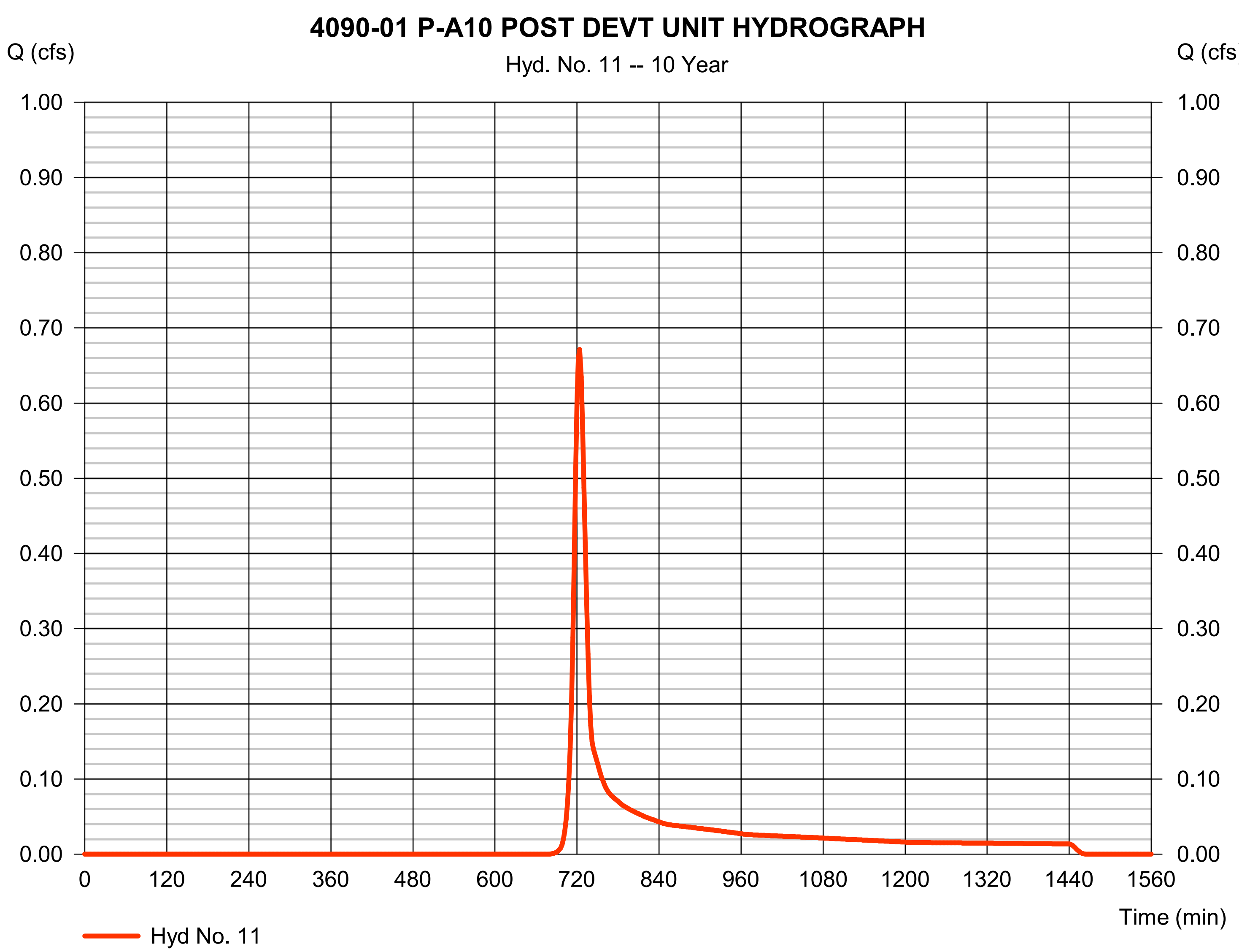
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 11

4090-01 P-A10 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 0.671 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 2,026 cuft
Drainage area	= 0.900 ac	Curve number	= 77
Basin Slope	= 0.9 %	Hydraulic length	= 375 ft
Tc method	= LAG	Time of conc. (Tc)	= 16.68 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



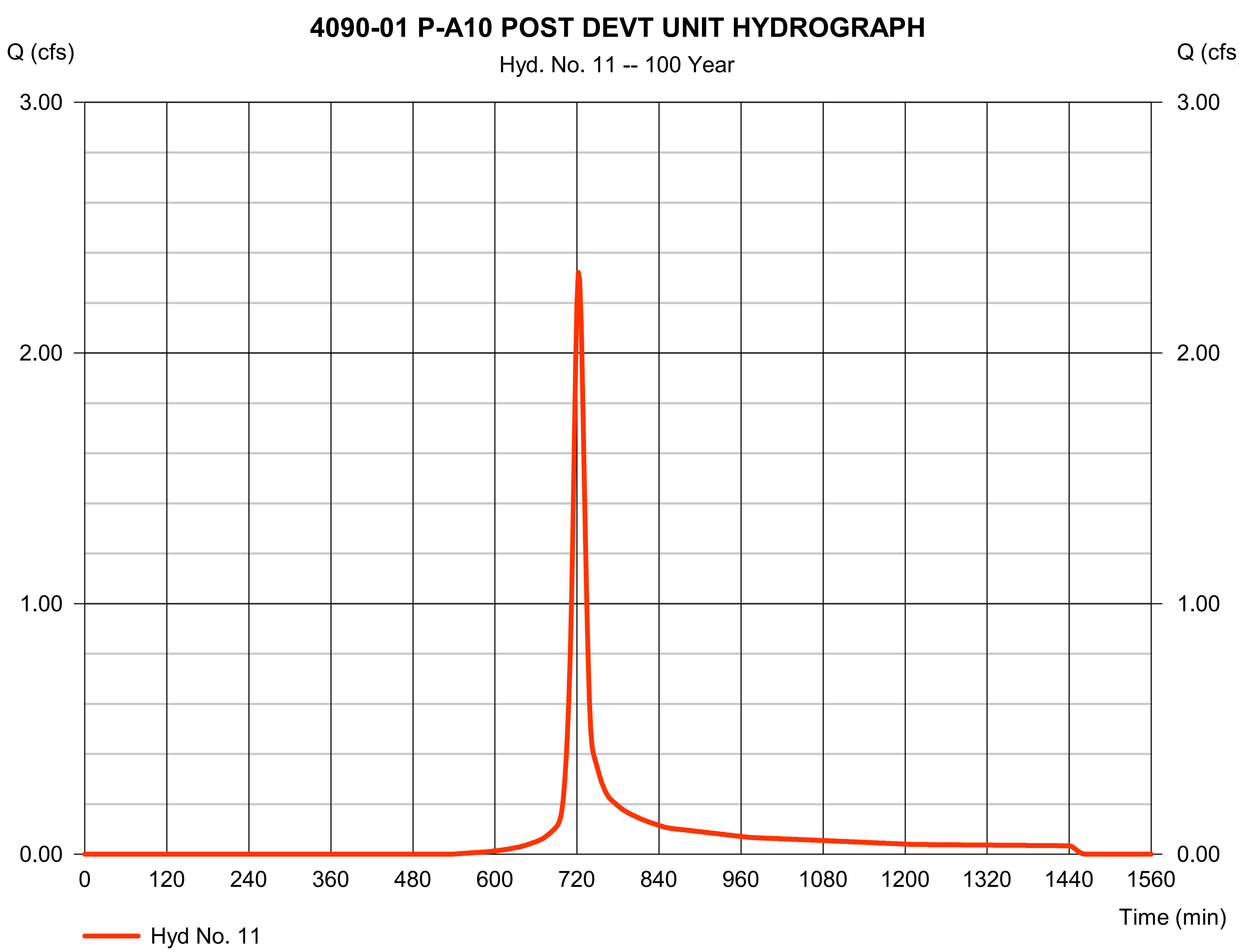
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 11

4090-01 P-A10 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 2.321 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 6,528 cuft
Drainage area	= 0.900 ac	Curve number	= 77
Basin Slope	= 0.9 %	Hydraulic length	= 375 ft
Tc method	= LAG	Time of conc. (Tc)	= 16.68 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

e: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

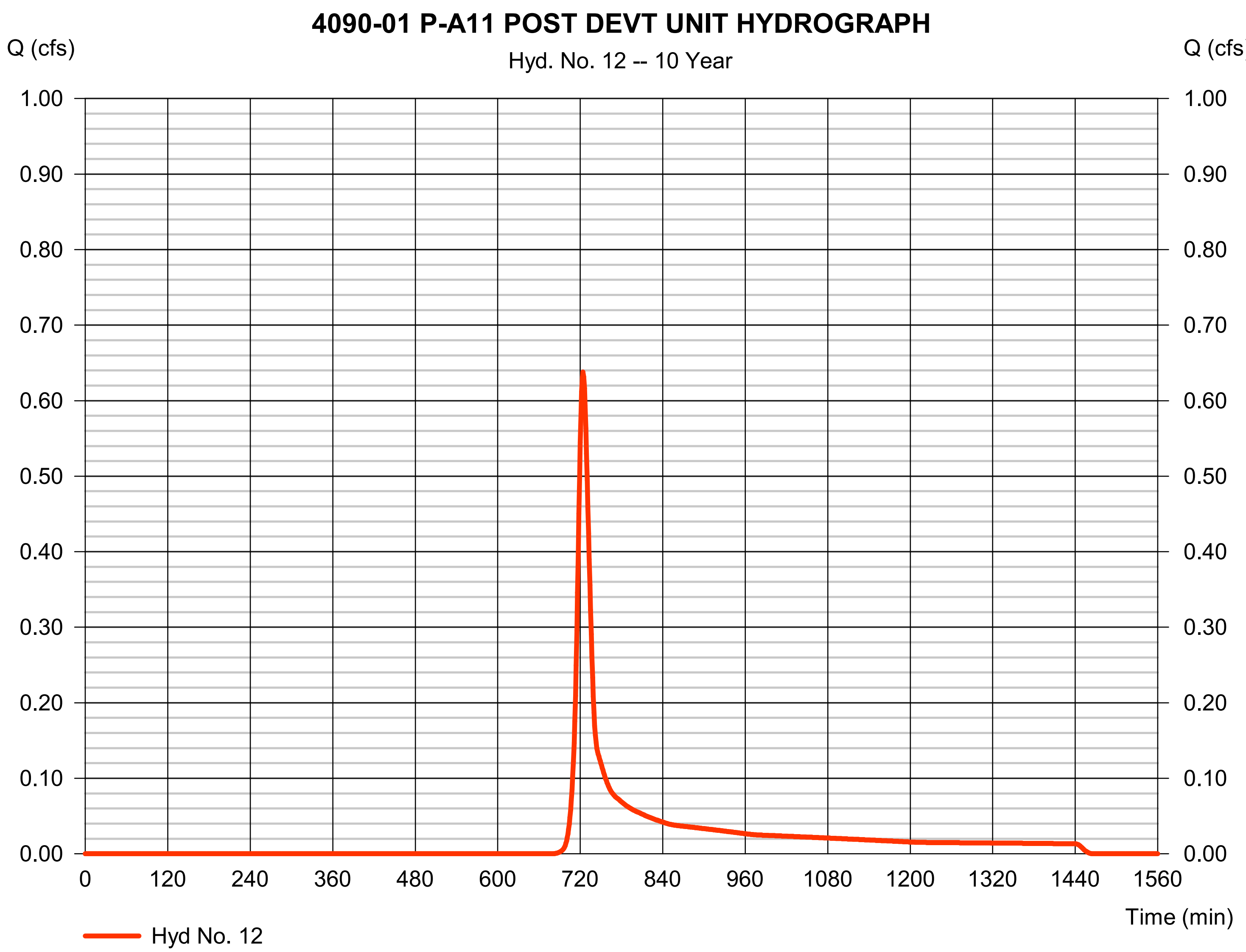
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 12

4090-01 P-A11 POST DEVT UNIT HYDROGRAPH

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.638 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	1,964 cuft
Drainage area	=	0.840 ac	Curve number	=	77
Basin Slope	=	0.9 %	Hydraulic length	=	352 ft
Tc method	=	LAG	Time of conc. (Tc)	=	15.60 min
Total precip.	=	2.33 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



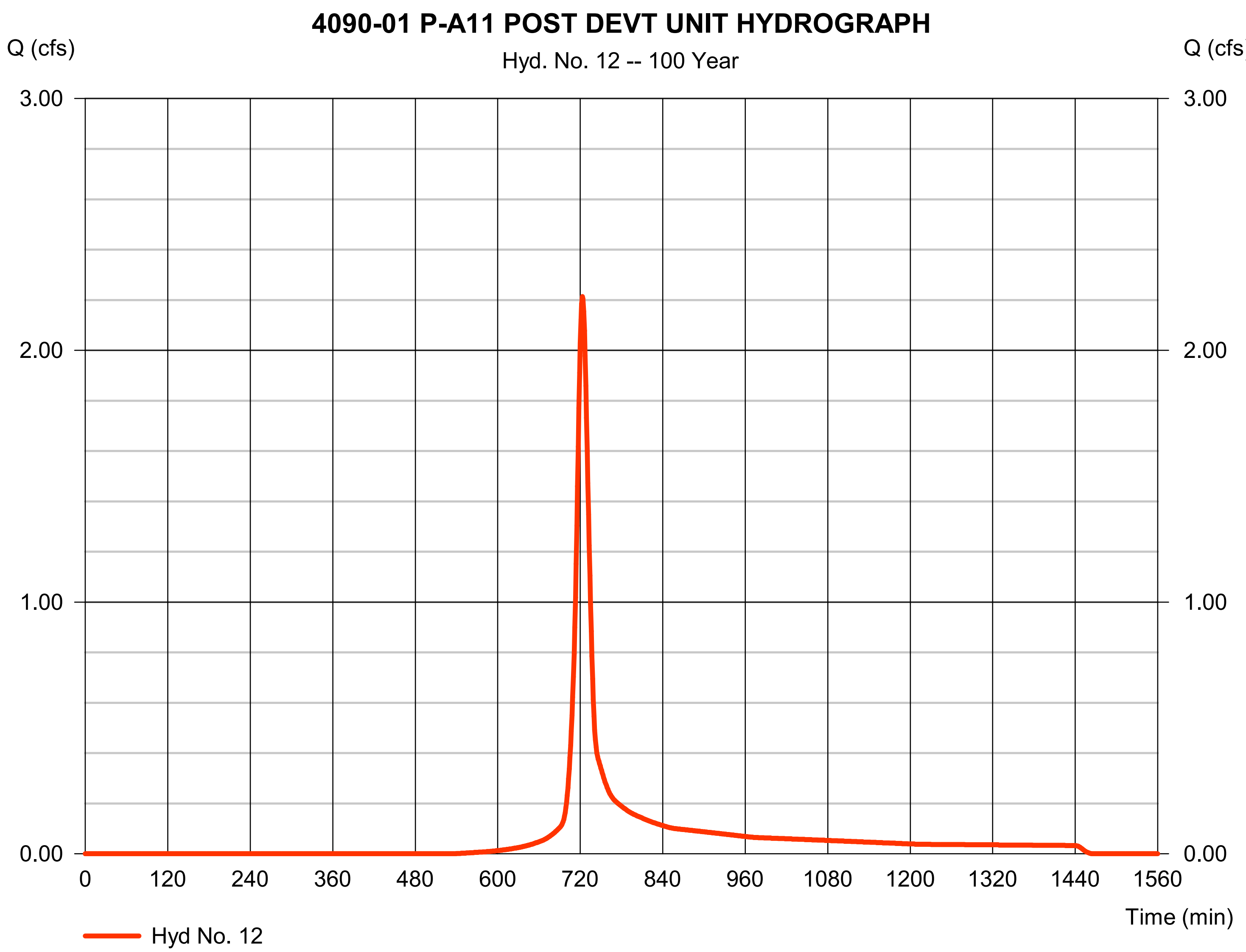
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 12

4090-01 P-A11 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 2.214 cfs
Storm frequency	= 100 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 6,327 cuft
Drainage area	= 0.840 ac	Curve number	= 77
Basin Slope	= 0.9 %	Hydraulic length	= 352 ft
Tc method	= LAG	Time of conc. (Tc)	= 15.60 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

e: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

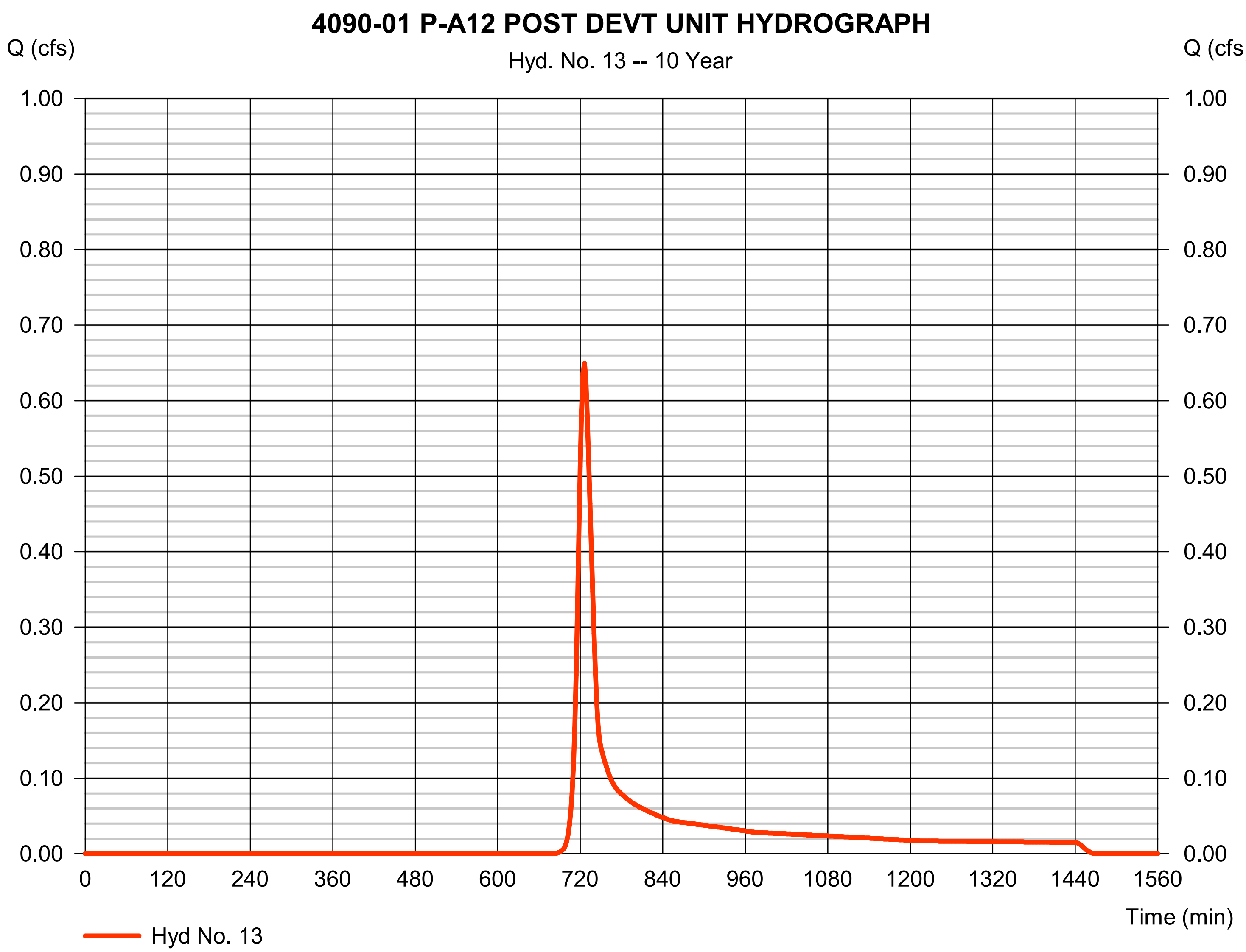
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Monday, 06 / 5 / 2023

Hyd. No. 13

4090-01 P-A12 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 0.649 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 2,216 cuft
Drainage area	= 0.960 ac	Curve number	= 77
Basin Slope	= 0.9 %	Hydraulic length	= 373 ft
Tc method	= LAG	Time of conc. (Tc)	= 16.89 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



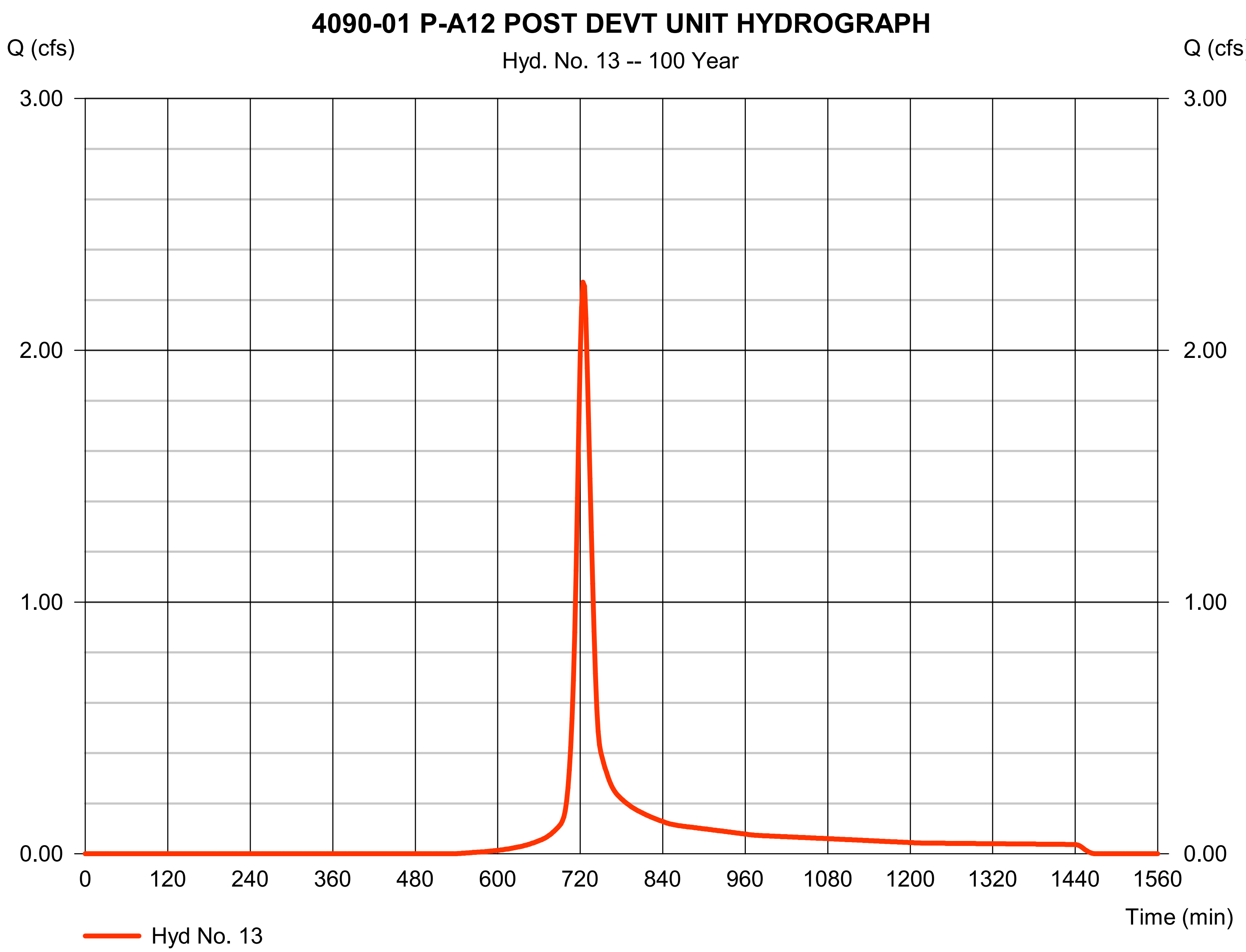
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 | Monday, 06 / 5 / 2023

Hyd. No. 13

4090-01 P-A12 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 2.270 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 7,142 cuft
Drainage area	= 0.960 ac	Curve number	= 77
Basin Slope	= 0.9 %	Hydraulic length	= 373 ft
Tc method	= LAG	Time of conc. (Tc)	= 16.89 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

ne: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

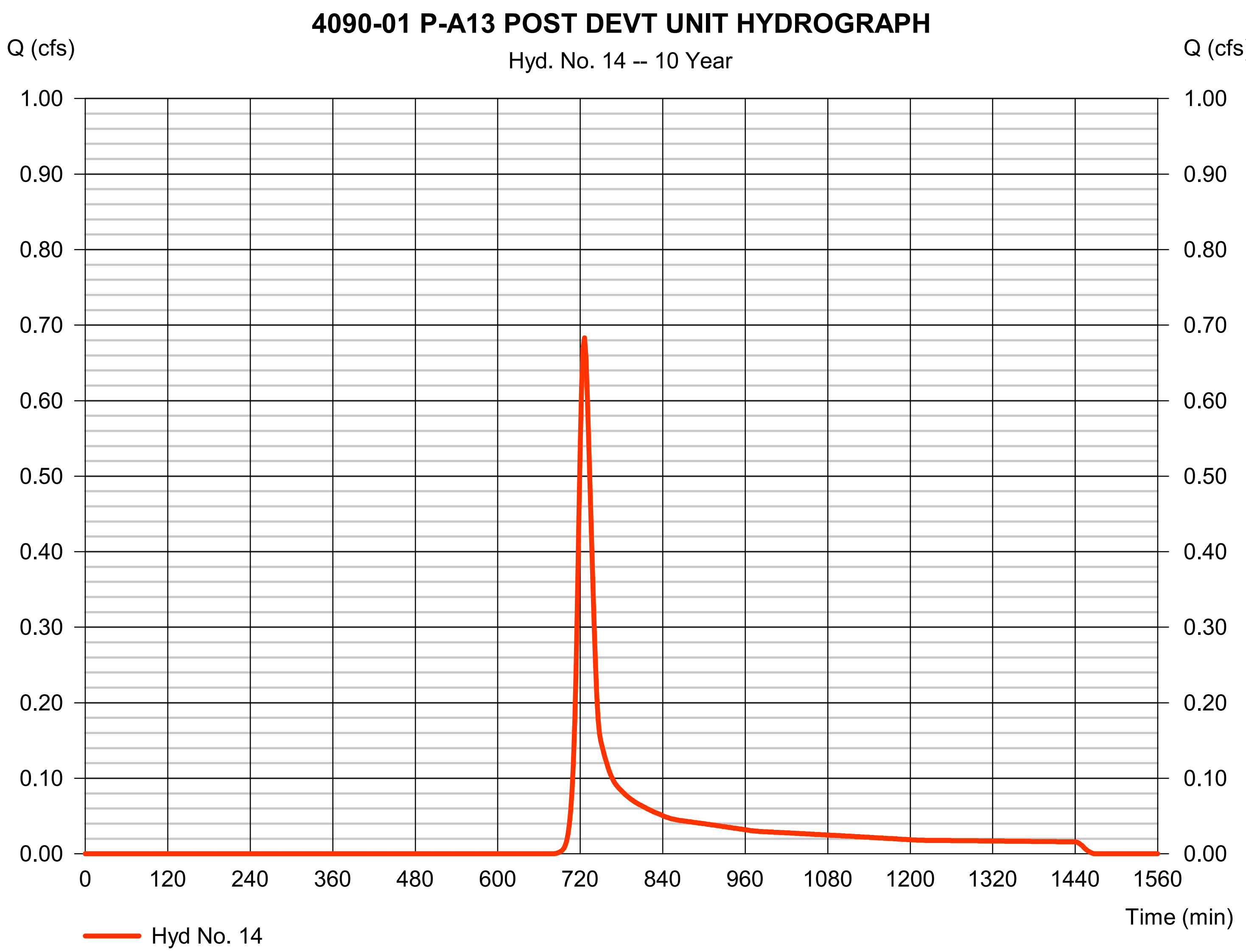
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 14

4090-01 P-A13 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 0.683 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 2,332 cuft
Drainage area	= 1.010 ac	Curve number	= 77
Basin Slope	= 0.9 %	Hydraulic length	= 369 ft
Tc method	= LAG	Time of conc. (Tc)	= 16.84 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



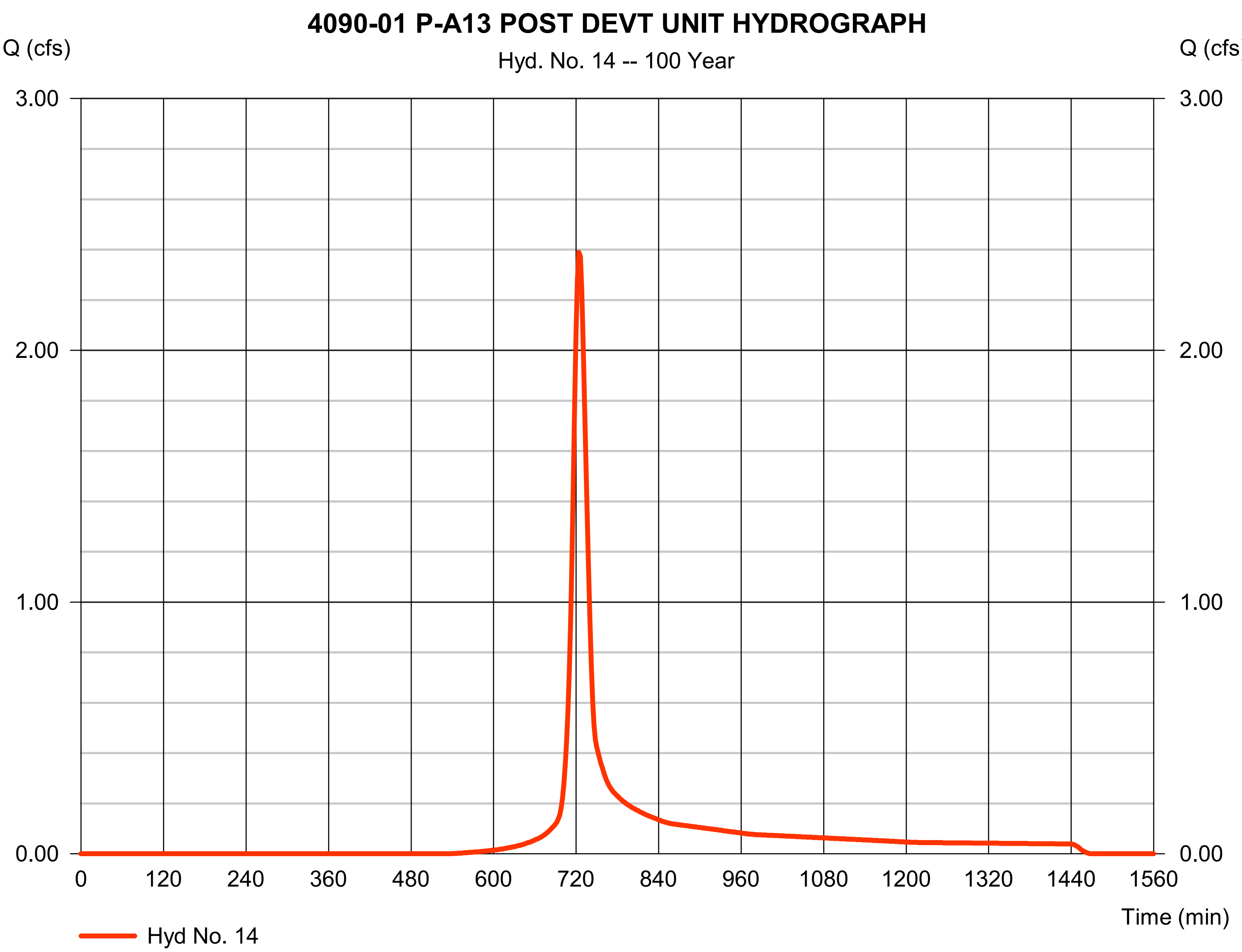
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Monday, 06 / 5 / 2023

Hyd. No. 14

4090-01 P-A13 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 2.389 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 7,513 cuft
Drainage area	= 1.010 ac	Curve number	= 77
Basin Slope	= 0.9 %	Hydraulic length	= 369 ft
Tc method	= LAG	Time of conc. (Tc)	= 16.84 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

ne: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

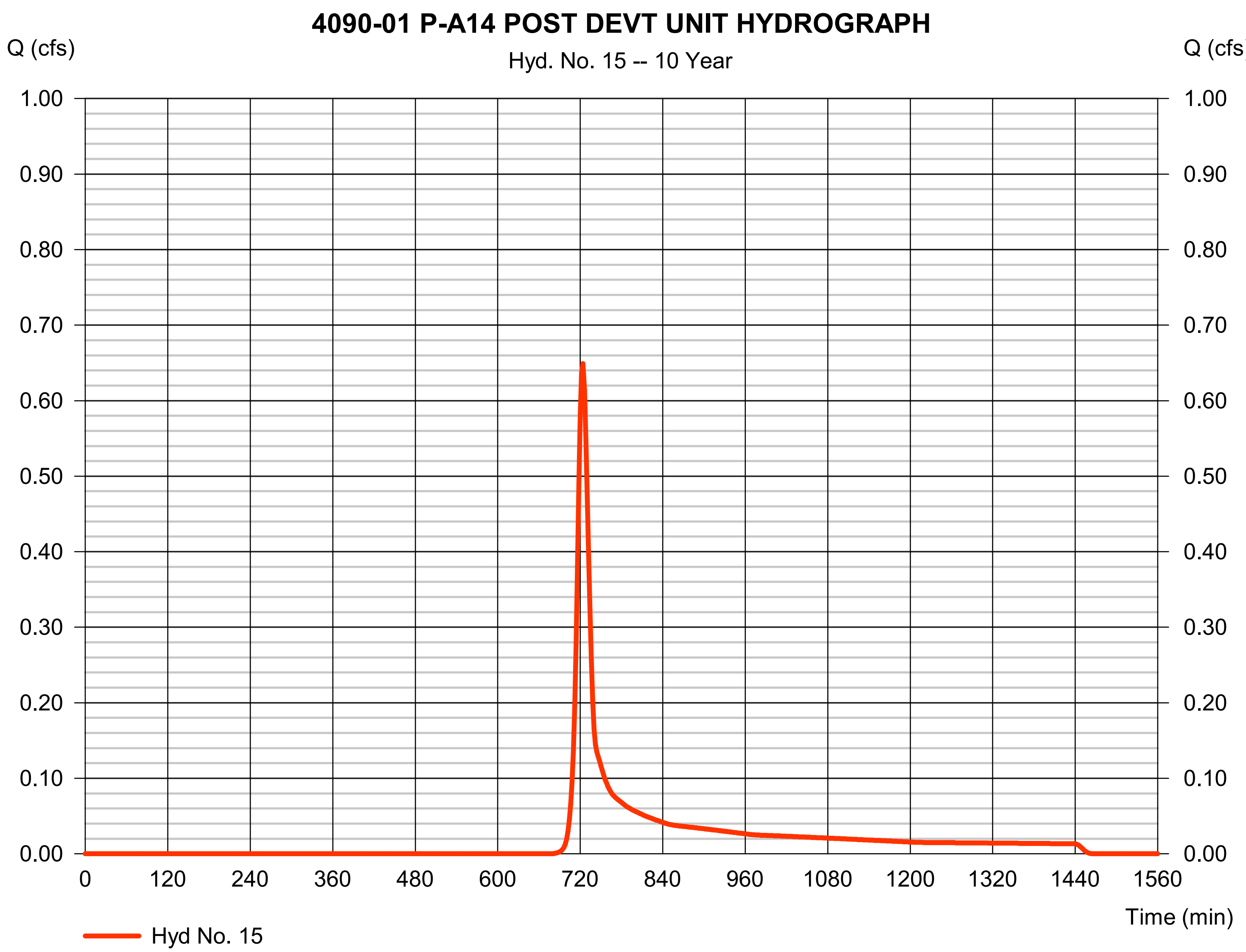
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Monday, 06 / 5 / 2023

Hyd. No. 15

4090-01 P-A14 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 0.649 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 1,958 cuft
Drainage area	= 0.870 ac	Curve number	= 77
Basin Slope	= 0.8 %	Hydraulic length	= 348 ft
Tc method	= LAG	Time of conc. (Tc)	= 16.45 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



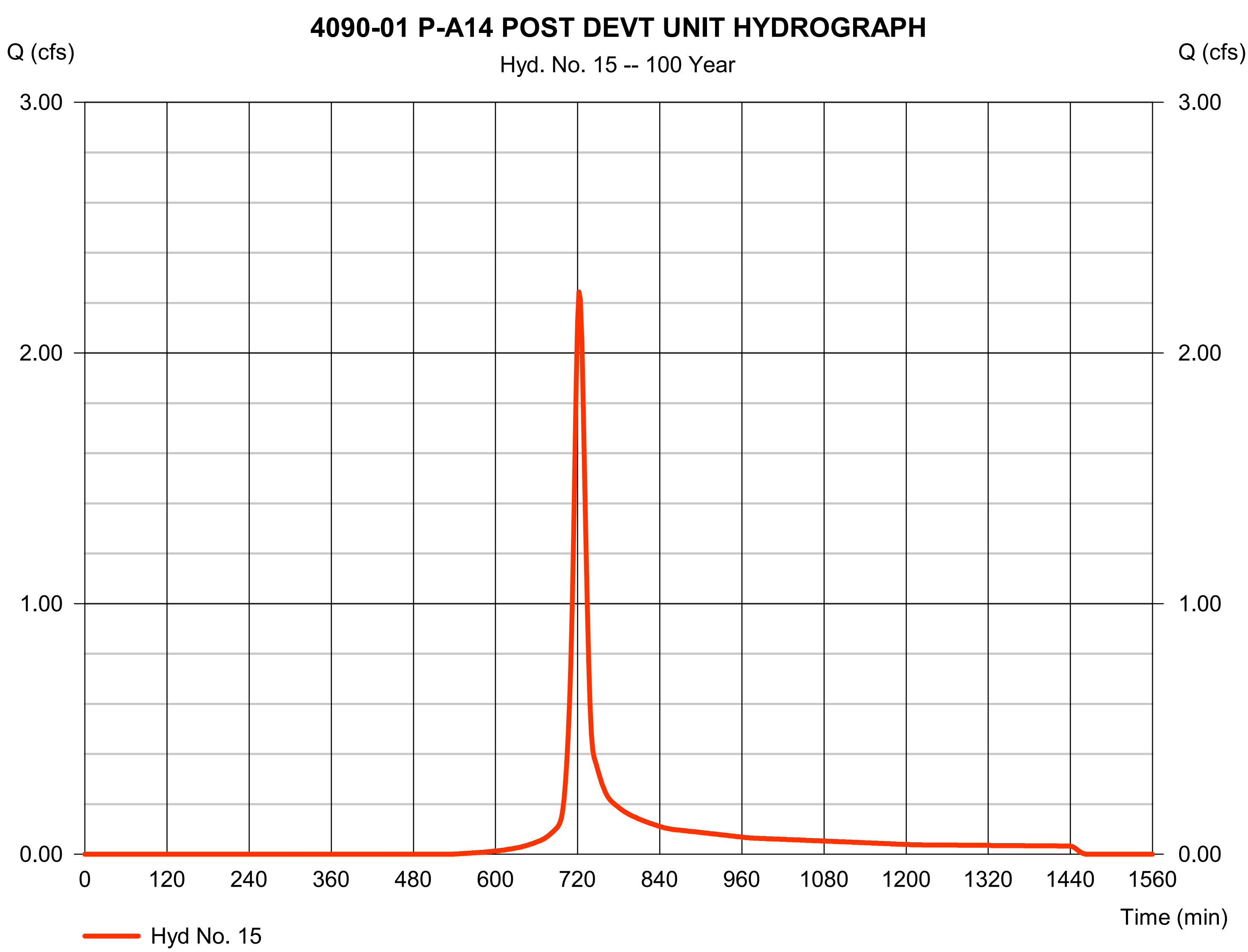
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 | Monday, 06 / 5 / 2023

Hyd. No. 15

4090-01 P-A14 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 2.244 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 6,310 cuft
Drainage area	= 0.870 ac	Curve number	= 77
Basin Slope	= 0.8 %	Hydraulic length	= 348 ft
Tc method	= LAG	Time of conc. (Tc)	= 16.45 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

ne: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

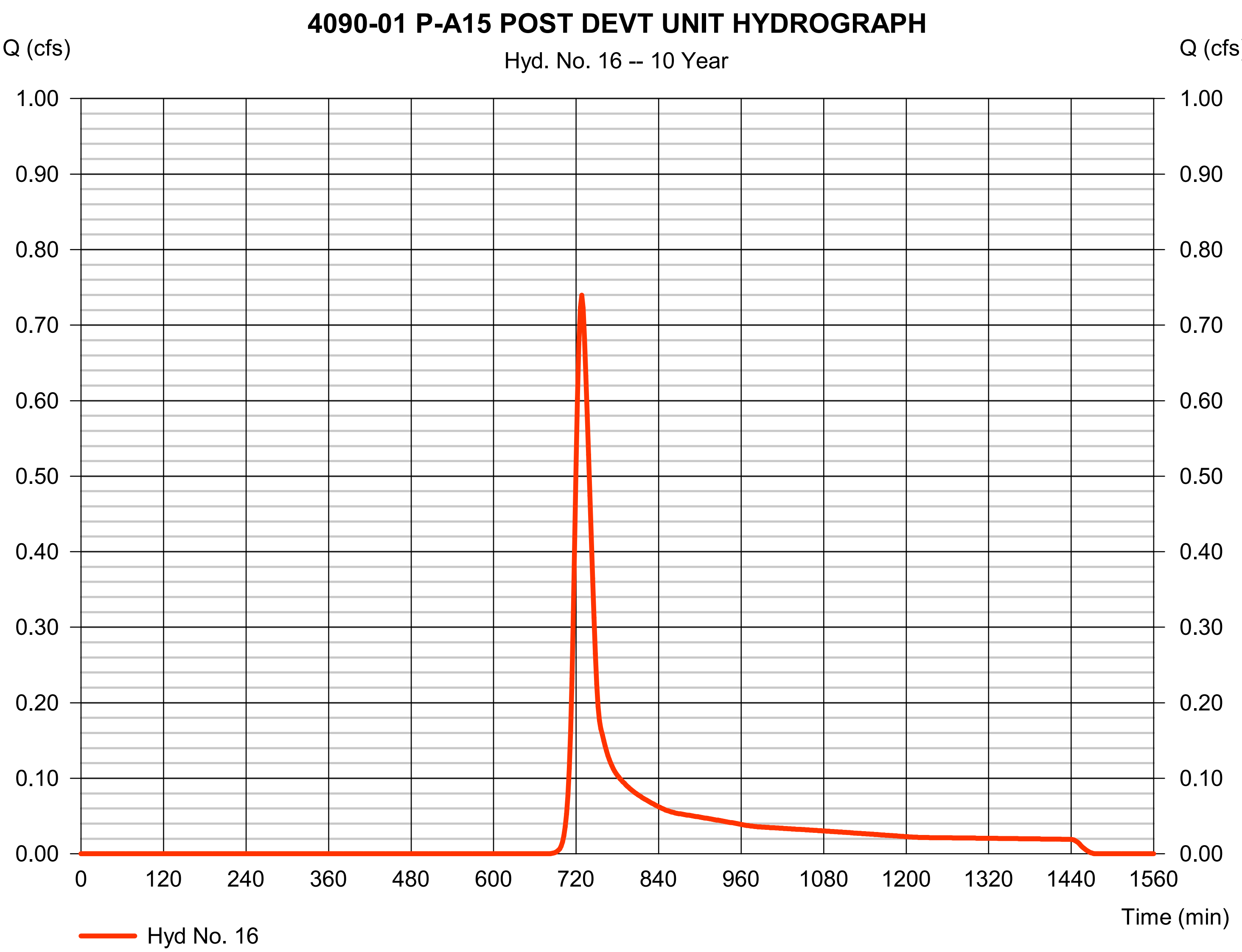
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Monday, 06 / 5 / 2023

Hyd. No. 16

4090-01 P-A15 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 0.740 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 2,820 cuft
Drainage area	= 1.200 ac	Curve number	= 77
Basin Slope	= 0.9 %	Hydraulic length	= 489 ft
Tc method	= LAG	Time of conc. (Tc)	= 20.52 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



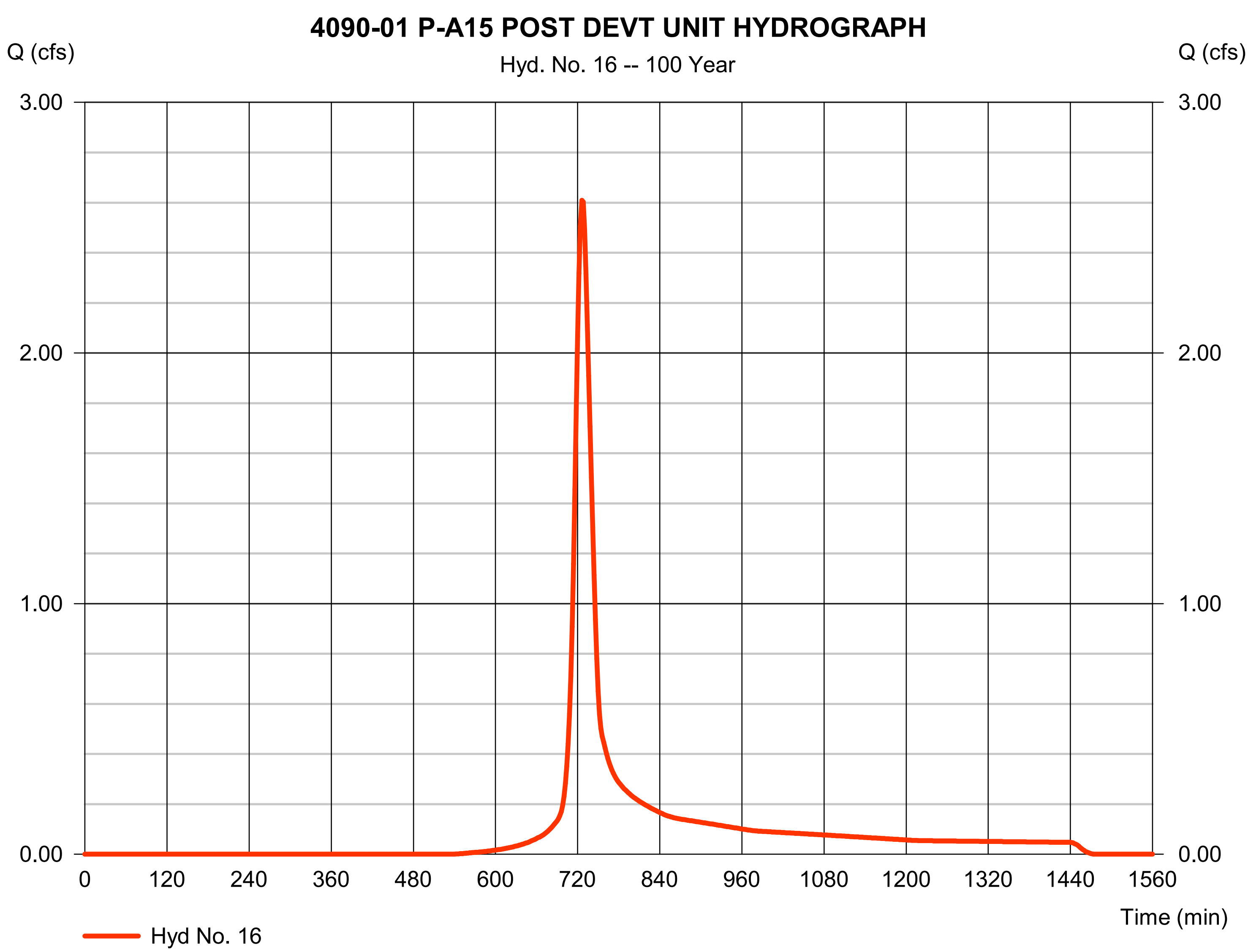
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Monday, 06 / 5 / 2023

Hyd. No. 16

4090-01 P-A15 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 2.609 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 9,086 cuft
Drainage area	= 1.200 ac	Curve number	= 77
Basin Slope	= 0.9 %	Hydraulic length	= 489 ft
Tc method	= LAG	Time of conc. (Tc)	= 20.52 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

ne: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

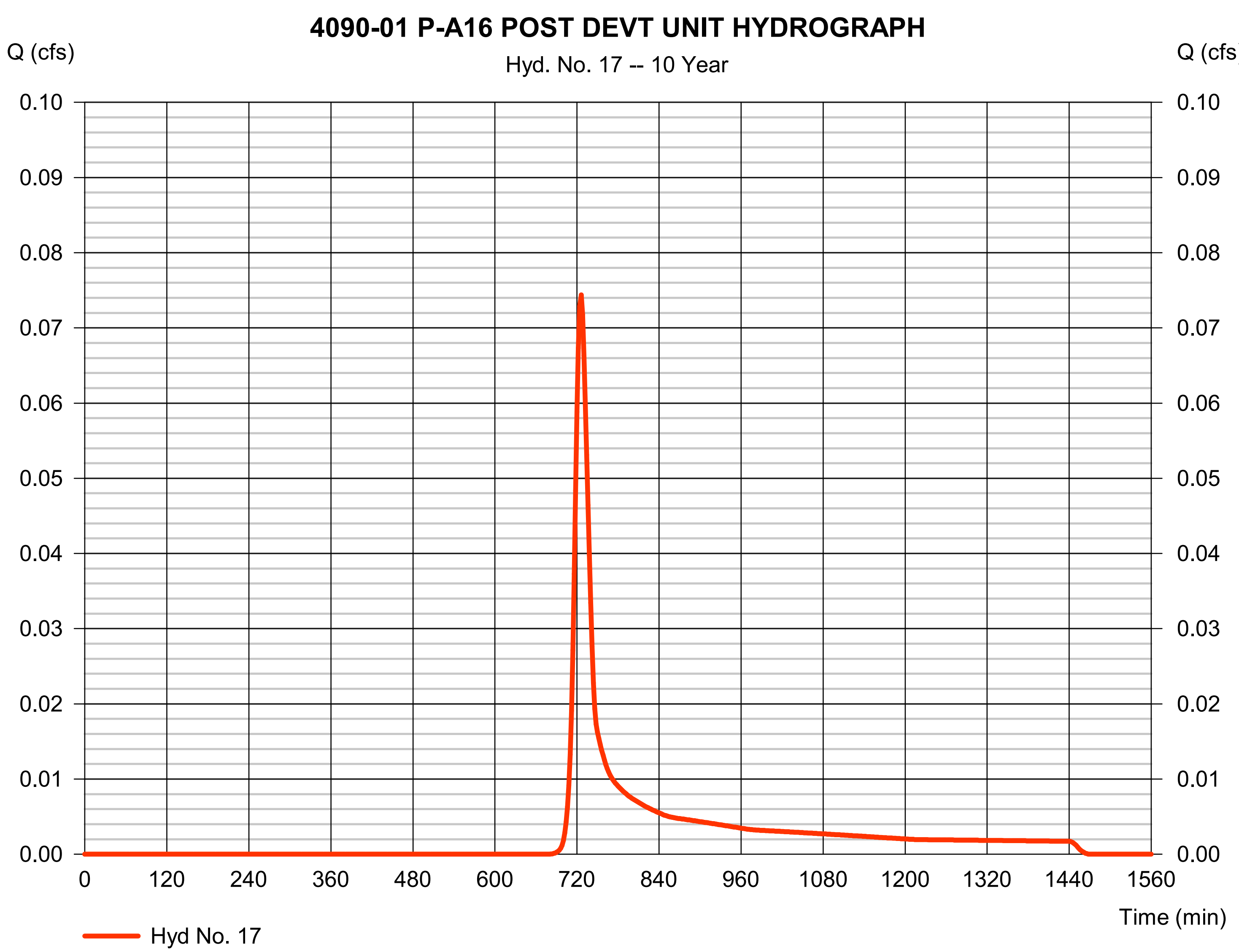
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Monday, 06 / 5 / 2023

Hyd. No. 17

4090-01 P-A16 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 0.074 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 254 cuft
Drainage area	= 0.110 ac	Curve number	= 77
Basin Slope	= 0.7 %	Hydraulic length	= 383 ft
Tc method	= LAG	Time of conc. (Tc)	= 18.94 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



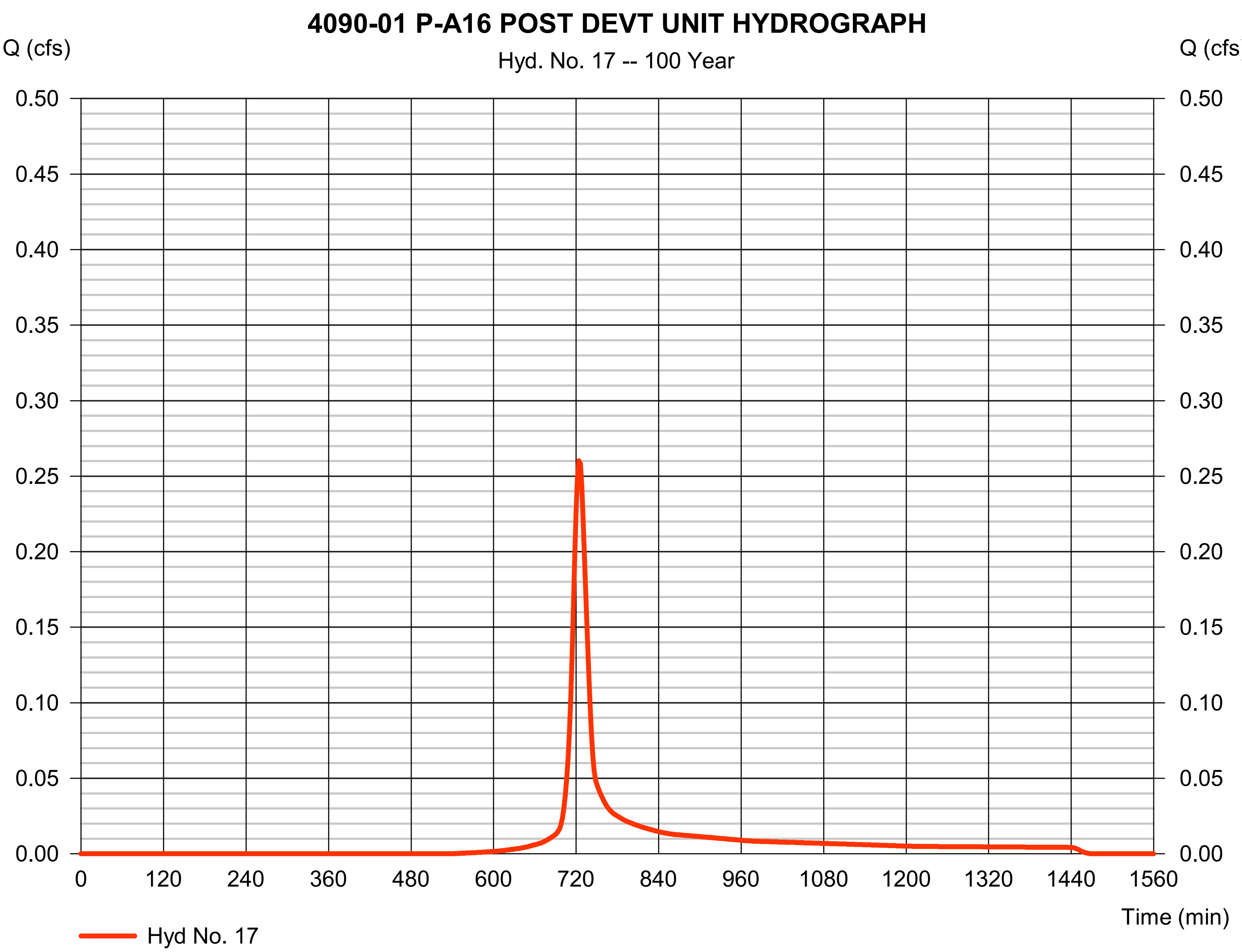
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 17

4090-01 P-A16 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 0.260 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 818 cuft
Drainage area	= 0.110 ac	Curve number	= 77
Basin Slope	= 0.7 %	Hydraulic length	= 383 ft
Tc method	= LAG	Time of conc. (Tc)	= 18.94 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

ne: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

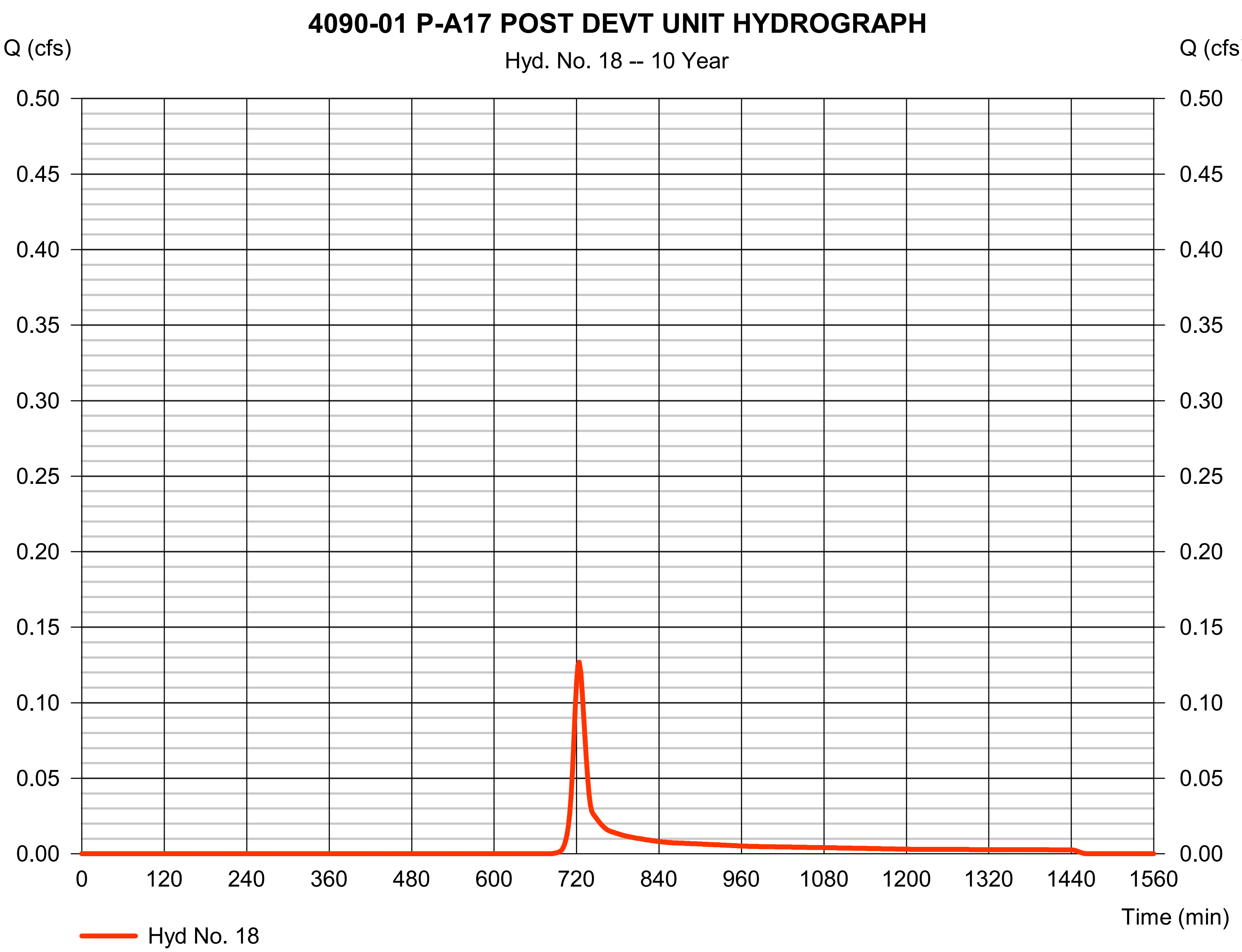
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Monday, 06 / 5 / 2023

Hyd. No. 18

4090-01 P-A17 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 0.127 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 383 cuft
Drainage area	= 0.170 ac	Curve number	= 77
Basin Slope	= 0.7 %	Hydraulic length	= 258 ft
Tc method	= LAG	Time of conc. (Tc)	= 14.20 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

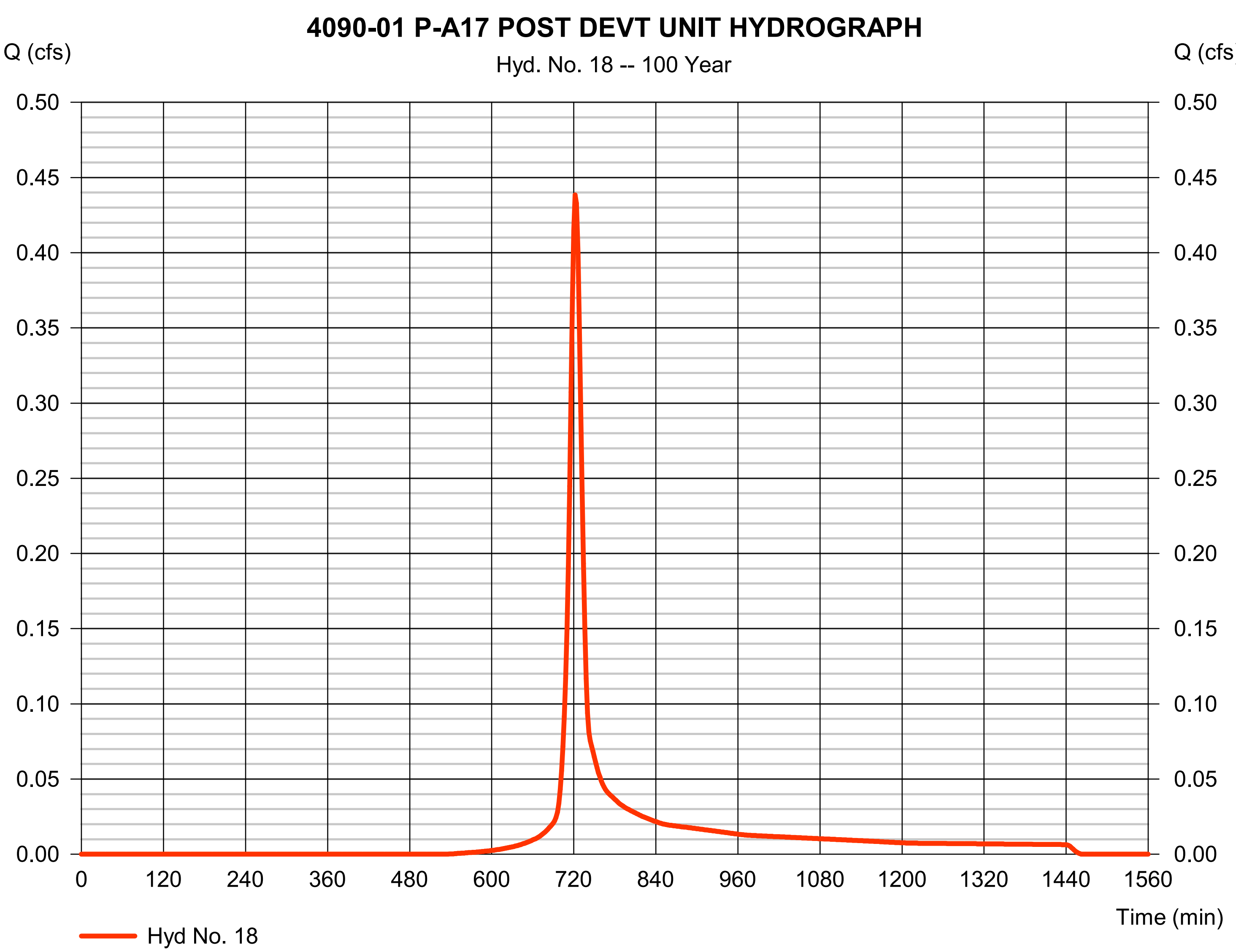


Hydrograph Report

Hyd. No. 18

4090-01 P-A17 POST DEVT UNIT HYDROGRAPH

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.438 cfs
Storm frequency	=	100 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	1,233 cuft
Drainage area	=	0.170 ac	Curve number	=	77
Basin Slope	=	0.7 %	Hydraulic length	=	258 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.20 min
Total precip.	=	4.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

ne: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

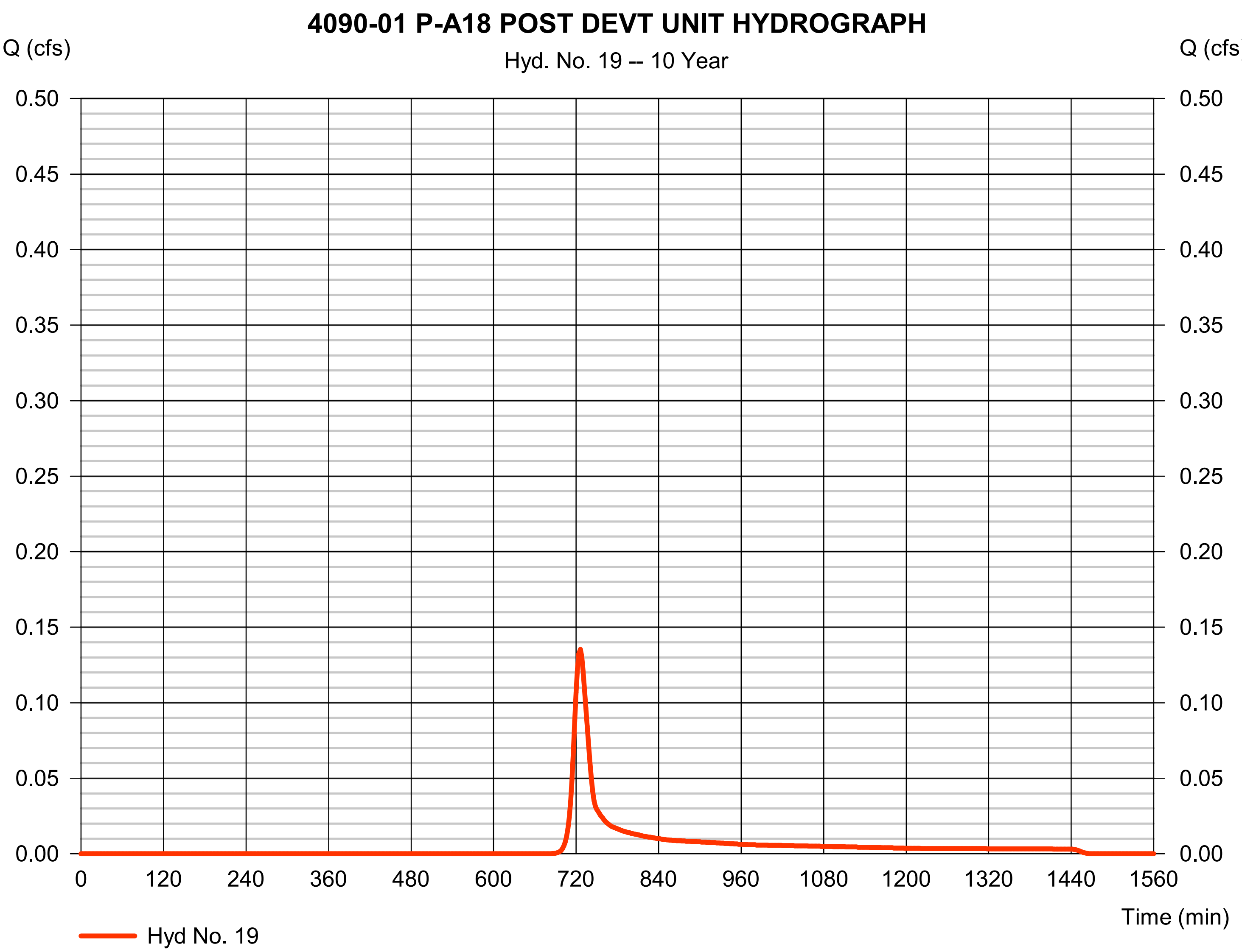
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Monday, 06 / 5 / 2023

Hyd. No. 19

4090-01 P-A18 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 0.135 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 462 cuft
Drainage area	= 0.200 ac	Curve number	= 77
Basin Slope	= 0.7 %	Hydraulic length	= 359 ft
Tc method	= LAG	Time of conc. (Tc)	= 18.37 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



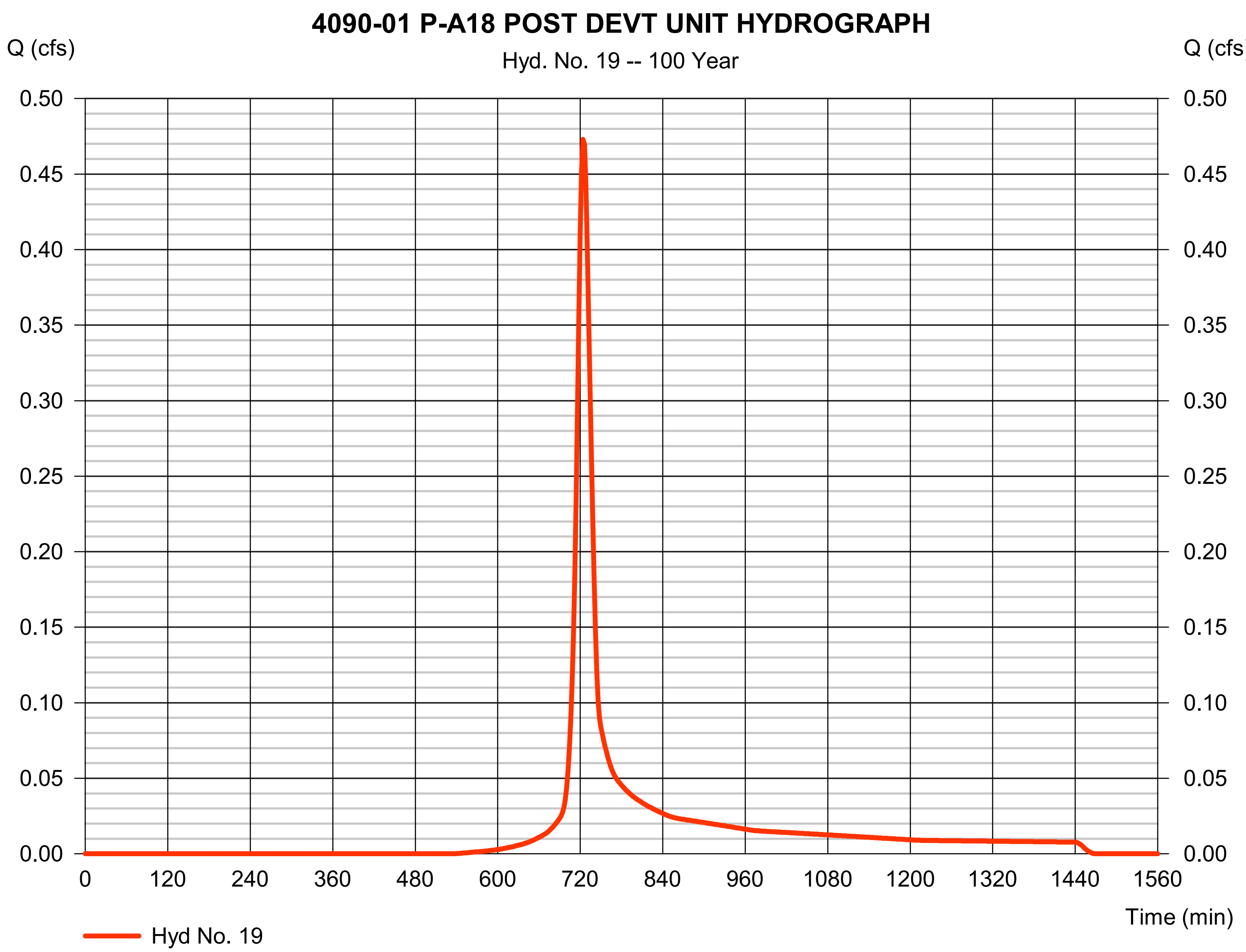
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 19

4090-01 P-A18 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 0.473 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 1,488 cuft
Drainage area	= 0.200 ac	Curve number	= 77
Basin Slope	= 0.7 %	Hydraulic length	= 359 ft
Tc method	= LAG	Time of conc. (Tc)	= 18.37 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

ne: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

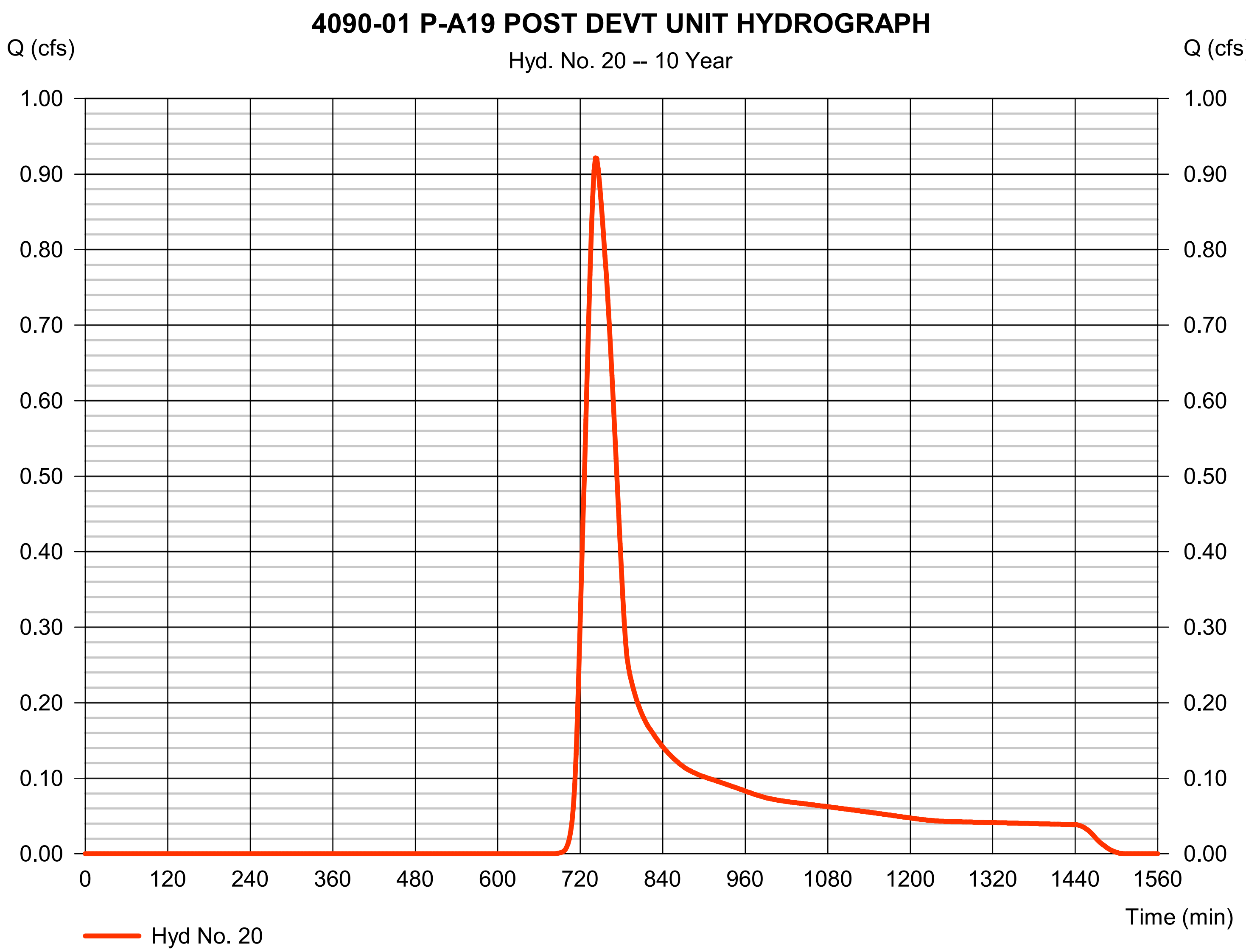
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 20

4090-01 P-A19 POST DEVT UNIT HYDROGRAPH

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.922 cfs
Storm frequency	=	10 yrs	Time to peak	=	742 min
Time interval	=	2 min	Hyd. volume	=	5,629 cuft
Drainage area	=	2.460 ac	Curve number	=	77
Basin Slope	=	0.5 %	Hydraulic length	=	918 ft
Tc method	=	LAG	Time of conc. (Tc)	=	45.61 min
Total precip.	=	2.33 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



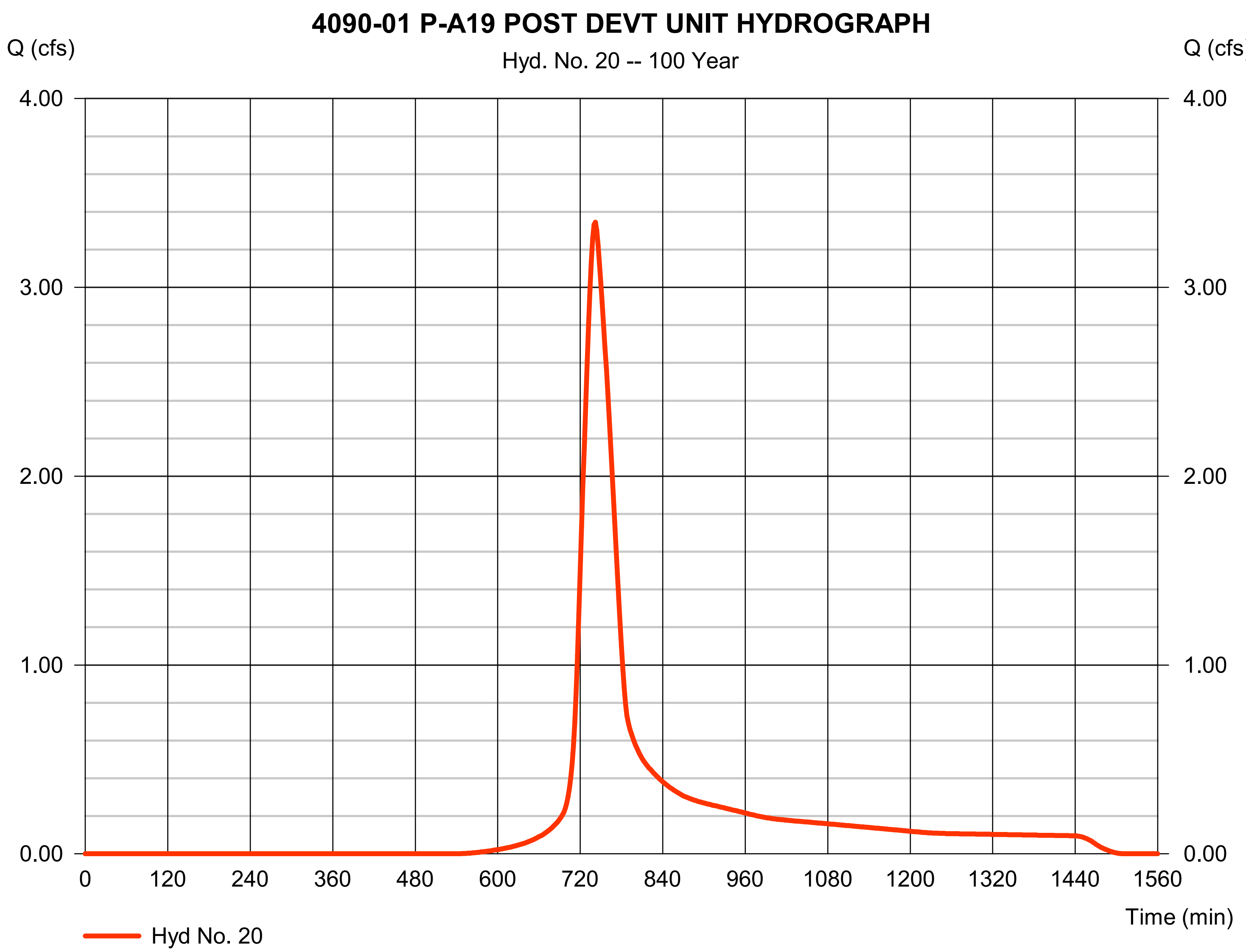
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 20

4090-01 P-A19 POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 3.345 cfs
Storm frequency	= 100 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 18,137 cuft
Drainage area	= 2.460 ac	Curve number	= 77
Basin Slope	= 0.5 %	Hydraulic length	= 918 ft
Tc method	= LAG	Time of conc. (Tc)	= 45.61 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

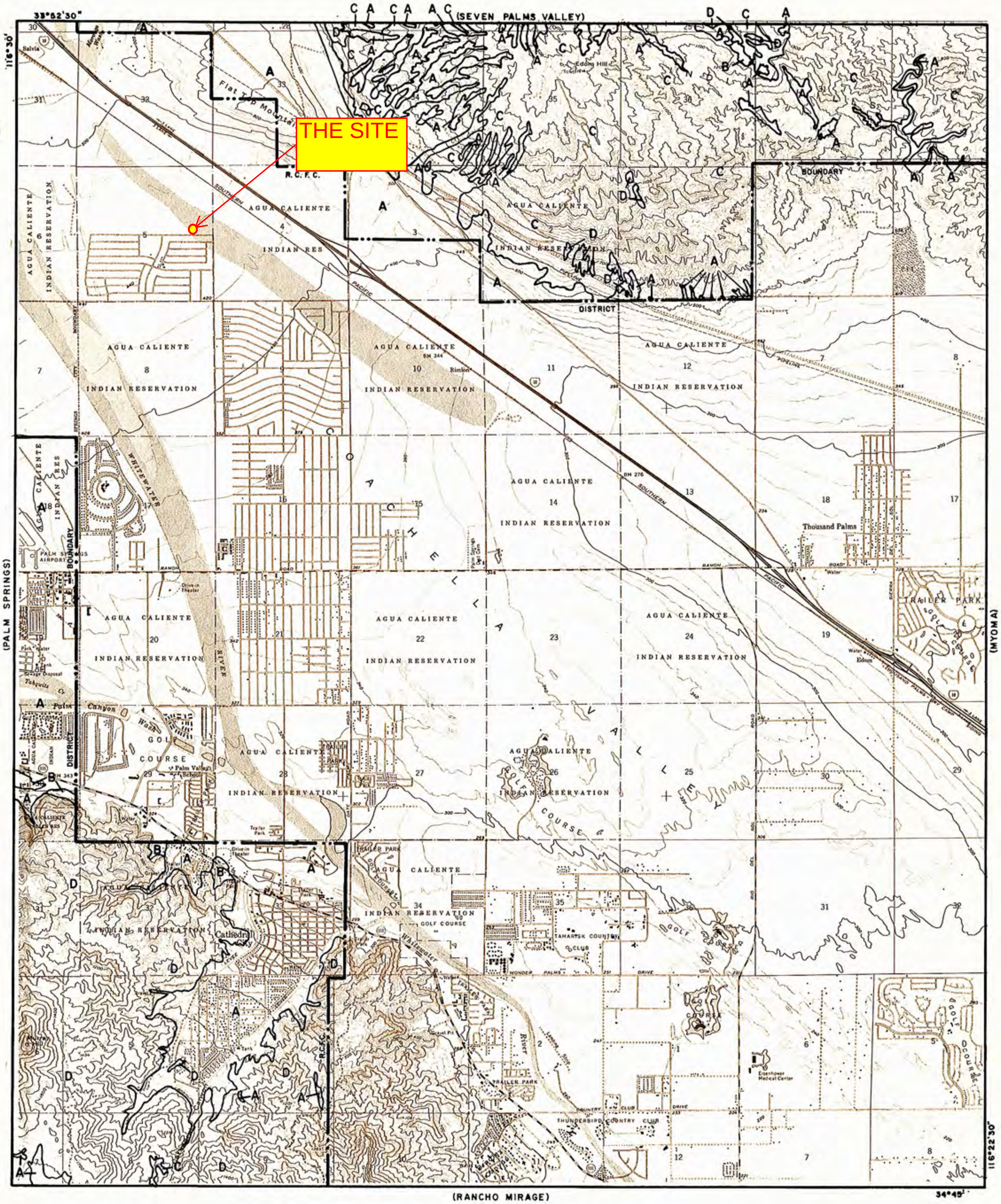
Tc = time in minutes. Values may exceed 60.

ne: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX 3

RCFC & WCD HYDROLOGIC SOIL MAP
(PLATE C-1.35)



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC & WCD

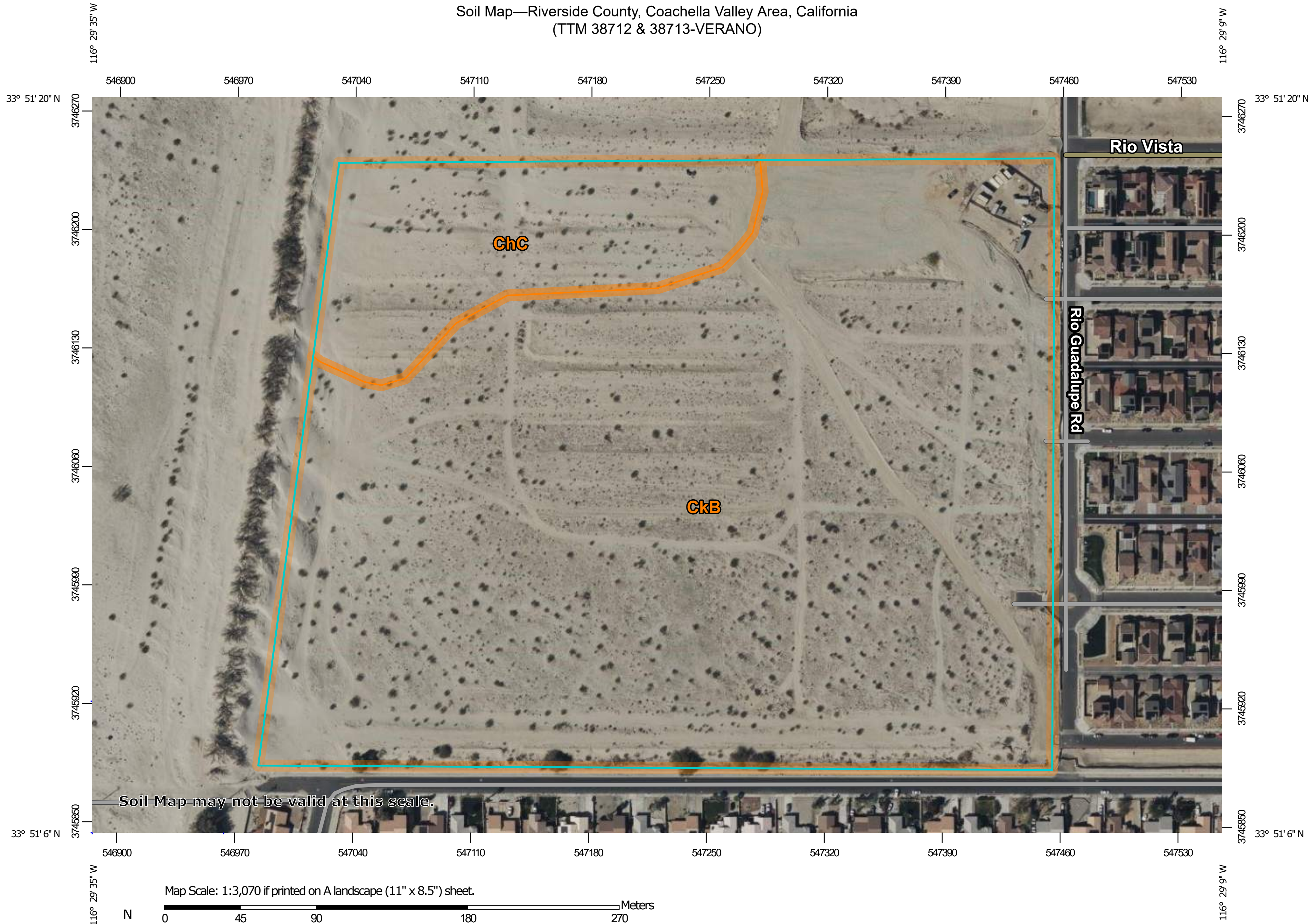
HYDROLOGY MANUAL

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR CATHEDRAL CITY

PLATE C-1.36

Soil Map—Riverside County, Coachella Valley Area, California
(TTM 38712 & 38713-VERANO)



Map Scale: 1:3,070 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 45, 90, 180, 270

Feet: 0, 100, 200, 400, 600

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 Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Riverside County, Coachella Valley Area, California
Survey Area Data: Version 14, Sep 1, 2022

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

Date(s) aerial images were photographed: Mar 15, 2022—May 28, 2022

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ChC	Carsitas cobbly sand, 2 to 9 percent slopes	5.6	14.1%
CkB	Carsitas fine sand, 0 to 5 percent slopes	34.3	85.9%
Totals for Area of Interest		**39.9**	**100.0%**

Riverside County, Coachella Valley Area, California

ChC—Carsitas cobbly sand, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hkv3
Elevation: 800 feet
Mean annual precipitation: 4 inches
Mean annual air temperature: 72 to 73 degrees F
Frost-free period: 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Carsitas and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carsitas

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium derived from granite

Typical profile

H1 - 0 to 10 inches: cobbly sand
H2 - 10 to 60 inches: gravelly sand

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): 6s
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R040XD200CA - Rarely Flooded Fans

Hydric soil rating: No

Minor Components

Chuckawalla

Percent of map unit: 4 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 4 percent
Landform: Channels
Hydric soil rating: Yes

Carrizo

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 3 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Riverside County, Coachella Valley Area, California
Survey Area Data: Version 14, Sep 1, 2022

Riverside County, Coachella Valley Area, California

CkB—Carsitas fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hkv4
Elevation: 800 feet
Mean annual precipitation: 4 inches
Mean annual air temperature: 72 to 73 degrees F
Frost-free period: 275 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Carsitas and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carsitas

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy alluvium derived from granite

Typical profile

H1 - 0 to 10 inches: fine sand
H2 - 10 to 60 inches: gravelly sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R040XD200CA - Rarely Flooded Fans

Hydric soil rating: No

Minor Components

Myoma

Percent of map unit: 10 percent
Hydric soil rating: No

Coachella

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed, gravel surface

Percent of map unit: 2 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Riverside County, Coachella Valley Area, California
Survey Area Data: Version 14, Sep 1, 2022

APPENDIX 4

HYDRAFLOW UNIT HYDROGRAPH CALCULATIONS
STORAGE REQUIREMENT, 100YR-24HR

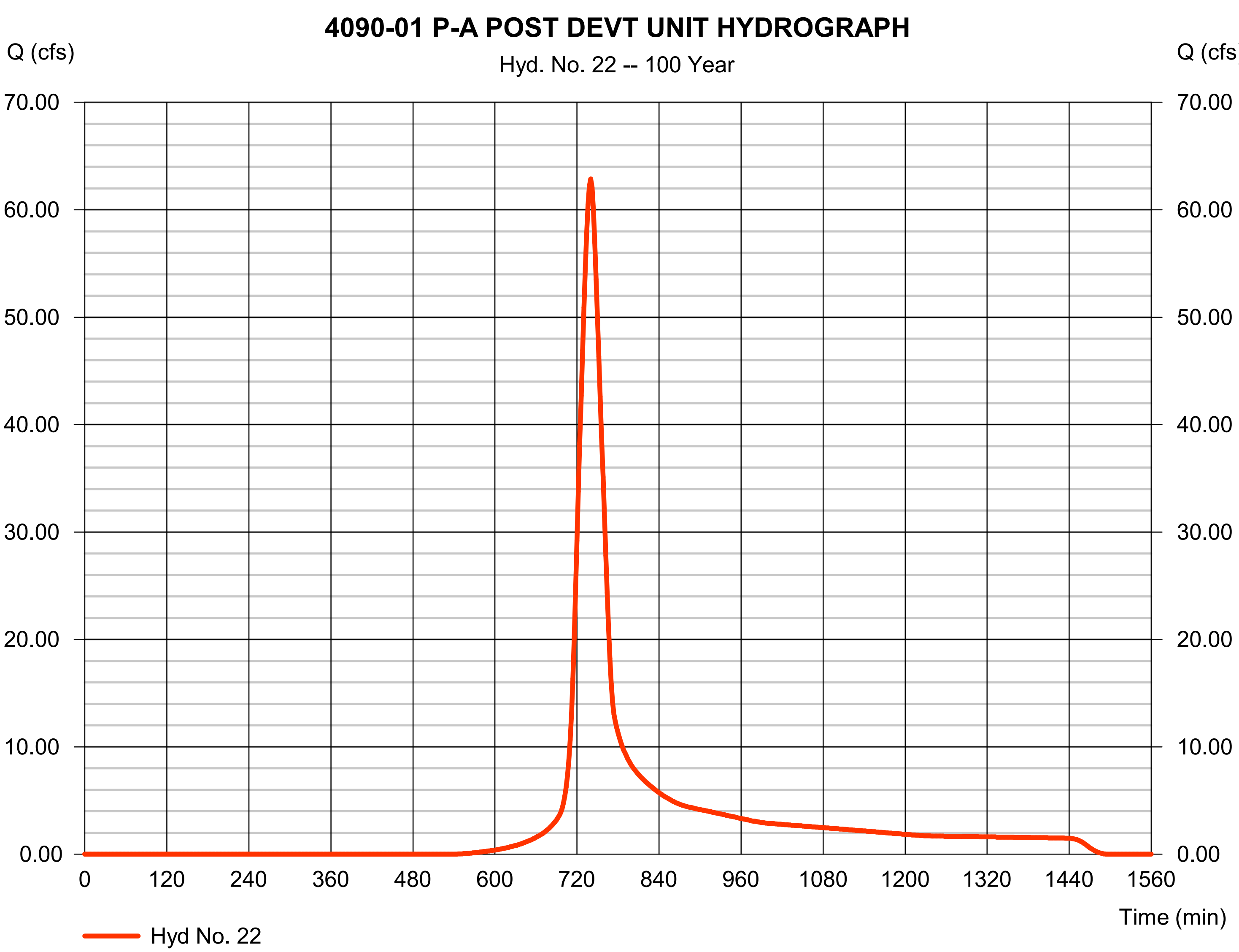
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Hyd. No. 22

4090-01 P-A POST DEVT UNIT HYDROGRAPH

Hydrograph type	= SCS Runoff	Peak discharge	= 62.87 cfs
Storm frequency	= 100 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 285,709 cuft
Drainage area	= 38.350 ac	Curve number	= 77
Basin Slope	= 2.2 %	Hydraulic length	= 2358 ft
Tc method	= LAG	Time of conc. (Tc)	= 47.25 min
Total precip.	= 4.30 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 624



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 06 / 5 / 2023

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

ne: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hydrograph Report

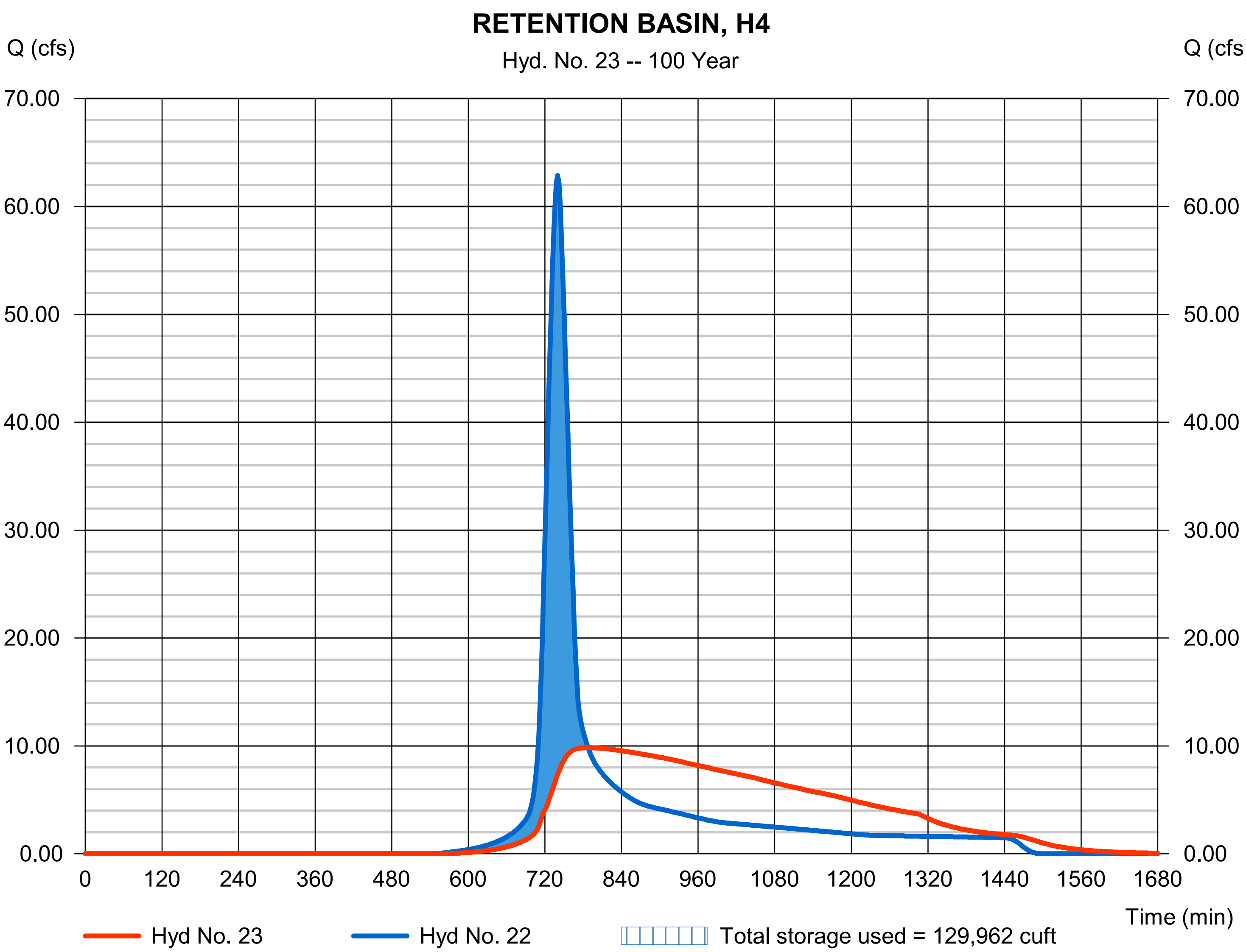
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Monday, 06 / 5 / 2023

Hyd. No. 23

RETENTION BASIN, H4

Hydrograph type	= Reservoir	Peak discharge	= 9.833 cfs
Storm frequency	= 100 yrs	Time to peak	= 788 min
Time interval	= 2 min	Hyd. volume	= 285,706 cuft
Inflow hyd. No.	= 22 - 4090-01 P-A POST DEVT UNIT HYDROGRAPH	Max. Elevation	= 454.56 ft
Reservoir name	= RETENTION BASIN,H4	Max. Storage	= 129,962 cuft

Storage Indication method used. Outflow includes exfiltration.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Monday, 06 / 5 / 2023

Pond No. 1 - RETENTION BASIN,H4

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 450.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	450.00	9,478	0	0
1.00	451.00	17,683	13,368	13,368
2.00	452.00	25,959	21,687	35,055
3.00	453.00	34,308	30,034	65,088
4.00	454.00	42,728	38,437	103,525
5.00	455.00	51,220	46,905	150,431

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 450.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 8.940 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	450.00	---	---	---	---	---	---	---	---	0.000	---	0.000
0.10	1,337	450.10	---	---	---	---	---	---	---	---	0.366	---	0.366
0.20	2,674	450.20	---	---	---	---	---	---	---	---	0.732	---	0.732
0.30	4,010	450.30	---	---	---	---	---	---	---	---	1.098	---	1.098
0.40	5,347	450.40	---	---	---	---	---	---	---	---	1.464	---	1.464
0.50	6,684	450.50	---	---	---	---	---	---	---	---	1.830	---	1.830
0.60	8,021	450.60	---	---	---	---	---	---	---	---	2.196	---	2.196
0.70	9,357	450.70	---	---	---	---	---	---	---	---	2.562	---	2.562
0.80	10,694	450.80	---	---	---	---	---	---	---	---	2.928	---	2.928
0.90	12,031	450.90	---	---	---	---	---	---	---	---	3.293	---	3.293
1.00	13,368	451.00	---	---	---	---	---	---	---	---	3.659	---	3.659
1.10	15,536	451.10	---	---	---	---	---	---	---	---	3.831	---	3.831
1.20	17,705	451.20	---	---	---	---	---	---	---	---	4.002	---	4.002
1.30	19,874	451.30	---	---	---	---	---	---	---	---	4.173	---	4.173
1.40	22,042	451.40	---	---	---	---	---	---	---	---	4.344	---	4.344
1.50	24,211	451.50	---	---	---	---	---	---	---	---	4.516	---	4.516
1.60	26,380	451.60	---	---	---	---	---	---	---	---	4.687	---	4.687
1.70	28,548	451.70	---	---	---	---	---	---	---	---	4.858	---	4.858
1.80	30,717	451.80	---	---	---	---	---	---	---	---	5.030	---	5.030
1.90	32,886	451.90	---	---	---	---	---	---	---	---	5.201	---	5.201
2.00	35,055	452.00	---	---	---	---	---	---	---	---	5.372	---	5.372
2.10	38,058	452.10	---	---	---	---	---	---	---	---	5.545	---	5.545
2.20	41,061	452.20	---	---	---	---	---	---	---	---	5.718	---	5.718
2.30	44,065	452.30	---	---	---	---	---	---	---	---	5.890	---	5.890
2.40	47,068	452.40	---	---	---	---	---	---	---	---	6.063	---	6.063
2.50	50,071	452.50	---	---	---	---	---	---	---	---	6.236	---	6.236
2.60	53,075	452.60	---	---	---	---	---	---	---	---	6.409	---	6.409
2.70	56,078	452.70	---	---	---	---	---	---	---	---	6.581	---	6.581
2.80	59,081	452.80	---	---	---	---	---	---	---	---	6.754	---	6.754
2.90	62,085	452.90	---	---	---	---	---	---	---	---	6.927	---	6.927
3.00	65,088	453.00	---	---	---	---	---	---	---	---	7.100	---	7.100
3.10	68,932	453.10	---	---	---	---	---	---	---	---	7.274	---	7.274
3.20	72,776	453.20	---	---	---	---	---	---	---	---	7.448	---	7.448
3.30	76,619	453.30	---	---	---	---	---	---	---	---	7.623	---	7.623
3.40	80,463	453.40	---	---	---	---	---	---	---	---	7.797	---	7.797
3.50	84,307	453.50	---	---	---	---	---	---	---	---	7.971	---	7.971
3.60	88,151	453.60	---	---	---	---	---	---	---	---	8.145	---	8.145

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RETENTION BASIN,H4

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
3.70	91,994	453.70	---	---	---	---	---	---	---	---	8.320	---	8.320
3.80	95,838	453.80	---	---	---	---	---	---	---	---	8.494	---	8.494
3.90	99,682	453.90	---	---	---	---	---	---	---	---	8.668	---	8.668
4.00	103,525	454.00	---	---	---	---	---	---	---	---	8.842	---	8.842
4.10	108,216	454.10	---	---	---	---	---	---	---	---	9.018	---	9.018
4.20	112,906	454.20	---	---	---	---	---	---	---	---	9.194	---	9.194
4.30	117,597	454.30	---	---	---	---	---	---	---	---	9.369	---	9.369
4.40	122,288	454.40	---	---	---	---	---	---	---	---	9.545	---	9.545
4.50	126,978	454.50	---	---	---	---	---	---	---	---	9.721	---	9.721
4.60	131,669	454.60	---	---	---	---	---	---	---	---	9.897	---	9.897
4.70	136,359	454.70	---	---	---	---	---	---	---	---	10.072	---	10.07
4.80	141,050	454.80	---	---	---	---	---	---	---	---	10.248	---	10.25
4.90	145,740	454.90	---	---	---	---	---	---	---	---	10.424	---	10.42
5.00	150,431	455.00	---	---	---	---	---	---	---	---	10.600	---	10.60

...End

Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	5.0994	0.1000	0.5670	--------
3	0.0000	0.0000	0.0000	--------
5	5.5223	0.1000	0.4686	--------
10	9.9784	0.1000	0.5666	--------
25	10.1229	0.1000	0.5206	--------
50	14.1968	0.1000	0.5656	--------
100	15.9941	0.1000	0.5621	--------

File name: 4090-01 Intensity.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.02	1.37	1.09	0.93	0.82	0.74	0.68	0.63	0.59	0.55	0.53	0.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.57	1.87	1.55	1.35	1.22	1.12	1.04	0.98	0.93	0.88	0.84	0.81
10	3.96	2.69	2.14	1.82	1.61	1.45	1.33	1.23	1.15	1.09	1.03	0.98
25	4.33	3.04	2.46	2.12	1.89	1.72	1.59	1.48	1.39	1.32	1.26	1.20
50	5.65	3.84	3.06	2.60	2.29	2.07	1.90	1.76	1.65	1.55	1.47	1.40
100	6.40	4.36	3.48	2.96	2.61	2.36	2.16	2.01	1.88	1.77	1.68	1.60

Tc = time in minutes. Values may exceed 60.

ne: F:\Projects\4090\001_Support Files\Reports\Hydrology\TTM - 38712 & 38713\Calculation\4090-01 Precipitation.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.28	0.00	2.04	2.33	3.18	4.00	4.30
SCS 6-Hr	0.00	0.82	0.00	1.13	1.28	1.83	2.11	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Monday, 06 / 5 / 2023

Hyd. No. 23

RETENTION BASIN, H4

Hydrograph type	= Reservoir	Peak discharge	= 9.833 cfs
Storm frequency	= 100 yrs	Time to peak	= 13.13 hrs
Time interval	= 2 min	Hyd. volume	= 285,706 cuft
Inflow hyd. No.	= 22 - 4090-01 P-A POST-DEV T UNIT HYDROGRAPH	Reservoir name	= RETENTION BASIN,H
Max. Elevation	= 454.56 ft	Max. Storage	= 129,962 cuft

Storage Indication method used. Outflow includes exfiltration.

Hydrograph Discharge Table

(Printed values >= 1.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
9.93	0.354	450.03	-----	-----	-----	-----	-----	-----	-----	-----	0.104	0.104
9.97	0.374	450.03	-----	-----	-----	-----	-----	-----	-----	-----	0.112	0.112
10.00	0.394	450.03	-----	-----	-----	-----	-----	-----	-----	-----	0.121	0.121
10.03	0.415	450.04	-----	-----	-----	-----	-----	-----	-----	-----	0.130	0.130
10.07	0.436	450.04	-----	-----	-----	-----	-----	-----	-----	-----	0.140	0.140
10.10	0.459	450.04	-----	-----	-----	-----	-----	-----	-----	-----	0.150	0.149
10.13	0.482	450.04	-----	-----	-----	-----	-----	-----	-----	-----	0.160	0.160
10.17	0.506	450.05	-----	-----	-----	-----	-----	-----	-----	-----	0.171	0.171
10.20	0.531	450.05	-----	-----	-----	-----	-----	-----	-----	-----	0.182	0.182
10.23	0.558	450.05	-----	-----	-----	-----	-----	-----	-----	-----	0.194	0.194
10.27	0.585	450.06	-----	-----	-----	-----	-----	-----	-----	-----	0.206	0.206
10.30	0.614	450.06	-----	-----	-----	-----	-----	-----	-----	-----	0.219	0.219
10.33	0.643	450.06	-----	-----	-----	-----	-----	-----	-----	-----	0.232	0.232
10.37	0.674	450.07	-----	-----	-----	-----	-----	-----	-----	-----	0.246	0.246
10.40	0.706	450.07	-----	-----	-----	-----	-----	-----	-----	-----	0.260	0.260
10.43	0.739	450.08	-----	-----	-----	-----	-----	-----	-----	-----	0.275	0.275
10.47	0.774	450.08	-----	-----	-----	-----	-----	-----	-----	-----	0.290	0.290
10.50	0.809	450.08	-----	-----	-----	-----	-----	-----	-----	-----	0.307	0.307
10.53	0.847	450.09	-----	-----	-----	-----	-----	-----	-----	-----	0.324	0.324
10.57	0.885	450.09	-----	-----	-----	-----	-----	-----	-----	-----	0.341	0.341

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RETENTION BASIN, H4

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
10.60	0.925	450.10	-----	-----	-----	-----	-----	-----	-----	-----	0.359	0.359
10.63	0.967	450.10	-----	-----	-----	-----	-----	-----	-----	-----	0.378	0.378
10.67	1.011	450.11	-----	-----	-----	-----	-----	-----	-----	-----	0.398	0.398
10.70	1.056	450.11	-----	-----	-----	-----	-----	-----	-----	-----	0.419	0.419
10.73	1.103	450.12	-----	-----	-----	-----	-----	-----	-----	-----	0.440	0.440
10.77	1.153	450.13	-----	-----	-----	-----	-----	-----	-----	-----	0.462	0.462
10.80	1.204	450.13	-----	-----	-----	-----	-----	-----	-----	-----	0.485	0.485
10.83	1.258	450.14	-----	-----	-----	-----	-----	-----	-----	-----	0.509	0.509
10.87	1.314	450.15	-----	-----	-----	-----	-----	-----	-----	-----	0.534	0.534
10.90	1.373	450.15	-----	-----	-----	-----	-----	-----	-----	-----	0.561	0.561
10.93	1.434	450.16	-----	-----	-----	-----	-----	-----	-----	-----	0.588	0.588
10.97	1.498	450.17	-----	-----	-----	-----	-----	-----	-----	-----	0.616	0.616
11.00	1.565	450.18	-----	-----	-----	-----	-----	-----	-----	-----	0.646	0.646
11.03	1.635	450.18	-----	-----	-----	-----	-----	-----	-----	-----	0.677	0.677
11.07	1.708	450.19	-----	-----	-----	-----	-----	-----	-----	-----	0.709	0.709
11.10	1.785	450.20	-----	-----	-----	-----	-----	-----	-----	-----	0.742	0.742
11.13	1.867	450.21	-----	-----	-----	-----	-----	-----	-----	-----	0.777	0.777
11.17	1.953	450.22	-----	-----	-----	-----	-----	-----	-----	-----	0.814	0.814
11.20	2.044	450.23	-----	-----	-----	-----	-----	-----	-----	-----	0.852	0.852
11.23	2.141	450.24	-----	-----	-----	-----	-----	-----	-----	-----	0.892	0.892
11.27	2.244	450.26	-----	-----	-----	-----	-----	-----	-----	-----	0.934	0.934
11.30	2.353	450.27	-----	-----	-----	-----	-----	-----	-----	-----	0.978	0.978
11.33	2.470	450.28	-----	-----	-----	-----	-----	-----	-----	-----	1.025	1.025
11.37	2.595	450.29	-----	-----	-----	-----	-----	-----	-----	-----	1.073	1.073
11.40	2.728	450.31	-----	-----	-----	-----	-----	-----	-----	-----	1.125	1.125
11.43	2.870	450.32	-----	-----	-----	-----	-----	-----	-----	-----	1.179	1.179
11.47	3.021	450.34	-----	-----	-----	-----	-----	-----	-----	-----	1.236	1.236
11.50	3.182	450.35	-----	-----	-----	-----	-----	-----	-----	-----	1.296	1.296

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RETENTION BASIN, H4

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
11.53	3.364	450.37	-----	-----	-----	-----	-----	-----	-----	-----	1.360	1.360
11.57	3.587	450.39	-----	-----	-----	-----	-----	-----	-----	-----	1.428	1.428
11.60	3.874	450.41	-----	-----	-----	-----	-----	-----	-----	-----	1.503	1.503
11.63	4.253	450.43	-----	-----	-----	-----	-----	-----	-----	-----	1.586	1.586
11.67	4.752	450.46	-----	-----	-----	-----	-----	-----	-----	-----	1.680	1.680
11.70	5.406	450.49	-----	-----	-----	-----	-----	-----	-----	-----	1.790	1.790
11.73	6.252	450.52	-----	-----	-----	-----	-----	-----	-----	-----	1.920	1.920
11.77	7.337	450.57	-----	-----	-----	-----	-----	-----	-----	-----	2.078	2.078
11.80	8.761	450.62	-----	-----	-----	-----	-----	-----	-----	-----	2.271	2.271
11.83	10.64	450.69	-----	-----	-----	-----	-----	-----	-----	-----	2.511	2.511
11.87	13.11	450.77	-----	-----	-----	-----	-----	-----	-----	-----	2.814	2.814
11.90	16.32	450.87	-----	-----	-----	-----	-----	-----	-----	-----	3.198	3.198
11.93	20.24	451.00	-----	-----	-----	-----	-----	-----	-----	-----	3.667	3.667
11.97	24.63	451.11	-----	-----	-----	-----	-----	-----	-----	-----	3.844	3.844
12.00	29.19	451.23	-----	-----	-----	-----	-----	-----	-----	-----	4.062	4.062
12.03	33.76	451.39	-----	-----	-----	-----	-----	-----	-----	-----	4.320	4.320
12.07	38.28	451.56	-----	-----	-----	-----	-----	-----	-----	-----	4.619	4.619
12.10	42.68	451.76	-----	-----	-----	-----	-----	-----	-----	-----	4.957	4.957
12.13	46.92	451.98	-----	-----	-----	-----	-----	-----	-----	-----	5.333	5.333
12.17	50.91	452.16	-----	-----	-----	-----	-----	-----	-----	-----	5.644	5.644
12.20	54.57	452.34	-----	-----	-----	-----	-----	-----	-----	-----	5.968	5.968
12.23	57.82	452.54	-----	-----	-----	-----	-----	-----	-----	-----	6.313	6.313
12.27	60.44	452.75	-----	-----	-----	-----	-----	-----	-----	-----	6.676	6.676
12.30	62.21	452.97	-----	-----	-----	-----	-----	-----	-----	-----	7.052	7.052
12.33	62.87 <<	453.15	-----	-----	-----	-----	-----	-----	-----	-----	7.363	7.363
12.37	62.10	453.32	-----	-----	-----	-----	-----	-----	-----	-----	7.662	7.662
12.40	59.97	453.49	-----	-----	-----	-----	-----	-----	-----	-----	7.952	7.952
12.43	56.93	453.65	-----	-----	-----	-----	-----	-----	-----	-----	8.226	8.226

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.47	53.50	453.79	-----	-----	-----	-----	-----	-----	-----	-----	8.481	8.481
12.50	49.95	453.93	-----	-----	-----	-----	-----	-----	-----	-----	8.716	8.716
12.53	46.31	454.04	-----	-----	-----	-----	-----	-----	-----	-----	8.914	8.914
12.57	42.59	454.13	-----	-----	-----	-----	-----	-----	-----	-----	9.074	9.074
12.60	38.85	454.21	-----	-----	-----	-----	-----	-----	-----	-----	9.216	9.216
12.63	35.11	454.28	-----	-----	-----	-----	-----	-----	-----	-----	9.340	9.340
12.67	31.42	454.34	-----	-----	-----	-----	-----	-----	-----	-----	9.448	9.448
12.70	27.81	454.40	-----	-----	-----	-----	-----	-----	-----	-----	9.538	9.538
12.73	24.34	454.44	-----	-----	-----	-----	-----	-----	-----	-----	9.612	9.612
12.77	21.12	454.47	-----	-----	-----	-----	-----	-----	-----	-----	9.671	9.671
12.80	18.25	454.50	-----	-----	-----	-----	-----	-----	-----	-----	9.716	9.716
12.83	15.88	454.52	-----	-----	-----	-----	-----	-----	-----	-----	9.749	9.749
12.87	14.15	454.53	-----	-----	-----	-----	-----	-----	-----	-----	9.773	9.773
12.90	13.04	454.54	-----	-----	-----	-----	-----	-----	-----	-----	9.790	9.790
12.93	12.34	454.55	-----	-----	-----	-----	-----	-----	-----	-----	9.803	9.803
12.97	11.81	454.55	-----	-----	-----	-----	-----	-----	-----	-----	9.813	9.813
13.00	11.33	454.56	-----	-----	-----	-----	-----	-----	-----	-----	9.821	9.821
13.03	10.88	454.56	-----	-----	-----	-----	-----	-----	-----	-----	9.827	9.827
13.07	10.47	454.56	-----	-----	-----	-----	-----	-----	-----	-----	9.830	9.830
13.10	10.09	454.56	-----	-----	-----	-----	-----	-----	-----	-----	9.832	9.832
13.13	9.749	454.56 <<	-----	-----	-----	-----	-----	-----	-----	-----	9.833	9.833 <<
13.17	9.437	454.56	-----	-----	-----	-----	-----	-----	-----	-----	9.832	9.832
13.20	9.152	454.56	-----	-----	-----	-----	-----	-----	-----	-----	9.829	9.829
13.23	8.893	454.56	-----	-----	-----	-----	-----	-----	-----	-----	9.826	9.826
13.27	8.656	454.56	-----	-----	-----	-----	-----	-----	-----	-----	9.821	9.821
13.30	8.440	454.55	-----	-----	-----	-----	-----	-----	-----	-----	9.815	9.815
13.33	8.242	454.55	-----	-----	-----	-----	-----	-----	-----	-----	9.809	9.809

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.37	8.059	454.55	-----	-----	-----	-----	-----	-----	-----	-----	9.801	9.801
13.40	7.888	454.54	-----	-----	-----	-----	-----	-----	-----	-----	9.793	9.793
13.43	7.728	454.54	-----	-----	-----	-----	-----	-----	-----	-----	9.784	9.784
13.47	7.575	454.53	-----	-----	-----	-----	-----	-----	-----	-----	9.774	9.774
13.50	7.428	454.52	-----	-----	-----	-----	-----	-----	-----	-----	9.764	9.764
13.53	7.286	454.52	-----	-----	-----	-----	-----	-----	-----	-----	9.753	9.753
13.57	7.150	454.51	-----	-----	-----	-----	-----	-----	-----	-----	9.742	9.742
13.60	7.018	454.51	-----	-----	-----	-----	-----	-----	-----	-----	9.730	9.730
13.63	6.891	454.50	-----	-----	-----	-----	-----	-----	-----	-----	9.718	9.718
13.67	6.769	454.49	-----	-----	-----	-----	-----	-----	-----	-----	9.705	9.705
13.70	6.651	454.48	-----	-----	-----	-----	-----	-----	-----	-----	9.691	9.691
13.73	6.537	454.48	-----	-----	-----	-----	-----	-----	-----	-----	9.677	9.677
13.77	6.427	454.47	-----	-----	-----	-----	-----	-----	-----	-----	9.663	9.663
13.80	6.320	454.46	-----	-----	-----	-----	-----	-----	-----	-----	9.648	9.648
13.83	6.216	454.45	-----	-----	-----	-----	-----	-----	-----	-----	9.633	9.633
13.87	6.115	454.44	-----	-----	-----	-----	-----	-----	-----	-----	9.618	9.618
13.90	6.017	454.43	-----	-----	-----	-----	-----	-----	-----	-----	9.602	9.602
13.93	5.921	454.42	-----	-----	-----	-----	-----	-----	-----	-----	9.585	9.585
13.97	5.828	454.41	-----	-----	-----	-----	-----	-----	-----	-----	9.569	9.569
14.00	5.736	454.40	-----	-----	-----	-----	-----	-----	-----	-----	9.552	9.552
14.03	5.646	454.39	-----	-----	-----	-----	-----	-----	-----	-----	9.534	9.534
14.07	5.559	454.38	-----	-----	-----	-----	-----	-----	-----	-----	9.517	9.517
14.10	5.473	454.37	-----	-----	-----	-----	-----	-----	-----	-----	9.499	9.499
14.13	5.390	454.36	-----	-----	-----	-----	-----	-----	-----	-----	9.481	9.481
14.17	5.309	454.35	-----	-----	-----	-----	-----	-----	-----	-----	9.462	9.462
14.20	5.230	454.34	-----	-----	-----	-----	-----	-----	-----	-----	9.443	9.443
14.23	5.155	454.33	-----	-----	-----	-----	-----	-----	-----	-----	9.424	9.424
14.27	5.082	454.32	-----	-----	-----	-----	-----	-----	-----	-----	9.405	9.405

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
14.30	5.012	454.31	-----	-----	-----	-----	-----	-----	-----	-----	9.385	9.385
14.33	4.945	454.30	-----	-----	-----	-----	-----	-----	-----	-----	9.366	9.366
14.37	4.881	454.29	-----	-----	-----	-----	-----	-----	-----	-----	9.346	9.346
14.40	4.820	454.27	-----	-----	-----	-----	-----	-----	-----	-----	9.325	9.325
14.43	4.763	454.26	-----	-----	-----	-----	-----	-----	-----	-----	9.305	9.305
14.47	4.710	454.25	-----	-----	-----	-----	-----	-----	-----	-----	9.285	9.285
14.50	4.659	454.24	-----	-----	-----	-----	-----	-----	-----	-----	9.264	9.264
14.53	4.613	454.23	-----	-----	-----	-----	-----	-----	-----	-----	9.243	9.243
14.57	4.569	454.22	-----	-----	-----	-----	-----	-----	-----	-----	9.222	9.222
14.60	4.527	454.20	-----	-----	-----	-----	-----	-----	-----	-----	9.201	9.201
14.63	4.489	454.19	-----	-----	-----	-----	-----	-----	-----	-----	9.180	9.180
14.67	4.452	454.18	-----	-----	-----	-----	-----	-----	-----	-----	9.159	9.159
14.70	4.418	454.17	-----	-----	-----	-----	-----	-----	-----	-----	9.138	9.138
14.73	4.385	454.16	-----	-----	-----	-----	-----	-----	-----	-----	9.117	9.117
14.77	4.354	454.14	-----	-----	-----	-----	-----	-----	-----	-----	9.095	9.095
14.80	4.325	454.13	-----	-----	-----	-----	-----	-----	-----	-----	9.074	9.074
14.83	4.296	454.12	-----	-----	-----	-----	-----	-----	-----	-----	9.053	9.053
14.87	4.268	454.11	-----	-----	-----	-----	-----	-----	-----	-----	9.031	9.031
14.90	4.241	454.10	-----	-----	-----	-----	-----	-----	-----	-----	9.010	9.010
14.93	4.214	454.08	-----	-----	-----	-----	-----	-----	-----	-----	8.988	8.988
14.97	4.187	454.07	-----	-----	-----	-----	-----	-----	-----	-----	8.967	8.967
15.00	4.160	454.06	-----	-----	-----	-----	-----	-----	-----	-----	8.945	8.945
15.03	4.133	454.05	-----	-----	-----	-----	-----	-----	-----	-----	8.924	8.924
15.07	4.105	454.03	-----	-----	-----	-----	-----	-----	-----	-----	8.902	8.902
15.10	4.078	454.02	-----	-----	-----	-----	-----	-----	-----	-----	8.881	8.881
15.13	4.051	454.01	-----	-----	-----	-----	-----	-----	-----	-----	8.859	8.859
15.17	4.024	454.00	-----	-----	-----	-----	-----	-----	-----	-----	8.837	8.837
15.20	3.997	453.98	-----	-----	-----	-----	-----	-----	-----	-----	8.810	8.810

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
15.23	3.969	453.97	-----	-----	-----	-----	-----	-----	-----	-----	8.784	8.784
15.27	3.942	453.95	-----	-----	-----	-----	-----	-----	-----	-----	8.758	8.758
15.30	3.914	453.94	-----	-----	-----	-----	-----	-----	-----	-----	8.732	8.732
15.33	3.887	453.92	-----	-----	-----	-----	-----	-----	-----	-----	8.706	8.706
15.37	3.859	453.91	-----	-----	-----	-----	-----	-----	-----	-----	8.679	8.679
15.40	3.832	453.89	-----	-----	-----	-----	-----	-----	-----	-----	8.653	8.653
15.43	3.804	453.88	-----	-----	-----	-----	-----	-----	-----	-----	8.627	8.627
15.47	3.776	453.86	-----	-----	-----	-----	-----	-----	-----	-----	8.601	8.601
15.50	3.749	453.85	-----	-----	-----	-----	-----	-----	-----	-----	8.574	8.574
15.53	3.721	453.83	-----	-----	-----	-----	-----	-----	-----	-----	8.548	8.548
15.57	3.693	453.82	-----	-----	-----	-----	-----	-----	-----	-----	8.522	8.522
15.60	3.665	453.80	-----	-----	-----	-----	-----	-----	-----	-----	8.496	8.496
15.63	3.637	453.79	-----	-----	-----	-----	-----	-----	-----	-----	8.469	8.469
15.67	3.610	453.77	-----	-----	-----	-----	-----	-----	-----	-----	8.443	8.443
15.70	3.582	453.76	-----	-----	-----	-----	-----	-----	-----	-----	8.417	8.417
15.73	3.554	453.74	-----	-----	-----	-----	-----	-----	-----	-----	8.390	8.390
15.77	3.526	453.73	-----	-----	-----	-----	-----	-----	-----	-----	8.364	8.364
15.80	3.497	453.71	-----	-----	-----	-----	-----	-----	-----	-----	8.338	8.338
15.83	3.469	453.70	-----	-----	-----	-----	-----	-----	-----	-----	8.311	8.312
15.87	3.441	453.68	-----	-----	-----	-----	-----	-----	-----	-----	8.285	8.285
15.90	3.413	453.67	-----	-----	-----	-----	-----	-----	-----	-----	8.259	8.259
15.93	3.385	453.65	-----	-----	-----	-----	-----	-----	-----	-----	8.232	8.232
15.97	3.356	453.63	-----	-----	-----	-----	-----	-----	-----	-----	8.206	8.206
16.00	3.328	453.62	-----	-----	-----	-----	-----	-----	-----	-----	8.180	8.180
16.03	3.300	453.60	-----	-----	-----	-----	-----	-----	-----	-----	8.153	8.153
16.07	3.272	453.59	-----	-----	-----	-----	-----	-----	-----	-----	8.127	8.127
16.10	3.244	453.57	-----	-----	-----	-----	-----	-----	-----	-----	8.100	8.100
16.13	3.216	453.56	-----	-----	-----	-----	-----	-----	-----	-----	8.074	8.074

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
16.17	3.189	453.54	-----	-----	-----	-----	-----	-----	-----	-----	8.048	8.048
16.20	3.162	453.53	-----	-----	-----	-----	-----	-----	-----	-----	8.021	8.021
16.23	3.136	453.51	-----	-----	-----	-----	-----	-----	-----	-----	7.995	7.995
16.27	3.110	453.50	-----	-----	-----	-----	-----	-----	-----	-----	7.968	7.968
16.30	3.085	453.48	-----	-----	-----	-----	-----	-----	-----	-----	7.942	7.942
16.33	3.061	453.47	-----	-----	-----	-----	-----	-----	-----	-----	7.915	7.915
16.37	3.038	453.45	-----	-----	-----	-----	-----	-----	-----	-----	7.889	7.889
16.40	3.016	453.44	-----	-----	-----	-----	-----	-----	-----	-----	7.863	7.863
16.43	2.996	453.42	-----	-----	-----	-----	-----	-----	-----	-----	7.836	7.836
16.47	2.976	453.41	-----	-----	-----	-----	-----	-----	-----	-----	7.810	7.810
16.50	2.958	453.39	-----	-----	-----	-----	-----	-----	-----	-----	7.784	7.784
16.53	2.941	453.38	-----	-----	-----	-----	-----	-----	-----	-----	7.758	7.758
16.57	2.925	453.36	-----	-----	-----	-----	-----	-----	-----	-----	7.731	7.731
16.60	2.910	453.35	-----	-----	-----	-----	-----	-----	-----	-----	7.705	7.705
16.63	2.896	453.33	-----	-----	-----	-----	-----	-----	-----	-----	7.679	7.679
16.67	2.882	453.32	-----	-----	-----	-----	-----	-----	-----	-----	7.653	7.653
16.70	2.870	453.30	-----	-----	-----	-----	-----	-----	-----	-----	7.627	7.627
16.73	2.858	453.29	-----	-----	-----	-----	-----	-----	-----	-----	7.601	7.601
16.77	2.847	453.27	-----	-----	-----	-----	-----	-----	-----	-----	7.576	7.576
16.80	2.836	453.26	-----	-----	-----	-----	-----	-----	-----	-----	7.550	7.550
16.83	2.825	453.24	-----	-----	-----	-----	-----	-----	-----	-----	7.524	7.524
16.87	2.815	453.23	-----	-----	-----	-----	-----	-----	-----	-----	7.499	7.499
16.90	2.805	453.21	-----	-----	-----	-----	-----	-----	-----	-----	7.473	7.473
16.93	2.795	453.20	-----	-----	-----	-----	-----	-----	-----	-----	7.448	7.448
16.97	2.785	453.19	-----	-----	-----	-----	-----	-----	-----	-----	7.423	7.423
17.00	2.775	453.17	-----	-----	-----	-----	-----	-----	-----	-----	7.398	7.398
17.03	2.766	453.16	-----	-----	-----	-----	-----	-----	-----	-----	7.373	7.373
17.07	2.756	453.14	-----	-----	-----	-----	-----	-----	-----	-----	7.347	7.347

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
17.10	2.746	453.13	-----	-----	-----	-----	-----	-----	-----	-----	7.323	7.323
17.13	2.736	453.11	-----	-----	-----	-----	-----	-----	-----	-----	7.298	7.298
17.17	2.726	453.10	-----	-----	-----	-----	-----	-----	-----	-----	7.273	7.273
17.20	2.716	453.09	-----	-----	-----	-----	-----	-----	-----	-----	7.248	7.248
17.23	2.706	453.07	-----	-----	-----	-----	-----	-----	-----	-----	7.224	7.224
17.27	2.696	453.06	-----	-----	-----	-----	-----	-----	-----	-----	7.199	7.199
17.30	2.686	453.04	-----	-----	-----	-----	-----	-----	-----	-----	7.175	7.175
17.33	2.676	453.03	-----	-----	-----	-----	-----	-----	-----	-----	7.150	7.150
17.37	2.666	453.02	-----	-----	-----	-----	-----	-----	-----	-----	7.126	7.126
17.40	2.656	453.00	-----	-----	-----	-----	-----	-----	-----	-----	7.102	7.102
17.43	2.646	452.98	-----	-----	-----	-----	-----	-----	-----	-----	7.072	7.072
17.47	2.636	452.97	-----	-----	-----	-----	-----	-----	-----	-----	7.041	7.041
17.50	2.626	452.95	-----	-----	-----	-----	-----	-----	-----	-----	7.011	7.011
17.53	2.616	452.93	-----	-----	-----	-----	-----	-----	-----	-----	6.981	6.981
17.57	2.606	452.91	-----	-----	-----	-----	-----	-----	-----	-----	6.951	6.951
17.60	2.596	452.90	-----	-----	-----	-----	-----	-----	-----	-----	6.921	6.921
17.63	2.586	452.88	-----	-----	-----	-----	-----	-----	-----	-----	6.891	6.891
17.67	2.576	452.86	-----	-----	-----	-----	-----	-----	-----	-----	6.861	6.861
17.70	2.566	452.84	-----	-----	-----	-----	-----	-----	-----	-----	6.832	6.832
17.73	2.556	452.83	-----	-----	-----	-----	-----	-----	-----	-----	6.802	6.802
17.77	2.546	452.81	-----	-----	-----	-----	-----	-----	-----	-----	6.773	6.773
17.80	2.536	452.79	-----	-----	-----	-----	-----	-----	-----	-----	6.744	6.744
17.83	2.526	452.78	-----	-----	-----	-----	-----	-----	-----	-----	6.715	6.715
17.87	2.516	452.76	-----	-----	-----	-----	-----	-----	-----	-----	6.686	6.686
17.90	2.506	452.74	-----	-----	-----	-----	-----	-----	-----	-----	6.657	6.657
17.93	2.496	452.73	-----	-----	-----	-----	-----	-----	-----	-----	6.629	6.629
17.97	2.485	452.71	-----	-----	-----	-----	-----	-----	-----	-----	6.600	6.600
18.00	2.475	452.69	-----	-----	-----	-----	-----	-----	-----	-----	6.572	6.572

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RETENTION BASIN, H4

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
18.03	2.465	452.68	-----	-----	-----	-----	-----	-----	-----	-----	6.544	6.544
18.07	2.455	452.66	-----	-----	-----	-----	-----	-----	-----	-----	6.516	6.516
18.10	2.445	452.65	-----	-----	-----	-----	-----	-----	-----	-----	6.488	6.488
18.13	2.435	452.63	-----	-----	-----	-----	-----	-----	-----	-----	6.460	6.460
18.17	2.424	452.61	-----	-----	-----	-----	-----	-----	-----	-----	6.432	6.432
18.20	2.414	452.60	-----	-----	-----	-----	-----	-----	-----	-----	6.405	6.405
18.23	2.404	452.58	-----	-----	-----	-----	-----	-----	-----	-----	6.377	6.377
18.27	2.394	452.57	-----	-----	-----	-----	-----	-----	-----	-----	6.350	6.350
18.30	2.384	452.55	-----	-----	-----	-----	-----	-----	-----	-----	6.322	6.322
18.33	2.373	452.53	-----	-----	-----	-----	-----	-----	-----	-----	6.295	6.295
18.37	2.363	452.52	-----	-----	-----	-----	-----	-----	-----	-----	6.268	6.268
18.40	2.353	452.50	-----	-----	-----	-----	-----	-----	-----	-----	6.241	6.241
18.43	2.343	452.49	-----	-----	-----	-----	-----	-----	-----	-----	6.215	6.215
18.47	2.332	452.47	-----	-----	-----	-----	-----	-----	-----	-----	6.188	6.188
18.50	2.322	452.46	-----	-----	-----	-----	-----	-----	-----	-----	6.161	6.161
18.53	2.312	452.44	-----	-----	-----	-----	-----	-----	-----	-----	6.135	6.135
18.57	2.301	452.43	-----	-----	-----	-----	-----	-----	-----	-----	6.109	6.109
18.60	2.291	452.41	-----	-----	-----	-----	-----	-----	-----	-----	6.082	6.082
18.63	2.281	452.40	-----	-----	-----	-----	-----	-----	-----	-----	6.056	6.056
18.67	2.271	452.38	-----	-----	-----	-----	-----	-----	-----	-----	6.030	6.030
18.70	2.260	452.37	-----	-----	-----	-----	-----	-----	-----	-----	6.004	6.004
18.73	2.250	452.35	-----	-----	-----	-----	-----	-----	-----	-----	5.979	5.979
18.77	2.240	452.34	-----	-----	-----	-----	-----	-----	-----	-----	5.953	5.953
18.80	2.229	452.32	-----	-----	-----	-----	-----	-----	-----	-----	5.927	5.927
18.83	2.219	452.31	-----	-----	-----	-----	-----	-----	-----	-----	5.902	5.902
18.87	2.209	452.29	-----	-----	-----	-----	-----	-----	-----	-----	5.876	5.876
18.90	2.198	452.28	-----	-----	-----	-----	-----	-----	-----	-----	5.851	5.851
18.93	2.188	452.26	-----	-----	-----	-----	-----	-----	-----	-----	5.826	5.826

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
18.97	2.177	452.25	-----	-----	-----	-----	-----	-----	-----	-----	5.801	5.801
19.00	2.167	452.23	-----	-----	-----	-----	-----	-----	-----	-----	5.776	5.776
19.03	2.157	452.22	-----	-----	-----	-----	-----	-----	-----	-----	5.751	5.751
19.07	2.146	452.21	-----	-----	-----	-----	-----	-----	-----	-----	5.726	5.726
19.10	2.136	452.19	-----	-----	-----	-----	-----	-----	-----	-----	5.702	5.702
19.13	2.125	452.18	-----	-----	-----	-----	-----	-----	-----	-----	5.677	5.677
19.17	2.115	452.16	-----	-----	-----	-----	-----	-----	-----	-----	5.653	5.653
19.20	2.105	452.15	-----	-----	-----	-----	-----	-----	-----	-----	5.628	5.628
19.23	2.094	452.13	-----	-----	-----	-----	-----	-----	-----	-----	5.604	5.604
19.27	2.084	452.12	-----	-----	-----	-----	-----	-----	-----	-----	5.580	5.580
19.30	2.073	452.11	-----	-----	-----	-----	-----	-----	-----	-----	5.556	5.556
19.33	2.063	452.09	-----	-----	-----	-----	-----	-----	-----	-----	5.532	5.532
19.37	2.052	452.08	-----	-----	-----	-----	-----	-----	-----	-----	5.508	5.508
19.40	2.042	452.06	-----	-----	-----	-----	-----	-----	-----	-----	5.484	5.484
19.43	2.031	452.05	-----	-----	-----	-----	-----	-----	-----	-----	5.460	5.460
19.47	2.021	452.04	-----	-----	-----	-----	-----	-----	-----	-----	5.437	5.437
19.50	2.010	452.02	-----	-----	-----	-----	-----	-----	-----	-----	5.413	5.413
19.53	2.000	452.01	-----	-----	-----	-----	-----	-----	-----	-----	5.390	5.390
19.57	1.989	452.00	-----	-----	-----	-----	-----	-----	-----	-----	5.364	5.364
19.60	1.979	451.98	-----	-----	-----	-----	-----	-----	-----	-----	5.332	5.332
19.63	1.968	451.96	-----	-----	-----	-----	-----	-----	-----	-----	5.301	5.301
19.67	1.958	451.94	-----	-----	-----	-----	-----	-----	-----	-----	5.269	5.269
19.70	1.947	451.92	-----	-----	-----	-----	-----	-----	-----	-----	5.238	5.238
19.73	1.937	451.90	-----	-----	-----	-----	-----	-----	-----	-----	5.207	5.207
19.77	1.926	451.89	-----	-----	-----	-----	-----	-----	-----	-----	5.176	5.176
19.80	1.916	451.87	-----	-----	-----	-----	-----	-----	-----	-----	5.145	5.145
19.83	1.905	451.85	-----	-----	-----	-----	-----	-----	-----	-----	5.115	5.115
19.87	1.895	451.83	-----	-----	-----	-----	-----	-----	-----	-----	5.084	5.084

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
19.90	1.884	451.81	-----	-----	-----	-----	-----	-----	-----	-----	5.054	5.054
19.93	1.873	451.80	-----	-----	-----	-----	-----	-----	-----	-----	5.024	5.024
19.97	1.863	451.78	-----	-----	-----	-----	-----	-----	-----	-----	4.994	4.994
20.00	1.852	451.76	-----	-----	-----	-----	-----	-----	-----	-----	4.965	4.965
20.03	1.842	451.75	-----	-----	-----	-----	-----	-----	-----	-----	4.935	4.935
20.07	1.831	451.73	-----	-----	-----	-----	-----	-----	-----	-----	4.906	4.906
20.10	1.821	451.71	-----	-----	-----	-----	-----	-----	-----	-----	4.877	4.877
20.13	1.810	451.69	-----	-----	-----	-----	-----	-----	-----	-----	4.848	4.848
20.17	1.800	451.68	-----	-----	-----	-----	-----	-----	-----	-----	4.820	4.820
20.20	1.791	451.66	-----	-----	-----	-----	-----	-----	-----	-----	4.791	4.791
20.23	1.781	451.64	-----	-----	-----	-----	-----	-----	-----	-----	4.763	4.763
20.27	1.772	451.63	-----	-----	-----	-----	-----	-----	-----	-----	4.735	4.735
20.30	1.763	451.61	-----	-----	-----	-----	-----	-----	-----	-----	4.707	4.707
20.33	1.754	451.60	-----	-----	-----	-----	-----	-----	-----	-----	4.679	4.679
20.37	1.746	451.58	-----	-----	-----	-----	-----	-----	-----	-----	4.651	4.651
20.40	1.739	451.56	-----	-----	-----	-----	-----	-----	-----	-----	4.624	4.624
20.43	1.732	451.55	-----	-----	-----	-----	-----	-----	-----	-----	4.597	4.596
20.47	1.725	451.53	-----	-----	-----	-----	-----	-----	-----	-----	4.569	4.569
20.50	1.719	451.52	-----	-----	-----	-----	-----	-----	-----	-----	4.543	4.543
20.53	1.714	451.50	-----	-----	-----	-----	-----	-----	-----	-----	4.516	4.516
20.57	1.709	451.48	-----	-----	-----	-----	-----	-----	-----	-----	4.489	4.489
20.60	1.705	451.47	-----	-----	-----	-----	-----	-----	-----	-----	4.463	4.463
20.63	1.701	451.45	-----	-----	-----	-----	-----	-----	-----	-----	4.437	4.437
20.67	1.697	451.44	-----	-----	-----	-----	-----	-----	-----	-----	4.411	4.411
20.70	1.694	451.42	-----	-----	-----	-----	-----	-----	-----	-----	4.386	4.386
20.73	1.691	451.41	-----	-----	-----	-----	-----	-----	-----	-----	4.360	4.360
20.77	1.689	451.39	-----	-----	-----	-----	-----	-----	-----	-----	4.335	4.335
20.80	1.686	451.38	-----	-----	-----	-----	-----	-----	-----	-----	4.310	4.310

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
20.83	1.684	451.37	-----	-----	-----	-----	-----	-----	-----	-----	4.285	4.285
20.87	1.682	451.35	-----	-----	-----	-----	-----	-----	-----	-----	4.261	4.261
20.90	1.680	451.34	-----	-----	-----	-----	-----	-----	-----	-----	4.237	4.237
20.93	1.678	451.32	-----	-----	-----	-----	-----	-----	-----	-----	4.212	4.212
20.97	1.676	451.31	-----	-----	-----	-----	-----	-----	-----	-----	4.189	4.189
21.00	1.674	451.30	-----	-----	-----	-----	-----	-----	-----	-----	4.165	4.165
21.03	1.672	451.28	-----	-----	-----	-----	-----	-----	-----	-----	4.141	4.141
21.07	1.670	451.27	-----	-----	-----	-----	-----	-----	-----	-----	4.118	4.118
21.10	1.668	451.25	-----	-----	-----	-----	-----	-----	-----	-----	4.095	4.095
21.13	1.666	451.24	-----	-----	-----	-----	-----	-----	-----	-----	4.072	4.072
21.17	1.664	451.23	-----	-----	-----	-----	-----	-----	-----	-----	4.049	4.049
21.20	1.662	451.21	-----	-----	-----	-----	-----	-----	-----	-----	4.027	4.027
21.23	1.660	451.20	-----	-----	-----	-----	-----	-----	-----	-----	4.005	4.005
21.27	1.658	451.19	-----	-----	-----	-----	-----	-----	-----	-----	3.982	3.982
21.30	1.657	451.18	-----	-----	-----	-----	-----	-----	-----	-----	3.960	3.960
21.33	1.655	451.16	-----	-----	-----	-----	-----	-----	-----	-----	3.939	3.939
21.37	1.653	451.15	-----	-----	-----	-----	-----	-----	-----	-----	3.917	3.917
21.40	1.651	451.14	-----	-----	-----	-----	-----	-----	-----	-----	3.896	3.896
21.43	1.649	451.13	-----	-----	-----	-----	-----	-----	-----	-----	3.875	3.875
21.47	1.647	451.11	-----	-----	-----	-----	-----	-----	-----	-----	3.854	3.854
21.50	1.645	451.10	-----	-----	-----	-----	-----	-----	-----	-----	3.833	3.833
21.53	1.643	451.09	-----	-----	-----	-----	-----	-----	-----	-----	3.812	3.812
21.57	1.641	451.08	-----	-----	-----	-----	-----	-----	-----	-----	3.792	3.792
21.60	1.639	451.07	-----	-----	-----	-----	-----	-----	-----	-----	3.771	3.771
21.63	1.637	451.05	-----	-----	-----	-----	-----	-----	-----	-----	3.751	3.751
21.67	1.635	451.04	-----	-----	-----	-----	-----	-----	-----	-----	3.731	3.731
21.70	1.633	451.03	-----	-----	-----	-----	-----	-----	-----	-----	3.712	3.712
21.73	1.631	451.02	-----	-----	-----	-----	-----	-----	-----	-----	3.692	3.692

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RETENTION BASIN, H4

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
21.77	1.629	451.01	-----	-----	-----	-----	-----	-----	-----	-----	3.672	3.672
21.80	1.627	450.99	-----	-----	-----	-----	-----	-----	-----	-----	3.638	3.638
21.83	1.625	450.98	-----	-----	-----	-----	-----	-----	-----	-----	3.573	3.573
21.87	1.623	450.96	-----	-----	-----	-----	-----	-----	-----	-----	3.510	3.510
21.90	1.621	450.94	-----	-----	-----	-----	-----	-----	-----	-----	3.449	3.449
21.93	1.619	450.93	-----	-----	-----	-----	-----	-----	-----	-----	3.390	3.390
21.97	1.617	450.91	-----	-----	-----	-----	-----	-----	-----	-----	3.333	3.333
22.00	1.615	450.90	-----	-----	-----	-----	-----	-----	-----	-----	3.277	3.277
22.03	1.613	450.88	-----	-----	-----	-----	-----	-----	-----	-----	3.223	3.223
22.07	1.611	450.87	-----	-----	-----	-----	-----	-----	-----	-----	3.171	3.171
22.10	1.609	450.85	-----	-----	-----	-----	-----	-----	-----	-----	3.121	3.121
22.13	1.607	450.84	-----	-----	-----	-----	-----	-----	-----	-----	3.072	3.072
22.17	1.605	450.83	-----	-----	-----	-----	-----	-----	-----	-----	3.025	3.025
22.20	1.603	450.81	-----	-----	-----	-----	-----	-----	-----	-----	2.979	2.979
22.23	1.601	450.80	-----	-----	-----	-----	-----	-----	-----	-----	2.934	2.934
22.27	1.599	450.79	-----	-----	-----	-----	-----	-----	-----	-----	2.891	2.891
22.30	1.597	450.78	-----	-----	-----	-----	-----	-----	-----	-----	2.849	2.849
22.33	1.595	450.77	-----	-----	-----	-----	-----	-----	-----	-----	2.809	2.809
22.37	1.593	450.76	-----	-----	-----	-----	-----	-----	-----	-----	2.770	2.770
22.40	1.591	450.75	-----	-----	-----	-----	-----	-----	-----	-----	2.732	2.732
22.43	1.589	450.74	-----	-----	-----	-----	-----	-----	-----	-----	2.695	2.695
22.47	1.587	450.73	-----	-----	-----	-----	-----	-----	-----	-----	2.659	2.659
22.50	1.586	450.72	-----	-----	-----	-----	-----	-----	-----	-----	2.624	2.624
22.53	1.584	450.71	-----	-----	-----	-----	-----	-----	-----	-----	2.591	2.591
22.57	1.582	450.70	-----	-----	-----	-----	-----	-----	-----	-----	2.558	2.558
22.60	1.580	450.69	-----	-----	-----	-----	-----	-----	-----	-----	2.526	2.527
22.63	1.578	450.68	-----	-----	-----	-----	-----	-----	-----	-----	2.496	2.496
22.67	1.576	450.67	-----	-----	-----	-----	-----	-----	-----	-----	2.466	2.466

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RETENTION BASIN, H4

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
22.70	1.574	450.67	-----	-----	-----	-----	-----	-----	-----	-----	2.437	2.437
22.73	1.572	450.66	-----	-----	-----	-----	-----	-----	-----	-----	2.409	2.409
22.77	1.570	450.65	-----	-----	-----	-----	-----	-----	-----	-----	2.382	2.382
22.80	1.568	450.64	-----	-----	-----	-----	-----	-----	-----	-----	2.356	2.356
22.83	1.566	450.64	-----	-----	-----	-----	-----	-----	-----	-----	2.331	2.331
22.87	1.564	450.63	-----	-----	-----	-----	-----	-----	-----	-----	2.306	2.306
22.90	1.562	450.62	-----	-----	-----	-----	-----	-----	-----	-----	2.282	2.282
22.93	1.559	450.62	-----	-----	-----	-----	-----	-----	-----	-----	2.258	2.258
22.97	1.557	450.61	-----	-----	-----	-----	-----	-----	-----	-----	2.236	2.236
23.00	1.555	450.60	-----	-----	-----	-----	-----	-----	-----	-----	2.214	2.214
23.03	1.553	450.60	-----	-----	-----	-----	-----	-----	-----	-----	2.192	2.193
23.07	1.551	450.59	-----	-----	-----	-----	-----	-----	-----	-----	2.172	2.172
23.10	1.549	450.59	-----	-----	-----	-----	-----	-----	-----	-----	2.152	2.152
23.13	1.547	450.58	-----	-----	-----	-----	-----	-----	-----	-----	2.132	2.132
23.17	1.545	450.58	-----	-----	-----	-----	-----	-----	-----	-----	2.113	2.113
23.20	1.543	450.57	-----	-----	-----	-----	-----	-----	-----	-----	2.095	2.095
23.23	1.541	450.57	-----	-----	-----	-----	-----	-----	-----	-----	2.077	2.077
23.27	1.539	450.56	-----	-----	-----	-----	-----	-----	-----	-----	2.060	2.060
23.30	1.537	450.56	-----	-----	-----	-----	-----	-----	-----	-----	2.043	2.043
23.33	1.535	450.55	-----	-----	-----	-----	-----	-----	-----	-----	2.027	2.027
23.37	1.533	450.55	-----	-----	-----	-----	-----	-----	-----	-----	2.011	2.011
23.40	1.531	450.55	-----	-----	-----	-----	-----	-----	-----	-----	1.995	1.995
23.43	1.529	450.54	-----	-----	-----	-----	-----	-----	-----	-----	1.980	1.980
23.47	1.527	450.54	-----	-----	-----	-----	-----	-----	-----	-----	1.966	1.966
23.50	1.525	450.53	-----	-----	-----	-----	-----	-----	-----	-----	1.951	1.951
23.53	1.523	450.53	-----	-----	-----	-----	-----	-----	-----	-----	1.938	1.938
23.57	1.521	450.53	-----	-----	-----	-----	-----	-----	-----	-----	1.924	1.924
23.60	1.519	450.52	-----	-----	-----	-----	-----	-----	-----	-----	1.911	1.911

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
23.63	1.517	450.52	-----	-----	-----	-----	-----	-----	-----	-----	1.898	1.898
23.67	1.515	450.52	-----	-----	-----	-----	-----	-----	-----	-----	1.886	1.886
23.70	1.513	450.51	-----	-----	-----	-----	-----	-----	-----	-----	1.874	1.874
23.73	1.511	450.51	-----	-----	-----	-----	-----	-----	-----	-----	1.862	1.862
23.77	1.509	450.51	-----	-----	-----	-----	-----	-----	-----	-----	1.851	1.851
23.80	1.507	450.50	-----	-----	-----	-----	-----	-----	-----	-----	1.840	1.840
23.83	1.505	450.50	-----	-----	-----	-----	-----	-----	-----	-----	1.829	1.829
23.87	1.503	450.50	-----	-----	-----	-----	-----	-----	-----	-----	1.819	1.819
23.90	1.501	450.49	-----	-----	-----	-----	-----	-----	-----	-----	1.808	1.808
23.93	1.499	450.49	-----	-----	-----	-----	-----	-----	-----	-----	1.798	1.798
23.97	1.497	450.49	-----	-----	-----	-----	-----	-----	-----	-----	1.789	1.789
24.00	1.495	450.49	-----	-----	-----	-----	-----	-----	-----	-----	1.779	1.779
24.03	1.486	450.48	-----	-----	-----	-----	-----	-----	-----	-----	1.770	1.770
24.07	1.469	450.48	-----	-----	-----	-----	-----	-----	-----	-----	1.760	1.760
24.10	1.445	450.48	-----	-----	-----	-----	-----	-----	-----	-----	1.751	1.751
24.13	1.415	450.48	-----	-----	-----	-----	-----	-----	-----	-----	1.740	1.740
24.17	1.377	450.47	-----	-----	-----	-----	-----	-----	-----	-----	1.729	1.729
24.20	1.331	450.47	-----	-----	-----	-----	-----	-----	-----	-----	1.717	1.717
24.23	1.279	450.47	-----	-----	-----	-----	-----	-----	-----	-----	1.704	1.704
24.27	1.219	450.46	-----	-----	-----	-----	-----	-----	-----	-----	1.689	1.689
24.30	1.153	450.46	-----	-----	-----	-----	-----	-----	-----	-----	1.673	1.673
24.33	1.079	450.45	-----	-----	-----	-----	-----	-----	-----	-----	1.655	1.655
24.37	0.998	450.45	-----	-----	-----	-----	-----	-----	-----	-----	1.635	1.635
24.40	0.910	450.44	-----	-----	-----	-----	-----	-----	-----	-----	1.613	1.613
24.43	0.815	450.43	-----	-----	-----	-----	-----	-----	-----	-----	1.589	1.589
24.47	0.713	450.43	-----	-----	-----	-----	-----	-----	-----	-----	1.562	1.562
24.50	0.617	450.42	-----	-----	-----	-----	-----	-----	-----	-----	1.533	1.533
24.53	0.529	450.41	-----	-----	-----	-----	-----	-----	-----	-----	1.502	1.502

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
24.57	0.447	450.40	-----	-----	-----	-----	-----	-----	-----	-----	1.469	1.469
24.60	0.373	450.39	-----	-----	-----	-----	-----	-----	-----	-----	1.435	1.435
24.63	0.305	450.38	-----	-----	-----	-----	-----	-----	-----	-----	1.399	1.399
24.67	0.244	450.37	-----	-----	-----	-----	-----	-----	-----	-----	1.363	1.363
24.70	0.189	450.36	-----	-----	-----	-----	-----	-----	-----	-----	1.326	1.326
24.73	0.142	450.35	-----	-----	-----	-----	-----	-----	-----	-----	1.289	1.289
24.77	0.101	450.34	-----	-----	-----	-----	-----	-----	-----	-----	1.251	1.251
24.80	0.068	450.33	-----	-----	-----	-----	-----	-----	-----	-----	1.213	1.213
24.83	0.041	450.32	-----	-----	-----	-----	-----	-----	-----	-----	1.176	1.176
24.87	0.020	450.31	-----	-----	-----	-----	-----	-----	-----	-----	1.139	1.139
24.90	0.007	450.30	-----	-----	-----	-----	-----	-----	-----	-----	1.102	1.102
24.93	0.000	450.29	-----	-----	-----	-----	-----	-----	-----	-----	1.067	1.067
24.97	0.000	450.28	-----	-----	-----	-----	-----	-----	-----	-----	1.032	1.032
25.00	0.000	450.27	-----	-----	-----	-----	-----	-----	-----	-----	0.999	0.999
25.03	0.000	450.26	-----	-----	-----	-----	-----	-----	-----	-----	0.967	0.967
25.07	0.000	450.26	-----	-----	-----	-----	-----	-----	-----	-----	0.935	0.935
25.10	0.000	450.25	-----	-----	-----	-----	-----	-----	-----	-----	0.905	0.905
25.13	0.000	450.24	-----	-----	-----	-----	-----	-----	-----	-----	0.876	0.876
25.17	0.000	450.23	-----	-----	-----	-----	-----	-----	-----	-----	0.848	0.848
25.20	0.000	450.22	-----	-----	-----	-----	-----	-----	-----	-----	0.820	0.820
25.23	0.000	450.22	-----	-----	-----	-----	-----	-----	-----	-----	0.794	0.794
25.27	0.000	450.21	-----	-----	-----	-----	-----	-----	-----	-----	0.768	0.768
25.30	0.000	450.20	-----	-----	-----	-----	-----	-----	-----	-----	0.743	0.743
25.33	0.000	450.20	-----	-----	-----	-----	-----	-----	-----	-----	0.719	0.719
25.37	0.000	450.19	-----	-----	-----	-----	-----	-----	-----	-----	0.696	0.696
25.40	0.000	450.18	-----	-----	-----	-----	-----	-----	-----	-----	0.673	0.673
25.43	0.000	450.18	-----	-----	-----	-----	-----	-----	-----	-----	0.652	0.652
25.47	0.000	450.17	-----	-----	-----	-----	-----	-----	-----	-----	0.631	0.631

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
25.50	0.000	450.17	-----	-----	-----	-----	-----	-----	-----	-----	0.610	0.610
25.53	0.000	450.16	-----	-----	-----	-----	-----	-----	-----	-----	0.591	0.591
25.57	0.000	450.16	-----	-----	-----	-----	-----	-----	-----	-----	0.572	0.571
25.60	0.000	450.15	-----	-----	-----	-----	-----	-----	-----	-----	0.553	0.553
25.63	0.000	450.15	-----	-----	-----	-----	-----	-----	-----	-----	0.535	0.535
25.67	0.000	450.14	-----	-----	-----	-----	-----	-----	-----	-----	0.518	0.518
25.70	0.000	450.14	-----	-----	-----	-----	-----	-----	-----	-----	0.501	0.501
25.73	0.000	450.13	-----	-----	-----	-----	-----	-----	-----	-----	0.485	0.485
25.77	0.000	450.13	-----	-----	-----	-----	-----	-----	-----	-----	0.469	0.469
25.80	0.000	450.12	-----	-----	-----	-----	-----	-----	-----	-----	0.454	0.454
25.83	0.000	450.12	-----	-----	-----	-----	-----	-----	-----	-----	0.439	0.439
25.87	0.000	450.12	-----	-----	-----	-----	-----	-----	-----	-----	0.425	0.425
25.90	0.000	450.11	-----	-----	-----	-----	-----	-----	-----	-----	0.411	0.411
25.93	0.000	450.11	-----	-----	-----	-----	-----	-----	-----	-----	0.398	0.398
25.97	0.000	450.11	-----	-----	-----	-----	-----	-----	-----	-----	0.385	0.385
26.00	0.000	450.10	-----	-----	-----	-----	-----	-----	-----	-----	0.373	0.373
26.03	0.000	450.10	-----	-----	-----	-----	-----	-----	-----	-----	0.361	0.361
26.07	0.000	450.10	-----	-----	-----	-----	-----	-----	-----	-----	0.349	0.349
26.10	0.000	450.09	-----	-----	-----	-----	-----	-----	-----	-----	0.338	0.338
26.13	0.000	450.09	-----	-----	-----	-----	-----	-----	-----	-----	0.327	0.327
26.17	0.000	450.09	-----	-----	-----	-----	-----	-----	-----	-----	0.316	0.316
26.20	0.000	450.08	-----	-----	-----	-----	-----	-----	-----	-----	0.306	0.306
26.23	0.000	450.08	-----	-----	-----	-----	-----	-----	-----	-----	0.296	0.296
26.27	0.000	450.08	-----	-----	-----	-----	-----	-----	-----	-----	0.287	0.287
26.30	0.000	450.08	-----	-----	-----	-----	-----	-----	-----	-----	0.277	0.277
26.33	0.000	450.07	-----	-----	-----	-----	-----	-----	-----	-----	0.268	0.268
26.37	0.000	450.07	-----	-----	-----	-----	-----	-----	-----	-----	0.260	0.260
26.40	0.000	450.07	-----	-----	-----	-----	-----	-----	-----	-----	0.251	0.251

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
26.43	0.000	450.07	-----	-----	-----	-----	-----	-----	-----	-----	0.243	0.243
26.47	0.000	450.06	-----	-----	-----	-----	-----	-----	-----	-----	0.235	0.235
26.50	0.000	450.06	-----	-----	-----	-----	-----	-----	-----	-----	0.228	0.228
26.53	0.000	450.06	-----	-----	-----	-----	-----	-----	-----	-----	0.220	0.220
26.57	0.000	450.06	-----	-----	-----	-----	-----	-----	-----	-----	0.213	0.213
26.60	0.000	450.06	-----	-----	-----	-----	-----	-----	-----	-----	0.206	0.206
26.63	0.000	450.05	-----	-----	-----	-----	-----	-----	-----	-----	0.200	0.200
26.67	0.000	450.05	-----	-----	-----	-----	-----	-----	-----	-----	0.193	0.193
26.70	0.000	450.05	-----	-----	-----	-----	-----	-----	-----	-----	0.187	0.187
26.73	0.000	450.05	-----	-----	-----	-----	-----	-----	-----	-----	0.181	0.181
26.77	0.000	450.05	-----	-----	-----	-----	-----	-----	-----	-----	0.175	0.175
26.80	0.000	450.05	-----	-----	-----	-----	-----	-----	-----	-----	0.170	0.169
26.83	0.000	450.04	-----	-----	-----	-----	-----	-----	-----	-----	0.164	0.164
26.87	0.000	450.04	-----	-----	-----	-----	-----	-----	-----	-----	0.159	0.159
26.90	0.000	450.04	-----	-----	-----	-----	-----	-----	-----	-----	0.154	0.154
26.93	0.000	450.04	-----	-----	-----	-----	-----	-----	-----	-----	0.149	0.149
26.97	0.000	450.04	-----	-----	-----	-----	-----	-----	-----	-----	0.144	0.144
27.00	0.000	450.04	-----	-----	-----	-----	-----	-----	-----	-----	0.139	0.139
27.03	0.000	450.04	-----	-----	-----	-----	-----	-----	-----	-----	0.135	0.135
27.07	0.000	450.04	-----	-----	-----	-----	-----	-----	-----	-----	0.130	0.130
27.10	0.000	450.03	-----	-----	-----	-----	-----	-----	-----	-----	0.126	0.126
27.13	0.000	450.03	-----	-----	-----	-----	-----	-----	-----	-----	0.122	0.122
27.17	0.000	450.03	-----	-----	-----	-----	-----	-----	-----	-----	0.118	0.118
27.20	0.000	450.03	-----	-----	-----	-----	-----	-----	-----	-----	0.114	0.114
27.23	0.000	450.03	-----	-----	-----	-----	-----	-----	-----	-----	0.111	0.111
27.27	0.000	450.03	-----	-----	-----	-----	-----	-----	-----	-----	0.107	0.107
27.30	0.000	450.03	-----	-----	-----	-----	-----	-----	-----	-----	0.104	0.104
27.33	0.000	450.03	-----	-----	-----	-----	-----	-----	-----	-----	0.100	0.100

...End

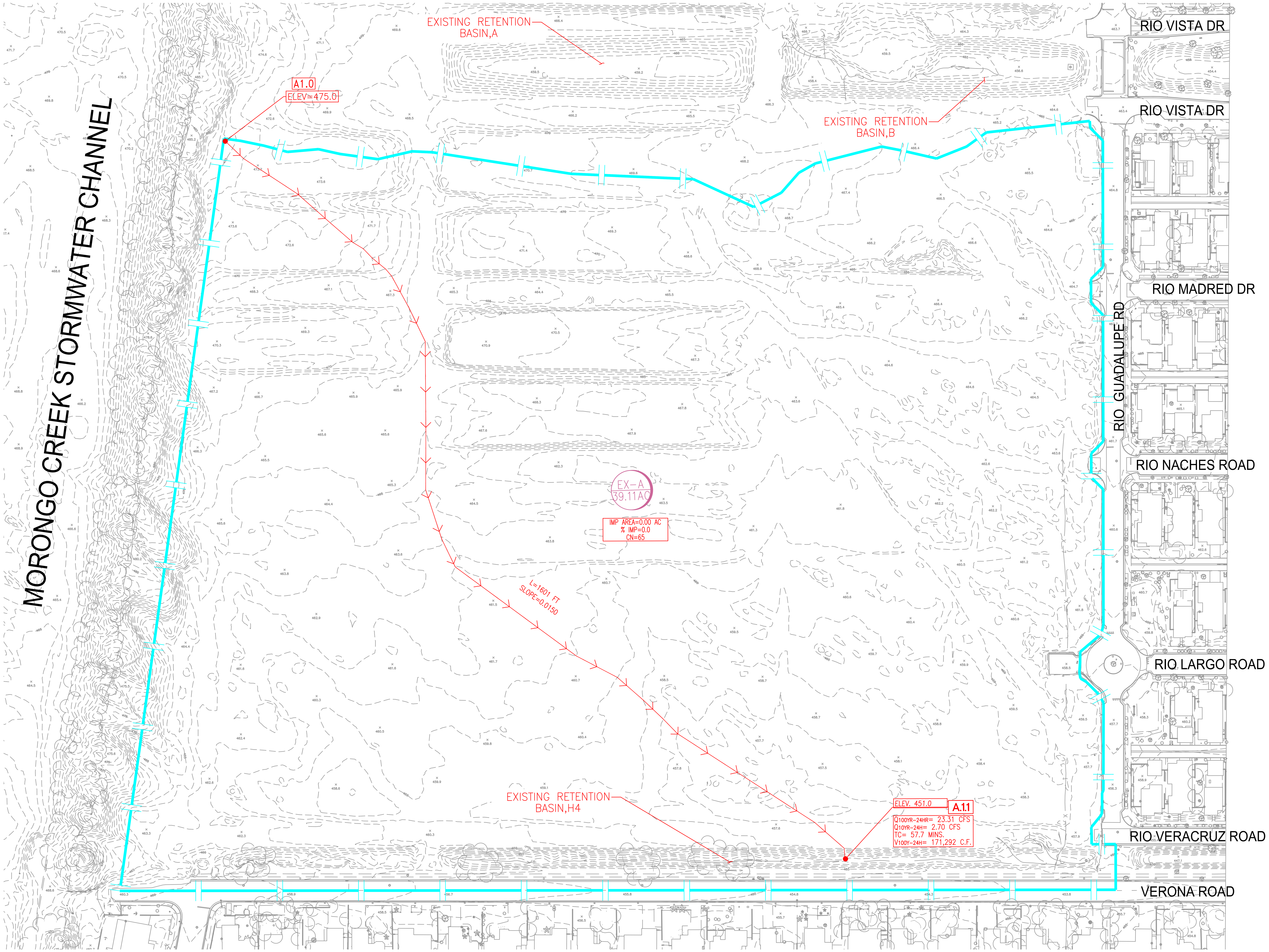
APPENDIX 5

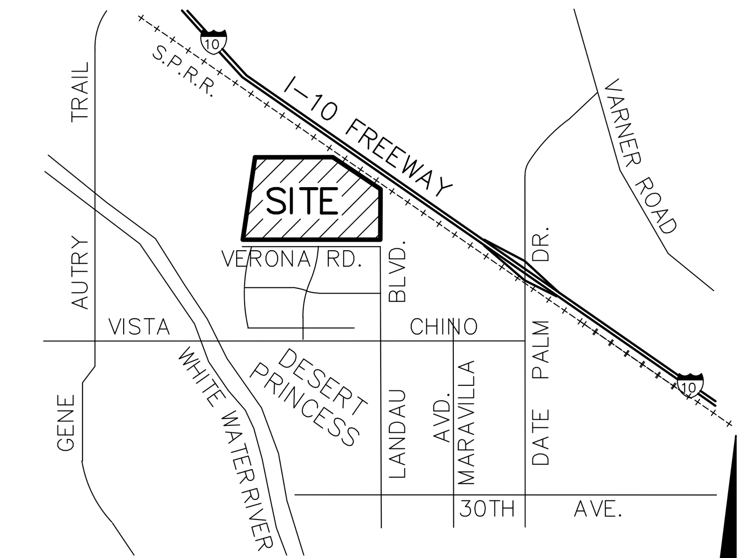
PRE/POST DEVELOPMENT HYDROLOGY MAPS
POST DEVELOPMENT UNIT HYDROGRAPH MAP
STORM DRAIN & CATCH BASIN EXHIBIT

PRE-DEVELOPMENT DRAINAGE MAP

CATHEDRAL CITY, CA

TTM - 38712 & 38713





VICINITY MAP

NOT TO SCALE

ASSESSORS PARCEL NUMBERS:

APN: 677-050-031, 677-050-032

OWNER/DEVELOPER:

NCP VERANO, LLC
690 E GREEN STREET, SUITE 200
PASADENA, CA 91101
(323)874-8000

CIVIL ENGINEER:

FUSCOE ENGEERING, INC.
2850 INLAND EMPIRE BLVD, SUITE B
ONTARIO, CA 91764
(909)581-0676

LEGEND

AREA BOUNDARY

SUB AREA

DA

AC

SUB-AREA (ACRES)

AREA NODE

FLOW

DRAINAGE AREA SUMMARY				
DRAINAGE AREA	AREA, AC	IMPERVIOUS AREA, AC	% IMP	CN
EX-A	39.11	0.00	0.00	65

80' 0' 40' 80'

SCALE: 1" = 80'

PREPARED BY:

JUNE, 2023

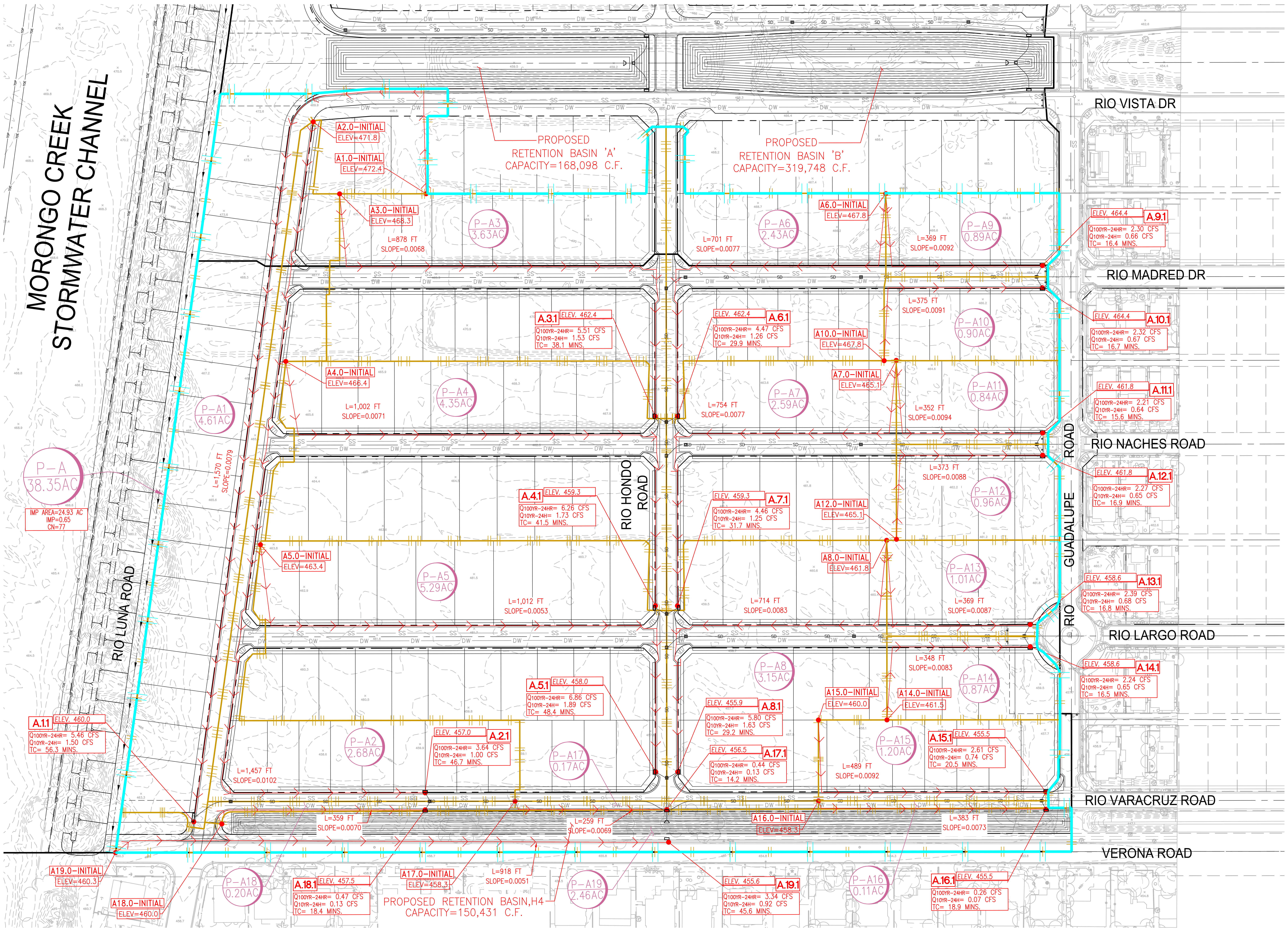
FUSCOE ENGINEERING

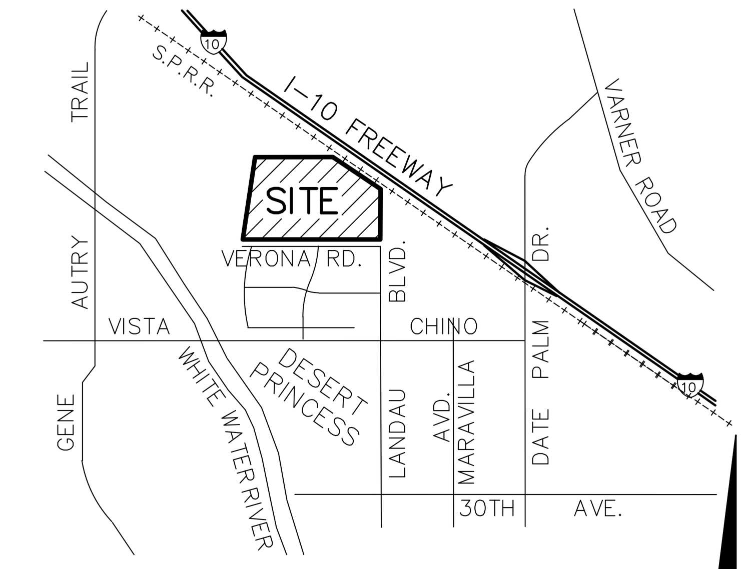
full circle thinking

POST-DEVELOPMENT DRAINAGE MAP

CATHEDRAL CITY, CA

TTM - 38712 & 38713





VICINITY MAP

NOT TO SCALE

ASSESSORS PARCEL NUMBERS:

APN: 677-050-031, 677-050-032

OWNER/DEVELOPER:

NCP VERANO, LLC
690 E GREEN STREET, SUITE 200
PASADENA, CA 91101
(323)874-8000

CIVIL ENGINEER:

FUSCOE ENGEERING, INC.
2850 INLAND EMPIRE BLVD, SUITE B
ONTARIO, CA 91764
(909)581-0676

LEGEND

AREA BOUNDARY

SUB-DRAINAGE AREA BOUNDARY

SUB AREA

DA AC

SUB-AREA (ACRES)

AREA NODE

FLOW

DRAINAGE AREA SUMMARY

DRAINAGE AREA	AREA, AC	IMPERVIOUS AREA, AC	% IMP	CN
P-A	38.35	24.93	0.65	77

80' 0' 40' 80'

SCALE: 1" = 80'

PREPARED BY:

JUNE, 2023

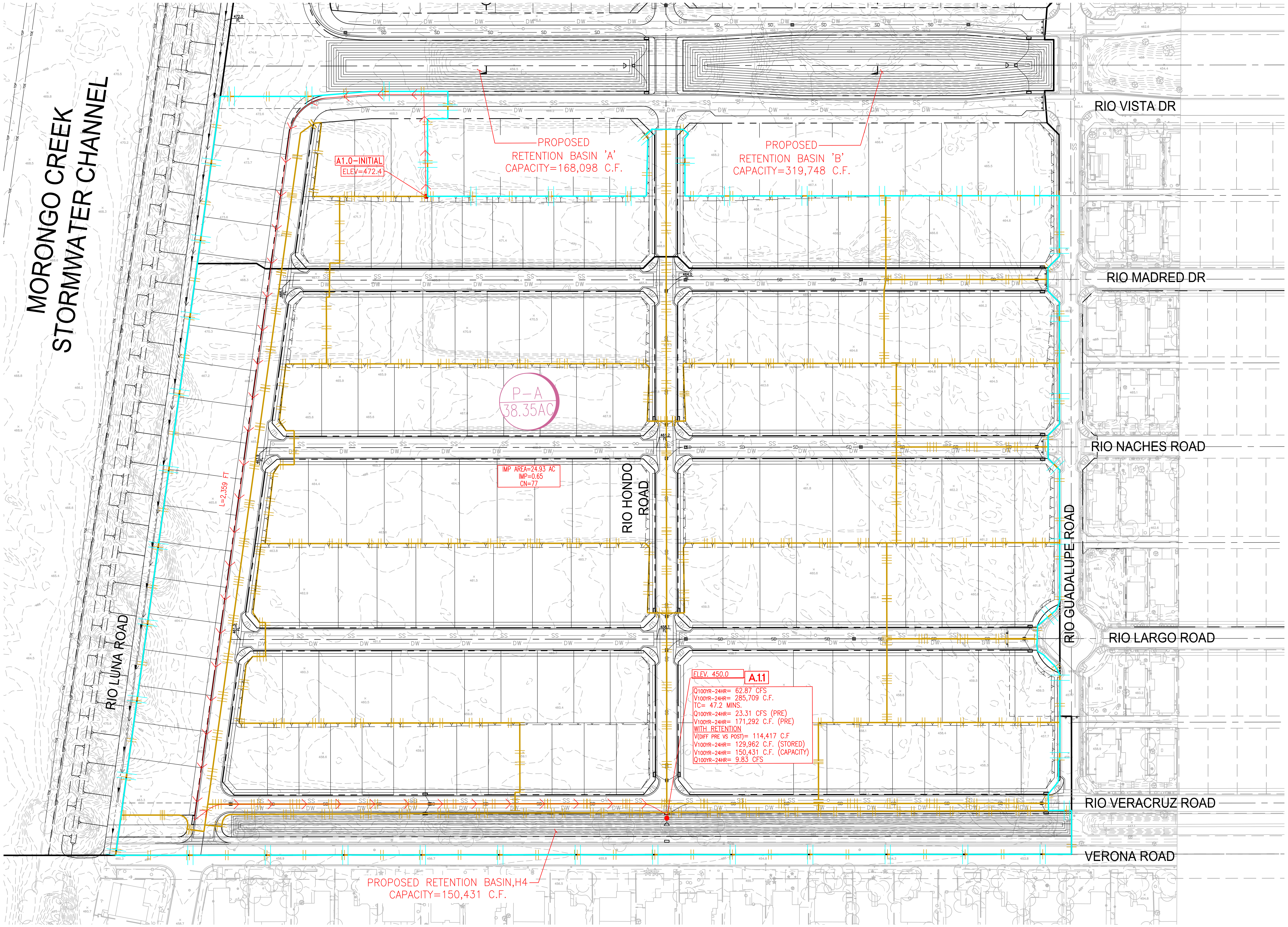
FUSCOE ENGINEERING

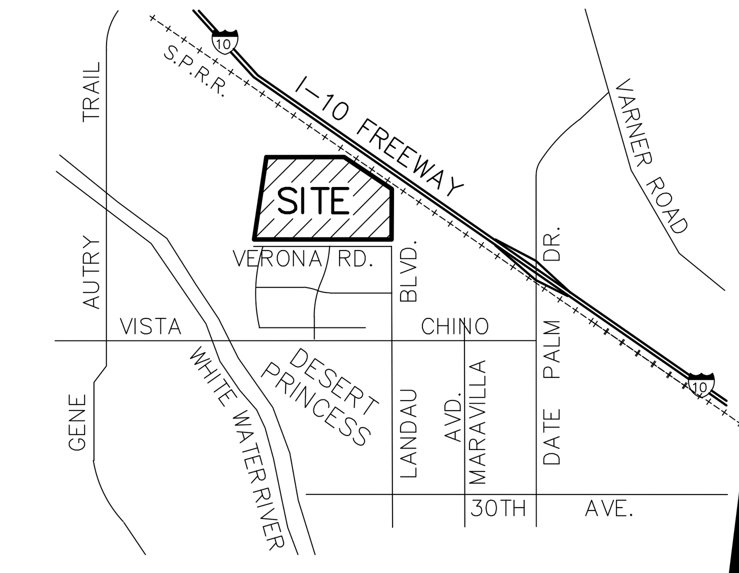
full circle thinking

POST-DEVELOPMENT UNIT HYDROGRAPH

CATHEDRAL CITY, CA

TTM - 38712 & 38713





VICINITY MAP

NOT TO SCALE

ASSESSORS PARCEL NUMBERS:

APN: 677-050-031, 677-050-032

OWNER/DEVELOPER:

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ONTARIO, CA 91764
(909)581-0676

LEGEND

AREA BOUNDARY

SUB-DRAINAGE AREA BOUNDARY

SUB AREA
DA
AC
SUB-AREA (ACRES)
AREA NODE

FLOW

DRAINAGE AREA SUMMARY

DRAINAGE AREA	AREA, AC	IMPERVIOUS AREA, AC	% IMP	CN
P-A	38.35	24.93	0.65	77

80' 0' 40' 80'

SCALE: 1" = 80'

PREPARED BY:

JUNE, 2023

FUSCOE ENGINEERING

full circle thinking

STORM DRAIN AND CATCH BASIN EXHIBIT

CATHEDRAL CITY, CA

TENTATIVE TRACT MAP NO. 38712 & 38713

PREPARED BY:

JUNE, 2023

FUSCOE
ENGINEERING
full circle thinking

APPENDIX 6

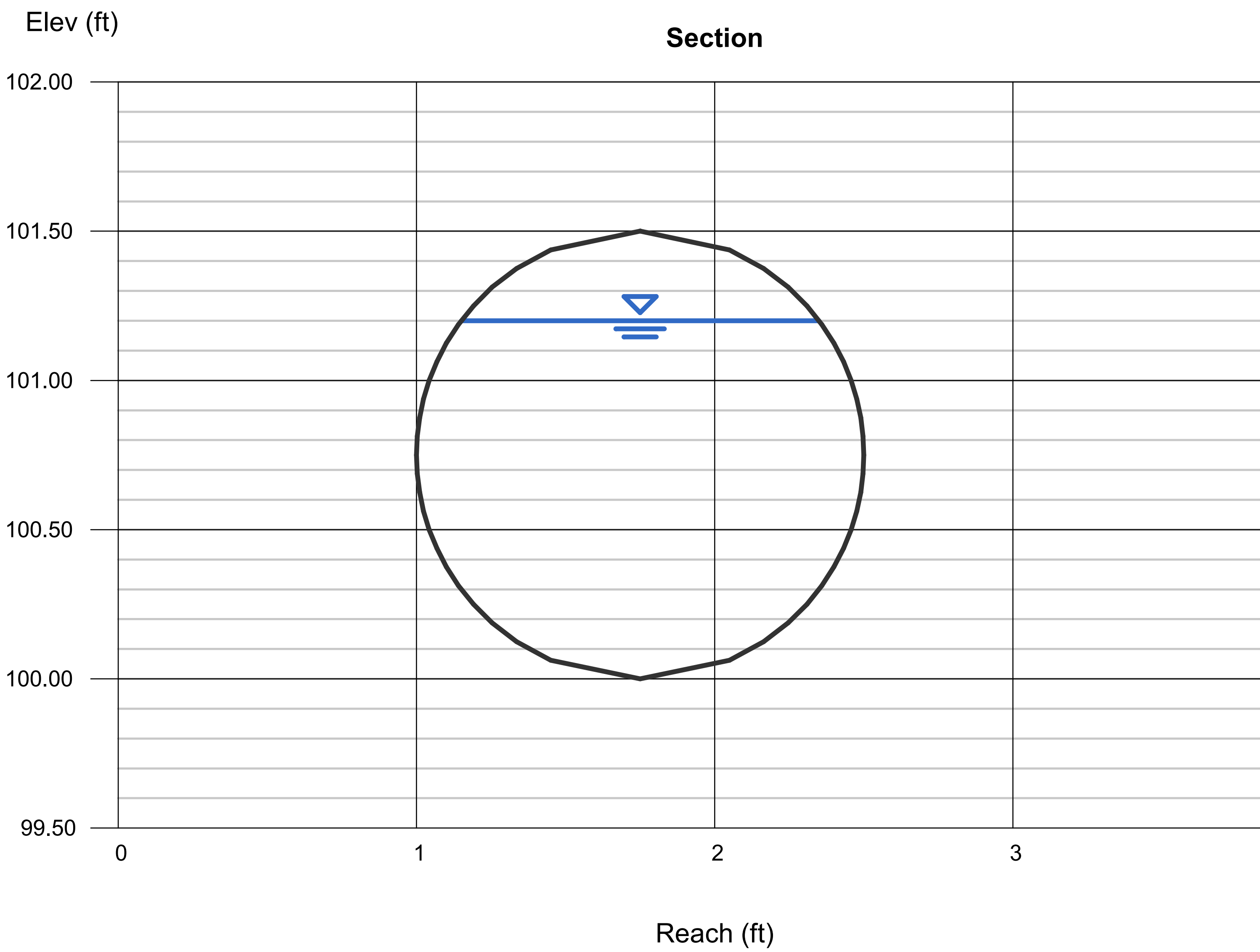
STORM DRAIN SIZING

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Jun 1 2023

4090-01 TTM 38712-13 -18IN PIPE - Q100(MAX)=7.23 CFS -S=0.0050

Circular		**Highlighted**	
Diameter (ft)	= 1.50	Depth (ft)	= 1.20
		Q (cfs)	= 7.230
		Area (sqft)	= 1.52
Invert Elev (ft)	= 100.00	Velocity (ft/s)	= 4.77
Slope (%)	= 0.50	Wetted Perim (ft)	= 3.32
N-Value	= 0.013	Crit Depth, Yc (ft)	= 1.05
		Top Width (ft)	= 1.20
Calculations		EGL (ft)	= 1.55
Compute by:	Known Q		
Known Q (cfs)	= 7.23		



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Jun 6 2023

4090-01 TTM 38712-13 -24IN PIPE - Q100(MAX)=14.60 CFS -S=0.0050

Circular

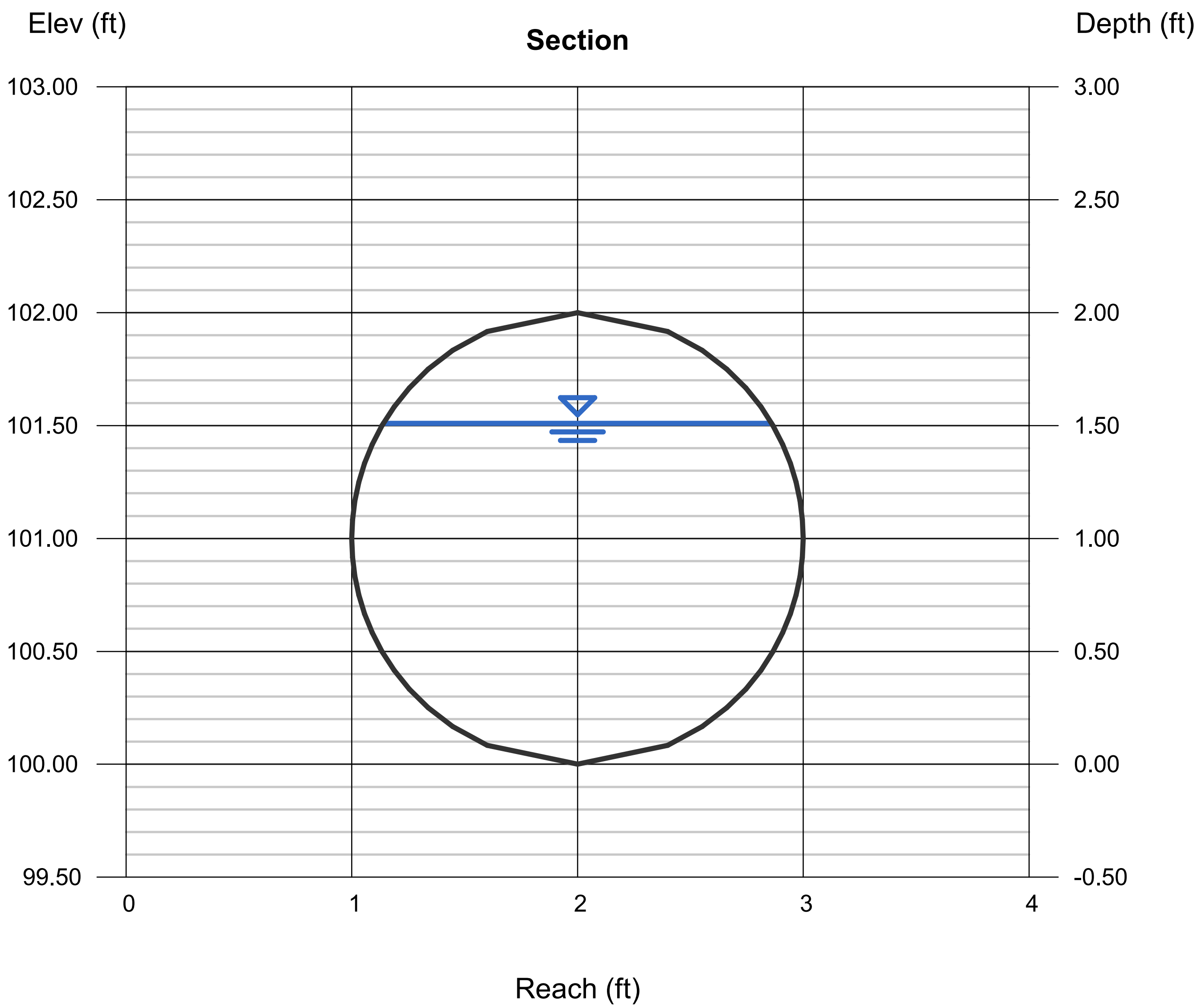
Diameter (ft)	= 2.00
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 14.60

Highlighted

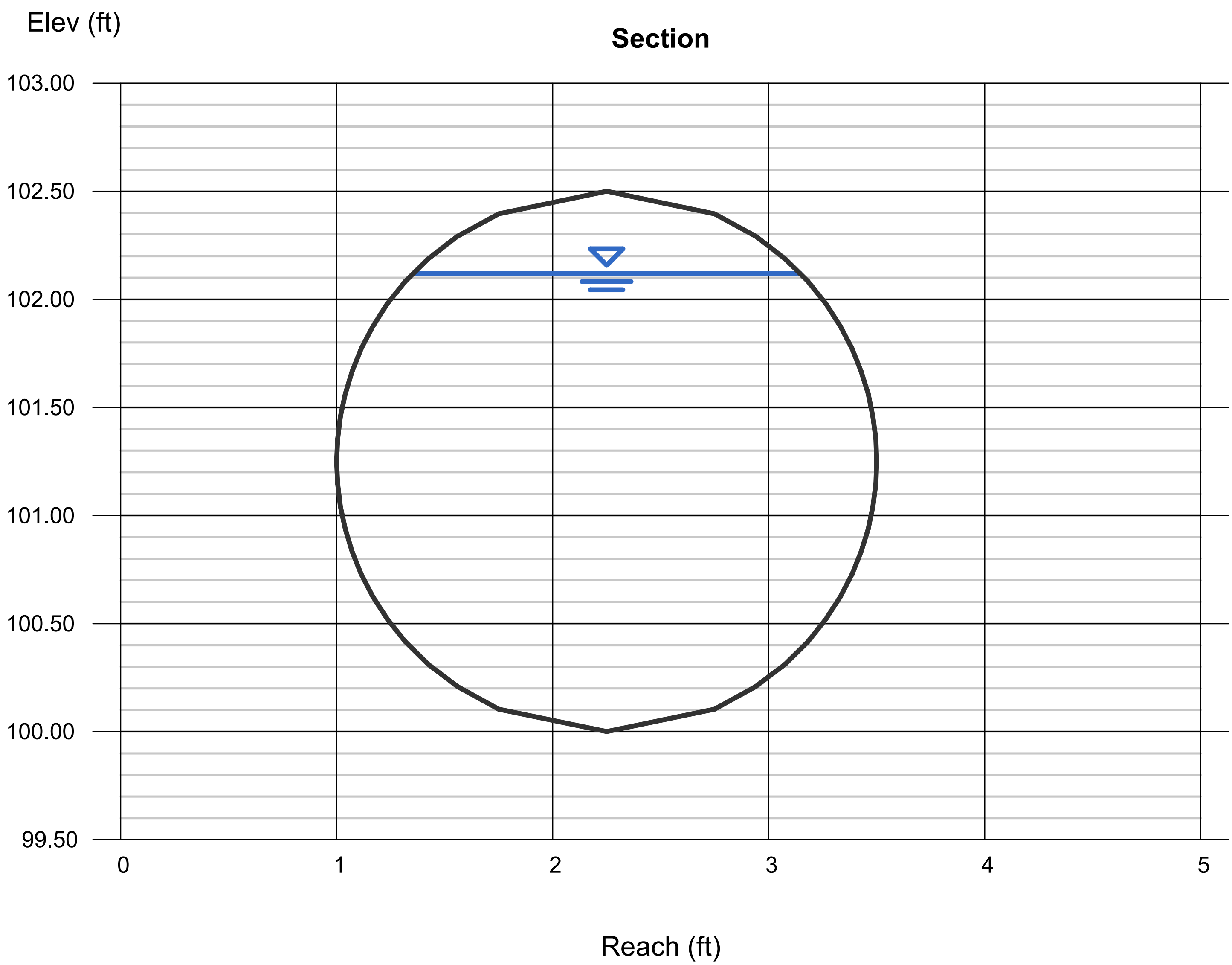
Depth (ft)	= 1.51
Q (cfs)	= 14.60
Area (sqft)	= 2.55
Velocity (ft/s)	= 5.72
Wetted Perim (ft)	= 4.22
Crit Depth, Yc (ft)	= 1.38
Top Width (ft)	= 1.72
EGL (ft)	= 2.02



Channel Report

4090-01 TTM 38712-13 -30IN PIPE - Q100(MAX)=29.80 CFS -S=0.0050

Circular		**Highlighted**	
Diameter (ft)	= 2.50	Depth (ft)	= 2.12
		Q (cfs)	= 29.80
		Area (sqft)	= 4.45
Invert Elev (ft)	= 100.00	Velocity (ft/s)	= 6.70
Slope (%)	= 0.50	Wetted Perim (ft)	= 5.86
N-Value	= 0.013	Crit Depth, Yc (ft)	= 1.86
		Top Width (ft)	= 1.79
Calculations		EGL (ft)	= 2.82
Compute by:	Known Q		
Known Q (cfs)	= 29.80		

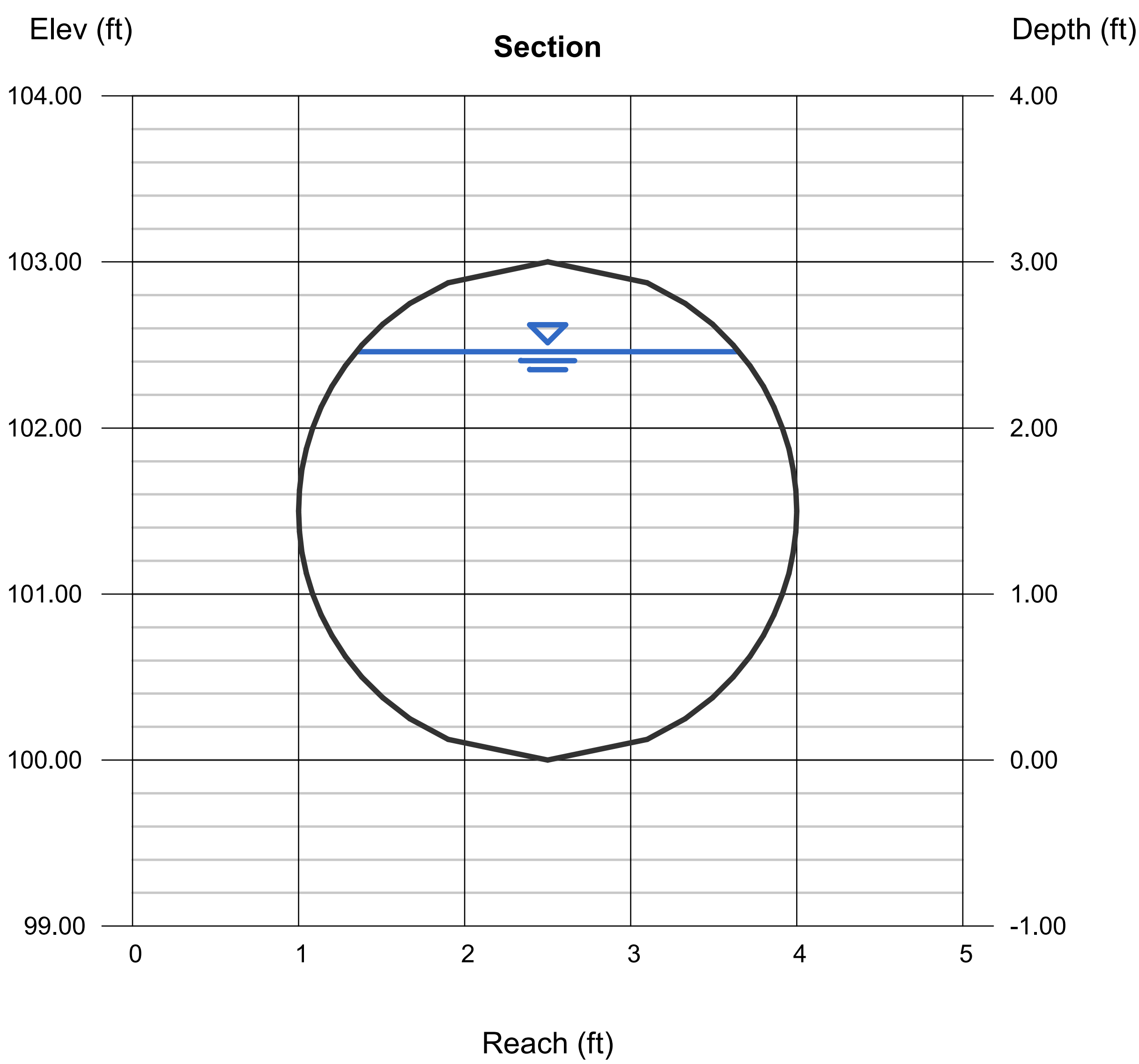


Channel Report

4090-01 TTM 38712-13 -36IN PIPE - Q100(MAX)=47.09 CFS -S=0.0050

Circular	
Diameter (ft)	= 3.00
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.013
Calculations	
Compute by:	Known Q
Known Q (cfs)	= 47.09

Highlighted	
Depth (ft)	= 2.46
Q (cfs)	= 47.09
Area (sqft)	= 6.22
Velocity (ft/s)	= 7.58
Wetted Perim (ft)	= 6.81
Crit Depth, Yc (ft)	= 2.24
Top Width (ft)	= 2.30
EGL (ft)	= 3.35



Channel Report

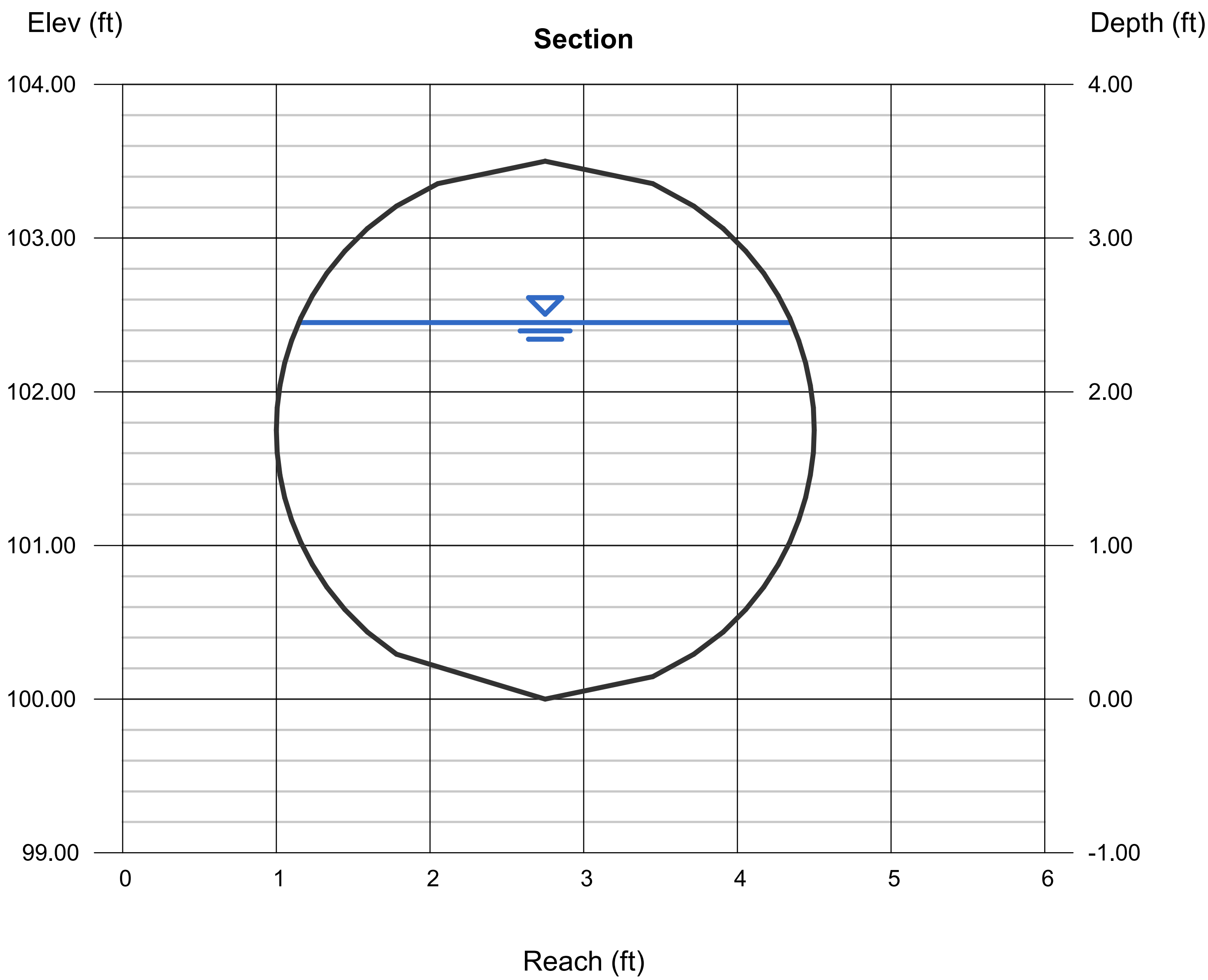
4090-01 TTM 38712-13 -42IN PIPE - Q100(MAX)=59.53 CFS -S=0.0050

Circular
Diameter (ft) = 3.50

Invert Elev (ft) = 100.00
Slope (%) = 0.50
N-Value = 0.013

Calculations
Compute by: Known Q
Known Q (cfs) = 59.53

Highlighted
Depth (ft) = 2.45
Q (cfs) = 59.53
Area (sqft) = 7.21
Velocity (ft/s) = 8.26
Wetted Perim (ft) = 6.95
Crit Depth, Yc (ft) = 2.42
Top Width (ft) = 3.20
EGL (ft) = 3.51



APPENDIX 7

EXCERTPS FROM APPROVED MASTER DRAINAGE REPORT FOR TRACT 28639-1 AND M-WQMP FOR RIO VISTA VILLAGE (FOR REFERENCE ONLY)

Project Specific
Master WQMP for Rio Vista Village

For: **Rio Vista Village**

NW Corner of Landau Blvd. & Verona Blvd.

DEVELOPMENT NO. **Tract 28639-1, PM 34148, Specific Plan 97-55**
DESIGN REVIEW NO.

Prepared for:
Verano Recovery, LLC; Portales Recovery, LLC; Cassia at Rio Vista Recovery; Sol Recovery, LLC
Contact: Inland Communities Corp.
Attn: Mohamad Younes, P.E., Senior Vice President
6430 W. Sunset Boulevard, Suite 460
Los Angeles, California 90028
Telephone: (323) 874-8000

Prepared by:
Joyce Goode and Chris Ogaz
Under direction of:
Jeffrey D. Endicott, PE, BCEE, CPESC
CASC Engineering and Consulting, Inc.
77-567 Country Club Drive, Suite 211
Palm Desert, CA 92211
Telephone: (760) 259-0108, Ext 5380

REGISTERED PROFESSIONAL ENGINEER
JEFFREY DUANE ENDICOTT
No. C 040658
Exp. 3-31-2017
CIVIL
STATE OF CALIFORNIA
8-4-2015

Please send correspondence to our Corporate Office:
1470 E. Cooley Drive
Colton, California 92324

Original Date Prepared: April 29, 2015

OWNER'S CERTIFICATION

This project-specific Water Quality Management Plan (WQMP) has been prepared for:

Verano Recovery, LLC; Portales Recovery, LLC; Cassia at Rio Vista Recovery; Sol Recovery, LLC; & Los Portales Recovery, LLC
by **Inland Communities Corp.**
for the project known as **Rio Vista Village** at northwest corner of Landau Boulevard and Verona Boulevard.

This WQMP is intended to comply with the requirements of **Cathedral City** for **Tract 28639-1 and Parcel Map 34148** which includes the requirement for the preparation and implementation of a project-specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity.

The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under **Cathedral City** Water Quality Ordinance (Municipal Code Section 8.24.070).

If the undersigned transfers its interest in the subject property/project, the undersigned shall notify the successor in interest of its responsibility to implement this WQMP.

"I, the undersigned, certify under penalty of law that I am the authorized signatory on behalf of the owner of the property that is the subject of this WQMP, and that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Authorized Signature

Mohamad Younes, P.E.
Owner's Authorized Printed Name

Senior Vice President
Owner's Title/Position

8/4/2015
Date

Its managing member:
Inland Communities Corp.
6430 W. Sunset Boulevard, Suite 460
Los Angeles, California 90028
Telephone: (323) 874-8000

ATTEST

Notary Signature

Dale Martinez III
Printed Name

Notary Public
Title/Position

8/4/15
Date

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
County of Riverside)

On Agst 4, 2015 before me, Dale Martinez III, Notary Public,
Date | Here Insert Name and Title of the Officer

personally appeared Mohamad Younes
Name~~(s)~~ of Signer~~(s)~~

who proved to me on the basis of satisfactory evidence to be the person~~(s)~~ whose name~~(s)~~ is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she~~/~~they~~ executed the same in his/~~her~~/~~their~~ authorized capacity~~(ies)~~, and that by his/~~her~~/~~their~~ signature~~(s)~~ on the instrument the person~~(s)~~, or the entity upon behalf of which the person~~(s)~~ acted, executed the instrument.

DALE MARTINEZ III
Commission # 2107127
Notary Public - California
Riverside County
My Comm. Expires Apr 16, 2019

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature [signature] III
Signature of Notary Public

Place Notary Seal Above

OPTIONAL

Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document

Title or Type of Document: ______ Document Date: ______
Number of Pages: ______ Signer(s) Other Than Named Above: ______

Capacity(ies) Claimed by Signer(s)

Signer's Name: ______	Signer's Name: ______
☐ Corporate Officer — Title(s): ______	☐ Corporate Officer — Title(s): ______
☐ Partner — ☐ Limited ☐ General	☐ Partner — ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other: ______	☐ Other: ______
Signer Is Representing: ______	Signer Is Representing: ______

Contents

I. Project Description

Project Owner: Verano Recovery, LLC
Attn: Mohamad Younes, P.E.
c/o Inland Communities Corp.
6430 W. Sunset Boulevard, Suite 460
Los Angeles, CA 90028
(323) 874-8000

WQMP Preparer: CASC Engineering and Consulting, Inc.
77-567 Country Club Drive, Suite 211
Palm Desert, CA 92211
Office: (760) 259-0108

Project Site Address: **NW Corner of Landau Blvd & Verona Rd**
Cathedral City, CA

Planning Area/
Community Name/
Development Name: **Rio Vista Village - Master WQMP**

APN Number(s): To be included in F-WQMP phased developments

Latitude & Longitude: **33.8556, -116.4824**

Receiving Water: **Whitewater River to Coachella Valley Storm Water Channel**

Project Site Size: **290.91 ac**

Standard Industrial Classification (SIC) Code: **1521, Single Family Homes**
1522, Multi-Family Use

Formation of Home Owners' Association (HOA)
or Property Owners Association (POA): Y ☒ N ☐

Additional Permits/Approvals required for the Project:

AGENCY	Permit required
State Department of Fish and Wildlife, Fish and Game Code §1602 Streambed Alteration Agreement	Y ☐ N☒
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Certification	Y ☐ N☒
US Army Corps of Engineers, CWA Section 404 permit	Y ☐ N☒
US Fish and Wildlife, Endangered Species Act Section 7 biological opinion	Y ☐ N☒
Statewide Construction General Permit Coverage	Y ☒ N☐
Statewide Industrial General Permit Coverage	Y ☐ N☒
Other *(please list in the space below as required)*	

Rio Vista Village Master WQMP

The project proposes to develop an overall Master WQMP (M-WQMP) with area specific Final WQMPs (F-WQMP) to address potential water quality issues. The Master WQMP will function as the conceptual water quality plan for the entire project. It will identify all drainage areas and retention facilities for the purpose of water quality (See Appendix B, M-WQMP Site Exhibit). This conceptual master plan will also incorporate existing developed areas and proposed areas into the sizing calculations for water quality purposes. As phases of Rio Vista Village progress towards permitting and construction, F-WQMPs will be prepared for each phase and will identify the specific features to be incorporated into the project to address water quality protection requirements. Features may include a combination of existing and/or newly proposed features. Existing and proposed developments will include, but not be limited to, public and private roads and alley ways, common parking areas, drainage patterns, catch basins, onsite storm drain systems, retention areas, common space areas, and pervious surfaces. Appendix J of the M-WQMP will be an amendment section where future phases of development will be logged.

Rio Vista Village is located on the northwest corner of Landau Boulevard and Verona Road in Cathedral City. The project is bounded by the Southern Pacific Railroad Right-of-Way to the North, Verona Road to the South, Landau Boulevard to the East, and Morongo Creek Stormwater Channel to the west. It is currently under the ownership of several different LLCs. An aerial photo overlay map distinguishing ownership is provided in Appendix B. An HOA has been formed for Rio Vista Village. CC&Rs are included in Appendix G. The Remainder Parcel of Tract 28639-1 (Parcel Map 34148) is a part of the annexable territory was not incorporated into the HOA. This area will need to be incorporated into the HOA upon proposed development.

The total area of the project is 290.91 acres, as shown on the tract map for Tract 28639-1 in Appendix B. Approximately 26.7 acres of the western portion of the property is located within the Morongo Creek Stormwater Channel. This area slopes towards the channel and contributes no runoff to the development; therefore, it has been excluded from the WQMP, M-WQMP Site Exhibit, and drainage studies. Overflows associated with the project discharge from the site to the east onto Landau Boulevard and is conveyed by the MS4 to the Whitewater River. Flows from the Whitewater River ultimately discharge to the Coachella Valley Storm Water Channel.

The western portion of the site has been previously graded; however, it remains vacant, desert terrain sloping to the southeast. The eastern portion of the property has been partially developed. Existing development includes open space areas, retention basins, utilities, catch basins, onsite storm drain systems, public roads and alley ways, common parking areas, a community center (Lot 294 of Tract Map 28639-1), and completed existing single family residences. Existing single family residences are located on Lots 1-3, 17-28, 42-56, 61-63, 65-71, 73-98, 106-132, 133-144 of Tract Map 28639-1. The overall project will construct approximately 1,362 single family residential lots, associated streets, utilities, landscaping and retention areas.

The geotechnical investigation reported loose soils throughout the upper 3 to 4 feet of underlying soils with soils becoming firmer with depth. Moisture content of samples were low, ranging between 0.5 to 1.5 percent. Groundwater was cited to be in exceedance of 200’ below the surface. The geotechnical report is located in Appendix E.

A drainage report for the project was prepared and has been included in Appendix F. A total of twelve drainage areas and twelve retention areas were identified for retention of the entire 100-year, 24-hour storm event. Flows exceeding the 100-yr, 24-hr event will pond and discharge to the east onto Landau Boulevard. Typical details of retention areas are provided on the Master Site

Map in Appendix B. Basins A through Basin G are located in the center of Rio Vista Boulevard. Discharge from the onsite storm drains directly enter into existing drywells of Basins C, D, F, G and I. Overflows from the dry wells will pond up into the basin area. Runoff will be conveyed via the onsite storm drains and directly discharge into existing Basins G, H1, H2, and H4 Retention volumes and a water surface for Basin B were include in the drainage study. A design showing how discharges enter this basin will need to be addressed as Drainage Area B is developed. Drainage Area A/ Retention Area A and Lots 299, 300 and 277 of Tract 28639-1 were not included in the hydrology report. When these areas are developed, a hydrology report will be prepared and included in the F-WQMP. See Appendix B Master WQMP Site Map for all retention area locations.

Infiltration testing cited a rate of 8.94 in/hr (Appendix F, Basic Infiltration Testing Report). Calculations were prepared using the infiltration rate and volumes based on the 100-yr, 24-hr storm event per the hydrology study. See Appendix F, Infiltration Basin Worksheets. The calculations demonstrate that the design of the basins provide adequate surface area to infiltrate for this event within 36 hours. The design of the existing basins exceed current NPDES WQMP requirements. Cathedral City Municipal Code – Title 8 § 8.24.070 requires the retention/detention of the 100-year, 3-hour storm events. The design capture volume of the retention areas surpasses this volume. Therefore, the project is not subject to the HCOC provisions of the WQMP and the project satisfies 100% of the LID/ site design measurable goal.

Appendix A of this project-specific WQMP includes a complete copy of the final Conditions of Approval. Appendix B of this project-specific WQMP includes:

a. A Vicinity Map identifying the project site and surrounding planning areas in sufficient detail; and

b. A Site Plan for the project. The Site Plan included as part of Appendix B depicts the following project features:

- Location and identification of all structural BMPs, including Source Control, LID/Site Design and Treatment Control BMPs.
- Landscaped areas.
- Paved areas and intended uses (i.e., parking, outdoor work area, outdoor material storage area, sidewalks, patios, tennis courts, etc.).
- Number and type of structures and intended uses (i.e., buildings, tenant spaces, dwelling units, community facilities such as pools, recreation facilities, tot lots, etc.).
- Infrastructure (i.e., streets, storm drains, etc.) that will revert to public agency ownership and operation.
- Location of existing and proposed public and private storm drainage facilities (i.e., storm drains, channels, basins, etc.), including catch basins and other inlets/outlet structures. Existing and proposed drainage facilities should be clearly differentiated.
- Location(s) of Receiving Waters to which the project directly or indirectly discharges.

- Location of points where onsite (or tributary offsite) flows exit the property/project site.
- Delineation of proposed drainage area boundaries, including tributary offsite areas, for each location where flows exit the project site and existing site (where existing site flows are required to be addressed). Each tributary area should be clearly denoted.
- Pre- and post-project topography.

Appendix I is a one page form that summarizes pertinent information relative to this project-specific WQMP.

II. Site Characterization

Land Use Designation or Zoning:	**R1 (Single Family Residential) and R3 (Multiple Family Residential)**
Current Property Use:	**Partially Developed, Partially Vacant**
Proposed Property Use:	**Single and Multiple Family Residential**
Availability of Soils Report:	Y ☒ N ☐ *Note: A soils report is required if infiltration BMPs are utilized. Attach report in Appendix E.*
Phase 1 Site Assessment:	Y ☐ N ☒ *Note: If prepared, attached remediation summary and use restrictions in Appendix H.*

Receiving Waters for Urban Runoff from Site

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use Designated Receiving Waters
Whitewater River	-	MUN, AGR, GWR, RECI, RECII, WARM, COLD, WILD, POW	-
Coachella Valley Stormwater Channel	DDT, Dieldrin, PCBs, Pathogens, Toxaphene	FRESH, RECI, RECII, WARM, WILD, RARE	19.43 miles

III. Pollutants of Concern

Table 1. Pollutant of Concern Summary

Pollutant Category	Potential for Project and/or Existing Site	Causing Receiving Water Impairment
Bacteria/Virus	X	X
Heavy Metals	X	
Nutrients	X	
Toxic Organic Compounds	X	
Sediment/Turbidity	X	
Trash & Debris	X	
Oil & Grease	X	
Other (specify pollutant):		
Other (specify pollutant):		

Pathogens are identified in the Colorado River Basin 303(d) Impaired Waterbody List. Pathogens have been identified as a potential pollutant. The implementation of retention basins will mitigate potential discharges with a high removal efficiency.

IV. Hydrologic Conditions of Concern

Local Jurisdiction Requires On-Site Retention of Urban Runoff:

Yes ☒ The project will be required to retain urban runoff onsite in conformance with local ordinance (See Table 6 of the WQMP Guidance document, "Local Land use Authorities Requiring Onsite Retention of Stormwater"). This section does not need to be completed; however, retention facility design details and sizing calculations must be included in Appendix F.

No ☐ This section must be completed.

This Project meets the following condition:

☐ **Condition A**: 1) Runoff from the Project is discharged directly to a publicly-owned, operated and maintained MS4 or engineered and maintained channel, 2) the discharge is in full compliance with local land use authority requirements for connections and discharges to the MS4 (including both quality and quantity requirements), 3) the discharge would not significantly impact stream habitat in proximate Receiving Waters, **and** 4) the discharge is authorized by the local land use authority.

☐ **Condition B**: The project disturbs less than 1 acre and is not part of a larger common plan of development that exceeds 1 acre of disturbance. The disturbed area calculation must include all disturbances associated with larger plans of development.

☐ **Condition C**: The project's runoff flow rate, volume, velocity and duration for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour and 10-year 24-hour rainfall events. This condition can be achieved by, where applicable, complying with the local land use authority's on-site retention ordinance, or minimizing impervious area on a site and incorporating other Site-Design BMP concepts and LID/Site Design BMPs that assure non-exceedance of pre-development conditions. This condition must be substantiated by hydrologic modeling methods acceptable to the local land use authority.

☐ **None:** Refer to Section 3.4 of the Whitewater River Region WQMP Guidance document for additional requirements.

Supporting engineering studies, calculations, and reports are included in Appendix C.

	2 year – 24 hour		10 year – 24 hour	
	Precondition	**Post-condition**	**Precondition**	**Post-condition**
Discharge (cfs)				
Velocity (fps)				
Volume (cubic feet)				
Duration (minutes)				

V. Best Management Practices

This project implements Best Management Practices (BMPs) to address the Pollutants of Concern that may potentially be generated from the use of the project site areas. These BMPs have been selected and implemented to comply with Section 3.5 of the WQMP Guidance document, and consist of Site Design BMP concepts, Source Control, LID/Site Design and, if/where necessary, Treatment Control BMPs as described herein.

V.1 SITE DESIGN BMP CONCEPTS, LID/SITE DESIGN AND TREATMENT CONTROL BMPS

Local Jurisdiction Requires On-Site Retention of Urban Runoff:

Yes ☒ The project will be required to retain Urban Runoff onsite in conformance with local ordinance (See Table 6 of the WQMP Guidance document, "Local Land use Authorities Requiring Onsite Retention of Stormwater). **The LID/Site Design measurable goal has thus been met (100%), and Sections V.1.A and V.1.B do not need to be completed**; however, retention facility design details and sizing calculations must be included in Appendix F, and '100%' should be entered into Column 3 of Table 6 below.

No ☐ Section V.1 must be completed.

This section of the Project-Specific WQMP documents the LID/Site Design BMPs and, if/where necessary, the Treatment Control BMPs that will be implemented on the project to meet the requirements detailed within Section 3.5.1 of the WQMP Guidance document. Section 3.5.1 includes requirements to implement Site Design Concepts and BMPs, and includes requirements to address Pollutants of Concern with BMPs. Further, sub-section 3.5.1.1 specifically requires that Pollutants of Concern be addressed with <u>LID/Site Design</u> BMPs to the extent feasible.

LID/Site Design BMPs are those BMPs listed within Table 2 below which promote retention and/or feature a natural treatment mechanism; off-site and regionally-based BMPs are also LID/Site Design BMPs, and therefore count towards the measurable goal, if they fit these criteria. This project incorporates LID/Site Design BMPs to fully address the Treatment Control BMP requirement where and to the extent feasible. If and where it has been acceptably demonstrated to the local land use authority that it is infeasible to fully meet this requirement with LID/Site Design BMPs, Section V.1.B (below) includes a description of the conventional Treatment Control BMPs that will be substituted to meet the same requirements.

In addressing Pollutants of Concern, BMPs are selected using Table 2 below.

Table 2. BMP Selection Matrix Based Upon Pollutant of Concern Removal Efficiency (1)

(Sources: Riverside County Flood Control & Water Conservation District Design Handbook for Low Impact Development Best Management Practices, dated September 2011, the Orange County Technical Guidance Document for Water Quality Management Plans, dated May 19, 2011, and the Caltrans Treatment BMP Technology Report, dated April 2010 and April 2008)

Pollutant of Concern	Landscape Swale[2, 3]	Landscape Strip[2, 3]	Biofiltration (with underdrain)[2, 3]	Extended Detention Basin[2]	Sand Filter Basin[2]	Infiltration Basin[2]	Infiltration Trench[2]	Permeable Pavement[2]	Bioretention (w/o underdrain)[2, 3]	Other BMPs Including Proprietary BMPs[4, 6]
Sediment & Turbidity	M	M	H	M	H	H	H	H	H	Varies by Product[5]
Nutrients	L/M	L/M	M	L/M	L/M	H	H	H	H	
Toxic Organic Compounds	M/H	M/H	M/H	L	L/M	H	H	H	H	
Trash & Debris	L	L	H	H	H	H	H	L	H	
Bacteria & Viruses (also: Pathogens)	L	M	H	L	M	H	H	H	H	
Oil & Grease	M	M	H	M	H	H	H	H	H	
Heavy Metals	M	M/H	M/H	L/M	M	H	H	H	H	

Abbreviations:

L: Low removal efficiency M: Medium removal efficiency H: High removal efficiency

Notes:

(1) Periodic performance assessment and updating of the guidance provided by this table may be necessary.

(2) Expected performance when designed in accordance with the most current edition of the document, "Riverside County, Whitewater River Region Stormwater Quality Best Management Practice Design Handbook".

(3) Performance dependent upon design which includes implementation of thick vegetative cover. Local water conservation and/or landscaping requirements should be considered; approval is based on the discretion of the local land use authority.

(4) Includes proprietary stormwater treatment devices as listed in the CASQA Stormwater Best Management Practices Handbooks, other stormwater treatment BMPs not specifically listed in this WQMP (including proprietary filters, hydrodynamic separators, inserts, etc.), or newly developed/emerging stormwater treatment technologies.

(5) Expected performance should be based on evaluation of unit processes provided by BMP and available testing data. Approval is based on the discretion of the local land use authority.

(6) When used for primary treatment as opposed to pre-treatment, requires site-specific approval by the local land use authority.

V.1.A Site Design BMP Concepts and LID/Site Design BMPs

This section documents the Site Design BMP concepts and LID/Site Design BMPs that will be implemented on this project to comply with the requirements detailed in Section 3.5.1 of the WQMP Guidance document.

- Table 3 herein documents the implementation of the Site Design BMP Concepts described in sub-sections 3.5.1.3 and 3.5.1.4.
- Table 4 herein documents the extent to which this project has implemented the LID/Site Design goals described in sub-section 3.5.1.1.

Table 3. Implementation of Site Design BMP Concepts

Design Concept	Technique	Specific BMP	Included: Yes	Included: No	Included: N/A	Brief Reason for BMPs Indicated as No or N/A
Site Design BMP Concept 1	**Minimize Urban Runoff, Minimize Impervious Footprint, and Conserve Natural Areas (See WQMP Section 3.5.1.3)**	Conserve natural areas by concentrating or clustering development on the least environmentally sensitive portions of a site while leaving the remaining land in a natural, undisturbed condition.	☐	☐	☐	
		Conserve natural areas by incorporating the goals of the Multi-Species Habitat Conservation Plan or other natural resource plans.	☐	☐	☐	
		Preserve natural drainage features and natural depressional storage areas on the site.	☐	☐	☐	
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.	☐	☐	☐	
		Use natural drainage systems.	☐	☐	☐	
		Where applicable, incorporate Self-Treating Areas	☐	☐	☐	
		Where applicable, incorporate Self-Retaining Areas	☐	☐	☐	
		Increase the building floor to area ratio (i.e., number of stories above or below ground).	☐	☐	☐	
		Construct streets, sidewalks and parking lot aisles to minimum widths necessary, provided that public safety and a walkable environment for pedestrians are not compromised.	☐	☐	☐	
		Reduce widths of streets where off-street parking is available.	☐	☐	☐	
		Minimize the use of impervious surfaces, such as decorative concrete, in the landscape design.	☐	☐	☐	
		Other comparable and equally effective Site Design BMP concept(s) as approved by the local land use authority (Note: Additional narrative required to describe BMP and how it addresses site design concept).	☐	☐	☐	

Table 3. Site Design BMP Concepts (continued)

Design Concept	Technique	Specific BMP	Included: Yes	Included: No	Included: N/A	Brief Reason for Each BMP Indicated as No or N/A
Site Design BMP Concept 2	**Minimize Directly Connected Impervious Area (See WQMP Section 3.5.1.4)**	Design residential and commercial sites to contain and infiltrate roof runoff, or direct roof runoff to landscaped swales or buffer areas.	☐	☐	☐	
		Drain impervious sidewalks, walkways, trails, and patios into adjacent landscaping.	☐	☐	☐	
		Incorporate landscaped buffer areas between sidewalks and streets.	☐	☐	☐	
		Use natural or landscaped drainage swales in lieu of underground piping or imperviously lined swales.	☐	☐	☐	
		Where soil conditions are suitable, use perforated pipe or gravel filtration pits for low flow infiltration.	☐	☐	☐	
		Maximize the permeable area by constructing walkways, trails, patios, overflow parking, alleys, driveways, low-traffic streets, and other low-traffic areas with open-jointed paving materials or permeable surfaces such as pervious concrete, porous asphalt, unit pavers, and granular materials.	☐	☐	☐	
		Use one or more of the following:				
		Rural swale system: street sheet flows to landscaped swale or gravel shoulder, curbs used at street corners, and culverts used under driveways and street crossings.	☐	☐	☐	
		Urban curb/swale system: street slopes to curb; periodic swale inlets drain to landscaped swale or biofilter.	☐	☐	☐	
		Dual drainage system: first flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder; high flows connect directly to MS4s.	☐	☐	☐	
		Other comparable and equally effective Site Design BMP concept(s) as approved by the local land use authority (Note: Additional narrative required to describe BMP and how it addresses site design concept).	☐	☐	☐	
		Use one or more of the following for design of driveways and private residential parking areas:				
		Design driveways with shared access, flared (single lane at street), or wheel strips (paving only under the tires).	☐	☐	☐	
		Uncovered temporary or guest parking on residential lots paved with a permeable surface, or designed to drain into landscaping.	☐	☐	☐	

Table 3. Site Design BMP Concepts (continued)

Design Concept	Technique	Specific BMP	Included: Yes	Included: No	Included: N/A	Brief Reason for Each BMP Indicated as No or N/A
Site Design BMP Concept 2 (cont'd)	**Minimize Directly Connected Impervious Area (See WQMP Section 3.5.1.4)**	Other comparable and equally effective Site Design BMP concept(s) as approved by the local land use authority (Note: Additional narrative required to describe BMP and how it addresses site design concept).	☐	☐	☐	
		Use one or more of the following for design of parking areas:				
		Where landscaping is proposed in parking areas, incorporate parking area landscaping into the drainage design.	☐	☐	☐	
		Overflow parking (parking stalls provided in excess of the Permittee's minimum parking requirements) may be constructed with permeable pavement.	☐	☐	☐	
		Other comparable and equally effective Site Design BMP (or BMPs) as approved by the local land use authority (Note: Additional narrative required describing BMP and how it addresses site design concept).	☐	☐	☐	

<u>Project Site Design BMP Concepts:</u>

Not applicable to the project. The total area treated requirement is met via onsite retention per ***Cathedral City Municipal Code – Title 8 § 8.24.070***

<u>Alternative Project Site Design BMP Concepts:</u>

Not applicable to the project. The total area treated requirement is met via onsite retention per ***Cathedral City Municipal Code – Title 8 § 8.24.070***

Table 4. LID/Site Design BMPs Meeting the LID/Site Design Measurable Goal

(1) DRAINAGE SUB-AREA ID OR NO.	(2) LID/SITE DESIGN BMP TYPE* (See Table 2)	(3) POTENTIAL POLLUTANTS OF CONCERN WITHIN DRAINAGE SUB-AREA (Refer to Table 1)	(4) POTENTIAL POLLUTANTS WITHIN SUB-AREA CAUSING RECEIVING WATER IMPAIRMENTS (Refer to Table 1)	(5) EFFECTIVENESS OF LID/SITE DESIGN BMP AT ADDRESSING IDENTIFIED POTENTIAL POLLUTANTS (U, L, M, H/M, H; see Table 2)	(6) BMP MEETS WHICH DESIGN CRITERIA? (Identify as V_{BMP} OR Q_{BMP})	(7) TOTAL AREA WITHIN DRAINAGE SUB-AREA (Nearest 0.1 acre)
TOTAL PROJECT AREA TREATED WITH LID/SITE DESIGN BMPs (NEAREST 0.1 ACRE)						

*** LID/Site Design BMPs listed in this table are those that <u>completely</u> address the 'Treatment Control BMP requirement' for their drainage sub-area.**

<u>Justification of infeasibility for sub-areas not addressed with LID/Site Design BMPs</u>

Insert text here listing each drainage sub-area wherein the design criteria of VBMP and/or QBMP are not treated using LID/Site Design BMPs as required in WQMP Guidance Section 3.5.1.1, and provide justification of infeasibility for each.

V.1.B TREATMENT CONTROL BMPS

Conventional Treatment Control BMPs shall be implemented to address the project's Pollutants of Concern as required in WQMP Section 3.5.1 where, and to the extent that, Section V.1.A has demonstrated that it is infeasible to meet these requirements through implementation of LID/Site Design BMPs.

☐ The LID/Site Design BMPs described in Section V.1.A of this project-specific WQMP completely address the 'Treatment Control BMP requirement' for the entire project site (and where applicable, entire existing site) as required in Section 3.5.1.1 of the WQMP Guidance document. Supporting documentation for the sizing of these LID/Site Design BMPs is included in Appendix F. ***Section V.1.B does not need to be completed**.

☐ The LID/Site Design BMPs described in Section V.1.A of this project-specific WQMP do **NOT** completely address the 'Treatment Control BMP requirement' for the entire project site (or where applicable, entire existing site) as required in Section 3.5.1.1 of the WQMP. ***Section V.1.B must be completed.**

The Treatment Control BMPs identified in this section are selected, sized and implemented to treat the design criteria of V_{BMP} and/or Q_{BMP} for all project (and if required, existing site) drainage sub-areas which were not fully addressed using LID/Site Design BMPs. Supporting documentation for the sizing of these Treatment Control BMPs is included in Appendix F.

Table 5: Treatment Control BMP Summary

(1) **DRAINAGE SUB-AREA ID OR NO.**	(2) **TREATMENT CONTROL BMP TYPE*** (See Table 2)	(3) **POTENTIAL POLLUTANTS OF CONCERN WITHIN DRAINAGE SUB-AREA** (Refer to Table 1)	(4) **POTENTIAL POLLUTANTS WITHIN SUB-AREA CAUSING RECEIVING WATER IMPAIRMENTS** (Refer to Table 1)	(5) **EFFECTIVENESS OF TREATMENT CONTROL BMP AT ADDRESSING IDENTIFIED POTENTIAL POLLUTANTS** (U, L, M, H/M, H; see Table 2)	(6) **BMP MEETS WHICH DESIGN CRITERIA?** (Identify as V_{BMP} OR Q_{BMP})	(7) **TOTAL AREA WITHIN DRAINAGE SUB-AREA** (Nearest 0.1 acre)
	TOTAL PROJECT AREA TREATED WITH TREATMENT CONTROL BMPs (NEAREST 0.1 ACRE)					

V.1.C MEASURABLE GOAL SUMMARY

This section documents the extent to which this project has met the measurable goal described in WQMP Section 3.5.1.1 of addressing 100% of the project's 'Treatment Control BMP requirement' with LID/Site Design BMPs. Projects required to retain Urban Runoff onsite in conformance with local ordinance are considered to have met the measurable goal; for these instances, '100%' is entered into Column 3 of the Table.

Table 6: Measurable Goal Summary

(1) Total Area Treated with LID/Site Design BMPs (Last row of Table 4)	(2) Total Area Treated with Treatment Control BMPs (Last row of Table 5)	(3) % of Treatment Control BMP Requirement addressed with LID/Site Design BMPs
264.21 ac		100%

* Approximately 26.7 acres of the western portion of the property is located within the Morongo Creek Stormwater Channel. This portion of the site will not be developed; therefore, it is not included in the total area treated.

The total area treated requirement is met via onsite retention per ***Cathedral City Municipal Code – Title 8 § 8.24.070***

V.2 SOURCE CONTROL BMPS

This section identifies and describes the Source Control BMPs applicable and implemented on this project.

Table 7. Source Control BMPs

BMP Name	***Check One***		***If not applicable, state brief reason***
	Included	***Not Applicable***	
Non-Structural Source Control BMPs			
Education for Property Owners, Operators, Tenants, Occupants, or Employees	☒	☐	
Activity Restrictions	☒	☐	
Irrigation System and Landscape Maintenance	☒	☐	
Common Area Litter Control	☒	☐	
Street Sweeping Private Streets and Parking Lots	☒	☐	
Drainage Facility Inspection and Maintenance	☒	☐	
Structural Source Control BMPs			
Storm Drain Inlet Stenciling and Signage	☒	☐	
Landscape and Irrigation System Design	☒	☐	
Protect Slopes and Channels	☒	☐	
Provide Community Car Wash Racks	☐	☒	Wash & rinse waters from car washing activities from any homeowner will drain to the onsite storm drain system and discharge into onsite retention basins for treatment.
Properly Design*:			
Fueling Areas	☐	☒	Not a part of the project
Air/Water Supply Area Drainage	☐	☒	Not a part of the project
Trash Storage Areas	☒	☐	
Loading Docks	☐	☒	Not a part of the project
Maintenance Bays	☐	☒	Not a part of the project
Vehicle and Equipment Wash Areas	☐	☒	Not a part of the project
Outdoor Material Storage Areas	☐	☒	Not a part of the project
Outdoor Work Areas or Processing Areas	☐	☒	Not a part of the project
Provide Wash Water Controls for Food Preparation Areas	☒	☐	

*Details demonstrating proper design must be included in Appendix F.

Education/ Training of Property Owners, Tenants, or Employees

The HOA shall provide environmental awareness education materials to all home owners, members of the HOA, employees and contracted personnel. These materials shall include general housekeeping practices that contribute to the protection of urban runoff quality and BMPs that eliminate or reduce pollution during subsequent property improvements.

Activity Restrictions

CC&Rs of the HOA identify activity restrictions for the purpose of Receiving Water quality protection. These restrictions include:

- Prohibiting vehicular parking in streets. Vehicular parking is restricted to residential driveways and common parking areas within Rio Vista Village.

Irrigation System and Landscape Maintenance

Maintenance of irrigation systems and landscaping shall be consistent with the local land use authority's water conservation ordinance, which can be accessed through the local land use authority's website at http://web.cvwd.org/about/conservation.php. Fertilizer and pesticide usage shall be consistent with the instructions contained on product labels and with regulations administered by California's Department of Pesticide Regulations.

Common Area Litter Control

The HOA will provide trash receptacles in common/ open space areas. The receptacles will be emptied weekly and placed in trash containers approved by the City for weekly disposal by City's trash disposal service.

Street Sweeping Private Streets and Parking Lots

Public streets within the development will be swept monthly according to the City's street sweeping schedule. The HOA shall provide sweeping of the developments private parking areas.

Drainage Facility Inspection and Maintenance

The HOA will provide inspections of onsite catch basins and storm drain inlets. Drainage facilities to be cleaned if any debris and sediments are present.

Storm Drain Inlet Stenciling and Signage

Stencils containing a brief statement that prohibits dumping into common area catch basins will be placed at all onsite catch basin locations.

Landscape and Irrigation System Design

Implementation of landscaping that is consistent with the local land use authority's water conservation ordinance, and landscaping that utilizes native or drought tolerant species

Protection of Slopes and Channels

Slopes will be planted with native or drought tolerant vegetation to prevent erosion of slope walls.

Properly Design and Maintain Trash Storage Areas

All trash container areas in common and open space areas maintained by the HOA will be designed to City standards and shall meet the following requirements:

- Paved with an impervious surface, designed not to allow run-on from adjoining areas, designed to divert drainage from adjoining roofs and pavements diverted around the area, screened or walled to prevent off-site transport of trash.

- Trash dumpsters (containers) shall be leak proof and have attached covers or lids.
- Connection of trash area drains to the MS4 is prohibited.

Individual lots will have trash containers provided by the Cathedral City. Three 96 gallon automated carts will be provided to each homeowner for the collection of regular household trash, recyclables, and green waste. Additional information regarding refuge services can be obtained at: http://www.cathedralcity.gov/index.aspx?page=97

Provide Wash Water Controls for Food Preparation Areas

All food preparation areas within the Community Center building shall have contained areas or sinks, each with connections to the sanitary sewer for disposal of wash waters containing kitchen and food wastes. Food preparation is proposed within the facility only.

*Appendix D includes copies of the educational materials (described in Section 3.5.2.1 of the WQMP Guidance document) that will be used in implementing this project-specific WQMP.

V.3 Equivalent Treatment Control BMP Alternatives

Not applicable to the project.

V.4 Regionally-Based BMPs

Not applicable to the project.

VI. Operation and Maintenance Responsibility for BMPs

Appendix G of this project-specific WQMP includes copies of CC&Rs, Covenant and Agreements, BMP Maintenance Agreement and/or other mechanisms used to ensure the ongoing operation, maintenance, funding, transfer and implementation of the project-specific WQMP requirements.

The Homeowners Association is responsible for all common area BMP maintenance.

Contact:
Rio Vista Village Community Association
C/O: The Management Trust (The Monarch Division)
Attention: Liz Weber, CCAM
Association Manager
39755 Berkey Drive, Suite A • Palm Desert, CA 92211
Phone: (760) 776-5100 ext 6341
Fax: (760) 776-5111

Source Control BMP	Implementation and Maintenance Frequency	Inspection Frequency	Responsible Party
Education/ Training for Property Owners, Tenants, or Employees	The HOA shall provide environmental awareness education materials to all home owners and members of the HOA. These materials shall include general housekeeping practices that contribute to the protection of Urban Runoff quality and BMPs that eliminate or reduce pollution during subsequent property improvements and day to day uses. The HOA shall obtain these materials through the local land use authority at http://web.cvwd.org/about/stormwater.php . Employees or contracted personnel of the HOA performing activities that may impact Urban Runoff, BMP training and education programs must be provided to all new employees/ contracted members within 6 months of hire date/ contracted date and annually thereafter. Employee training materials may be derived from educational materials available through the local land use authority. The HOA will provide training to new employees or newly contracted members. The project features retention basins that may have potential to violate local vector control requirements, the HOA will obtain information from the local land use authority and provide information to the project's residents/occupants/tenants.	Annually	HOA

Activity Restrictions	CC&Rs of the HOA shall include activity restrictions for the purpose of receiving water quality protection. These restrictions include: -Prohibiting vehicular parking in streets. Parking will only be allowed in residential driveways and common parking areas.	Daily	HOA & Homeowner
Irrigation System & Landscape Maintenance	Homeowners shall be responsible for landscape maintenance associated with their lot which will include activities such as replacement of dead vegetation, the repair of erosion rills, proper disposal of green waste, etc. Per Article 7.3 of CC&Rs, if the homeowner fails to meet HOA requirements, the HOA will repair and replace vegetation at the Homeowners expense. For open space and common space areas, the HOA will ensure that weekly landscape maintenance procedures will incorporate the replacement of dead vegetation, the repair of erosion rills, proper disposal of green waste, trimming of overgrowth, etc. The HOA will perform monthly inspections for the irrigation system located within open space/ common space areas and will provide repairs, if observed, on system failures such as overspray and broken sprinkler heads.	Weekly/ Monthly	Homeowner & HOA
Common Area Litter Control	Trash receptacles will be located in common/ open space areas. The receptacles will be emptied weekly and placed in trash containers approved by the City for weekly disposal by Cathedral City's Trash and Recycling Department. Patrolling common areas and perimeter fences or walls to collect litter will occur weekly during landscape maintenance activities, noting trash disposal violations by tenants/home owners and reporting such observations to the HOA for investigation, and identification of the party responsible for the violation.	Weekly	HOA
Street Sweeping Private Streets and Parking Lots	Streets and alleys are owned by the City. The City will maintain street areas curb to curb. The HOA will maintain alley ways. Street sweeping on alley ways and common parking areas will be performed by the HOA. Trash and debris collected from maintenance activities shall be placed in receptacles to be disposed of by the City's Trash and Recycling Department	Monthly	HOA

Drainage Facility Inspection and Maintenance	Onsite catch basins and storm drain inlets will be inspected prior to the start of the rainy season (October 1st) shall be performed. The inlets and catch basins will be cleaned when accumulated sediment/debris fills 25% or more of the sediment/debris storage capacity. Onsite retention basins shall be cleaned of debris during weekly landscape maintenance activities. Trash and debris shall be placed in trash receptacles. Drywells are to be inspected prior to the start of the rainy season. Sediments, trash and debris shall be placed in trash receptacles. 72 hours after any storm event, retention basins and dry wells shall be inspected to ensure proper infiltration is occurring. Excess sediments and debris shall be removed. Repair as needed.	Yearly/ 72 hrs after any storm event	HOA
Storm Drain Inlet Stenciling & Signage	Where onsite catch basins are located, stenciling or labeling containing a brief statement prohibiting dumping into the onsite storm drain system or graphical icons discouraging illegal dumping shall be provided. Stenciling/ signage repairs will be performed as needed.	Yearly	HOA
Landscape and Irrigation System Design	Implementation of landscaping that is consistent with the local land use authority's water conservation ordinance, and landscaping that utilizes native or drought tolerant species.	New Ownership or Development	HOA & Homeowner
Protection of Slopes and Channel	Slopes in retention areas and slopes located on individual lots will be planted with native or drought tolerant vegetation to prevent erosion of slope walls. Slopes shall be maintained with the use of efficient irrigation and typical landscaping activities. If erosion rills occur, repair as needed.	Yearly	HOA & Homeowner

Properly Design and Maintain Trash Storage Areas	All trash container areas in common and open space areas maintained by the HOA will be designed to City's standards and shall meet the following requirements: ▪ Paved with an impervious surface, designed not to allow run-on from adjoining areas, designed to divert drainage from adjoining roofs and pavements areas, screened or walled to prevent off-site transport of trash. ▪ Trash dumpsters (containers) shall be leak proof and have attached covers or lids. ▪ Connection of trash area drains to the MS4 is prohibited. Individual lots will have trash containers provided by the Cathedral City. Three 96 gallon automated carts with workable lids will be provided by the City to each homeowner for the collection of regular household trash, recyclables, and green waste.	Weekly	HOA & Homeowner

Appendix D includes copies of the educational materials (described in Section 3.5.2.1 of the WQMP Guidance document) that will be used in implementing this project-specific WQMP.

The Homeowners association shall maintain inspection logs of routine maintenance inspections and shall note repairs performed.

VII. Funding

The Rio Vista Village Community Association will be responsible for the funding of Operation and Maintenance of all open space and common areas, retention basins, and common parking areas. Public streets and alley ways are owned by the City of Cathedral City. Cathedral City will be responsible for the maintenance of streets (curb to curb). The HOA will be responsible for the maintenance of alley ways and areas located between the right-of-way and curb of public streets.

Contact:
Rio Vista Village Community Association
C/O: The Management Trust (The Monarch Division)
Attention: Liz Weber, CCAM
Association Manager
39755 Berkey Drive, Suite A • Palm Desert, CA 92211
Phone: (760) 776-5100 ext 6341
Fax: (760) 776-5111

Homeowners will be responsible for Operation and Maintenance of individual lots.

Appendix B

Vicinity Map, WQMP Site Plan, Receiving Waters Map, and Reference Maps

WATER QUALITY MANAGEMENT PLAN

SHEET 1 OF 1

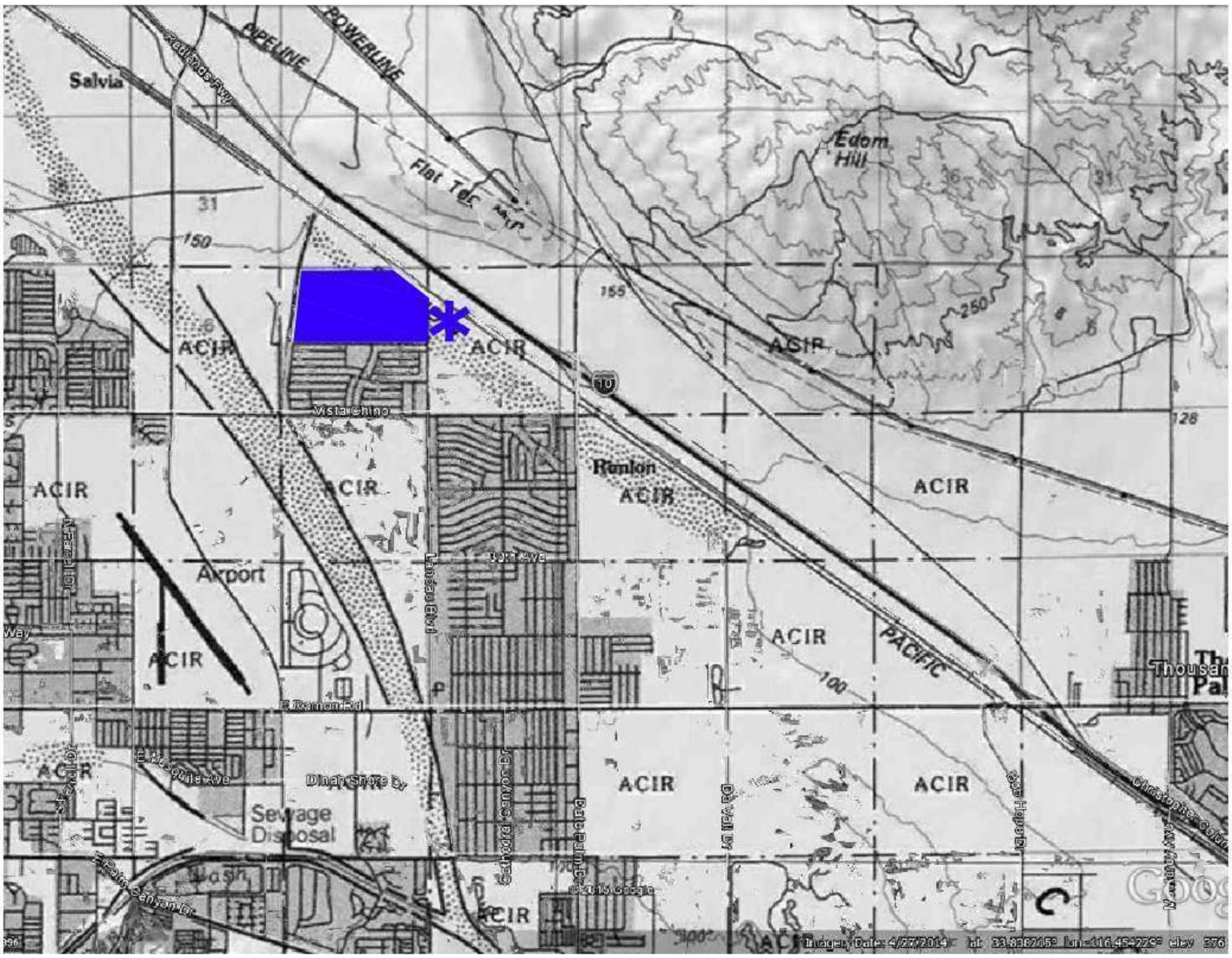
EXHIBIT A-VICINITY MAP

FOR

RIO VISTA VILLAGE

NW CORNER OF LANDAU BLVD AND VERONA RD

CATHEDRAL CITY, COUNTY OF RIVERSIDE



LEGEND:

- PROJECT AREA
- DISCHARGE POINT

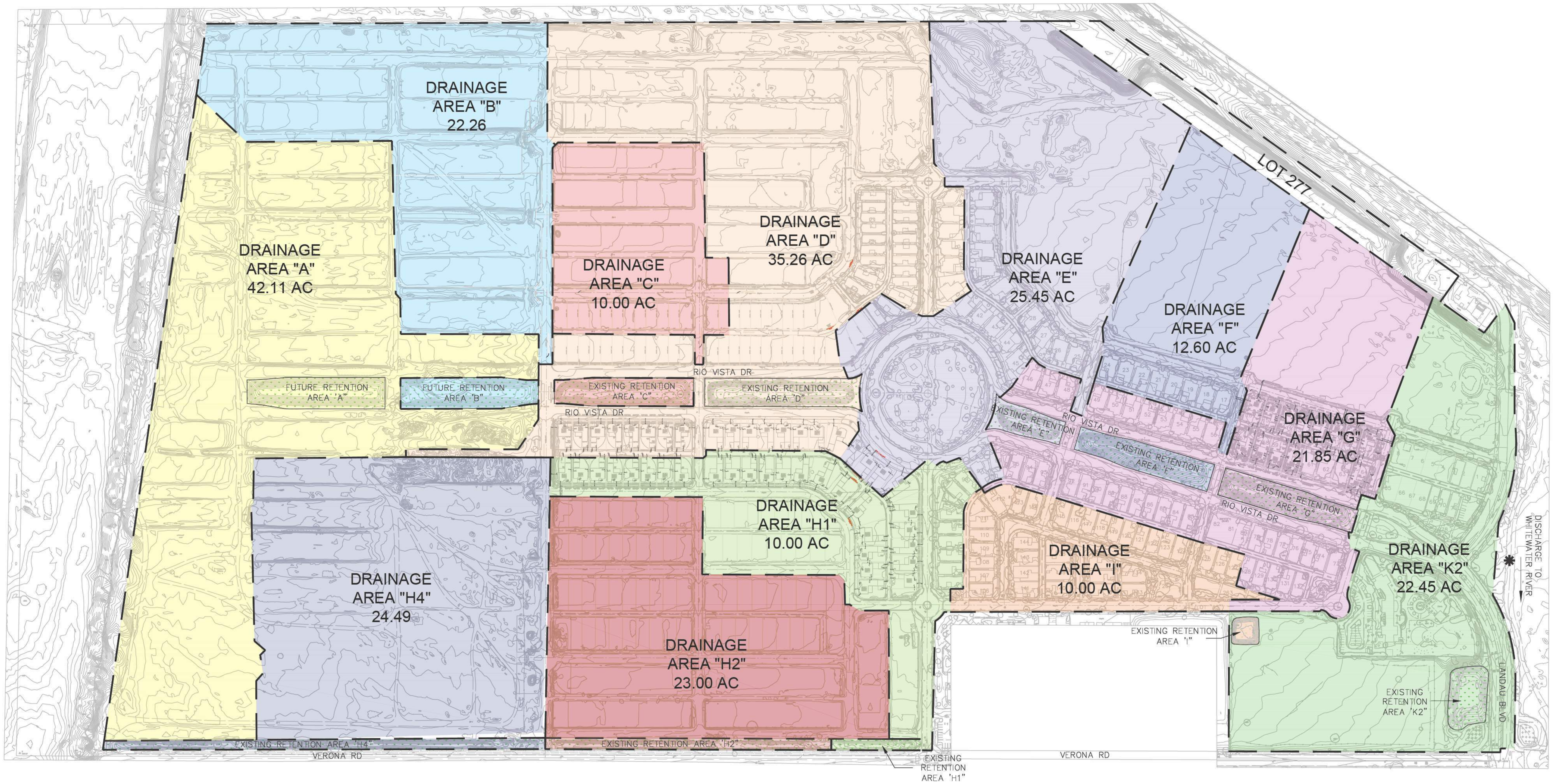
N

N.T.S.

CASC Engineering and Consulting
1470 EAST COOLEY DRIVE, COLTON, CA 92324
PH. (909) 783-0101 FAX (909) 783-0108
www.cei-casc.com

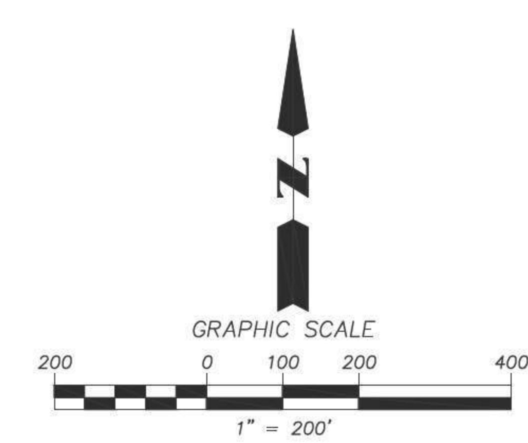
RETENTION AREA DATA			
	100-YR, 24-HR VOLUME OF RETENTION AREA (AC-FT)	MINIMUM DESIGN SURFACE AREA OF BASIN (CF)	PROVIDED SURFACE AREA OF BASIN (CF)
A	*	*	*
B	0.67	21018	27470
C	0.30	11471	14980
D	1.06	21635	26720
E	0.76	11854	12469
F	0.38	15311	19813
G	0.66	9272	25294
H1	0.30	5462	6453
H2	0.69	6011	25650
H4	0.73	6401	27000
I	0.30	6953	7545
K2	0.67	12912	19699

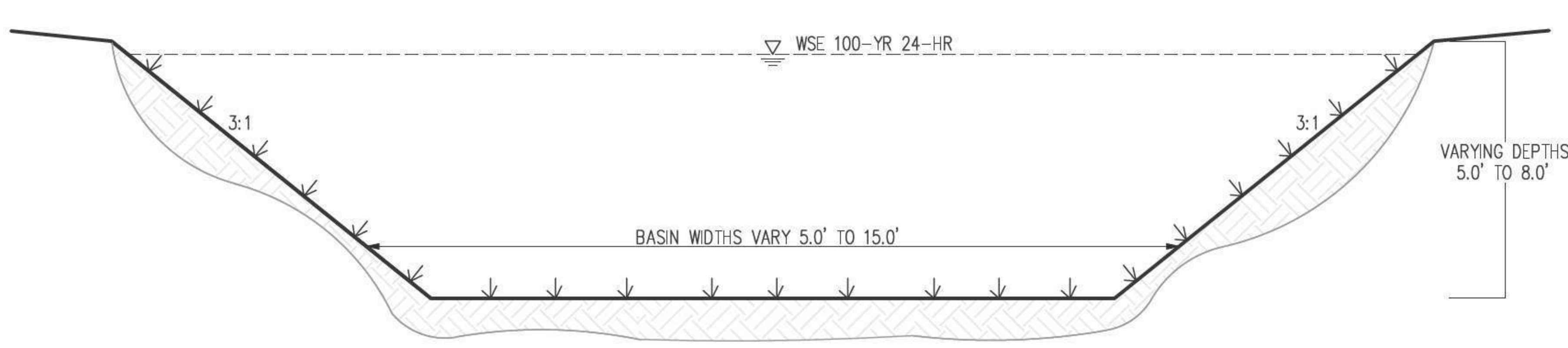
*TO BE DETERMINED DURING BUILD OUT



LEGEND

- RETENTION AREA
- EXISTING STRUCTURES
- DRAINAGE AREA BOUNDARY
- ✱ DISCHARGE POINT

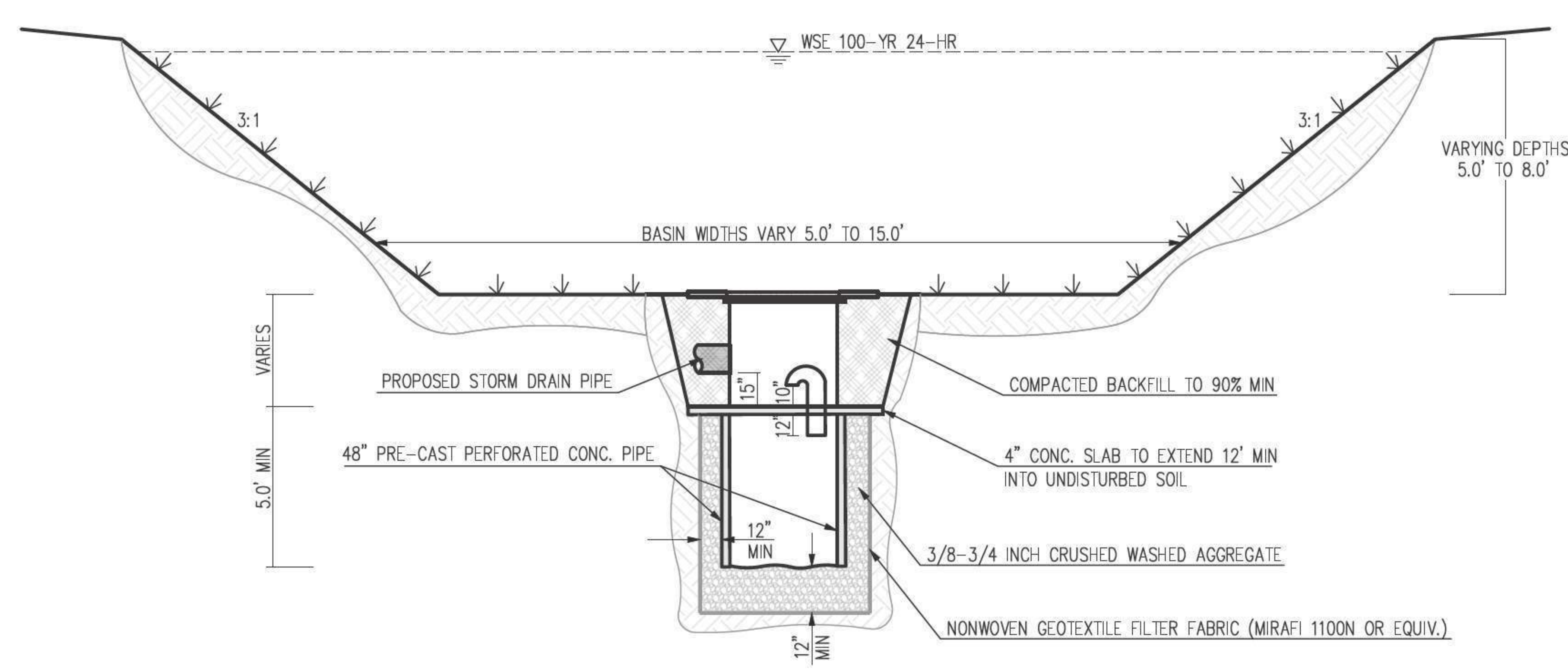




TYPICAL DETAIL

EXISTING RETENTION BASINS H1, H2, H4, AND K2

N.T.S.



TYPICAL DETAIL

EXISTING RETENTION AREAS C, D, E, F, G, AND I WITH DRY WELLS

N.T.S.

MASTER WATER QUALITY MANAGEMENT PLAN (M-WQMP) SITE EXHIBIT

FOR

RIO VISTA VILLAGE

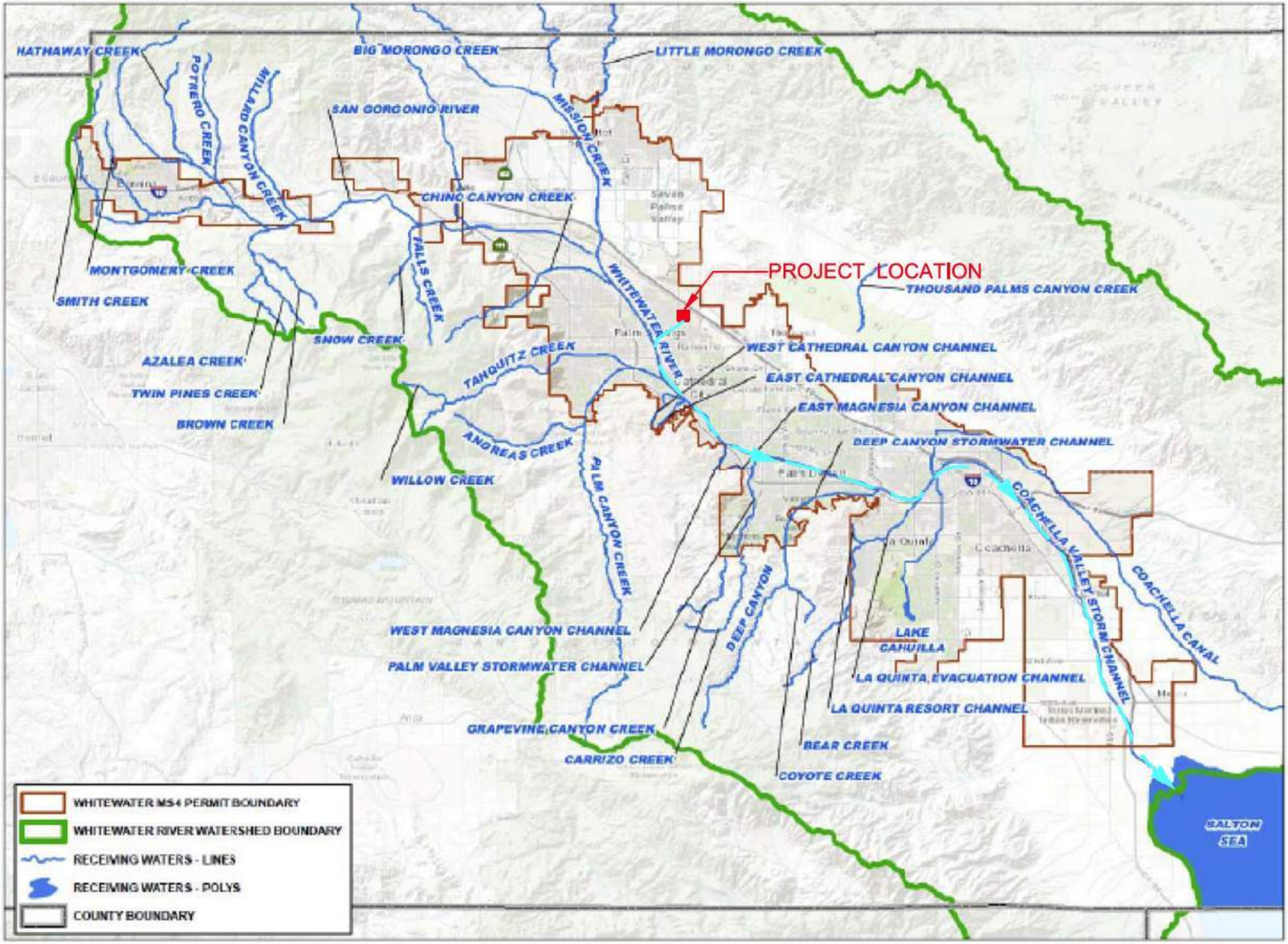
CASC Engineering and Consulting
1470 EAST COOLEY DRIVE, COLTON, CA 92324
PH. (909) 783-0101 FAX (909) 783-0108
www.oei-casc.com

APPLICANT:
INLAND COMMUNITY CORP.
6430 W. SUNSET BLVD., SUITE 460
LOS ANGELES, CA 90028
PH: (323) 874-8000

Drawing Name: Z:\1372-0001 Inland Communities - Rio Vista\WQMP DWGS\RIO VISTA MASTER V2.dwg
Last Opened: Jul 08, 2015 - 1:43pm by jgoode

RIO VISTA VILLAGE

Figure 2. Whitewater River Region Receiving Waters Map



CITY 300/54

IN THE CITY OF CATHEDRAL CITY, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

TRACT MAP NO. 28639-1

BEING A SUBDIVISION OF A PORTION OF THE NORTH HALF OF FRACTIONAL SECTION 5, TOWNSHIP 4 SOUTH, RANGE 5 EAST, S.B.M.
MAINIERO, SMITH AND ASSOCIATES, INC. MARCH 2000

300 NUMBERED LOTS
RESIDENTIAL LOTS- LOTS 1 - 261
PARK/OPENSPACE- LOTS 262-269, 271-272, 274, 278, 287, 288, 290, 295-298
FUTURE MULTI-FAMILY- LOTS 275 AND 276
FUTURE RESIDENTIAL- LOTS 270, 273, 286, 289
STORM DRAIN, RETENTION/OPEN SPACE- LOTS 279-282, 284, 285, 291
RECREATION- LOTS 283 AND 294
SCHOOL- LOT 292
COMMERCIAL- LOTS 277 AND 293
CVWD WELL SITES- LOTS 299, 300

A-Z, A1-A5- STREETS
AA-PP ALLEYS
QQ- STORM DRAIN LOT

SCALE 1"=300'

MONUMENT LEGEND

(A) FD 3-1/2" USGLO BRASS DISC UP 1.0' ACCEPT AS NW COR. SEC. 5 PER MB 41/67-71, STAMPED.

(B) FD USGLO BRASS DISC UP 0.5' ACCEPT AS N 1/4 SEC. 5 PER MB 41/67-71, STAMPED.

(C) SEARCHED, FD NOTHING. POINT FALLS IN DRIVING LANE OF I-10 FREEWAY. POSITION RE-ESTABLISHED BY INTERSECTION OF LINE THROUGH FOUND MONUMENTS OF EAST LINE AND PROLONGATION OF NORTH LINE. POSITION FITS TIE OF 53.27' SHOWN AS STA. 603+24.51 POT ON I-10 RW MAP 204-592

(D) FD 2x2 HUB OVER BRASS DISC STAMPED "603+24.51 POT" PER I-10 R/W MAP 204-592

(E) FD 3/4" I.P. DOWN 1.0' NO TAG, IN LIEU OF 1-1/4" I.P. FOR W 1/4 COR SEC. 5 PER MB 41/67-71. AFFIX TAG RCE 26401.

(F) FD COPPERWELD FLUSH RCE 22015 COR. REC. 97-215 AND 96-365 ACCEPT AS INTERSECTION VERONA ROAD AND VENTURA DRIVE, AS SHOWN ON MB 42/26-30.

(G) FD COPPERWELD FLUSH RCE 22015, NO REFERENCE. ACCEPT AS INTERSECTION NORTADA DRIVE AND VERONA ROAD.

(H) SEARCHED FOR C 1/4. DESTROYED BY CONSTRUCTION. RE-ESTABLISHED BY PRORATION BETWEEN 1/4 CORNERS.

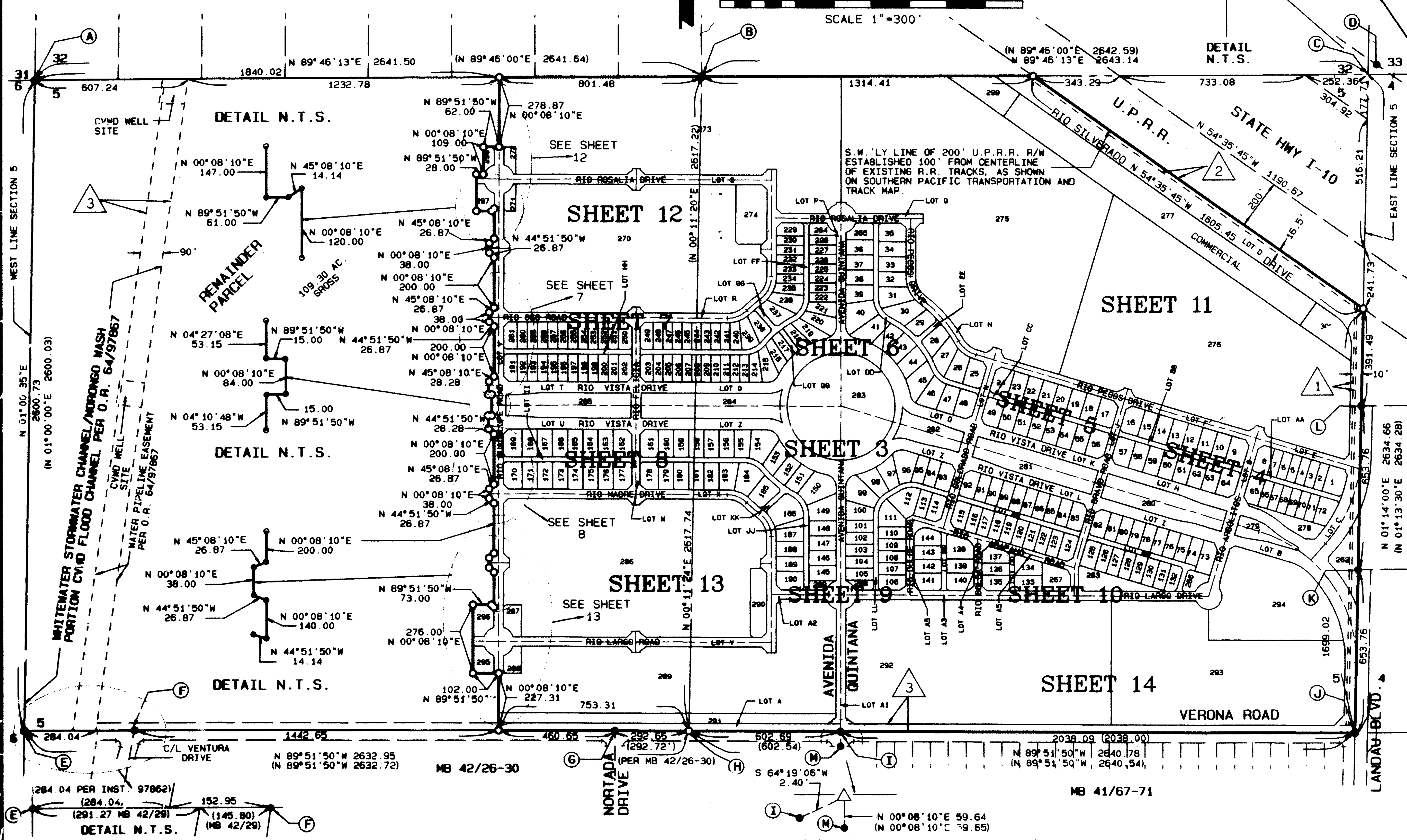
(I) FD COPPERWELD FLUSH RCE 22015 PER COR. REC. 97-177 S 64°19'06"W 2.40' FROM POSITION. ESTABLISHED POSITION FROM COPPERWELD AT B.C. TO SOUTH, PER COR. REC. 97-178. SET COPPERWELD FLUSH STAMPED RCE 26401

(J) FD COPPERWELD FLUSH RCE 22015 PER COR. REC. 97-156 AND 96-390 ACCEPT AS E 1/4 COR. SEC. 5, AS SHOWN ON MB 42/26-30.

(K) FD 1/2" I.P. NO TAG ACCEPT AS POINT ON LINE ONLY.

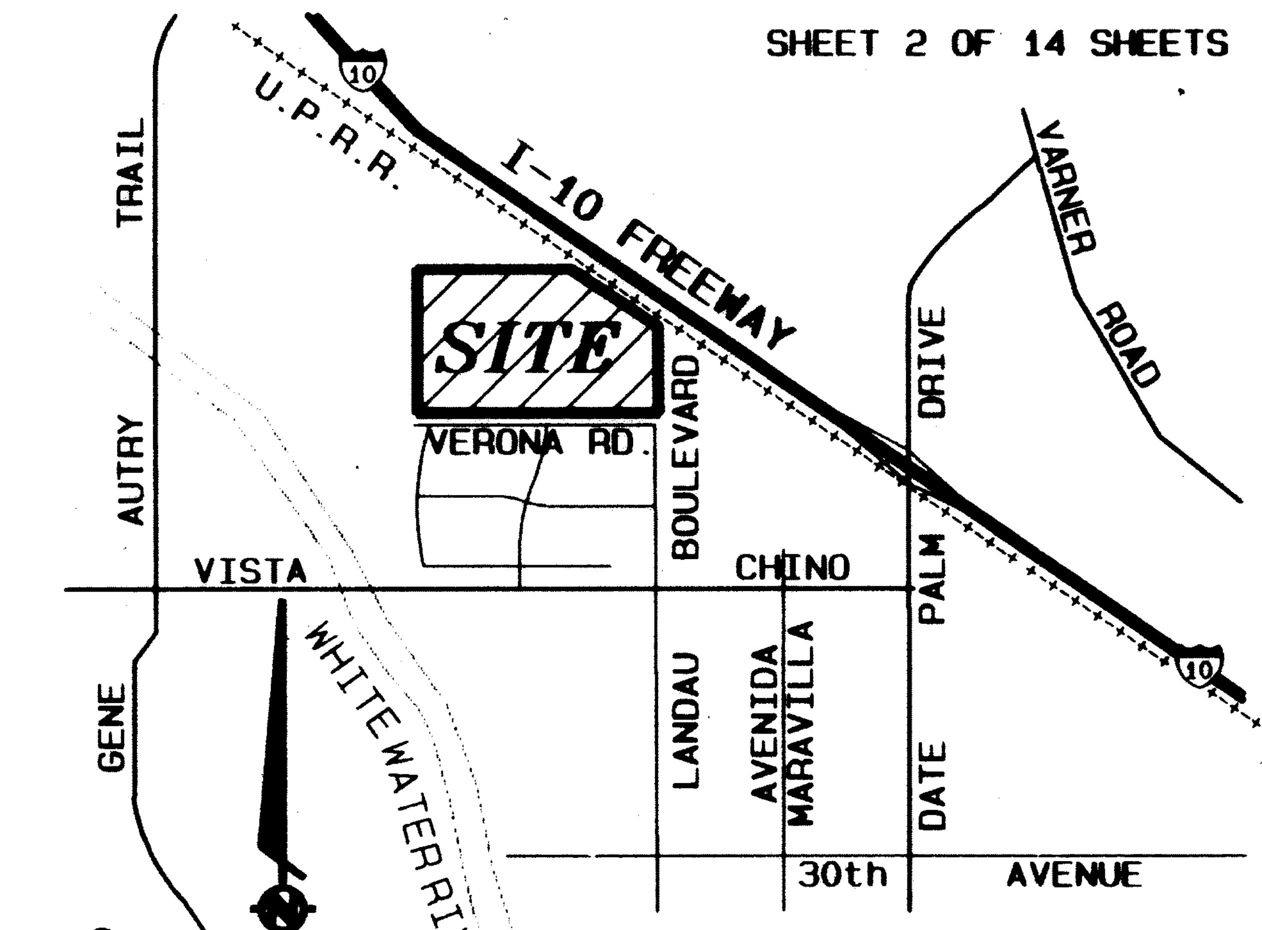
(L) FD 1-1/2" I.P. RCE 9121. ACCEPT AS POINT ON LINE ONLY.

(M) FD COPPERWELD FLUSH RCE 22015, PER COR. REC. 97-178 AND 96-373. ACCEPT AS C/L B.C. OF AVENIDA QUINTANA.



VICINITY MAP

NOT TO SCALE



ENGINEER'S NOTES

THE BASIS OF BEARINGS FOR THIS MAP IS THE CENTERLINE OF VERONA ROAD BETWEEN VENTURA DRIVE AND LANDAU BLVD. AS SHOWN ON TR. 2122 ON FILE IN BOOK 42, PAGES 26-30 OF MAPS, TAKEN AS N 89°51'50"W

● INDICATES FOUND MONUMENT AS NOTED

○ INDICATES SET 1" I.P. FLUSH, TAGGED RCE 26401

△ INDICATES SET 1-1/4" BRASS DISC STAMPED RCE 26401, FLUSH, IN A.C. PAVEMENT (RIV. CO. STD. TYPE "B") MONUMENT), UNLESS NOTED OTHERWISE

(-) INDICATES RECORD DATA PER MB 41/67-71 UNLESS NOTED OTHERWISE

PUE INDICATES PUBLIC UTILITY EASEMENT

CVWD INDICATES COACHELLA VALLEY COUNTY WATER DISTRICT

SET NAIL AND TAG IN CURB AT THE PROLONGATION OF ALL FRONT LOT CORNERS, STAMPED RCE 26401. SET NAIL AND TAG IN CURB AT ALL B.C.'S AND E.C.'S EITHER PERPENDICULAR OR RADIAL TO CENTERLINE, AS APPROPRIATE, STAMPED RCE 26401.

AT ALL REAR LOT CORNERS, SET 1" I.P. FLUSH IN NATURAL GROUND, TAGGED RCE 26401, SET NAIL AND TAG IN CONC. FOOTING STAMPED RCE 26401 OR NAIL AND TAG IN FENCING MATERIAL, TAGGED RCE 26401, AS APPROPRIATE.

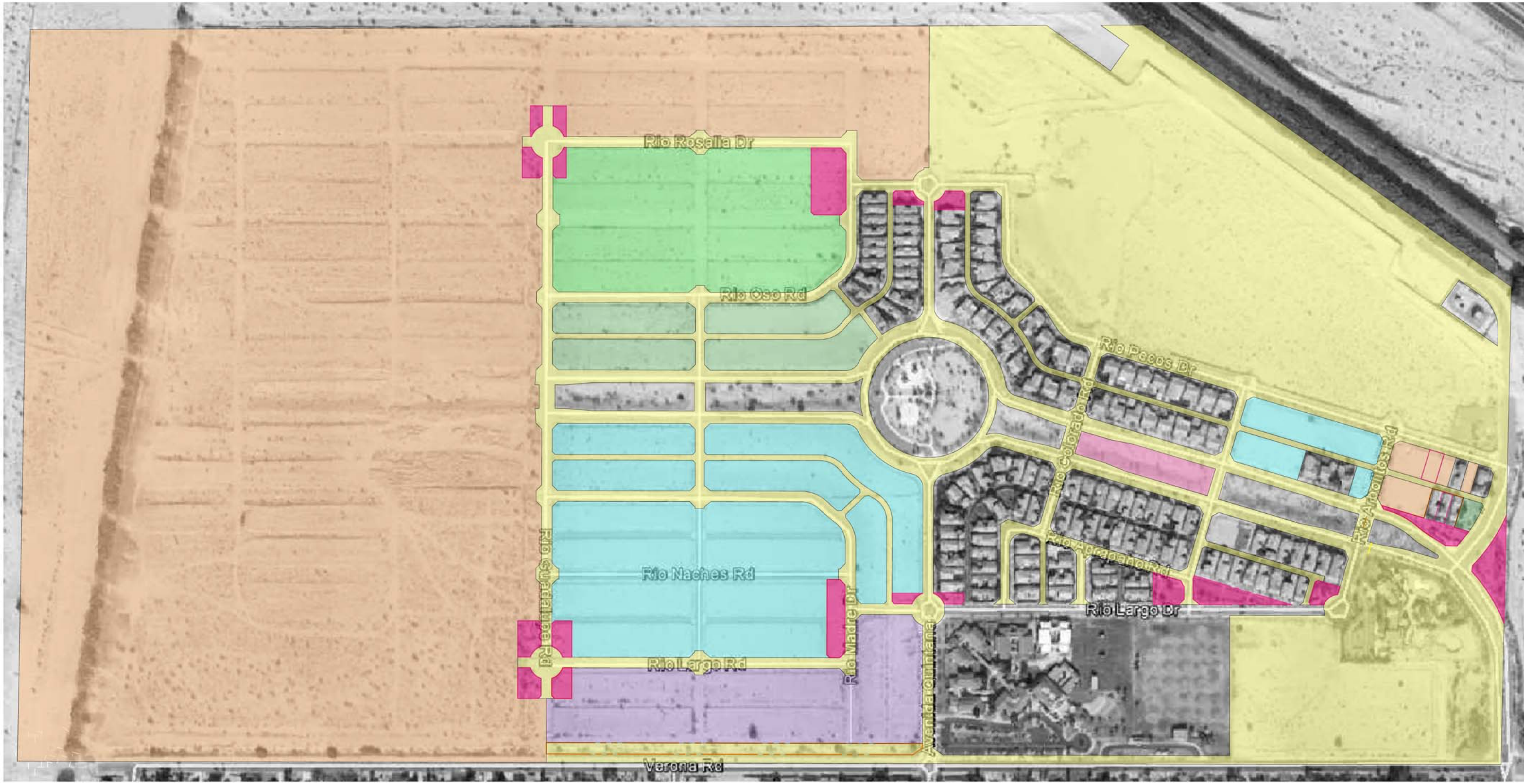
TOTAL GROSS AREA = 193.61 ACRES

EASEMENT NOTES

1. 10' WIDE PUBLIC UTILITY EASEMENT IN FAVOR OF SOUTHERN CALIF. EDISON SUCCESSOR IN INTEREST TO CALIFORNIA ELECTRIC POWER COMPANY, PER INST. NO. 34376, REC. 5-10-57, O.R.
2. 16.5' TELEPHONE LINE EASEMENT IN FAVOR OF OF GENERAL TELEPHONE COMPANY, SCUCESSOR TO PACIFIC TELEPHONE AND TELEGRAPH PER DEED REC. 1/23/12 IN BK. 344, PG. 227, O.R.
3. 30' WIDE PUBLIC ROAD AND UTILITY EASEMENT, IN FAVOR OF THE CITY OF CATHEDRAL CITY, PER INST. NO. 117040, REC. 4-2-96, O.R.
4. 20' WIDE BLOWSAND CONTROL EASEMENT IN FAVOR OF THE CITY OF CATHEDRAL CITY. PER INST. NO. 117039, REC. 4-2-96, O.R. SEE SHEET 14 FOR ABANDONMENT CERTIFICATE.
5. PIPELINE EASEMENT IN FAVOR OF SOUTHERN PACIFIC RAILROAD COMPANY PER INST. REC. 1-29-37 IN BK. 309, PG. 572, O.R. (BLANKET IN NATURE)

DRAWING NUMBER 300/54 29 14

DRAWING NUMBER 28639-1



VERONA RECOVERY, LLC	CITY OF CATHEDRAL (BEING ACQUIRED BY VERANO RECOVERY, LLC)
PORTALES RECOVERY, LLC	CASSIA AT RIO VISTA RECOVERY, LLC
SOL RECOVERY, LLC	CITY OF CATHEDRAL CITY, TO BE MAINTAINED BY RIO VISTA COMMUNITY ASSOCIATION
RIO VISTA COMMUNITY ASSOCIATION	

N

NO SCALE

PROPERTY OWNERSHIP REFERENCE EXHIBIT

FOR

RIO VISTA VILLAGE MASTER WOMP

CASC Engineering and Consulting

APPLICANT:

INLAND COMMUNITY CORP.
6430 W. SUNSET BLVD., SUITE 460
LOS ANGELES, CA 90028
PH: (323) 874-8000

Project Description

Project Owner: Portales Recovery, LLC
Attn: Mohamad Younes, P.E.
c/o Inland Communities Corp.
6430 W. Sunset Boulevard, Suite 460
Los Angeles, CA 90028
(323) 874-8000

WQMP Preparer: CASC Engineering and Consulting, Inc.
77-567 Country Club Drive, Suite 211
Palm Desert, CA 92211
Office: (760) 259-0108

Project Site Address: **NW Corner of Landau Blvd & Verona Rd**
Cathedral City, CA

Planning Area/
Community Name/
Development Name: **Los Portales 13 – Rio Vista Village (Final WQMP)**

APN Number(s): **Los Portales 13 (Lots 9-16, 57-60, & 64 of Tract 28639-1**)
APNs 677-553-001 to 677-553-012 & 677-553-016

Latitude & Longitude: **33.8556, -116.4824**

Receiving Water: **Whitewater River to Coachella Valley Storm Water Channel**

Project Site Size: **3.79 ac**

Standard Industrial Classification (SIC) Code: **1521, Single Family Homes**

Formation of Home Owners' Association (HOA)
or Property Owners Association (POA): Y ☒ N ☐

*See Rio Vista Master WQMP Section, Appendix G – CC&Rs

Los Portales 13 Final WQMP

Los Portales 13 lies within the project area of the Master WQMP (M-WQMP) for Rio Vista Village. The project will comply with the requirements established in the M-WQMP. Conditions of Approval for this phase of the development are located in the Rio Vista Village Master WQMP Section, Appendix A. Los Portales 13 proposes to develop Lots 9-16, 57-60, and 64 of Tract Map 28639-1. The proposed area for Los Portales 13 is approximately 3.79 acres. The project will construct 13 single family residences along Rio Vista Drive between Rio Bravo Road and Rio Arbolitos Road. Proposed construction will consist of residential buildings, utility laterals, landscaping, and minor grading. Roads, alleyways, curb and gutter, utilities, storm drain systems, and Retention Basin G were previously constructed during the initial phases of the project.

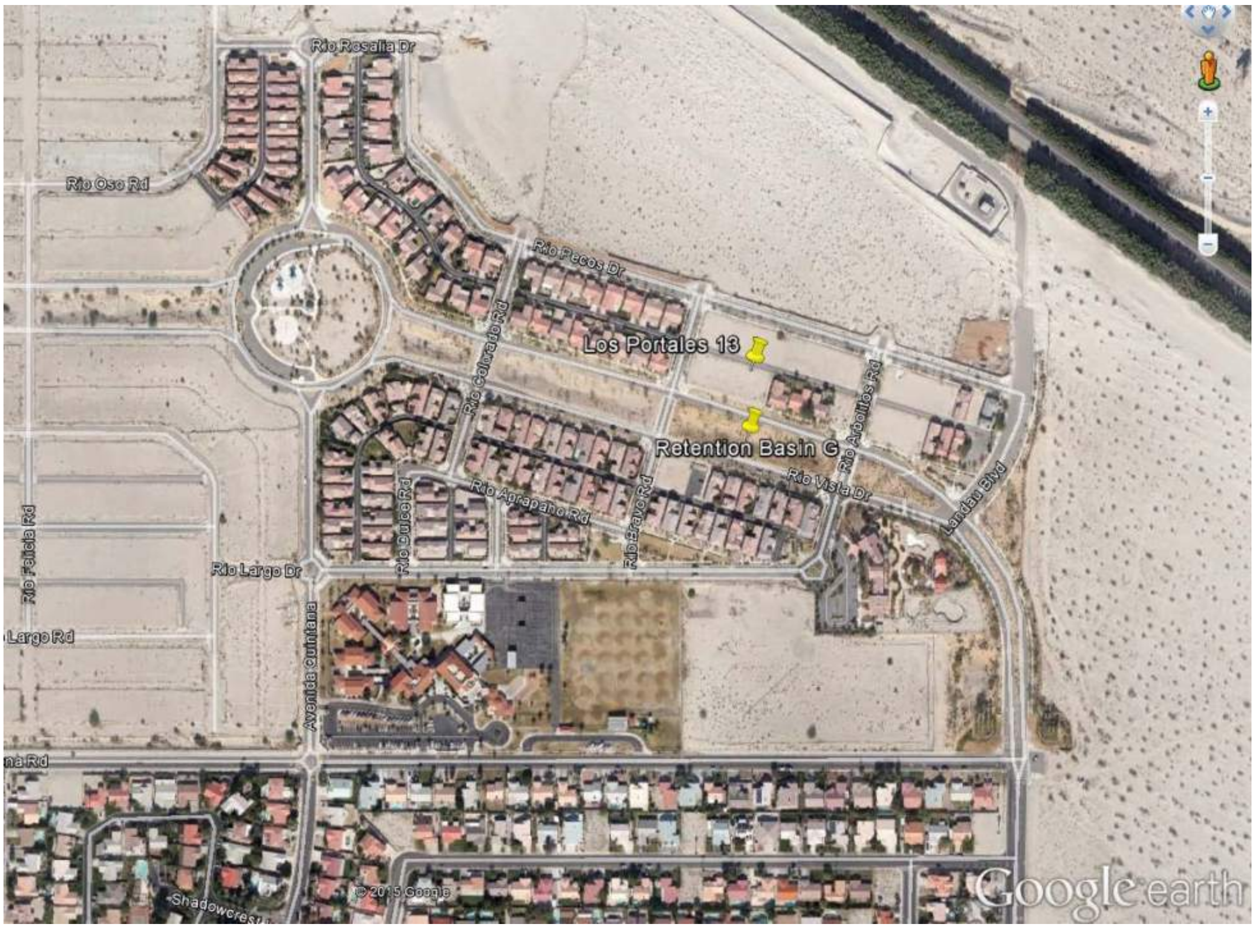


Figure 1. Project location of Los Portales 13 and Retention Basin G.

Los Portales 13 is located within Drainage Area G of the hydrology study. See Rio Vista Master WQMP Section, Appendix F – Drainage Report (dated May 4, 2001). The drainage area is approximately 12.60 acres. Each proposed lot will implement landscaping and roof runoff controls as on-lot site design features. Roof runoff will drain to landscaped areas and then conveyed to landscaped swales. Flows are directed to the existing curb and gutter system of the development and enter catch basins. Discharge is directed through the storm drain system to Retention Basin G.

Figure 2. Westerly view at the intersection of Rio Vista Boulevard and Rio Arbolitos Road. Catch basins associated with the drainage of Los Portales 13 are located at the northwest corner of Retention Basin G and at the northwest corner of the intersection.

To address potential water quality impacts associated with the development of the 13 residential lots, the project will utilize existing Retention Basin G in this drainage area for treatment control. The basin is designed with 3:1 slopes with capacity to detain for the 100-year, 24-hour storm event. Overflows from the 100-year, 24-hour storm event will discharge from catch basins located at the northeast corner and southeast corner of the basin. Overflows will be conveyed along the curb and gutter of Rio Vista Boulevard to Landau Boulevard. The total design capacity of the retention basin is 1.87 ac-ft. Infiltration testing sited a rate of 8.94 in/hr (Appendix F, Basic Infiltration Testing Report). Calculations were prepared using the infiltration rate and volumes based on the 100-yr, 24-hr storm event per the hydrology study. See M-WQMP, Appendix F, Infiltration Basin G Worksheet. The calculations demonstrate that the design of the basins provide adequate surface area to infiltrate for this event within 36 hours. The design of the existing basins exceed current NPDES WQMP requirements. Cathedral City Municipal Code – Title 8 § 8.24.070 requires the retention/detention of the 100-year, 3-hour storm events. The design capture volume of the retention areas surpasses this volume. Therefore, the project is not subject to the HCOC provisions of the WQMP and the project satisfies 100% of the LID/ site design measurable goal.

Figure 3. Overflow locations of Retention Basin G.

Attachments for Los Portales 13 Final WQMP section will include:

A. A Site Plan for the project. The Site Plan included as part of Appendix B depicts the following project features:

- Location and identification of all structural BMPs, including Source Control, LID/Site Design and Treatment Control BMPs.
- Landscaped areas.
- Paved areas and intended uses (i.e., parking, outdoor work area, outdoor material storage area, sidewalks, patios, tennis courts, etc.).
- Number and type of structures and intended uses (i.e., buildings, tenant spaces, dwelling units, community facilities such as pools, recreation facilities, tot lots, etc.).
- Infrastructure (i.e., streets, storm drains, etc.) that will revert to public agency ownership and operation.
- Location of existing and proposed public and private storm drainage facilities (i.e., storm drains, channels, basins, etc.), including catch basins and other inlets/outlet structures. Existing and proposed drainage facilities should be clearly differentiated.
- Location(s) of Receiving Waters to which the project directly or indirectly discharges.
- Location of points where onsite (or tributary offsite) flows exit the property/project site.

DRAINAGE REPORT

TRACT 28639-1

RIO VISTA VILLAGE
City of Cathedral City, California

Prepared for

BURNETT COMPANIES

REGISTERED PROFESSIONAL ENGINEER
JULIAN A. DE LA TORRE
Julian A. De La Torre
NO. 43880
exp. 6-30-01
CIVIL
STATE OF CALIFORNIA

Revised May 4, 2001

Prepared by

MAINIERO, SMITH AND ASSOCIATES, INC.
PLANNING / CIVIL ENGINEERING / LAND SURVEYING
777 East Tahquitz Canyon Way, Suite 301, Palm Springs, CA 92262
Telephone (760) 320-9811 / FAX (760) 323-7893 / www.mainierosmith.com

Project Description

The Rio Vista Village (development) watershed is generally bounded by the Southern Pacific Railroad right-of-way on the north, Verona Road to the south, Landau Boulevard on the east, and the Morongo Creek Stormwater Channel on the west (see Figure 1). Tract 28639-1 (project) occupies the eastern two-thirds of the Rio Vista Village development (see Figure 2).

Existing Hydrology and Flood Control Improvements

The Rio Vista Village watershed consists of undeveloped, flat desert terrain sloping in a southeasterly direction (see Figure 1).

An unlined earthen channel/levee system known as the Morongo Creek Stormwater Channel runs along the west side of the development. It is assumed that the existing facility will intercept and convey the tributary offsite storm flows.

Rio Vista Village Master Plan of Drainage

The Rio Vista Village Master Plan of Drainage and the Rio Vista Village Master Plan of Drainage Alternative were prepared by AEI-CASC Engineering in May of 2000. The two Master Plans and the Mass Grading Plan for the development were approved on August 24, 2000. The Master Drainage Plan Alternative was prepared to identify the advantages of conveying storm flows within the street right-of-way and public utility easement (P.U.C.). These Master Plans were used as a planning tool to collect and convey the 100-year storm flows associated with the final improvements of Tract 28639-1.

Hydrology and Hydraulic Methods

The City of Cathedral City has local flood control jurisdiction and has required that Rio Vista Village retain 100% of the 100-year, 24-hour storm that falls within the site. In addition, the 10-year storm flows shall not exceed the top of curb and the 100-year storm flows shall not exceed the public utility easement (located 10-feet outside the proposed curb).

The Rational Method Hydrology computer program, Version 1.5A was used to determine the peak flows during the10-year and 100-year, 1-hour storm events. Soil Type "A" was used throughout the analysis. Development types were interpreted from the "Land Used Plan" provided in the Specific Plan for this development (see Figure 3). 60-foot, 58-foot and some 48-foot wide lots with park areas were grouped into the 50-percent impervious category, while 38-foot and most 48-foot wide lots where grouped into the 65-percent impervious category. Park areas were considered to be 40-percent impervious and retention basin 15-percent impervious. The Rational Method program uses a County of Riverside standard curb when determining the depth of flow in the streets. The majority of the project streets have a wedge curb. The wedge curb, in combination with the typical street cross section, has the capacity to convey more flow at top of curb than the standard curb street. Figures 4 & 5 indicate the formula to determine the curb capacity based on the street width and slope. Using street slope from the Street Improvement Plans the true street capacity is indicated next to the appropriate Rational Method section. For Rational Method sections where no depth of flow is given, separate Rational Method calculations were performed, using flow, slope and street width. These calculations are not included in this report but can be provided for reference, if needed. The 10-year storm does not exceed the top of curb. The 100-year storm does not exceed the public utility easement (see Figures 6-10 for typical street sections and wedge curb detail). There are small drain boxes and small drain lines around Rio Vista Drive. These facilities are intended to pick-up nuisance flows while storm flows are assumed to flow-by. These facilities are not incorporated in the Rational Method or Storm Drain Analysis (see the Proposed Hydrology Map).

The Unit-Hydrograph Analysis computer program based on the 1978 RCFC&WCD Hydrology Manual was used to determine the runoff volume tributary to the proposed retention basins during the 100-year, 24-hour storm event. Figures 11-21 indicate the eleven drainage areas covered in this report. See Figure 22 for the Unit Hydrograph Summary Chart that identifies the characteristics of each drainage area. 100-percent of the 100-year, 24-hour storm runoff is captured and retained by the proposed retention basins. Figures 23-44 represent the retention capacity and shape of each retention basin. The 100-year, 1-hour runoff volume (hgl) and the 100-year, 24-hour runoff volume are also indicated on these figures.

The Simplified Method to Establish the 100-Year, 1-Hour Storm Hydraulic Grade Line in Retention Basins was used to determine the hydraulic grade line at the outlet of each storm drain system. This hydrologic method was proposed to the City of Cathedral City in an effort to establish a beginning hydraulic grade line for the storm drain systems of Rio Vista Village during the peak runoff of the 100-year, 1-hour storm. This method was approved by Dave Feassel (City Engineer) on March 7, 2001. A Simplified Method is provided for each drainage area (see Simplified Method to Establish the 100-Year, 1-Hour Storm Hydraulic Grade Line in Retention Basins).

The Eagle Point Storm Sewer Analysis program was used to determine the hydraulic grade line of the proposed storm drain system. The storm sewer line information is taken from the Storm Drain Improvement Plans for Tract 28639-1. The storm drain flow information is taken from the Rational Method results. The Storm Sewer Analysis program represents the storm drain system as a series of connected lines and manholes. Lines represent the storm drains, and manholes represent catch basins, manholes, junction structures and deflection angles (see Storm Drain System Hydraulics).

The Catch Basin Capacity Charts were used to determine the required catch basin openings in the 100-year storm. The 100-year peak runoff and depth of flow was taken from the Rational Method results. The catch basins are sized to capture the 100-percent of the 100-year flows (see Catch Basin Calculations).

Proposed Flood Control Improvements

Proposed flood control improvement for the eleven drainage areas, as shown on Figures 11-21, consists of the following:

Drainage Area "B" – Retention Area "B" is constructed in accordance with the Mass Grading Plan for Rio Vista Village. Storm Drain Line B-1 (33", 27" & 24"), B-2 (18") and B-3 (18") are constructed per the Storm Drain Plans for Tract 28639-1. Storm drain flows and hydraulic grade lines are also shown on the Storm Drain Plans (copy attached).

Drainage Area "C" – Retention Area "C" is constructed in accordance with the Construction Phase 4 Precise Grading Plans for Rio Vista Village. Storm Drain Line C-1 (24" & 18") are constructed per the Storm Drain Plans for Tract 28639-1. Storm drain flows and hydraulic grade lines are also shown on the Storm Drain Plans.

Drainage Area "D" – Retention Area "D" is constructed in accordance with the Construction Phase 3 Precise Grading Plans for Rio Vista Village. Storm Drain Line D-1 (42", 33" & 27"), D-2 (27" & 21") and D-3 (24") are constructed per the Storm Drain Plans for Tract 28639-1. Storm drain flows and hydraulic grade lines are also shown on the Storm Drain Plans.

Drainage Area "E" – Retention Area "E" is constructed in accordance with the Construction Phase 3 Precise Grading Plans for Rio Vista Village. Storm Drain Line E-1 (30" & 24") and E-2 (18") are constructed per the Storm Drain Plans for Tract 28639-1. Storm drain flows and hydraulic grade lines are also shown on the Storm Drain Plans.

Drainage Area "F" – Retention Area "F" is constructed in accordance with the Construction Phase 2 Precise Grading Plans for Rio Vista Village. Storm Drain Line F-1 (24" & 21") are constructed per the Storm Drain Plans for Tract 28639-1. Storm drain flows and hydraulic grade lines are also shown on the Storm Drain Plans.

Drainage Area "G" – Retention Area "G" is constructed in accordance with the Construction Phase 1B Precise Grading Plans for Rio Vista Village. Storm Drain Line G-1 (30", 24" & 18") and G-2 (18") are constructed per the Storm Drain

Plans for Tract 28639-1. Storm drain flows and hydraulic grade lines are also shown on the Storm Drain Plans.

Drainage Area "H1" – Retention Area "H1" is constructed in accordance with the Mass Grading Plan for Rio Vista Village. Storm Drain Line H1-1 (24" & 18") are constructed per the Storm Drain Plans for Tract 28639-1. Storm drain flows and hydraulic grade lines are also shown on the Storm Drain Plans.

Drainage Area "H2" – Retention Area "H2" is constructed in accordance with the Mass Grading Plan for Rio Vista Village. Storm drain facilities are not required at this time.

Drainage Area "H4" – Retention Area "H4" is constructed in accordance with the Mass Grading Plan for Rio Vista Village. Storm drain facilities are not required at this time.

Drainage Area "I" – Retention Area "I" is constructed in accordance with the Mass Grading Plan for Rio Vista Village. Storm Drain Line I-1 (24") is constructed per the Storm Drain Plans for Tract 28639-1. Storm drain flows and hydraulic grade lines are also shown on the Storm Drain Plans.

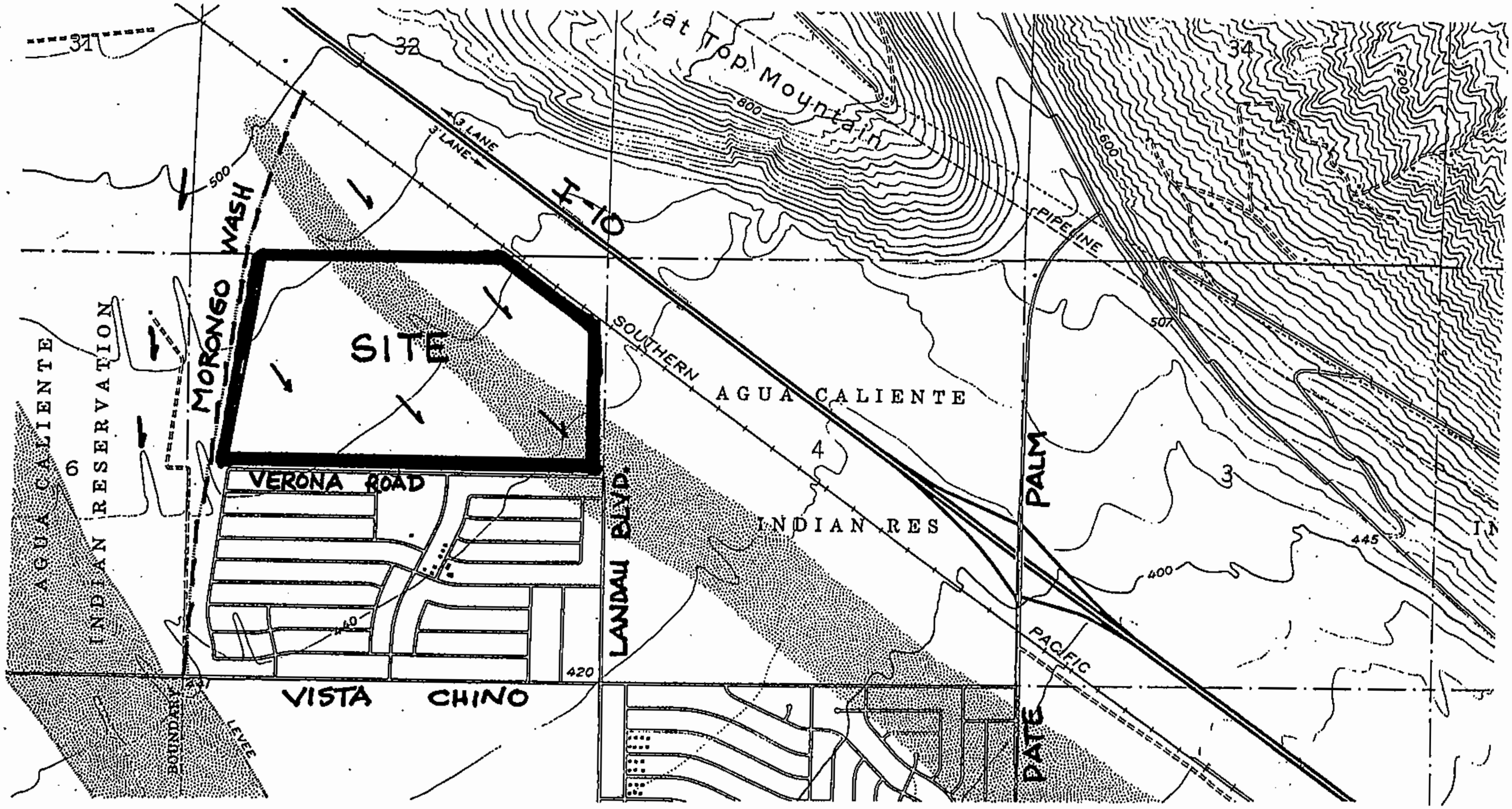
Drainage Area "K2" – Retention Area "B" is constructed in accordance with the Beach Club Precise Grading Plan for Rio Vista Village. Storm Drain Line K2-1 (30" & 27") are constructed per the Storm Drain Plans for Tract 28639-1. Storm drain flows and hydraulic grade lines are also shown on the Storm Drain Plans.

Conclusions

Based on results of this Drainage Report, it is concluded that:

1. Implementation of the proposed drainage facilities, as shown in this report, will provide Tract 28639-1 with 100-year flood protection from storm flows generated onsite.
2. The onsite 100-year storm flows will be intercepted and conveyed safely through proposed drainage facilities. These storm flows will be retained within the proposed retention basins.
3. In the event of storms larger than 100-year event, storm runoff will exceed the capacity of the retention basins, pond and safely overflow to Landau Boulevard.

Figures



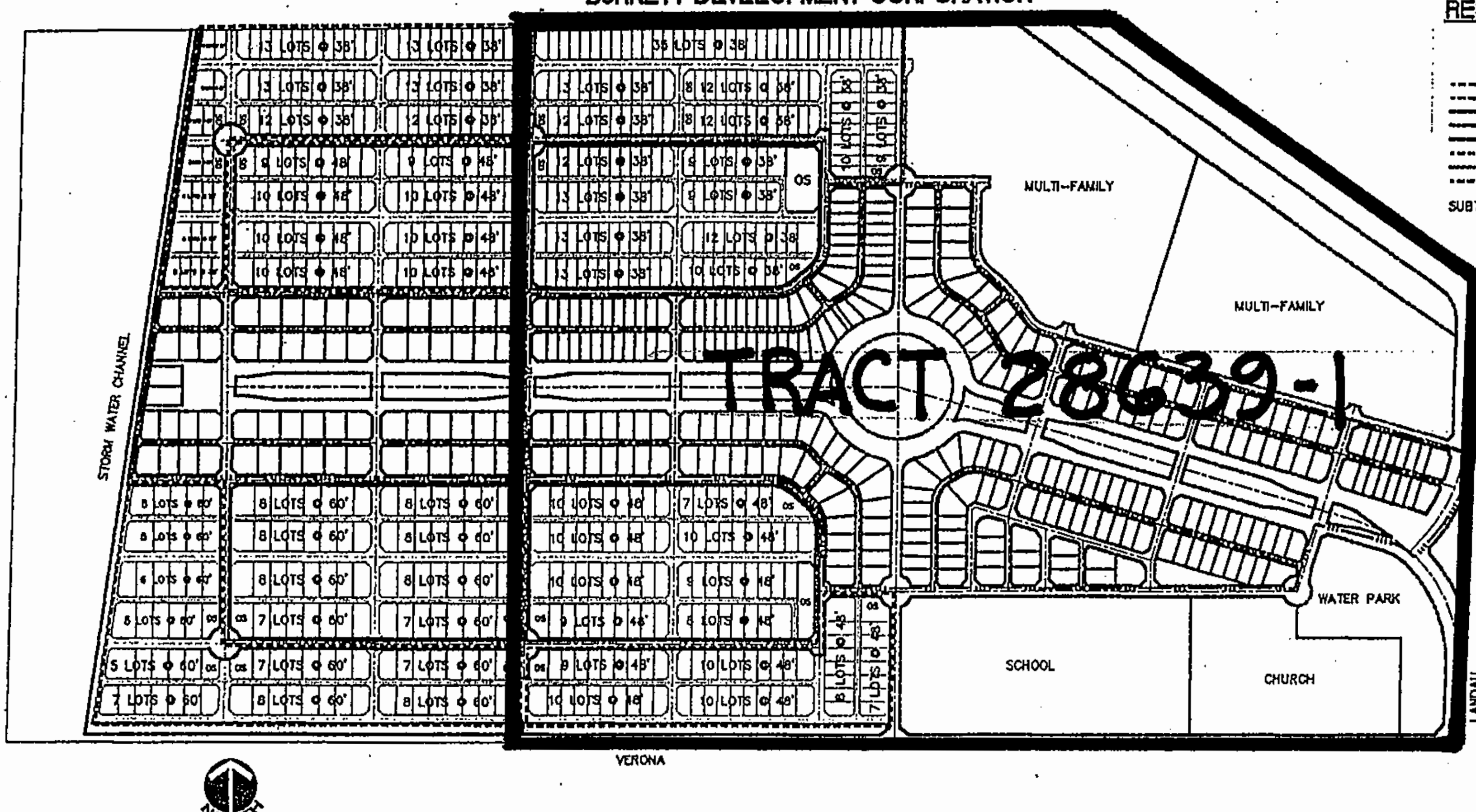
VICINITY MAP

Figure 1

TENTATIVE TRACT MAP NO. 28639

RIO VISTA VILLAGE

BURNETT DEVELOPMENT CORPORATION



RESIDENTIAL LOT ANALYSIS

LEGEND

Future Residential Lots	Open Space (OS)
54 LOTS @ 48'	.35 ACRES
83 LOTS @ 60'	.51 ACRES
62 LOTS @ 60'	.44 ACRES
73 LOTS @ 48'	.83 ACRES
91 LOTS @ 38'	.90 ACRES
78 LOTS @ 48'	.31 ACRES
103 LOTS @ 38'	.37 ACRES
97 LOTS @ 38'	.35 ACRES
SUBTOTAL 621 LOTS	4.06 ACRES

291 LOTS @ 38'
205 LOTS @ 48'
125 LOTS @ 60'

PHASE ONE
RESIDENTIAL LOTS = 268

PHASE TWO
RESIDENTIAL LOTS = 64

SUBTOTAL RESIDENTIAL LOTS
PHASE ONE AND PHASE TWO = 332

SUBTOTAL SINGLE FAMILY
RESIDENTIAL LOTS
PHASE ONE, TWO AND FUTURE = 953

MULTI-FAMILY
CLUSTER RESIDENTIAL = 162 UNITS
ATTACHED RESIDENTIAL = 204 UNITS

SUBTOTAL MULTI-FAMILY = 366 UNITS

TOTAL RESIDENTIAL = 1319 UNITS/LOTS

SPECIFIC PLAN
MAXIMUM DENSITY = 1362 UNITS/LOTS

LOT DIFFERENTIAL = 43

MADUENO, SMITH AND ASSOCIATES, INC.

FIGURE 2

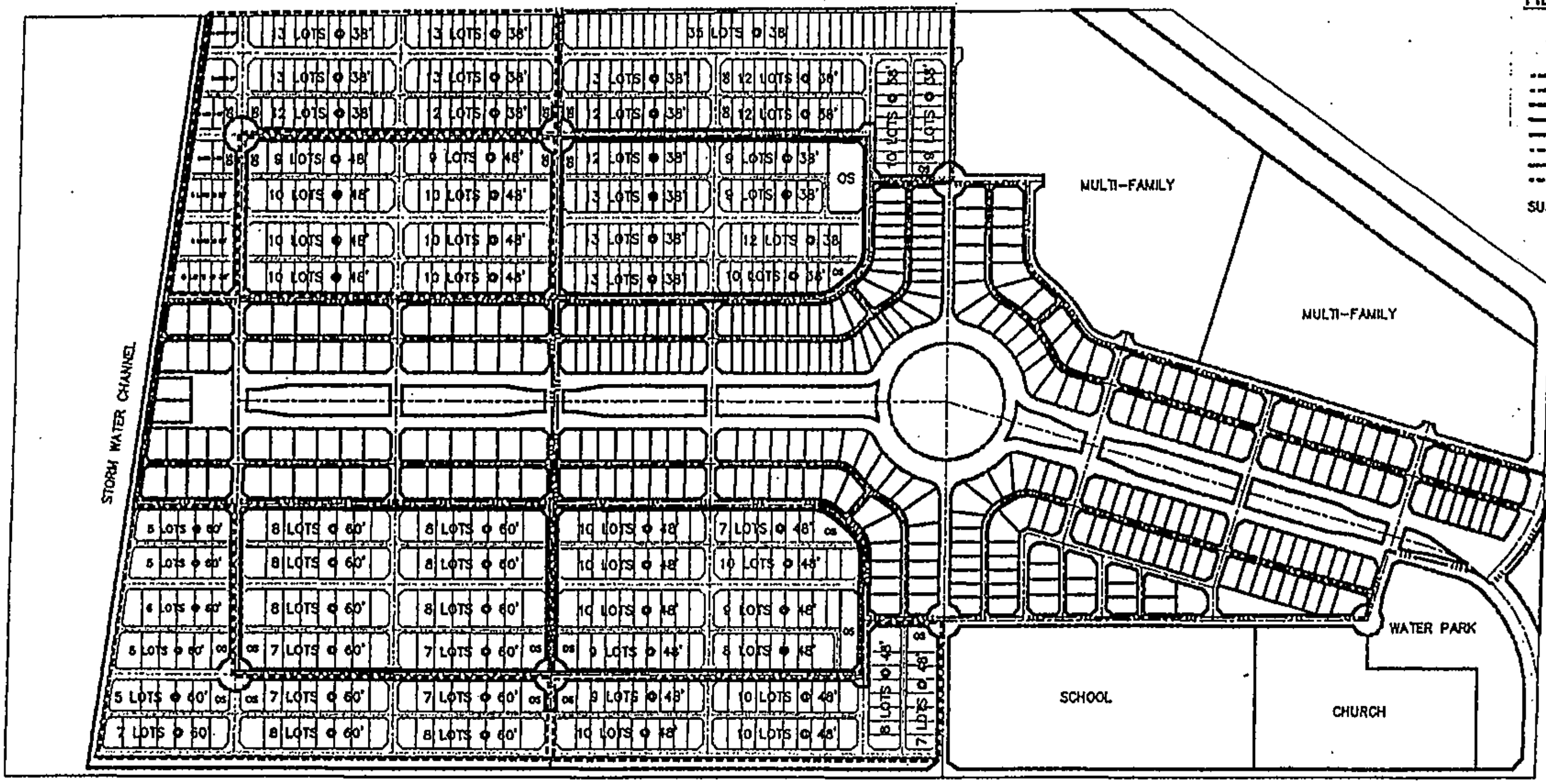
LAND USED PLAN

SCALE: N.T.S.	DATE: 1/19/2000	SHEET 1 OF 1

TENTATIVE TRACT MAP NO. 28639

RIO VISTA VILLAGE

BURNETT DEVELOPMENT CORPORATION



RESIDENTIAL LOT ANALYSIS

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54 LOTS @ 48'	.35 ACRES
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SUBTOTAL RESIDENTIAL LOTS PHASE ONE AND PHASE TWO = 332

SUBTOTAL SINGLE FAMILY RESIDENTIAL LOTS PHASE ONE, TWO AND FUTURE = 953

MULTI-FAMILY
CLUSTER RESIDENTIAL = 162 UNITS
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SUBTOTAL MULTI-FAMILY = 366 UNITS

TOTAL RESIDENTIAL = 1319 UNITS/LOTS

SPECIFIC PLAN MAXIMUM DENSITY = 1362 UNITS/LOTS

LOT DIFFERENTIAL = 43

MAINIERO, SMITH AND ASSOCIATES, INC.

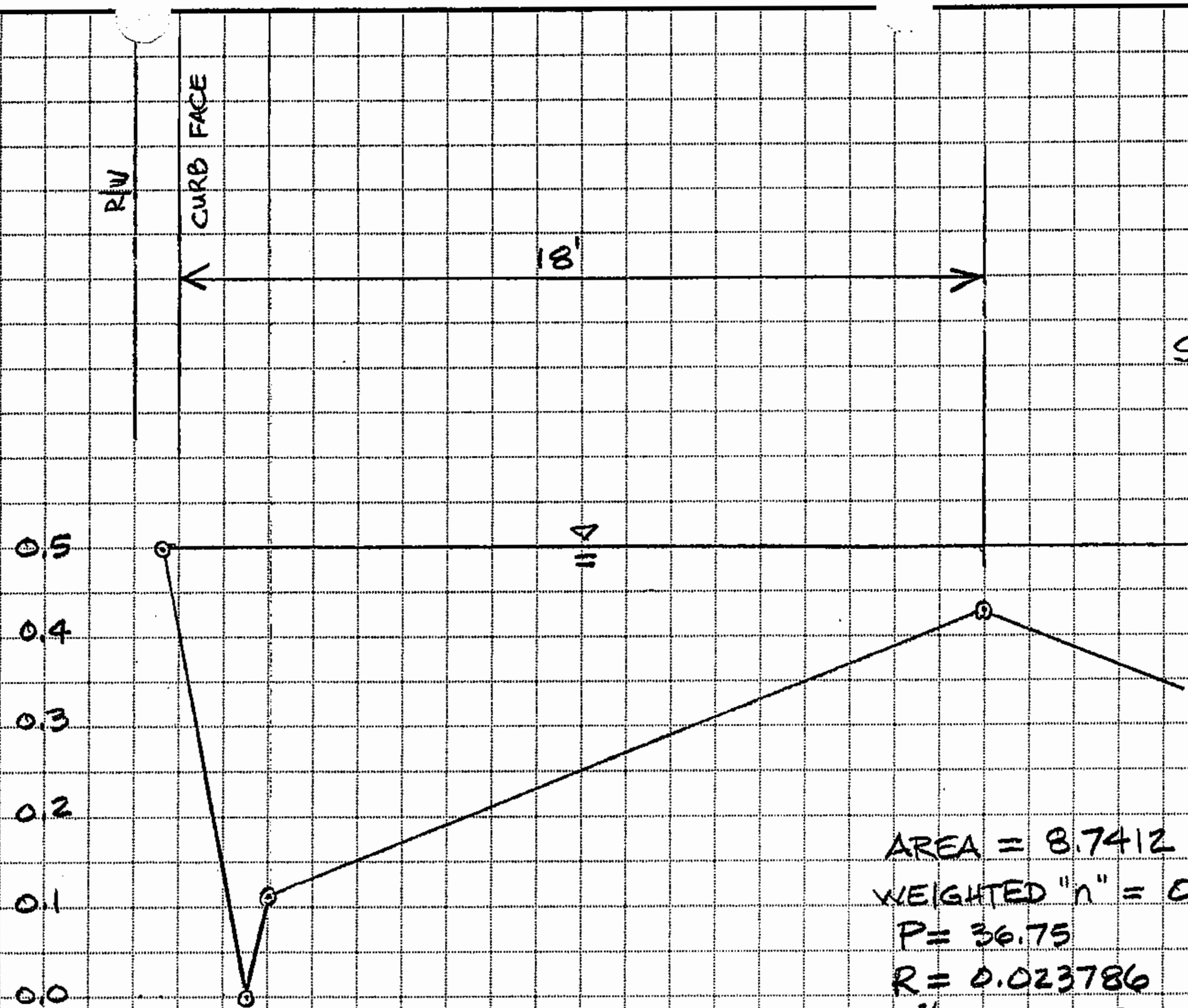
FIGURE 3

LAND USED PLAN

SCALE: N.T.S.	DATE: 1/19/2000	SHEET 1 OF 1

MAINIERO, SMITH AND ASSOCIATES, INC.
Planning/Civil Engineering/Land Surveying
777 E. Tahquitz Canyon Way Suite 301
PALM SPRINGS, CALIFORNIA 92262-6784
(760) 320-9811 FAX (760) 323-7893

JOB ______
SHEET NO. ______ OF ______
CALCULATED BY ______ DATE ______
CHECKED BY ______ DATE ______
SCALE ______



Scale: HORIZ. 1"=4'
VERT. 1"=1'

AREA = 8.7412 SF.
WEIGHTED "n" = 0.01585
P = 36.75
R = 0.023786
$R^{2/3}$ = 0.38389

Manning's Eq.

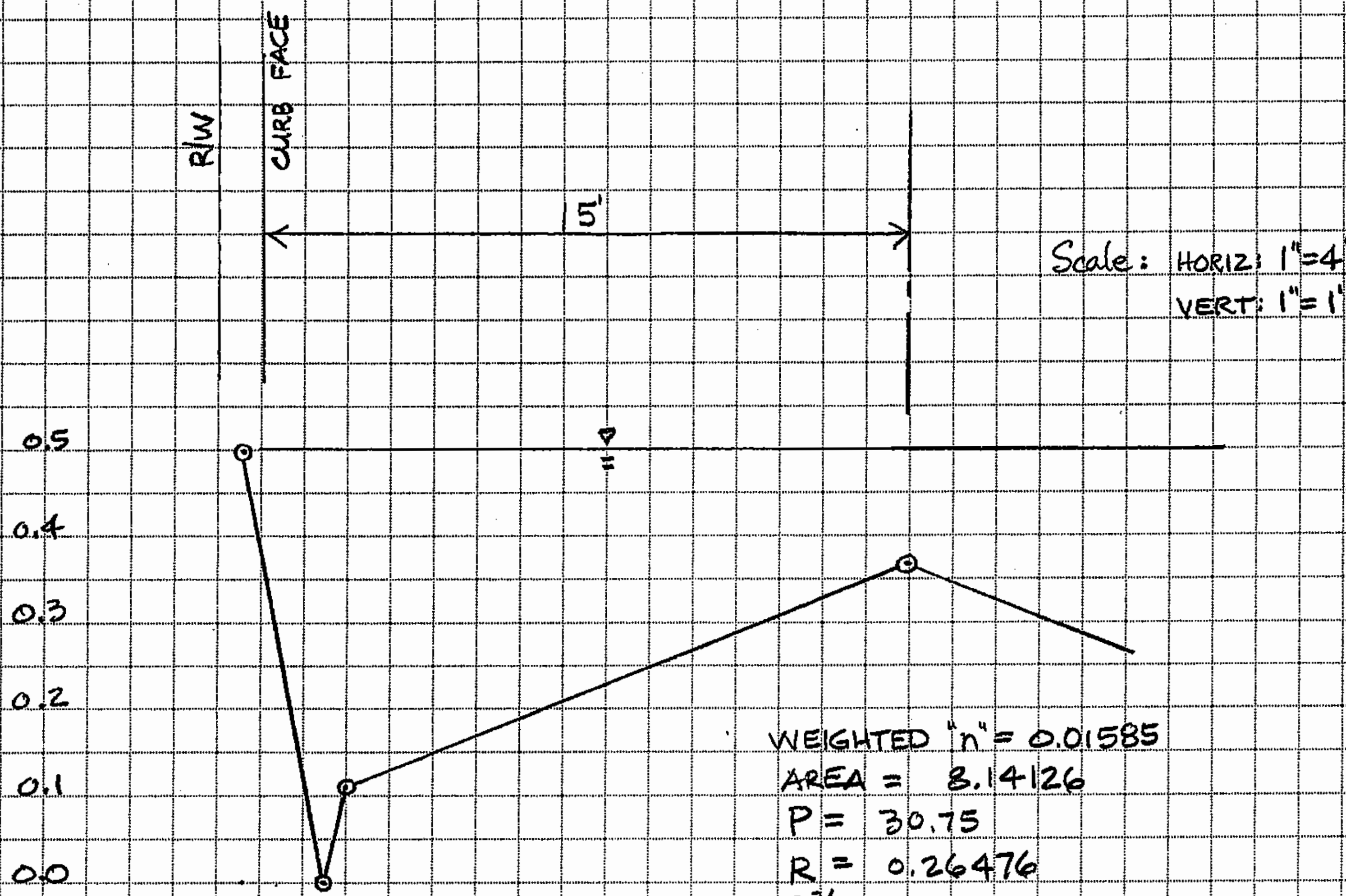
$$V = \frac{1.49}{n} R^{2/3} S^{1/2} \Rightarrow \boxed{Q = 315.45\ S^{1/2}}$$

TOP OF CURB CAPACITY OF 36' STREET

FIGURE 4

MAINIERO, SMITH AND ASSOCIATES, INC.
Planning/Civil Engineering/Land Surveying
777 E. Tahquitz Canyon Way Suite 301
PALM SPRINGS, CALIFORNIA 92262-6784
(760) 320-9811 FAX (760) 323-7893

JOB ____
SHEET NO. ____ OF ____
CALCULATED BY ____ DATE ____
CHECKED BY ____ DATE ____
SCALE ____



Scale: HORIZ: 1"=4'
VERT: 1"=1'

WEIGHTED "n" = 0.01585
AREA = 8.14126
P = 30.75
R = 0.26476
$R^{2/3}$ = 0.41232

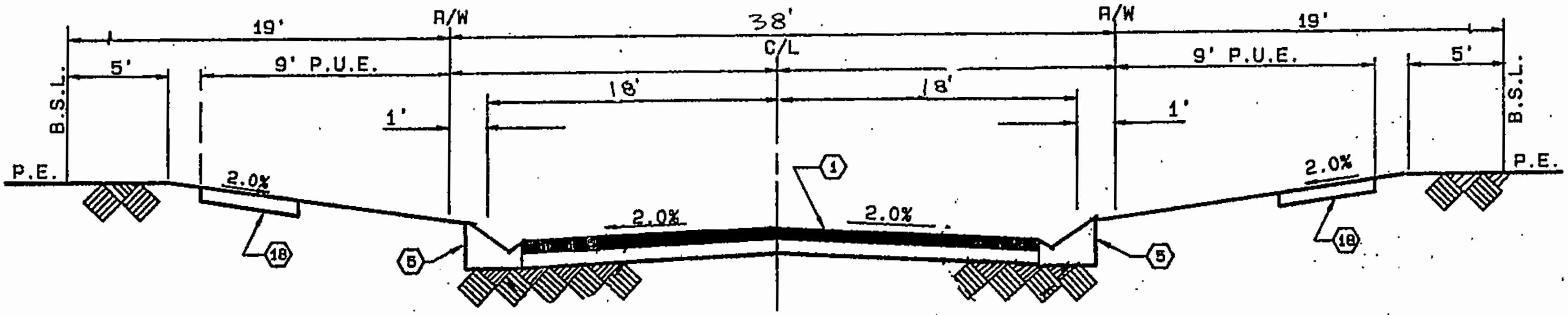
Manning's Eq.

$V = \frac{1.49}{n} R^{2/3} S^{1/2} \Rightarrow \boxed{Q = 315.56\ S^{1/2}}$

$Q = AY$

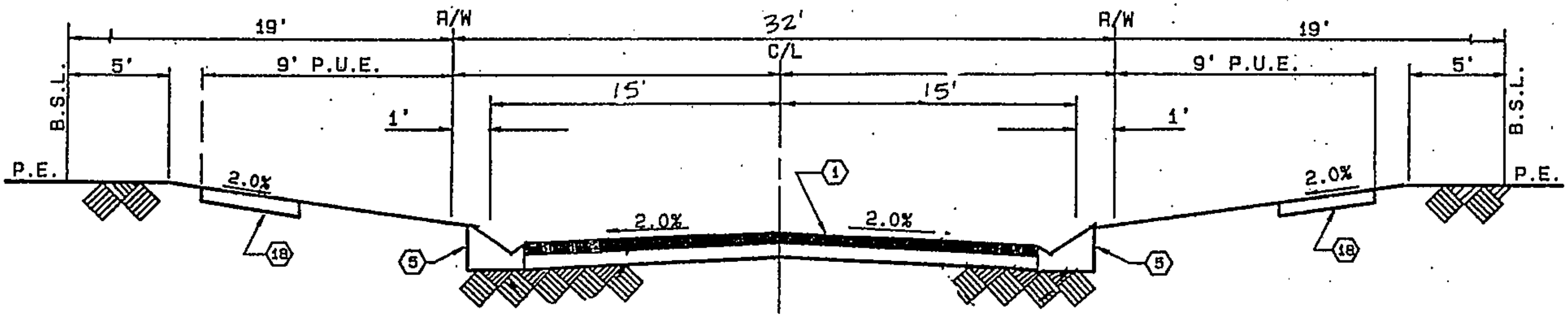
TOP OF CURB CAPACITY OF 30' STREET

FIGURE 5



TYPICAL STREET SECTION
NOT TO SCALE

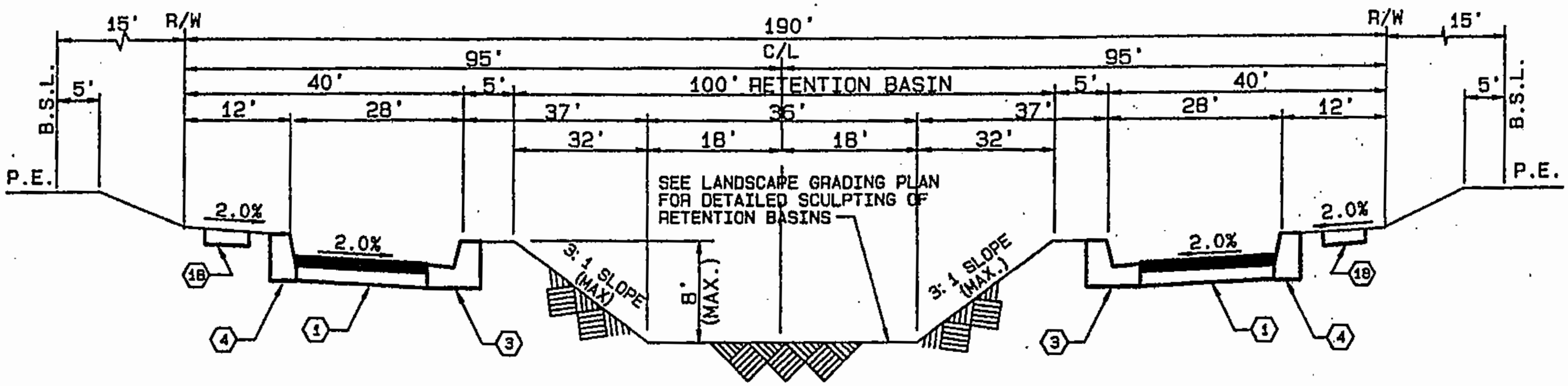
Figure 6



TYPICAL STREET SECTION
NOT TO SCALE

RIO FELECIA ROAD

Figure 7

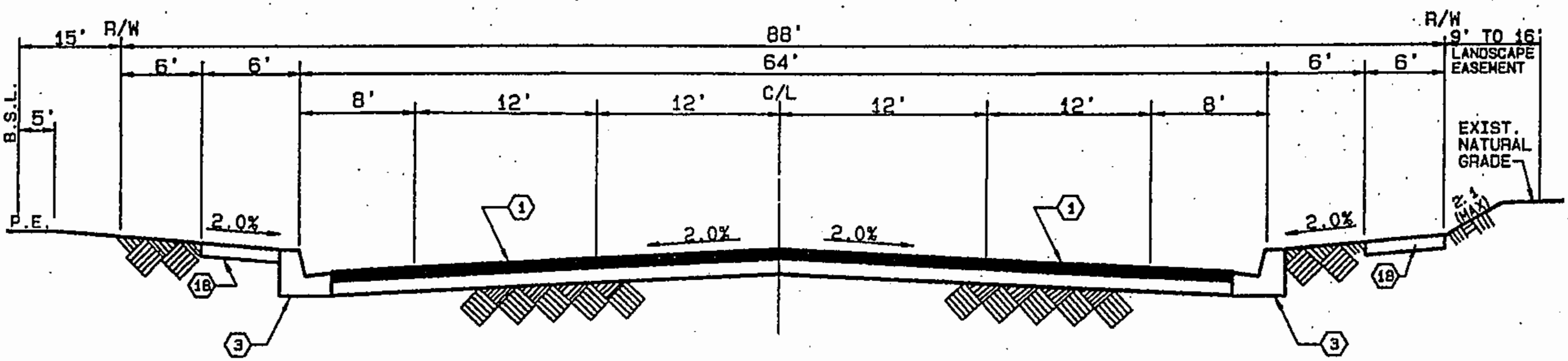


TYPICAL STREET SECTION C–C

NOT TO SCALE

RIO VISTA DRIVE - NORTH & SOUTH

Figure 8

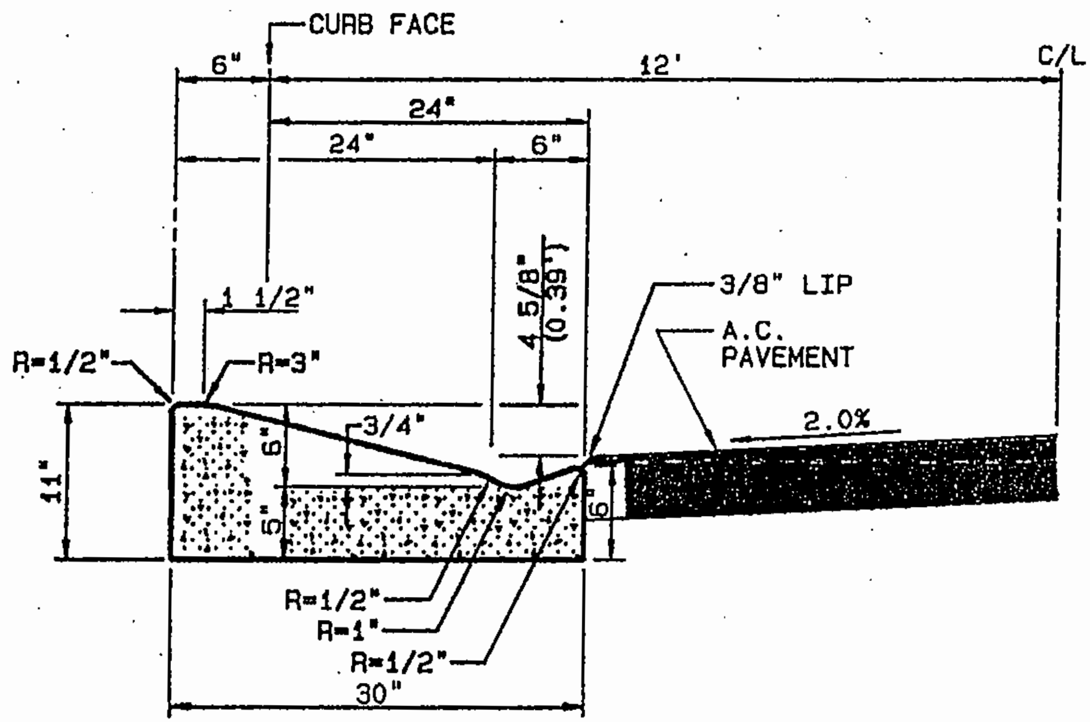


LANDAU BLVD.

TYPICAL STREET SECTION B–B

NOT TO SCALE

Figure 9

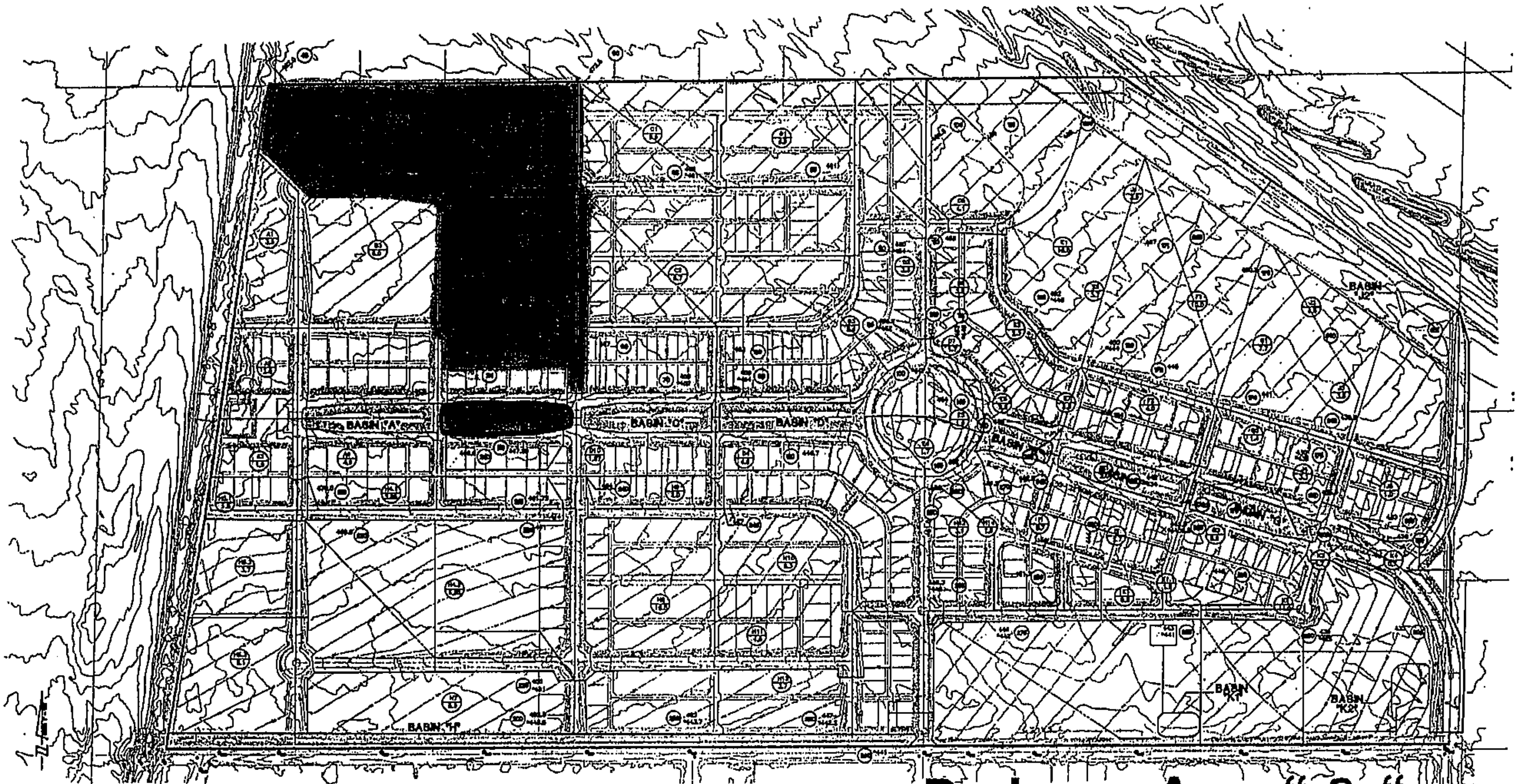


WEDGE CURB DETAIL–6" C.F. (5)
NOT TO SCALE

NOTES:

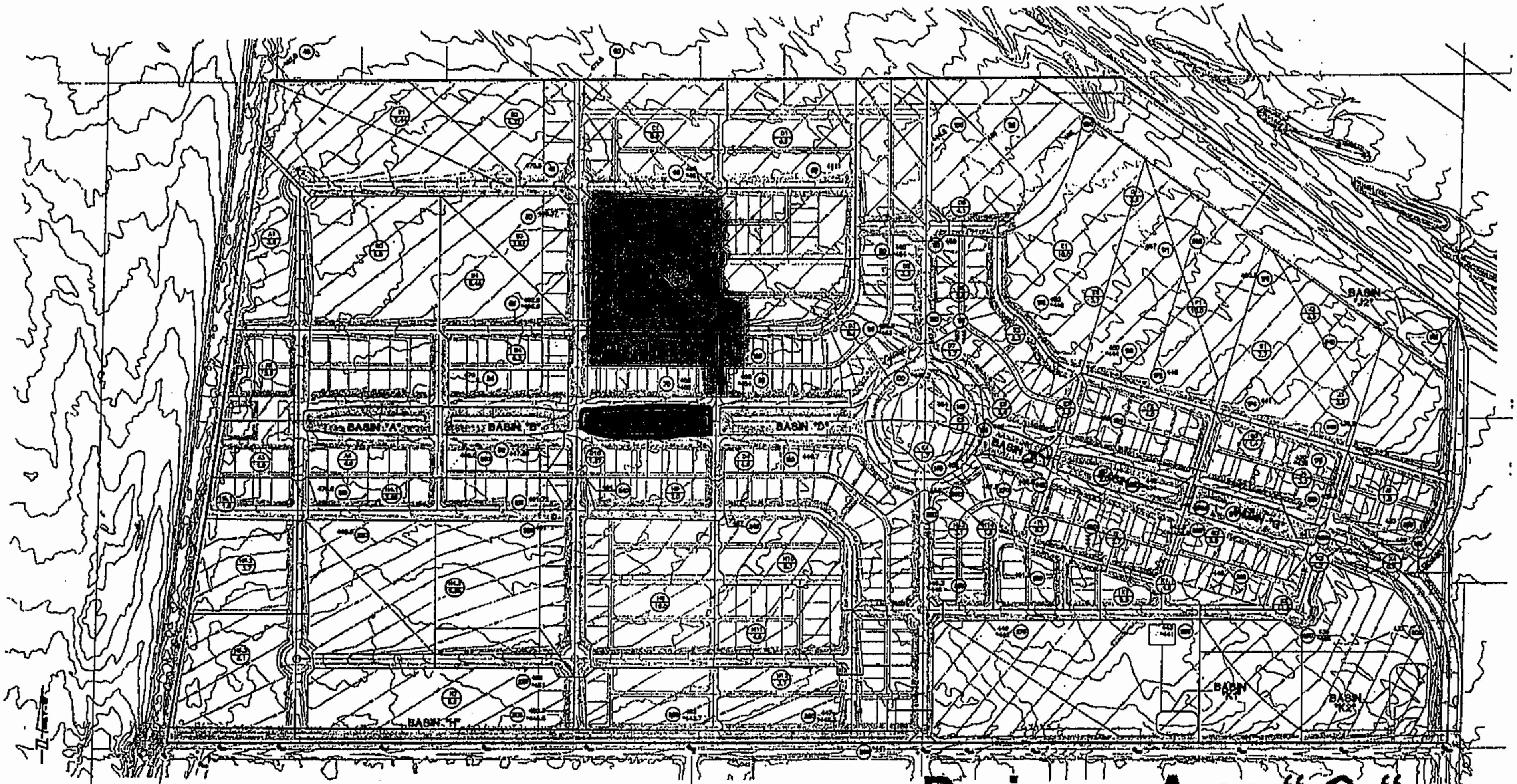
1. ALL CONCRETE SHALL BE 560–C–2800.
2. CURB FACE SHALL BE AS SPECIFIED ON PLANS.
3. WEAKENED PLANE JOINT EVERY 10' O.C.
4. EXPANSION PAPER REQUIRED EVERY 50' AT THE TOPS OF DRIVEWAY X'S AND AT ECR'S AND BCR'S.

Figure 10



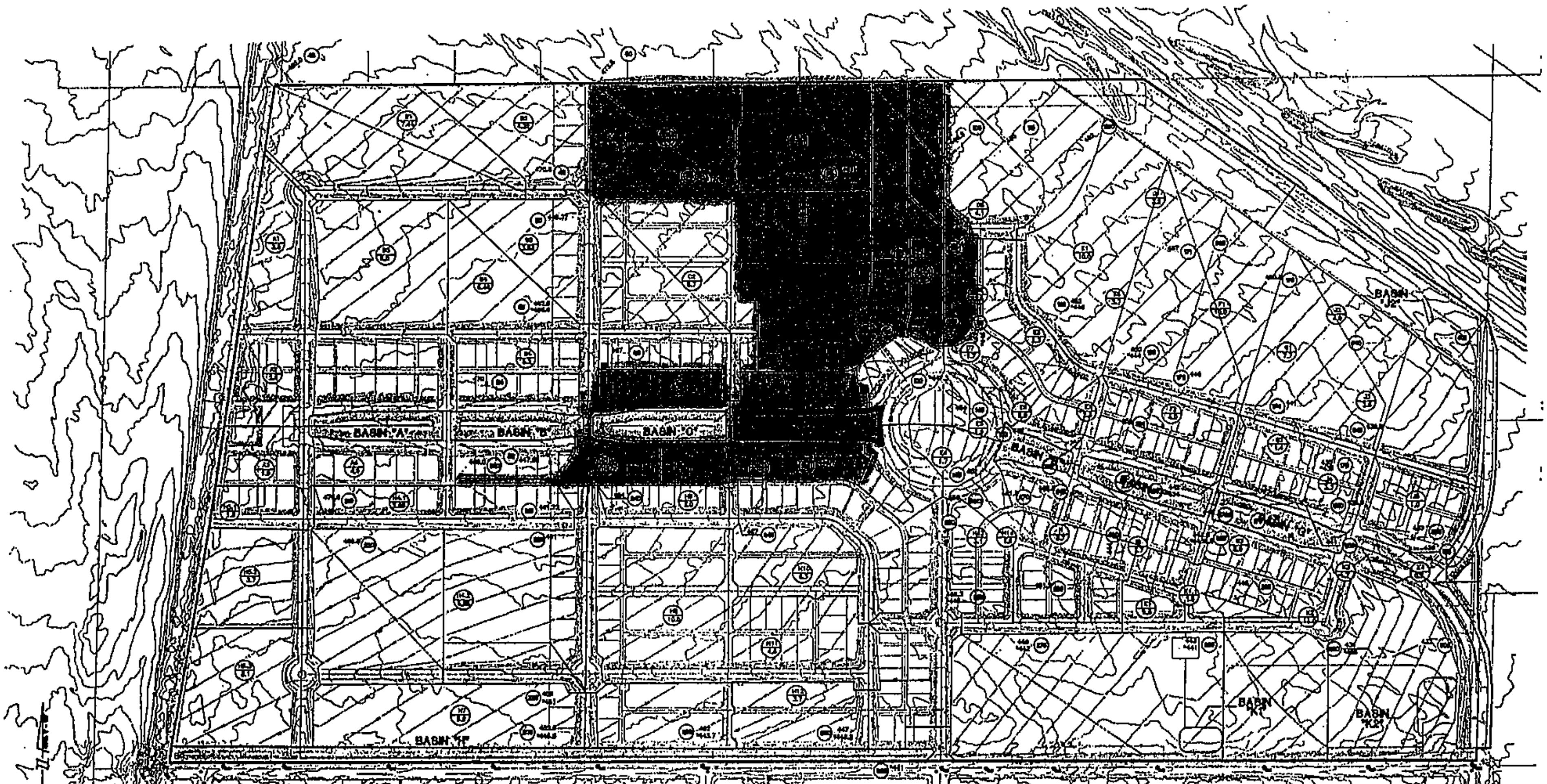
Drainage Area " B "

FIGURE 11



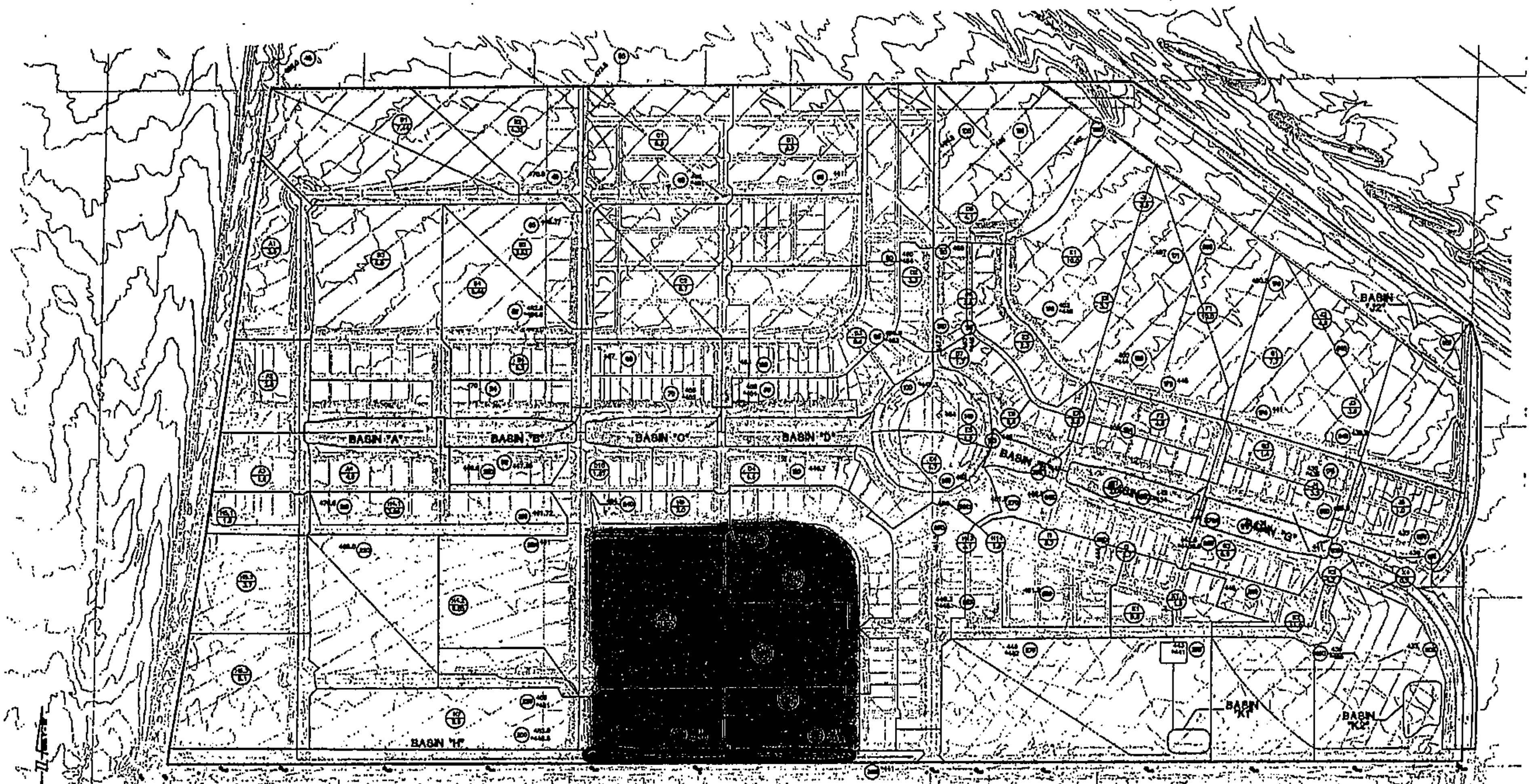
Drainage Area " C "

FIGURE 12



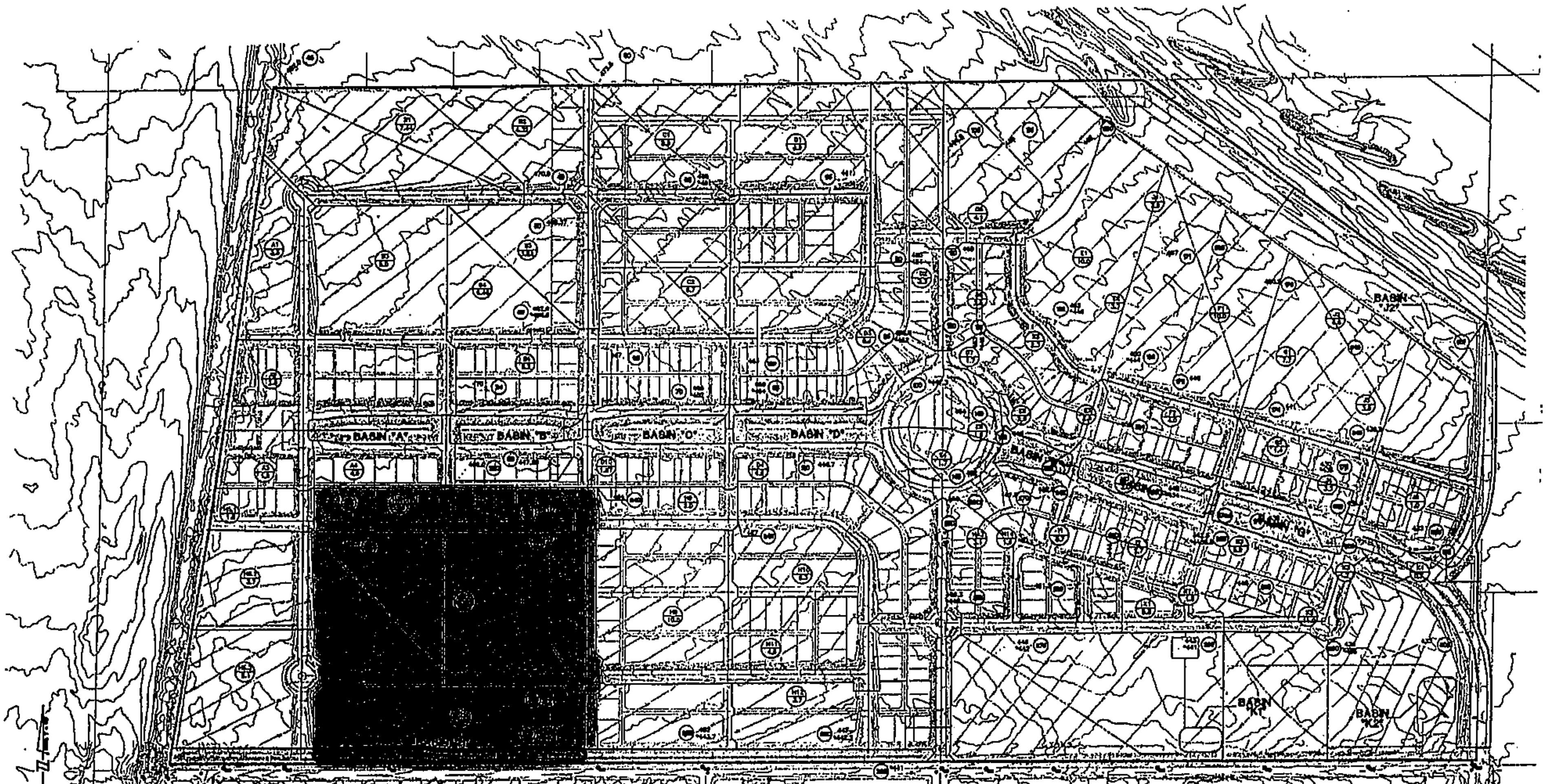
Drainage Area " D "

FIGURE 13



Drainage Area " H2 "

FIGURE 18



Drainage Area "H4"

FIGURE 19

Unit Hydrograph Summary Chart

Basin	L	Lc	H	"n"	Area Total	Ret.	1/2 ac.	1/4 ac.	Condo	Apt.	Comm.	Fp	Fp min.	Low Loss	Rain	Lag Time	Vol.
B	2095	950	16.15	0.015	22.26	1.22			21.04			0.325	0.16	90	4.5	15	1.93
C	1055	565	13.4	0.015	10	1.28			8.46			0.35	0.175	90	4.5	15	0.79
D	2260	760	26.4	0.015	35.26	1.47		4.5	29.29			0.33	0.017	90	4.5	15	2.98
E	1770	750	16.4	0.015	25.45	0.66	8.21	2.22		14.36		0.328	0.164	90	4.5	15	2.18
F	1372	680	13.09	0.015	12.6	1.2		1.96		9.44		0.29	0.145	90	4.5	15	1.26
G	1400	420	15.78	0.015	21.85	1.21		12.71		7.17	0.76	0.39	0.195	90	4.5	15	1.49
H1	2100	880	17.11	0.015	10			8.69				0.41	0.205	90	4.5	15	0.63
H2	1930	500	17.2	0.015	23				23			0.41	0.205	90	4.5	15	1.44
H4	2000	500	14.96	0.015	24.49			24.49				0.41	0.205	90	4.5	15	1.54
I	1078	358	8.73	0.015	10	0.223			8.2			0.316	0.158	90	4.5	15	0.89
K2	1784	704	12.1	0.015	22.45		11.1	3.41		3.84	4.1	0.37	0.185	90	4.5	15	1.66

L = Length of watercourse
Lc = Length from Concentration Point to point opposite centroid of area
H = Elevation difference along watercourse
"n" = Manning's friction factor along watercourse
Area Total = Total tributary area (10 acres minimum)
Ret. = Retention area
1/2 ac. = Land use with approximately 40% impervious area
1/4 ac. = Land use with approximately 50% impervious area
Condo = Land use with approximately 65% impervious area
Apt. = Land use with approximately 80% impervious area
Comm. = Land use with approximately 90% impervious area
Fp = Uniform mean soil loss
Fp min. = Minimun soil loss rate
Low Loss = Low soil loss rate
Rain = Rainfall
Lag Time = Unit hydrograph time unit
Vol. = Runoff Volume for drainage area

Figure 22

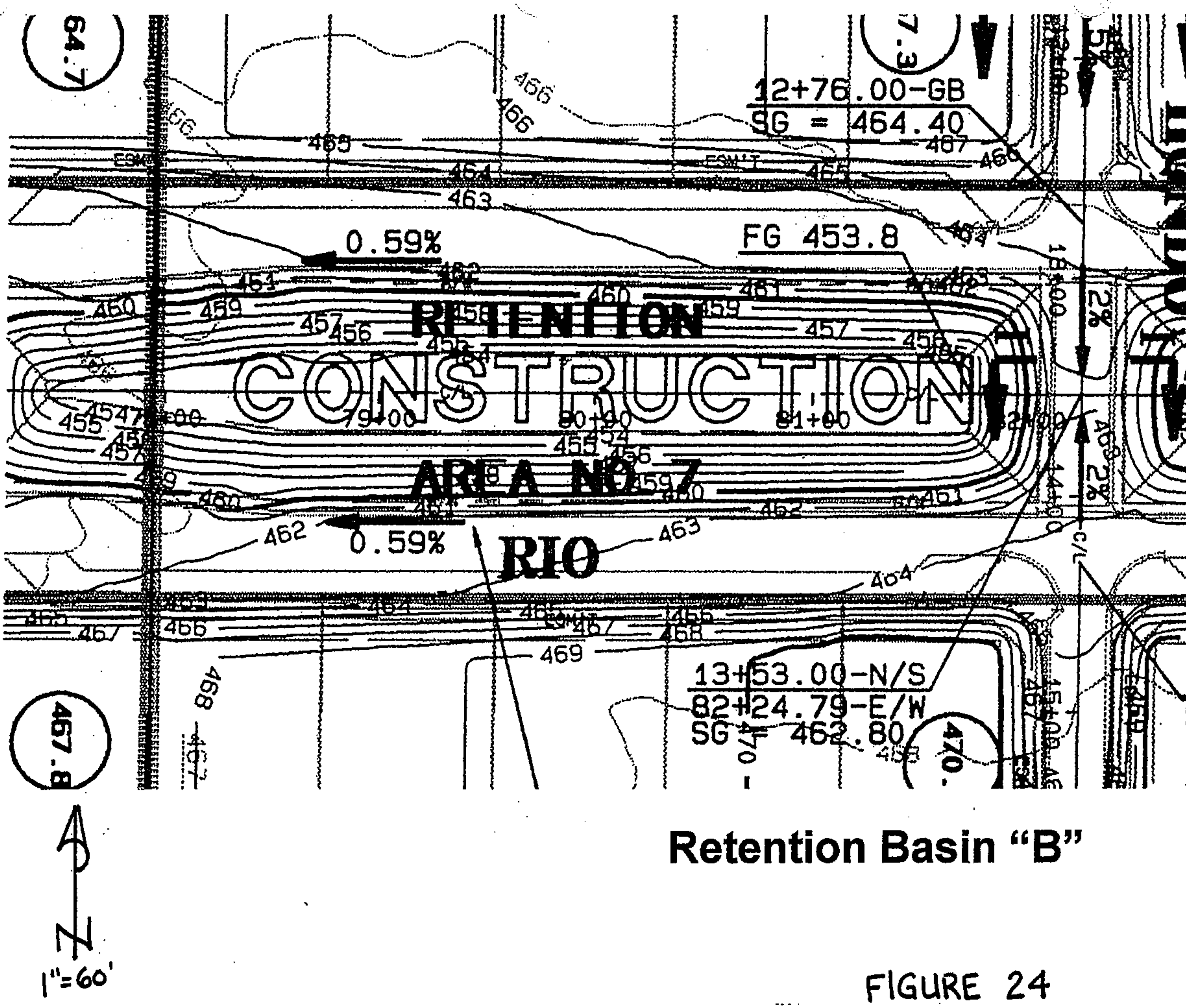
RETENTION BASIN "B" CAPACITY CHART

ELEVATION	AREA (AC)	INCREMENTAL VOLUME (A-F)	ACCUMULATED VOLUME (A-F)
454.0	0.3122	0	0
455.0	0.4245	0.36835	0.36835
456.0	0.5249	0.4747	0.84305 *
457.0	0.6306	0.57775	1.4208
458.0	0.7376	0.6841	2.1049 **
459.0	0.8519	0.79475	2.8996
460.0	0.9672	0.90955	3.80915

* 100 Year, 1 Hour Retention Volume
(See Shortcut Method for 100-year, 1-hour HGL) 0.462 A-F = WS 455.20

** 100 Year, 24 Hour Retention Volume
(See Synthetic Unit Hydrograph Calculations) 1.93 A-F = WS 457.74

FIGURE 23



Retention Basin "B"

FIGURE 24

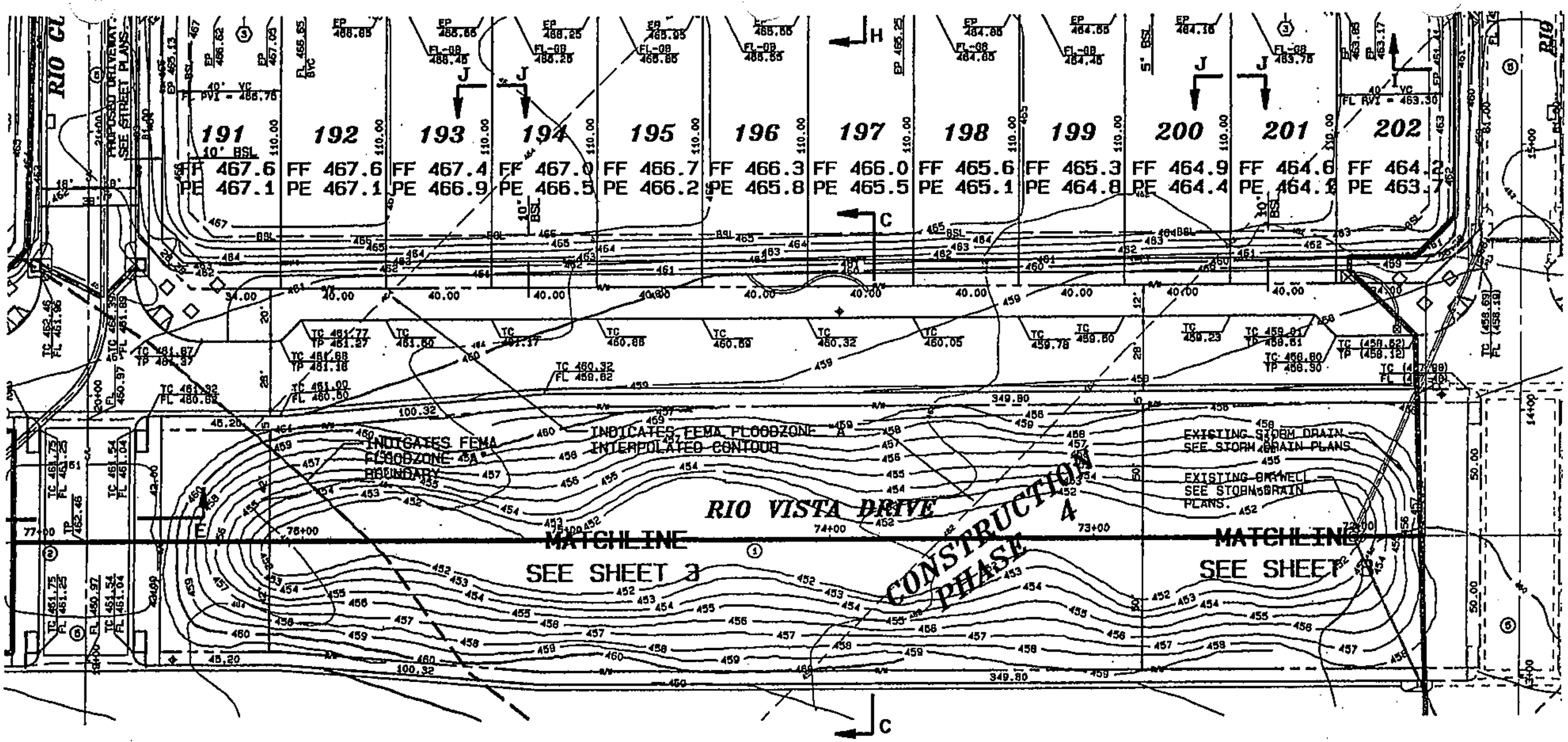
RETENTION BASIN “C” CAPACITY CHART

ELEVATION [illegible]	AREA (AC)	INCREMENTAL VOLUME (A-F)	ACCUMULATED VOLUME (A-F)
452.0	0.2590	0	0
453.0	0.3439	0.30145	0.30145 *
454.0	0.4512	0.3976	0.6990
455.0	0.5219	0.4866	1.1856 **
456.0	0.6168	0.5694	1.7549
457.0	0.7153	0.6660	2.421
458.0	0.8203	0.7678	3.189

* 100 Year, 1 Hour Retention Volume
(See Shortcut Method for 100-year, 1-hour HGL) 0.225 A-F = WS 452.75

** 100 Year, 24 Hour Retention Volume
(See Synthetic Unit Hydrograph Calculations) 0.790 A-F = WS 454.19

FIGURE 25



Retention Basin "C"

FIGURE 26

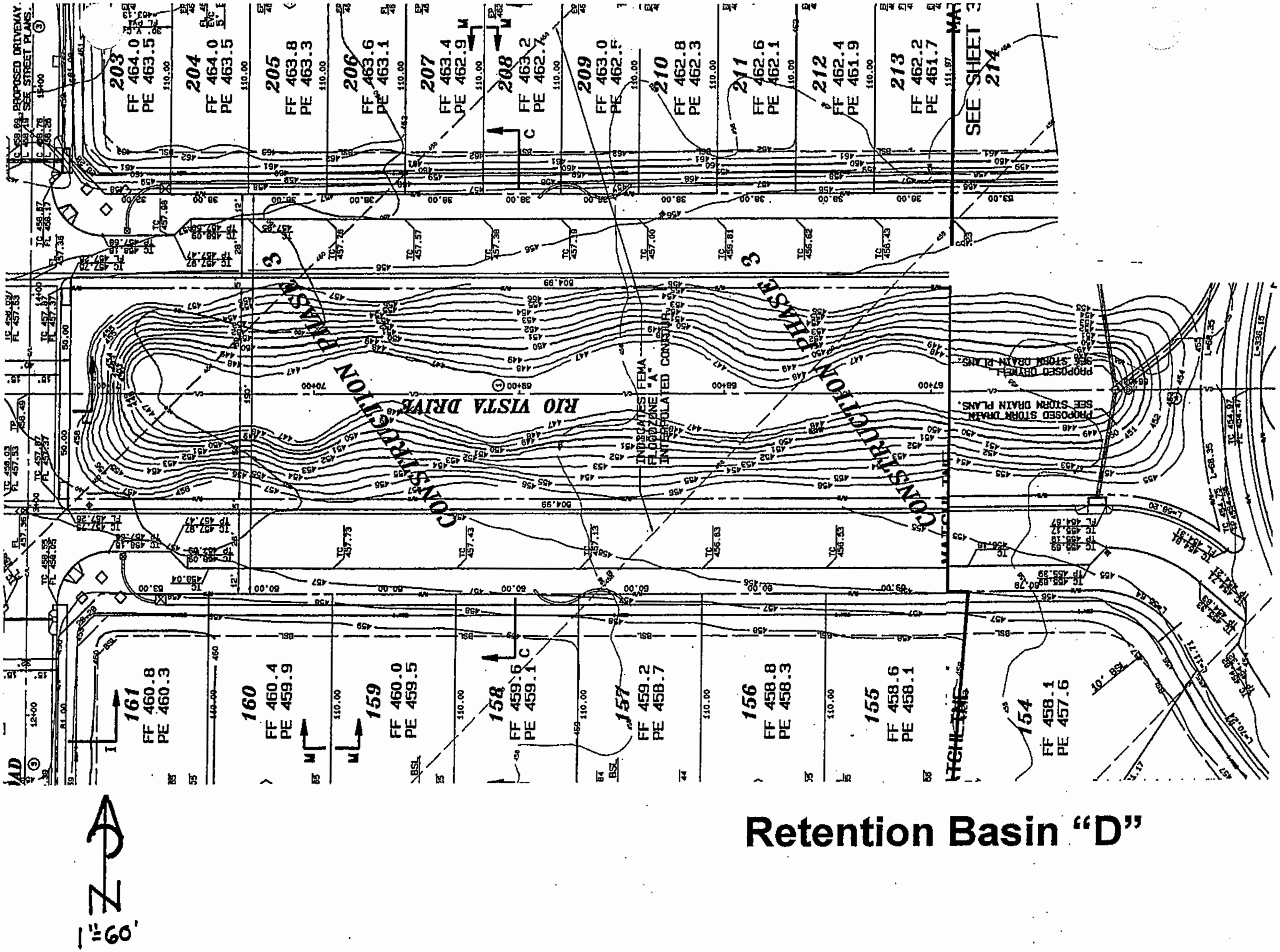
RETENTION BASIN "D" CAPACITY CHART

ELEVATION	AREA (AC)	INCREMENTAL VOLUME (A-F)	ACCUMULATED VOLUME (A-F)
447.0	0.2967	0.000	0
448.0	0.3680	0.3324	0.3324
449.0	0.4433	0.4057	0.738 *
450.0	0.5258	0.4845	1.2226
451.0	0.6134	0.5896	1.7922
452.0	0.7037	0.6585	2.45075
453.0	0.7991	0.7514	3.202 **
454.0	0.8940	0.8465	4.049
455.0	0.9943	0.94415	4.993

* 100 Year, 1 Hour Retention Volume
(See Shortcut Method for 100-year, 1-hour HGL) 0.733 A-F = WS 449.00

** 100 Year, 24 Hour Retention Volume
(See Synthetic Unit Hydrograph Calculations) 2.98 A-F = WS 452.71

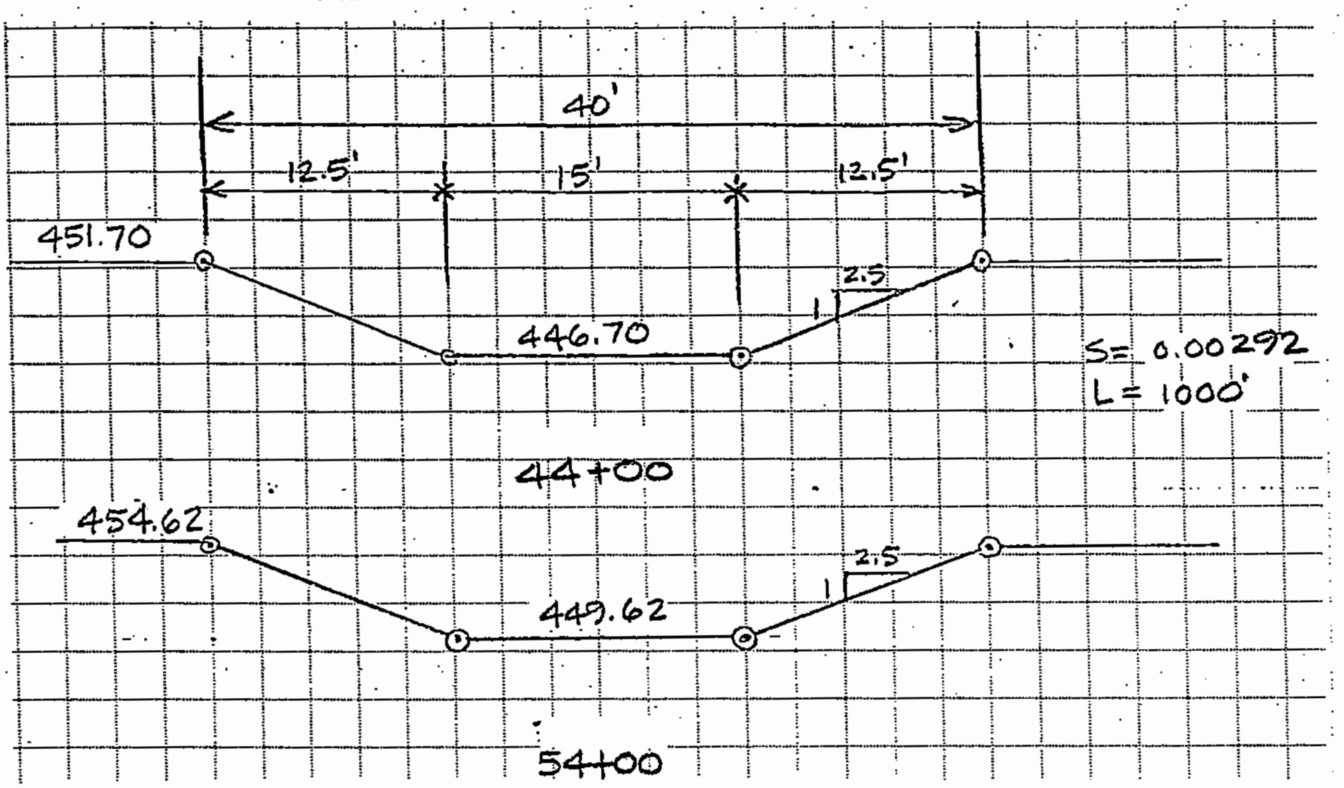
FIGURE 27



Retention Basin "D"

FIGURE 28

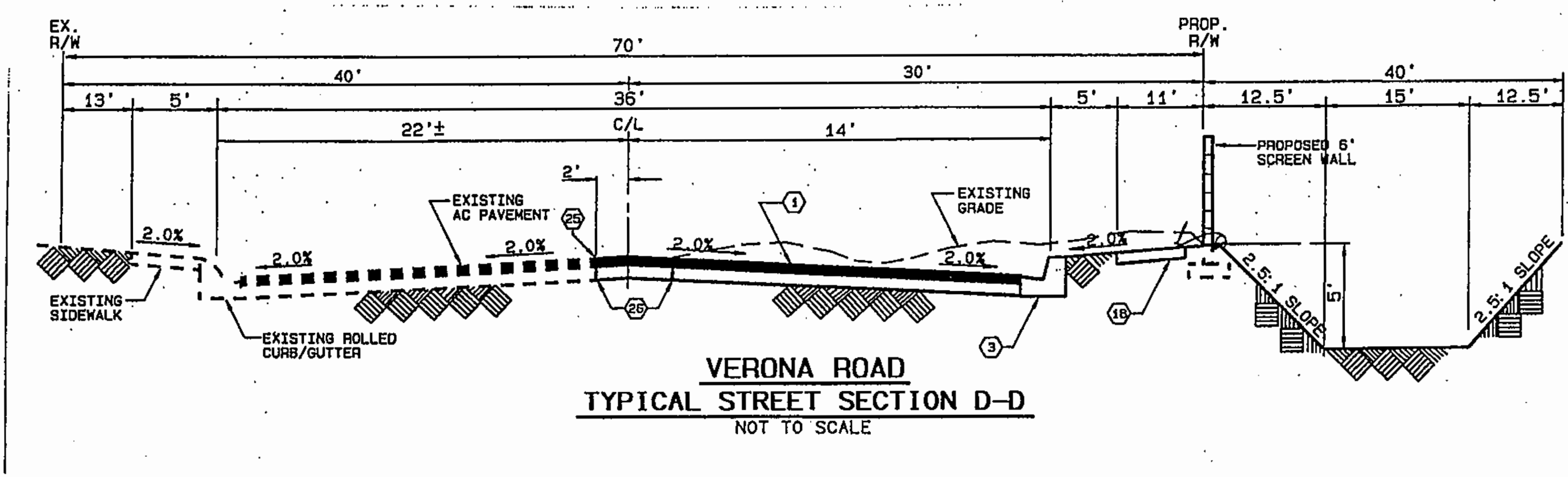
RETENTION BASIN "H4" CAPACITY CHART



DEPTH AT 44+00	DOWNSTREAM AREA at 44+00	UPSTREAM AREA at 54+00	VOLUME A-F
5' = 451.70	137.50	42.016	2.06056 **

** 100 Year, 24 Hour Retention Volume
(See Synthetic Unit Hydrograph Calculations) 1.54 A-F

FIGURE 39



VERONA ROAD

TYPICAL STREET SECTION D-D

NOT TO SCALE

Retention Basin “H4“

FIGURE 40

Rational Method Calculations
100-Year Storm

****

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
(RCFC&WCD) 1978 HYDROLOGY MANUAL

Ver. 1.5A Release Date: 6/01/94 License ID 1304

Analysis prepared by:

MAINIERO, SMITH & ASSOCIATES, INC.
CIVIL & ENVIRONMENTAL ENGINEERING, SURVEYING AND LAND PLANNING
777 TAHQUIST CANYON WAY, SUITE 301
PALM SPRINGS, CALIFORNIA 92262-7066

************************* DESCRIPTION OF STUDY *************************
* Rio Vista Village - Tract 28639-1 *
* 100 Year Storm *
* Rational Method Calculations *
****

FILE NAME: 1064P.DAT
TIME/DATE OF STUDY: 9:46 3/20/2001

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = .85
10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.770
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = .980
100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 4.520
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.600
SLOPE OF 10-YEAR INTENSITY-DURATION CURVE = .5799047
SLOPE OF 100-YEAR INTENSITY-DURATION CURVE = .5796024
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 100.00 1-HOUR INTENSITY(INCH/HOUR) = 1.6000
SLOPE OF INTENSITY DURATION CURVE = .5796
RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED
NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES

Begin Drainage Area "B"

****
FLOW PROCESS FROM NODE 40.00 TO NODE 45.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS CONDOMINIUM
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 1050.00
UPSTREAM ELEVATION = 482.00
DOWNSTREAM ELEVATION = 470.50
ELEVATION DIFFERENCE = 11.50
TC = .359*[(1050.00**3)/(11.50)]**.2 = 14.319
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.671
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7628
SUBAREA RUNOFF(CFS) = 21.67
TOTAL AREA(ACRES) = 7.74 TOTAL RUNOFF(CFS) = 21.67

****
FLOW PROCESS FROM NODE 45.00 TO NODE 50.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<

```
================================================================================
UPSTREAM ELEVATION =   470.50  DOWNSTREAM ELEVATION =   468.37
STREET LENGTH(FEET) =  300.00  CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK =  16.00
INTERIOR STREET CROSSFALL(DECIMAL) =  .020
OUTSIDE STREET CROSSFALL(DECIMAL)  =  .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2

    **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =  27.34
***STREET FLOWING FULL***
 STREETFLOW MODEL RESULTS:
    NOTE: STREETFLOW EXCEEDS TOP OF CURB.
    THE FOLLOWING STREETFLOW RESULTS ARE BASED ON THE ASSUMPTION
    THAT NEGLIBLE FLOW OCCURS OUTSIDE OF THE STREET CHANNEL.
    THAT IS, ALL FLOW ALONG THE PARKWAY, ETC., IS NEGLECTED.
    STREET FLOWDEPTH(FEET) =  .55
    HALFSTREET FLOODWIDTH(FEET) =  18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =  3.20
    PRODUCT OF DEPTH&VELOCITY =  1.77
STREETFLOW TRAVELTIME(MIN) =  1.56  TC(MIN) =  15.88

 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.457
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7581
SUBAREA AREA(ACRES) =   4.32  SUBAREA RUNOFF(CFS) =  11.32
SUMMED AREA(ACRES) =  12.06  TOTAL RUNOFF(CFS) =   33.00
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) =  .59  HALFSTREET FLOODWIDTH(FEET) = 18.00
FLOW VELOCITY(FEET/SEC.) =  3.32  DEPTH*VELOCITY =  1.96


****************************************************************************
FLOW PROCESS FROM NODE    50.00 TO NODE    51.00 IS CODE =  6
----------------------------------------------------------------------------
>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
================================================================================
UPSTREAM ELEVATION =   468.37  DOWNSTREAM ELEVATION =   465.72
STREET LENGTH(FEET) =  438.00  CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK =  16.00
INTERIOR STREET CROSSFALL(DECIMAL) =  .020
OUTSIDE STREET CROSSFALL(DECIMAL)  =  .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2

    **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =  37.24
***STREET FLOWING FULL***
 STREETFLOW MODEL RESULTS:
    NOTE: STREETFLOW EXCEEDS TOP OF CURB.
    THE FOLLOWING STREETFLOW RESULTS ARE BASED ON THE ASSUMPTION
    THAT NEGLIBLE FLOW OCCURS OUTSIDE OF THE STREET CHANNEL.
    THAT IS, ALL FLOW ALONG THE PARKWAY, ETC., IS NEGLECTED.
    STREET FLOWDEPTH(FEET) =  .61
    HALFSTREET FLOODWIDTH(FEET) =  18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =  3.50
    PRODUCT OF DEPTH&VELOCITY =  2.14
STREETFLOW TRAVELTIME(MIN) =  2.09  TC(MIN) =  17.97

 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.218
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7525
SUBAREA AREA(ACRES) =   3.52  SUBAREA RUNOFF(CFS) =  8.53
SUMMED AREA(ACRES) =  15.58  TOTAL RUNOFF(CFS) =   41.52
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) =  .63  HALFSTREET FLOODWIDTH(FEET) = 18.00
FLOW VELOCITY(FEET/SEC.) =  3.66  DEPTH*VELOCITY =  2.31
```

41.52 CFS ENTERS TWO
CATCH BASINS AT 23+53.50
RIO GUADALUPE. DEPTH = 0.63'
LINE B-1, MH 2 & MH 3

```
******************************************************************************
 FLOW PROCESS FROM NODE    51.00 TO NODE    55.00 IS CODE =  4
 ----------------------------------------------------------------------------
 >>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE<<<<<
==============================================================================
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.9 INCHES
 PIPEFLOW VELOCITY(FEET/SEC.) =  13.2
 UPSTREAM NODE ELEVATION =   458.47
 DOWNSTREAM NODE ELEVATION =   450.36
 FLOWLENGTH(FEET) =   306.49   MANNING'S N =  .013
 GIVEN PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPEFLOW THRU SUBAREA(CFS) =     41.52
 TRAVEL TIME(MIN.) =    .39    TC(MIN.) =  18.35

******************************************************************************
 FLOW PROCESS FROM NODE    55.00 TO NODE    55.00 IS CODE =  8
 ----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.179
 SOIL CLASSIFICATION IS "A"
 CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7516
 SUBAREA AREA(ACRES) =    5.46   SUBAREA RUNOFF(CFS) =   13.04
 TOTAL AREA(ACRES) =    21.04   TOTAL RUNOFF(CFS) =    54.57
 TC(MIN) =  18.35
```

13.04 CFS ENTERS TWO CATCH BASINS AT 20+54 RIO GUADALUPE.
DEPTH = 0.41'
LINE B-2, MH 4
LINE B-3, MH 5

```
******************************************************************************
 FLOW PROCESS FROM NODE    55.00 TO NODE    56.00 IS CODE =  4
 ----------------------------------------------------------------------------
 >>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE<<<<<
==============================================================================
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.2 INCHES
 PIPEFLOW VELOCITY(FEET/SEC.) =  12.9
 UPSTREAM NODE ELEVATION =   449.77
 DOWNSTREAM NODE ELEVATION =   447.35
 FLOWLENGTH(FEET) =   121.35   MANNING'S N =  .013
 GIVEN PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPEFLOW THRU SUBAREA(CFS) =     54.57
 TRAVEL TIME(MIN.) =    .16    TC(MIN.) =  18.51
```

End Drainage Area "B"

Begin Drainage Area "C"

```
******************************************************************************
 FLOW PROCESS FROM NODE    67.00 TO NODE    68.00 IS CODE = 21
 ----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
     ASSUMED INITIAL SUBAREA UNIFORM
     DEVELOPMENT IS CONDOMINIUM
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH =   700.00
 UPSTREAM ELEVATION =    470.40
 DOWNSTREAM ELEVATION =    461.61
 ELEVATION DIFFERENCE =      8.79
 TC = .359*[(  700.00**3)/(    8.79)]**.2 =   11.847
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.097
 SOIL CLASSIFICATION IS "A"
 CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7712
 SUBAREA RUNOFF(CFS) =     20.03
 TOTAL AREA(ACRES) =     6.34   TOTAL RUNOFF(CFS) =     20.03
```

****

FLOW PROCESS FROM NODE 68.00 TO NODE 69.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<

UPSTREAM ELEVATION = 461.61 DOWNSTREAM ELEVATION = 458.34
STREET LENGTH(FEET) = 242.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 15.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 13.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

**TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 23.20
STREET FLOWING FULL
STREETFLOW MODEL RESULTS:
STREET FLOWDEPTH(FEET) = .49
HALFSTREET FLOODWIDTH(FEET) = 15.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.70
PRODUCT OF DEPTH&VELOCITY = 1.82
STREETFLOW TRAVELTIME(MIN) = 1.09 TC(MIN) = 12.94

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.894
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7673
SUBAREA AREA(ACRES) = 2.12 SUBAREA RUNOFF(CFS) = 6.33
SUMMED AREA(ACRES) = 8.46 TOTAL RUNOFF(CFS) = 26.37
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .49 HALFSTREET FLOODWIDTH(FEET) = 15.00
FLOW VELOCITY(FEET/SEC.) = 4.21 DEPTH*VELOCITY = 2.07

26.37 CFS ENTERS TWO CATCH BASINS AT 14+69 RIO FELICIA.
DEPTH = 0.49'.
LINE C, MH 1 & MH 2

****

FLOW PROCESS FROM NODE 69.00 TO NODE 70.00 IS CODE = 4

>>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE<<<<<

DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.0 INCHES
PIPEFLOW VELOCITY(FEET/SEC.) = 12.8
UPSTREAM NODE ELEVATION = 451.33
DOWNSTREAM NODE ELEVATION = 447.75
FLOWLENGTH(FEET) = 114.63 MANNING'S N = .013
GIVEN PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPEFLOW THRU SUBAREA(CFS) = 26.37
TRAVEL TIME(MIN.) = .15 TC(MIN.) = 13.09

End Drainage Area "C"

Begin Drainage Area "D"

****

FLOW PROCESS FROM NODE 60.00 TO NODE 65.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS CONDOMINIUM
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 680.00
UPSTREAM ELEVATION = 473.40
DOWNSTREAM ELEVATION = 465.95
ELEVATION DIFFERENCE = 7.45
TC = .359*[(680.00**3)/(7.45)]**.2 = 12.034

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.060
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7705
SUBAREA RUNOFF(CFS) = 18.08
TOTAL AREA(ACRES) = 5.78 TOTAL RUNOFF(CFS) = 18.08

****

FLOW PROCESS FROM NODE 65.00 TO NODE 85.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<

==

UPSTREAM ELEVATION = 465.95 DOWNSTREAM ELEVATION = 462.19
STREET LENGTH(FEET) = 537.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

**TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 24.56
STREET FLOWING FULL
STREETFLOW MODEL RESULTS:
NOTE: STREETFLOW EXCEEDS TOP OF CURB.
THE FOLLOWING STREETFLOW RESULTS ARE BASED ON THE ASSUMPTION
THAT NEGLIBLE FLOW OCCURS OUTSIDE OF THE STREET CHANNEL.
THAT IS, ALL FLOW ALONG THE PARKWAY, ETC., IS NEGLECTED.
STREET FLOWDEPTH(FEET) = .53
HALFSTREET FLOODWIDTH(FEET) = 18.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.14
PRODUCT OF DEPTH&VELOCITY = 1.67
STREETFLOW TRAVELTIME(MIN) = 2.85 TC(MIN) = 14.89

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.589
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7610
SUBAREA AREA(ACRES) = 4.77 SUBAREA RUNOFF(CFS) = 13.03
SUMMED AREA(ACRES) = 10.55 TOTAL RUNOFF(CFS) = 31.11
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .57 HALFSTREET FLOODWIDTH(FEET) = 18.00
FLOW VELOCITY(FEET/SEC.) = 3.37 DEPTH*VELOCITY = 1.93

****

FLOW PROCESS FROM NODE 85.00 TO NODE 90.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<

==

UPSTREAM ELEVATION = 462.19 DOWNSTREAM ELEVATION = 461.13
STREET LENGTH(FEET) = 152.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

**TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 35.45
STREET FLOWING FULL
STREETFLOW MODEL RESULTS:
NOTE: STREETFLOW EXCEEDS TOP OF CURB.
THE FOLLOWING STREETFLOW RESULTS ARE BASED ON THE ASSUMPTION
THAT NEGLIBLE FLOW OCCURS OUTSIDE OF THE STREET CHANNEL.
THAT IS, ALL FLOW ALONG THE PARKWAY, ETC., IS NEGLECTED.
STREET FLOWDEPTH(FEET) = .59
HALFSTREET FLOODWIDTH(FEET) = 18.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.57

PRODUCT OF DEPTH&VELOCITY = 2.11
STREETFLOW TRAVELTIME(MIN) = .71 TC(MIN) = 15.60

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.493
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7589
SUBAREA AREA(ACRES) = 3.27 SUBAREA RUNOFF(CFS) = 8.67
SUMMED AREA(ACRES) = 13.82 TOTAL RUNOFF(CFS) = 39.78

FLOW SPLITS AT THIS POINT, 19.89 CFS ENTERS THE CATCH BASIN AT 11+50 RIO OSO; 19.89 CFS HEADS EAST ON RIO ROSALIA. DEPTH = 0.61' LINE D-3, MH 6

END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .61 HALFSTREET FLOODWIDTH(FEET) = 18.00
FLOW VELOCITY(FEET/SEC.) = 3.74 DEPTH*VELOCITY = 2.28

****

FLOW PROCESS FROM NODE 90.00 TO NODE 90.10 IS CODE = 7

THE FOLLOWING SECTIONS MODEL THE FLOW THAT ENTERS THE CATCH BASIN.

>>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<

USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN) = 15.60 RAIN INTENSITY(INCH/HOUR) = 3.49
TOTAL AREA(ACRES) = 6.91 TOTAL RUNOFF(CFS) = 19.89

****

FLOW PROCESS FROM NODE 90.10 TO NODE 91.00 IS CODE = 4

>>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE<<<<<

DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.1 INCHES
PIPEFLOW VELOCITY(FEET/SEC.) = 8.9
UPSTREAM NODE ELEVATION = 456.85
DOWNSTREAM NODE ELEVATION = 451.30
FLOWLENGTH(FEET) = 383.99 MANNING'S N = .013
GIVEN PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPEFLOW THRU SUBAREA(CFS) = 19.89
TRAVEL TIME(MIN.) = .72 TC(MIN.) = 16.32

****

FLOW PROCESS FROM NODE 91.00 TO NODE 91.10 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 16.32
RAINFALL INTENSITY(INCH/HR) = 3.40
TOTAL STREAM AREA(ACRES) = 6.91
PEAK FLOW RATE(CFS) AT CONFLUENCE = 19.89

****

FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS CONDOMINIUM
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 460.00
UPSTREAM ELEVATION = 466.00
DOWNSTREAM ELEVATION = 458.65
ELEVATION DIFFERENCE = 7.35
TC = .359*[(460.00**3)/(7.35)]**.2 = 9.544
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.644
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7806
SUBAREA RUNOFF(CFS) = 19.79
TOTAL AREA(ACRES) = 5.46 TOTAL RUNOFF(CFS) = 19.79

19.79 CFS ENTERS THE CATCH BASIN AT 15+25. RIO OSO. DEPTH = 0.7' LINE D-2, MH 5

```
************************************************************************
 FLOW PROCESS FROM NODE   121.00 TO NODE   122.00 IS CODE =  4
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE<<<<<
============================================================================
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  11.6 INCHES
 PIPEFLOW VELOCITY(FEET/SEC.) =  14.5
 UPSTREAM NODE ELEVATION =   453.89
 DOWNSTREAM NODE ELEVATION =   451.88
 FLOWLENGTH(FEET) =    38.00   MANNING'S N =  .013
 GIVEN PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPEFLOW THRU SUBAREA(CFS) =      19.79
 TRAVEL TIME(MIN.) =    .04    TC(MIN.) =    9.59

************************************************************************
 FLOW PROCESS FROM NODE   122.00 TO NODE    91.10 IS CODE =  1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.59
 RAINFALL INTENSITY(INCH/HR) =   4.63
 TOTAL STREAM AREA(ACRES) =    5.46
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.79

 ** CONFLUENCE DATA **
 STREAM    RUNOFF     Tc      INTENSITY     AREA
 NUMBER     (CFS)    (MIN.)  (INCH/HOUR)   (ACRE)
    1      19.89   16.32     3.403         6.91
    2      19.79    9.59     4.632         5.46

 *********************************WARNING**********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 **************************************************************************

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

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF     Tc      INTENSITY
 NUMBER     (CFS)    (MIN.)  (INCH/HOUR)
    1      31.48    9.59     4.632
    2      34.43   16.32     3.403

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      34.43  Tc(MIN.) =   16.32
 TOTAL AREA(ACRES) =      12.37

************************************************************************
 FLOW PROCESS FROM NODE    91.10 TO NODE    92.00 IS CODE =  4
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE<<<<<
============================================================================
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.5 INCHES
 PIPEFLOW VELOCITY(FEET/SEC.) =  12.6
 UPSTREAM NODE ELEVATION =   451.28
 DOWNSTREAM NODE ELEVATION =   444.02
 FLOWLENGTH(FEET) =   285.59   MANNING'S N =  .013
 GIVEN PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPEFLOW THRU SUBAREA(CFS) =      34.43
```

TRAVEL TIME(MIN.) = .38 TC(MIN.) = 16.70

****

FLOW PROCESS FROM NODE 92.00 TO NODE 92.10 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE: [redacted]
TIME OF CONCENTRATION(MIN.) = 16.70
RAINFALL INTENSITY(INCH/HR) = 3.36
TOTAL STREAM AREA(ACRES) = 12.37
PEAK FLOW RATE(CFS) AT CONFLUENCE = 34.43

****

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 7

THE FOLLOW SECTIONS MODEL THE 19.89 CFS THAT FLOW EAST ON RIO ROSALIA.

>>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<

USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN) = 15.60 RAIN INTENSITY(INCH/HOUR) = 3.49
TOTAL AREA(ACRES) = 6.91 TOTAL RUNOFF(CFS) = 19.89

****

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<

UPSTREAM ELEVATION = 461.89 DOWNSTREAM ELEVATION = 457.85
STREET LENGTH(FEET) = 336.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

**TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 22.99
STREETFLOW MODEL RESULTS:
STREET FLOWDEPTH(FEET) = .49
HALFSTREET FLOODWIDTH(FEET) = 17.50
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.58
PRODUCT OF DEPTH&VELOCITY = 1.77
STREETFLOW TRAVELTIME(MIN) = 1.56 TC(MIN) = 17.16

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.305
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7546
SUBAREA AREA(ACRES) = 2.48 SUBAREA RUNOFF(CFS) = 6.18
SUMMED AREA(ACRES) = 9.39 TOTAL RUNOFF(CFS) = 26.07
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .51 HALFSTREET FLOODWIDTH(FEET) = 18.00
FLOW VELOCITY(FEET/SEC.) = 3.66 DEPTH*VELOCITY = 1.88

****

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 8

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.305
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7546
SUBAREA AREA(ACRES) = 1.78 SUBAREA RUNOFF(CFS) = 4.44
TOTAL AREA(ACRES) = 11.17 TOTAL RUNOFF(CFS) = 30.51
TC(MIN) = 17.16

```
****************************************************************************
 FLOW PROCESS FROM NODE   106.00 TO NODE   107.00 IS CODE =  6
 ----------------------------------------------------------------------------
 >>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM ELEVATION =   457.85  DOWNSTREAM ELEVATION =   453.29
 STREET LENGTH(FEET) =   395.00  CURB HEIGHT(INCHES) = 6.
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK =  16.00
 INTERIOR STREET CROSSFALL(DECIMAL) =   .020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =   .055

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2

    **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =   33.13
 ***STREET FLOWING FULL***
  STREETFLOW MODEL RESULTS:
    NOTE: STREETFLOW EXCEEDS TOP OF CURB.
    THE FOLLOWING STREETFLOW RESULTS ARE BASED ON THE ASSUMPTION
    THAT NEGLIBLE FLOW OCCURS OUTSIDE OF THE STREET CHANNEL.
    THAT IS, ALL FLOW ALONG THE PARKWAY, ETC., IS NEGLECTED.
    STREET FLOWDEPTH(FEET) =   .55
    HALFSTREET FLOODWIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =   3.88
    PRODUCT OF DEPTH&VELOCITY =   2.15
 STREETFLOW TRAVELTIME(MIN) =   1.70   TC(MIN) =  18.86

  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.129
 SOIL CLASSIFICATION IS "A"
 CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7503
 SUBAREA AREA(ACRES) =    2.23   SUBAREA RUNOFF(CFS) =    5.24
 SUMMED AREA(ACRES) =   13.40   TOTAL RUNOFF(CFS) =    35.75
 END OF SUBAREA STREETFLOW HYDRAULICS:
 DEPTH(FEET) =  .55   HALFSTREET FLOODWIDTH(FEET) = 18.00
 FLOW VELOCITY(FEET/SEC.) =  4.19   DEPTH*VELOCITY =   2.31

****************************************************************************
 FLOW PROCESS FROM NODE   107.00 TO NODE    92.00 IS CODE =  4
 ----------------------------------------------------------------------------
 >>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE<<<<<
============================================================================
 PIPEFLOW VELOCITY(FEET/SEC.) =   6.0
 UPSTREAM NODE ELEVATION =   444.84
 DOWNSTREAM NODE ELEVATION =   444.04
 FLOWLENGTH(FEET) =   201.12   MANNING'S N =  .013
 GIVEN PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPEFLOW THRU SUBAREA(CFS) =     35.75
 TRAVEL TIME(MIN.) =    .56    TC(MIN.) =  19.42


****************************************************************************
 FLOW PROCESS FROM NODE    92.00 TO NODE    92.10 IS CODE =  1
 ----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  19.42
 RAINFALL INTENSITY(INCH/HR) =   3.08
 TOTAL STREAM AREA(ACRES) =   13.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      35.75

 ** CONFLUENCE DATA **
 STREAM    RUNOFF     Tc     INTENSITY     AREA
```

35.75 CFS ENTERS TWO
CATCH BASINS AT 26+07.88
AVE. QUINTANA
DEPTH = 0.55
LINE D-1, MH 2 & MH 3

```
NUMBER     (CFS)   (MIN.)  (INCH/HOUR)   (ACRE)
   1      34.43   16.70     3.358        12.37
   2      35.75   19.42     3.077        13.40

**********************************WARNING**********************************
IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
****************************************************************************

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

** PEAK FLOW RATE TABLE **
STREAM    RUNOFF     Tc     INTENSITY
NUMBER     (CFS)   (MIN.)  (INCH/HOUR)
   1      65.18   16.70     3.358
   2      67.30   19.42     3.077

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =    67.30  Tc(MIN.) =  19.42
TOTAL AREA(ACRES) =    25.77


****************************************************************************
FLOW PROCESS FROM NODE    92.10 TO NODE    93.00 IS CODE =  4
----------------------------------------------------------------------------
>>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE<<<<<
============================================================================
PIPEFLOW VELOCITY(FEET/SEC.) =  7.0
UPSTREAM NODE ELEVATION =  443.28
DOWNSTREAM NODE ELEVATION =  442.42
FLOWLENGTH(FEET) =  215.65   MANNING'S N = .013
GIVEN PIPE DIAMETER(INCH) = 42.00    NUMBER OF PIPES =  1
PIPEFLOW THRU SUBAREA(CFS) =    67.30
TRAVEL TIME(MIN.) =   .51    TC(MIN.) =  19.93


****************************************************************************
FLOW PROCESS FROM NODE    70.00 TO NODE    71.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
    ASSUMED INITIAL SUBAREA UNIFORM
    DEVELOPMENT IS CONDOMINIUM
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH =  660.00
UPSTREAM ELEVATION =   467.10
DOWNSTREAM ELEVATION =   457.36
ELEVATION DIFFERENCE =     9.74
TC = .359*[( 660.00**3)/(    9.74)]**.2 =  11.203
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.232
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7737
SUBAREA RUNOFF(CFS) =     6.22
TOTAL AREA(ACRES) =     1.90   TOTAL RUNOFF(CFS) =     6.22


****************************************************************************
FLOW PROCESS FROM NODE    71.00 TO NODE    72.00 IS CODE =  6
----------------------------------------------------------------------------
>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM ELEVATION =   457.36   DOWNSTREAM ELEVATION =   454.75
STREET LENGTH(FEET) =  520.00   CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 28.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK =  14.00
INTERIOR STREET CROSSFALL(DECIMAL) =   .020
```

OUTSIDE STREET CROSSFALL(DECIMAL) = .020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

**TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 8.43
STREETFLOW MODEL RESULTS:
STREET FLOWDEPTH(FEET) = .50
HALFSTREET FLOODWIDTH(FEET) = 18.48
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.39
PRODUCT OF DEPTH&VELOCITY = 1.18
STREETFLOW TRAVELTIME(MIN) = 3.63 TC(MIN) = 14.84

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.596
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7612
SUBAREA AREA(ACRES) = 1.62 SUBAREA RUNOFF(CFS) = 4.43
SUMMED AREA(ACRES) = 3.52 TOTAL RUNOFF(CFS) = 10.66
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .55 HALFSTREET FLOODWIDTH(FEET) = 20.96
FLOW VELOCITY(FEET/SEC.) = 2.36 DEPTH*VELOCITY = 1.29

10.66 CFS ENTERS THE
CATCH BASIN AT 66+21.30
(N) RIO VISTA DRIVE.
D=0.55', LINE D-5, MH 1

****
FLOW PROCESS FROM NODE 72.00 TO NODE 93.00 IS CODE = 4

>>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE<<<<<

===
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.1 INCHES
PIPEFLOW VELOCITY(FEET/SEC.) = 20.2
UPSTREAM NODE ELEVATION = 450.88
DOWNSTREAM NODE ELEVATION = 440.92
FLOWLENGTH(FEET) = 50.19 MANNING'S N = .013
GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPEFLOW THRU SUBAREA(CFS) = 10.66
TRAVEL TIME(MIN.) = .04 TC(MIN.) = 14.88

****
FLOW PROCESS FROM NODE 73.00 TO NODE 74.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

===
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 980.00
UPSTREAM ELEVATION = 467.30
DOWNSTREAM ELEVATION = 459.08
ELEVATION DIFFERENCE = 8.22
TC = .393*[(980.00**3)/(8.22)]**.2 = 16.059
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.435
SOIL CLASSIFICATION IS "A"
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6966
SUBAREA RUNOFF(CFS) = 4.00
TOTAL AREA(ACRES) = 1.67 TOTAL RUNOFF(CFS) = 4.00

****
FLOW PROCESS FROM NODE 74.00 TO NODE 75.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<

===
UPSTREAM ELEVATION = 459.08 DOWNSTREAM ELEVATION = 454.75
STREET LENGTH(FEET) = 782.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 28.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 14.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

**TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 6.75
STREETFLOW MODEL RESULTS:
STREET FLOWDEPTH(FEET) = .46
HALFSTREET FLOODWIDTH(FEET) = 16.82
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.29
PRODUCT OF DEPTH&VELOCITY = 1.06
STREETFLOW TRAVELTIME(MIN) = 5.69 TC(MIN) = 21.75

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.881
SOIL CLASSIFICATION IS "A"
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6769
SUBAREA AREA(ACRES) = 2.83 SUBAREA RUNOFF(CFS) = 5.52
SUMMED AREA(ACRES) = 4.50 TOTAL RUNOFF(CFS) = 9.52
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .51 HALFSTREET FLOODWIDTH(FEET) = 19.30
FLOW VELOCITY(FEET/SEC.) = 2.47 DEPTH*VELOCITY = 1.27

9.52 CFS ENTERS CATCH BASIN AT 66+21.30 (S) RIO VISTA DRIVE D=0.51, LINE D-4, MH1

****
FLOW PROCESS FROM NODE 75.00 TO NODE 93.00 IS CODE = 4

>>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE<<<<<

DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.9 INCHES
PIPEFLOW VELOCITY(FEET/SEC.) = 18.8
UPSTREAM NODE ELEVATION = 450.97
DOWNSTREAM NODE ELEVATION = 442.07
FLOWLENGTH(FEET) = 50.40 MANNING'S N = .013
GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPEFLOW THRU SUBAREA(CFS) = 9.52
TRAVEL TIME(MIN.) = .04 TC(MIN.) = 21.79

End Drainage Area "D"

Begin Drainage Area "E"

****
FLOW PROCESS FROM NODE 131.00 TO NODE 131.10 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS APARTMENT
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 800.00
UPSTREAM ELEVATION = 464.80
DOWNSTREAM ELEVATION = 456.37
ELEVATION DIFFERENCE = 8.43
TC = .323*[(800.00**3)/(8.43)]**.2 = 11.628
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.142
SOIL CLASSIFICATION IS "A"
APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8269
SUBAREA RUNOFF(CFS) = 23.73
TOTAL AREA(ACRES) = 6.93 TOTAL RUNOFF(CFS) = 23.73

****
FLOW PROCESS FROM NODE 131.10 TO NODE 132.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<

UPSTREAM ELEVATION = 456.37 DOWNSTREAM ELEVATION = 450.70
STREET LENGTH(FEET) = 724.00 CURB HEIGHT(INCHES) = 6.

```
** PEAK FLOW RATE TABLE **
STREAM    RUNOFF     Tc     INTENSITY
NUMBER     (CFS)   (MIN.)  (INCH/HOUR)
   1       13.64    11.70    4.127
   2       16.35    19.56    3.063

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     16.35  Tc(MIN.) =  19.56
TOTAL AREA(ACRES) =      7.09


****************************************************************************
 FLOW PROCESS FROM NODE   171.20 TO NODE   171.30 IS CODE =  4
 ----------------------------------------------------------------
 >>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE<<<<<
==============================================================================
 PIPEFLOW VELOCITY(FEET/SEC.) =  9.3
 UPSTREAM NODE ELEVATION =  430.87
 DOWNSTREAM NODE ELEVATION =  430.64
 FLOWLENGTH(FEET) =   58.74  MANNING'S N =  .013
 GIVEN PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES =  1
 PIPEFLOW THRU SUBAREA(CFS) =     16.35
 TRAVEL TIME(MIN.) =    .11    TC(MIN.) =  19.67
```

End Drainage Area "G"

Begin Drainage Area "H1"

```
****************************************************************************
 FLOW PROCESS FROM NODE   240.00 TO NODE   245.00 IS CODE =  21
 ----------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH =   640.00
 UPSTREAM ELEVATION =   464.00
 DOWNSTREAM ELEVATION =    457.61
 ELEVATION DIFFERENCE =      6.39
 TC =  .393*[( 640.00**3)/(    6.39)]**.2 =  13.078
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.869
 SOIL CLASSIFICATION IS "A"
 SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7098
 SUBAREA RUNOFF(CFS) =      5.35
 TOTAL AREA(ACRES) =      1.95   TOTAL RUNOFF(CFS) =      5.35


****************************************************************************
 FLOW PROCESS FROM NODE   245.00 TO NODE   250.00 IS CODE =  6
 ----------------------------------------------------------------
 >>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
 UPSTREAM ELEVATION =    457.61   DOWNSTREAM ELEVATION =    451.60
 STREET LENGTH(FEET) =   814.00   CURB HEIGHT(INCHES) = 6.
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK =  16.00
 INTERIOR STREET CROSSFALL(DECIMAL) =   .020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =   .055

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2

     **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =   12.15
   STREETFLOW MODEL RESULTS:
     STREET FLOWDEPTH(FEET) =   .45
     HALFSTREET FLOODWIDTH(FEET) =   15.50
```

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.38
PRODUCT OF DEPTH&VELOCITY = 1.08
STREETFLOW TRAVELTIME(MIN) = 5.70 TC(MIN) = 18.78

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.137
SOIL CLASSIFICATION IS "A"
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6865
SUBAREA AREA(ACRES) = 6.28 SUBAREA RUNOFF(CFS) = 13.52
SUMMED AREA(ACRES) = 8.23 TOTAL RUNOFF(CFS) = 18.88
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .51 HALFSTREET FLOODWIDTH(FEET) = 18.00
FLOW VELOCITY(FEET/SEC.) = 2.65 DEPTH*VELOCITY = 1.36

FLOW SPLITS AT THIS POINT, 9.44 CFS FLOWS EAST ON WEST RIO LARGO, 9.44 CFS FLOWS SOUTH ON RIO MADRE

****

FLOW PROCESS FROM NODE 250.00 TO NODE 250.10 IS CODE = 7

THE FOLLOWING SECTIONS MODEL THE FLOW THAT FLOW EAST ON WEST RIO LARGO

>>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==
USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN) = 18.78 RAIN INTENSITY(INCH/HOUR) = 3.14
TOTAL AREA(ACRES) = 4.12 TOTAL RUNOFF(CFS) = 9.44

****

FLOW PROCESS FROM NODE 250.10 TO NODE 275.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
==
UPSTREAM ELEVATION = 451.60 DOWNSTREAM ELEVATION = 446.89
STREET LENGTH(FEET) = 690.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

**TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 13.70
STREETFLOW MODEL RESULTS:
STREET FLOWDEPTH(FEET) = .47
HALFSTREET FLOODWIDTH(FEET) = 16.50
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.38
PRODUCT OF DEPTH&VELOCITY = 1.13
STREETFLOW TRAVELTIME(MIN) = 4.82 TC(MIN) = 23.60

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.748
SOIL CLASSIFICATION IS "A"
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6715
SUBAREA AREA(ACRES) = 4.57 SUBAREA RUNOFF(CFS) = 8.43
SUMMED AREA(ACRES) = 8.69 TOTAL RUNOFF(CFS) = 17.87
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .51 HALFSTREET FLOODWIDTH(FEET) = 18.00
FLOW VELOCITY(FEET/SEC.) = 2.51 DEPTH*VELOCITY = 1.29

17.87 CFS ENTERS TWO CATCH BASINS AT 11+34.81 AVE. QUINTANA
DEPTH = 0.51'
LINE H1, MH 7 & MH 2

****

FLOW PROCESS FROM NODE. 275.00 TO NODE 265.00 IS CODE = 4

>>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE<<<<<
==
DEPTH OF FLOW IN 24.0 INCH PIPE IS 11.3 INCHES
PIPEFLOW VELOCITY(FEET/SEC.) = 12.3
UPSTREAM NODE ELEVATION = 438.57
DOWNSTREAM NODE ELEVATION = 435.57
FLOWLENGTH(FEET) = 82.83 MANNING'S N = .013
GIVEN PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPEFLOW THRU SUBAREA(CFS) = 17.87

TRAVEL TIME(MIN.) = .11 TC(MIN.) = 23.71

End Drainage Area "H1"

Begin Drainage Area "H2"

```
****************************************************************************
FLOW PROCESS FROM NODE 250.00 TO NODE 250.00 IS CODE = 7
----------------------------------------------------------------------------
>>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN) = 18.78 RAIN INTENSITY(INCH/HOUR) = 3.14
TOTAL AREA(ACRES) = 4.12 TOTAL RUNOFF(CFS) = 9.44

****************************************************************************
FLOW PROCESS FROM NODE 250.00 TO NODE 251.00 IS CODE = 6
----------------------------------------------------------------------------
>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM ELEVATION = 451.60 DOWNSTREAM ELEVATION = 449.76
STREET LENGTH(FEET) = 235.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

    **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 22.37
***STREET FLOWING FULL***
  STREETFLOW MODEL RESULTS:
    NOTE: STREETFLOW EXCEEDS TOP OF CURB.
    THE FOLLOWING STREETFLOW RESULTS ARE BASED ON THE ASSUMPTION
    THAT NEGLIBLE FLOW OCCURS OUTSIDE OF THE STREET CHANNEL.
    THAT IS, ALL FLOW ALONG THE PARKWAY, ETC., IS NEGLECTED.
    STREET FLOWDEPTH(FEET) = .51
    HALFSTREET FLOODWIDTH(FEET) = 18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.14
    PRODUCT OF DEPTH&VELOCITY = 1.61
STREETFLOW TRAVELTIME(MIN) = 1.25 TC(MIN) = 20.03

 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.022
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7476
SUBAREA AREA(ACRES) = 11.49 SUBAREA RUNOFF(CFS) = 25.96
SUMMED AREA(ACRES) = 15.61 TOTAL RUNOFF(CFS) = 35.40
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .59 HALFSTREET FLOODWIDTH(FEET) = 18.00
FLOW VELOCITY(FEET/SEC.) = 3.56 DEPTH*VELOCITY = 2.11

****************************************************************************
FLOW PROCESS FROM NODE 251.00 TO NODE 252.00 IS CODE = 6
----------------------------------------------------------------------------
>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM ELEVATION = 449.76 DOWNSTREAM ELEVATION = 447.80
STREET LENGTH(FEET) = 220.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
```

**TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 43.53
STREET FLOWING FULL
STREETFLOW MODEL RESULTS:
NOTE: STREETFLOW EXCEEDS TOP OF CURB.
THE FOLLOWING STREETFLOW RESULTS ARE BASED ON THE ASSUMPTION
THAT NEGLIBLE FLOW OCCURS OUTSIDE OF THE STREET CHANNEL.
THAT IS, ALL FLOW ALONG THE PARKWAY, ETC., IS NEGLECTED.
STREET FLOWDEPTH(FEET) = .61
HALFSTREET FLOODWIDTH(FEET) = 18.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.09
PRODUCT OF DEPTH&VELOCITY = 2.50
STREETFLOW TRAVELTIME(MIN) = .90 TC(MIN) = 20.92

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.946
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7456
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 16.26
SUMMED AREA(ACRES) = 23.01 TOTAL RUNOFF(CFS) = 51.65
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .65 HALFSTREET FLOODWIDTH(FEET) = 18.00
FLOW VELOCITY(FEET/SEC.) = 4.29 DEPTH*VELOCITY = 2.79
==
END OF STUDY SUMMARY:
PEAK FLOW RATE(CFS) = 51.65 Tc(MIN.) = 20.92
TOTAL AREA(ACRES) = 23.01
==
END OF RATIONAL METHOD ANALYSIS

End Drainage Area “H2”

Begin Drainage Area “H4”

****
FLOW PROCESS FROM NODE 210.00 TO NODE 215.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 1090.00
UPSTREAM ELEVATION = 470.00
DOWNSTREAM ELEVATION = 461.72
ELEVATION DIFFERENCE = 8.28
TC = .393*[(1090.00**3)/(8.28)]**.2 = 17.092
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.313
SOIL CLASSIFICATION IS "A"
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6926
SUBAREA RUNOFF(CFS) = 8.37
TOTAL AREA(ACRES) = 3.65 TOTAL RUNOFF(CFS) = 8.37

****
FLOW PROCESS FROM NODE 215.00 TO NODE 225.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
==
UPSTREAM ELEVATION = 461.72 DOWNSTREAM ELEVATION = 455.04
STREET LENGTH(FEET) = 708.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

```
    **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =   15.16
  STREETFLOW MODEL RESULTS:
    STREET FLOWDEPTH(FEET) =  .45
    HALFSTREET FLOODWIDTH(FEET) =  15.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =   2.97
    PRODUCT OF DEPTH&VELOCITY =   1.35
 STREETFLOW TRAVELTIME(MIN) =   3.97   TC(MIN) =  21.07

  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.935
 SOIL CLASSIFICATION IS "A"
 SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6790
 SUBAREA AREA(ACRES) =    6.85   SUBAREA RUNOFF(CFS) =   13.65
 SUMMED AREA(ACRES) =   10.50   TOTAL RUNOFF(CFS) =     22.02
 END OF SUBAREA STREETFLOW HYDRAULICS:
 DEPTH(FEET) =  .51   HALFSTREET FLOODWIDTH(FEET) = 18.00
 FLOW VELOCITY(FEET/SEC.) =  3.09   DEPTH*VELOCITY =   1.59

****************************************************************************
 FLOW PROCESS FROM NODE   225.00 TO NODE   225.10 IS CODE =  1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  21.07
 RAINFALL INTENSITY(INCH/HR) =   2.93
 TOTAL STREAM AREA(ACRES) =   10.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.02

****************************************************************************
 FLOW PROCESS FROM NODE   220.00 TO NODE   221.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
     ASSUMED INITIAL SUBAREA UNIFORM
     DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH =   750.00
 UPSTREAM ELEVATION =    469.00
 DOWNSTREAM ELEVATION =    459.50
 ELEVATION DIFFERENCE =      9.50
 TC =  .393*[(  750.00**3)/(     9.50)]**.2 =   13.287
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.833
 SOIL CLASSIFICATION IS "A"
 SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7088
 SUBAREA RUNOFF(CFS) =     18.23
 TOTAL AREA(ACRES) =      6.71   TOTAL RUNOFF(CFS) =     18.23

****************************************************************************
 FLOW PROCESS FROM NODE   221.00 TO NODE   225.00 IS CODE =  6
----------------------------------------------------------------------------
 >>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM ELEVATION =    459.50   DOWNSTREAM ELEVATION =    455.04
 STREET LENGTH(FEET) =   610.00   CURB HEIGHT(INCHES) = 6.
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK =  16.00
 INTERIOR STREET CROSSFALL(DECIMAL) =   .020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =   .055

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2

    **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =   19.93
 ***STREET FLOWING FULL***
  STREETFLOW MODEL RESULTS:
    NOTE: STREETFLOW EXCEEDS TOP OF CURB.
```

THE FOLLOWING STREETFLOW RESULTS ARE BASED ON THE ASSUMPTION
THAT NEGLIBLE FLOW OCCURS OUTSIDE OF THE STREET CHANNEL.
THAT IS, ALL FLOW ALONG THE PARKWAY, ETC., IS NEGLECTED.
STREET FLOWDEPTH(FEET) = .51
HALFSTREET FLOODWIDTH(FEET) = 18.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.80
PRODUCT OF DEPTH&VELOCITY = 1.44
STREETFLOW TRAVELTIME(MIN) = 3.64 TC(MIN) = 16.92

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.332
SOIL CLASSIFICATION IS "A"
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6932
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 3.40
SUMMED AREA(ACRES) = 8.18 TOTAL RUNOFF(CFS) = 21.63
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .51 HALFSTREET FLOODWIDTH(FEET) = 18.00
FLOW VELOCITY(FEET/SEC.) = 3.03 DEPTH*VELOCITY = 1.56

****

FLOW PROCESS FROM NODE 225.00 TO NODE 225.10 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

==

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 16.92
RAINFALL INTENSITY(INCH/HR) = 3.33
TOTAL STREAM AREA(ACRES) = 8.18
PEAK FLOW RATE(CFS) AT CONFLUENCE = 21.63

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	22.02	21.07	2.935	10.50
2	21.63	16.92	3.332	8.18

*********************************WARNING**********************************
IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	39.32	16.92	3.332
2	41.07	21.07	2.935

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 41.07 Tc(MIN.) = 21.07
TOTAL AREA(ACRES) = 18.68

****

FLOW PROCESS FROM NODE 225.10 TO NODE 200.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<

==

UPSTREAM ELEVATION = 455.04 DOWNSTREAM ELEVATION = 453.60
STREET LENGTH(FEET) = 210.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

```
    **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =  46.70
***STREET FLOWING FULL***
 STREETFLOW MODEL RESULTS:
    NOTE: STREETFLOW EXCEEDS TOP OF CURB.
    THE FOLLOWING STREETFLOW RESULTS ARE BASED ON THE ASSUMPTION
    THAT NEGLIBLE FLOW OCCURS OUTSIDE OF THE STREET CHANNEL.
    THAT IS, ALL FLOW ALONG THE PARKWAY, ETC., IS NEGLECTED.
    STREET FLOWDEPTH(FEET) =  .65
    HALFSTREET FLOODWIDTH(FEET) =  18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =   3.88
    PRODUCT OF DEPTH&VELOCITY =   2.52
STREETFLOW TRAVELTIME(MIN) =   .90   TC(MIN) = 21.97

 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.864
SOIL CLASSIFICATION IS "A"
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6762
SUBAREA AREA(ACRES) =   5.81  SUBAREA RUNOFF(CFS) =  11.25
SUMMED AREA(ACRES) =  24.49  TOTAL RUNOFF(CFS) =    52.33
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .67   HALFSTREET FLOODWIDTH(FEET) = 18.00
FLOW VELOCITY(FEET/SEC.) = 4.10   DEPTH*VELOCITY =  2.75
```

End Drainage Area “H4”

Begin Drainage Area “I”

```
****************************************************************************
 FLOW PROCESS FROM NODE   315.00 TO NODE   320.00 IS CODE =  21
 ----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS CONDOMINIUM
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH =  840.00
 UPSTREAM ELEVATION =   453.10
 DOWNSTREAM ELEVATION =   445.18
 ELEVATION DIFFERENCE =      7.92
 TC = .359*[( 840.00**3)/(    7.92)]**.2 =  13.495
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.799
 SOIL CLASSIFICATION IS "A"
 CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7654
 SUBAREA RUNOFF(CFS) =    16.14
 TOTAL AREA(ACRES) =     5.55  TOTAL RUNOFF(CFS) =     16.14

****************************************************************************
 FLOW PROCESS FROM NODE   320.00 TO NODE   325.00 IS CODE =   6
 ----------------------------------------------------------------------------
 >>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM ELEVATION =   445.18  DOWNSTREAM ELEVATION =    442.57
 STREET LENGTH(FEET) =  238.00  CURB HEIGHT(INCHES) = 6.
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK =  16.00
 INTERIOR STREET CROSSFALL(DECIMAL) =  .020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  .055

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2

     **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =   19.78
  STREETFLOW MODEL RESULTS:
     STREET FLOWDEPTH(FEET) =  .49
     HALFSTREET FLOODWIDTH(FEET) =  17.50
     AVERAGE FLOW VELOCITY(FEET/SEC.) =   3.08
     PRODUCT OF DEPTH&VELOCITY =   1.52
```

Rational Method Calculations
10-Year Storm

****

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
(RCFC&WCD) 1978 HYDROLOGY MANUAL

Ver. 1.5A Release Date: 6/01/94 License ID 1304

Analysis prepared by:

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************************** DESCRIPTION OF STUDY **************************
* Rio Vista Village - Tract 28639-1 *
* 10 Year Storm *
* Rational Method Calculations *
****

FILE NAME: 1064P.DAT
TIME/DATE OF STUDY: 20:44 3/25/2001

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = .85
10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.770
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = .980
100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 4.520
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.600
SLOPE OF 10-YEAR INTENSITY-DURATION CURVE = .5799047
SLOPE OF 100-YEAR INTENSITY-DURATION CURVE = .5796024
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 10.00 1-HOUR INTENSITY(INCH/HOUR) = .9898
SLOPE OF INTENSITY DURATION CURVE = .5799
RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED
NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES

Begin Drainage Area "B"

****

FLOW PROCESS FROM NODE 40.00 TO NODE 45.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

===

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS CONDOMINIUM
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 1050.00
UPSTREAM ELEVATION = 482.00
DOWNSTREAM ELEVATION = 470.50
ELEVATION DIFFERENCE = 11.50
TC = .359*[(1050.00**3)/(11.50)]**.2 = 14.319
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.272
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7252
SUBAREA RUNOFF(CFS) = 12.75
TOTAL AREA(ACRES) = 7.74 TOTAL RUNOFF(CFS) = 12.75

****

FLOW PROCESS FROM NODE 45.00 TO NODE 50.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<

```
=========================================================================
UPSTREAM ELEVATION =   470.50   DOWNSTREAM ELEVATION =   468.37
STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK =  16.00
INTERIOR STREET CROSSFALL(DECIMAL) =   .020
OUTSIDE STREET CROSSFALL(DECIMAL)  =   .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2

    **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =   16.03
  STREETFLOW MODEL RESULTS:
    STREET FLOWDEPTH(FEET) =   .49
    HALFSTREET FLOODWIDTH(FEET) =   17.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =   2.50
    PRODUCT OF DEPTH&VELOCITY =    1.23
 STREETFLOW TRAVELTIME(MIN) =   2.00   TC(MIN) =  16.32

  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.106
 SOIL CLASSIFICATION IS "A"
 CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7193
 SUBAREA AREA(ACRES) =    4.32   SUBAREA RUNOFF(CFS) =    6.54
 SUMMED AREA(ACRES) =   12.06   TOTAL RUNOFF(CFS) =     19.30
 END OF SUBAREA STREETFLOW HYDRAULICS:
 DEPTH(FEET) =  .51   HALFSTREET FLOODWIDTH(FEET) = 18.00
 FLOW VELOCITY(FEET/SEC.) =  2.71   DEPTH*VELOCITY =    1.39

****************************************************************************
 FLOW PROCESS FROM NODE    50.00 TO NODE    51.00 IS CODE =  6
----------------------------------------------------------------------------
 >>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
=========================================================================
 UPSTREAM ELEVATION =   468.37   DOWNSTREAM ELEVATION =   465.72
 STREET LENGTH(FEET) =   438.00   CURB HEIGHT(INCHES) = 6.
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK =  16.00
 INTERIOR STREET CROSSFALL(DECIMAL) =   .020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =   .055

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2

     **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =   21.72
 ***STREET FLOWING FULL***
  STREETFLOW MODEL RESULTS:
     NOTE: STREETFLOW EXCEEDS TOP OF CURB.
     THE FOLLOWING STREETFLOW RESULTS ARE BASED ON THE ASSUMPTION
     THAT NEGLIBLE FLOW OCCURS OUTSIDE OF THE STREET CHANNEL.
     THAT IS, ALL FLOW ALONG THE PARKWAY, ETC., IS NEGLECTED.
     STREET FLOWDEPTH(FEET) =   .53
     HALFSTREET FLOODWIDTH(FEET) =   18.00
     AVERAGE FLOW VELOCITY(FEET/SEC.) =   2.77
     PRODUCT OF DEPTH&VELOCITY =    1.48
 STREETFLOW TRAVELTIME(MIN) =   2.63   TC(MIN) =  18.95

  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.931
 SOIL CLASSIFICATION IS "A"
 CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7127
 SUBAREA AREA(ACRES) =    3.52   SUBAREA RUNOFF(CFS) =    4.84
 SUMMED AREA(ACRES) =   15.58   TOTAL RUNOFF(CFS) =     24.14
 END OF SUBAREA STREETFLOW HYDRAULICS:
 DEPTH(FEET) =  .55   HALFSTREET FLOODWIDTH(FEET) = 18.00
 FLOW VELOCITY(FEET/SEC.) =  2.83   DEPTH*VELOCITY =    1.56
```

SEE FIGURE 4
S=0.00605
⟹ STREET CAPACITY = 25.54 CFS
OK

```
****************************************************************************
 FLOW PROCESS FROM NODE    51.00 TO NODE    55.00 IS CODE =  4
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE<<<<<
==========================================================================
DEPTH OF FLOW IN  27.0 INCH PIPE IS  13.8 INCHES
PIPEFLOW VELOCITY(FEET/SEC.) = 11.8
UPSTREAM NODE ELEVATION =  458.47
DOWNSTREAM NODE ELEVATION =  450.36
FLOWLENGTH(FEET) =   306.49  MANNING'S N =  .013
GIVEN PIPE DIAMETER(INCH) = 27.00   NUMBER OF PIPES =   1
PIPEFLOW THRU SUBAREA(CFS) =    24.14
TRAVEL TIME(MIN.) =   .43   TC(MIN.) =  19.39

****************************************************************************
FLOW PROCESS FROM NODE    55.00 TO NODE    55.00 IS CODE =  8
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
 10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.906
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7117
SUBAREA AREA(ACRES) =    5.46  SUBAREA RUNOFF(CFS) =    7.41
TOTAL AREA(ACRES) =    21.04  TOTAL RUNOFF(CFS) =   31.54
TC(MIN) =  19.39

****************************************************************************
FLOW PROCESS FROM NODE    55.00 TO NODE    56.00 IS CODE =  4
----------------------------------------------------------------------------
>>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE<<<<<
==========================================================================
DEPTH OF FLOW IN  33.0 INCH PIPE IS  15.7 INCHES
PIPEFLOW VELOCITY(FEET/SEC.) = 11.3
UPSTREAM NODE ELEVATION =  449.77
DOWNSTREAM NODE ELEVATION =  447.35
FLOWLENGTH(FEET) =   121.35  MANNING'S N =  .013
GIVEN PIPE DIAMETER(INCH) = 33.00   NUMBER OF PIPES =   1
PIPEFLOW THRU SUBAREA(CFS) =    31.54
TRAVEL TIME(MIN.) =   .18   TC(MIN.) =  19.57
```

End Drainage Area “B”

Begin Drainage Area “C”

```
****************************************************************************
FLOW PROCESS FROM NODE    67.00 TO NODE    68.00 IS CODE = 21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
    ASSUMED INITIAL SUBAREA UNIFORM
    DEVELOPMENT IS CONDOMINIUM
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH =  700.00
UPSTREAM ELEVATION =   470.40
DOWNSTREAM ELEVATION =   461.61
ELEVATION DIFFERENCE =     8.79
TC = .359*[( 700.00**3)/(   8.79)]**.2 =  11.847
 10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.536
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7338
SUBAREA RUNOFF(CFS) =    11.80
TOTAL AREA(ACRES) =     6.34  TOTAL RUNOFF(CFS) =    11.80

****************************************************************************
FLOW PROCESS FROM NODE    68.00 TO NODE    69.00 IS CODE =  6
```

```
>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
 UPSTREAM ELEVATION =   461.61   DOWNSTREAM ELEVATION =   458.34
 STREET LENGTH(FEET) =   242.00   CURB HEIGHT(INCHES) = 6.
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK =  13.00
 INTERIOR STREET CROSSFALL(DECIMAL) =   .020
 OUTSIDE STREET CROSSFALL(DECIMAL) =   .055

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2

    **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =   13.65
  STREETFLOW MODEL RESULTS:
    STREET FLOWDEPTH(FEET) =   .42
    HALFSTREET FLOODWIDTH(FEET) =   13.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.33
    PRODUCT OF DEPTH&VELOCITY =    1.40
 STREETFLOW TRAVELTIME(MIN) =   1.21   TC(MIN) =  13.06

  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.397
 SOIL CLASSIFICATION IS "A"
 CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7294
 SUBAREA AREA(ACRES) =     2.12   SUBAREA RUNOFF(CFS) =     3.71
 SUMMED AREA(ACRES) =     8.46   TOTAL RUNOFF(CFS) =     15.50
 END OF SUBAREA STREETFLOW HYDRAULICS:
 DEPTH(FEET) =  .44   HALFSTREET FLOODWIDTH(FEET) = 14.59
 FLOW VELOCITY(FEET/SEC.) =  3.40   DEPTH*VELOCITY =   1.48

****************************************************************************
 FLOW PROCESS FROM NODE     69.00 TO NODE     70.00 IS CODE =  4
 -------------------------------------------------------------
 >>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE<<<<<
==========================================================================
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.9 INCHES
 PIPEFLOW VELOCITY(FEET/SEC.) =  11.2
 UPSTREAM NODE ELEVATION =   451.33
 DOWNSTREAM NODE ELEVATION =   447.75
 FLOWLENGTH(FEET) =   114.63   MANNING'S N =  .013
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPEFLOW THRU SUBAREA(CFS) =      15.50
 TRAVEL TIME(MIN.) =     .17    TC(MIN.) =  13.23
```

End Drainage Area "C"

Begin Drainage Area "D"

```
****************************************************************************
 FLOW PROCESS FROM NODE     60.00 TO NODE     65.00 IS CODE =  21
 -------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS CONDOMINIUM
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH =   680.00
 UPSTREAM ELEVATION =    473.40
 DOWNSTREAM ELEVATION =     465.95
 ELEVATION DIFFERENCE =       7.45
 TC =  .359*[(  680.00**3)/(     7.45)]**.2 =    12.034
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.513
 SOIL CLASSIFICATION IS "A"
 CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7331
 SUBAREA RUNOFF(CFS) =      10.65
```

TOTAL AREA(ACRES) = 5.78 TOTAL RUNOFF(CFS) = 10.65

****

FLOW PROCESS FROM NODE 65.00 TO NODE 85.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<

==

UPSTREAM ELEVATION = 465.95 DOWNSTREAM ELEVATION = 462.19
STREET LENGTH(FEET) = 537.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

**TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 14.39
STREETFLOW MODEL RESULTS:
STREET FLOWDEPTH(FEET) = .47
HALFSTREET FLOODWIDTH(FEET) = 16.50
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.51
PRODUCT OF DEPTH&VELOCITY = 1.19
STREETFLOW TRAVELTIME(MIN) = 3.57 TC(MIN) = 15.61

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.161
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7213
SUBAREA AREA(ACRES) = 4.77 SUBAREA RUNOFF(CFS) = 7.44
SUMMED AREA(ACRES) = 10.55 TOTAL RUNOFF(CFS) = 18.08
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .49 HALFSTREET FLOODWIDTH(FEET) = 17.50
FLOW VELOCITY(FEET/SEC.) = 2.82 DEPTH*VELOCITY = 1.39

****

FLOW PROCESS FROM NODE 85.00 TO NODE 90.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<

==

UPSTREAM ELEVATION = 462.19 DOWNSTREAM ELEVATION = 461.13
STREET LENGTH(FEET) = 152.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

**TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 20.55
STREET FLOWING FULL
STREETFLOW MODEL RESULTS:
NOTE: STREETFLOW EXCEEDS TOP OF CURB.
THE FOLLOWING STREETFLOW RESULTS ARE BASED ON THE ASSUMPTION
THAT NEGLIBLE FLOW OCCURS OUTSIDE OF THE STREET CHANNEL.
THAT IS, ALL FLOW ALONG THE PARKWAY, ETC., IS NEGLECTED.
STREET FLOWDEPTH(FEET) = .51
HALFSTREET FLOODWIDTH(FEET) = 18.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.88
PRODUCT OF DEPTH&VELOCITY = 1.48
STREETFLOW TRAVELTIME(MIN) = .88 TC(MIN) = 16.48

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.094
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7189
SUBAREA AREA(ACRES) = 3.27 SUBAREA RUNOFF(CFS) = 4.92
SUMMED AREA(ACRES) = 13.82 TOTAL RUNOFF(CFS) = 23.01
END OF SUBAREA STREETFLOW HYDRAULICS:

SEE FIGURE 4

DEPTH(FEET) = .53 HALFSTREET FLOODWIDTH(FEET) = 18.00 ⇒ S= 0.00697
FLOW VELOCITY(FEET/SEC.) = 2.94 DEPTH*VELOCITY = 1.57

STREET CAPACITY = 26.34 CFS

ok

****

FLOW PROCESS FROM NODE 90.00 TO NODE 90.10 IS CODE = 7

>>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<

===

USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN) = 16.48 RAIN INTENSITY(INCH/HOUR) = 2.09
TOTAL AREA(ACRES) = 6.91 TOTAL RUNOFF(CFS) = 11.51

****

FLOW PROCESS FROM NODE 90.10 TO NODE 91.00 IS CODE = 4

>>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE<<<<<

===

DEPTH OF FLOW IN 24.0 INCH PIPE IS 11.4 INCHES
PIPEFLOW VELOCITY(FEET/SEC.) = 7.8
UPSTREAM NODE ELEVATION = 456.85
DOWNSTREAM NODE ELEVATION = 451.30
FLOWLENGTH(FEET) = 383.99 MANNING'S N = .013
GIVEN PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPEFLOW THRU SUBAREA(CFS) = 11.51
TRAVEL TIME(MIN.) = .82 TC(MIN.) = 17.30

****

FLOW PROCESS FROM NODE 91.00 TO NODE 91.10 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

===

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 17.30
RAINFALL INTENSITY(INCH/HR) = 2.04
TOTAL STREAM AREA(ACRES) = 6.91
PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.51

****

FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

===

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS CONDOMINIUM
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 460.00
UPSTREAM ELEVATION = 466.00
DOWNSTREAM ELEVATION = 458.65
ELEVATION DIFFERENCE = 7.35
TC = .359*[(460.00**3)/(7.35)]**.2 = 9.544
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.874
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7436
SUBAREA RUNOFF(CFS) = 11.67
TOTAL AREA(ACRES) = 5.46 TOTAL RUNOFF(CFS) = 11.67

****

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 4

>>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE<<<<<

===

DEPTH OF FLOW IN 21.0 INCH PIPE IS 8.5 INCHES

PIPEFLOW VELOCITY(FEET/SEC.) = 12.7
UPSTREAM NODE ELEVATION = 453.89
DOWNSTREAM NODE ELEVATION = 451.88
FLOWLENGTH(FEET) = 38.00 MANNING'S N = .013
GIVEN PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPEFLOW THRU SUBAREA(CFS) = 11.67
TRAVEL TIME(MIN.) = .05 TC(MIN.) = 9.59

****

FLOW PROCESS FROM NODE 122.00 TO NODE 91.10 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

==

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 9.59
RAINFALL INTENSITY(INCH/HR) = 2.87
TOTAL STREAM AREA(ACRES) = 5.46
PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.67

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	11.51	17.30	2.036	6.91
2	11.67	9.59	2.866	5.46

***********************************WARNING**********************************
IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	18.05	9.59	2.866
2	19.80	17.30	2.036

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 18.05 Tc(MIN.) = 9.59
TOTAL AREA(ACRES) = 12.37

****

FLOW PROCESS FROM NODE 91.10 TO NODE 92.00 IS CODE = 4

>>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE<<<<<

==

DEPTH OF FLOW IN 27.0 INCH PIPE IS 11.8 INCHES
PIPEFLOW VELOCITY(FEET/SEC.) = 10.8
UPSTREAM NODE ELEVATION = 451.28
DOWNSTREAM NODE ELEVATION = 444.02
FLOWLENGTH(FEET) = 285.59 MANNING'S N = .013
GIVEN PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPEFLOW THRU SUBAREA(CFS) = 18.05
TRAVEL TIME(MIN.) = .44 TC(MIN.) = 10.04

****

FLOW PROCESS FROM NODE 92.00 TO NODE 92.10 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

==

TOTAL NUMBER OF STREAMS = 2

```
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  10.04
RAINFALL INTENSITY(INCH/HR) =   2.79
TOTAL STREAM AREA(ACRES) =  12.37
PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.05

****************************************************************************
 FLOW PROCESS FROM NODE   105.00 TO NODE   105.00 IS CODE =  7
----------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  16.48   RAIN INTENSITY(INCH/HOUR) =  2.09
 TOTAL AREA(ACRES) =      6.91   TOTAL RUNOFF(CFS) =      11.51

****************************************************************************
 FLOW PROCESS FROM NODE   105.00 TO NODE   106.00 IS CODE =  6
----------------------------------------------------------------
 >>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM ELEVATION =    461.89   DOWNSTREAM ELEVATION =    457.85
 STREET LENGTH(FEET) =   336.00   CURB HEIGHT(INCHES) = 6.
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK =  16.00
 INTERIOR STREET CROSSFALL(DECIMAL) =   .020
 OUTSIDE STREET CROSSFALL(DECIMAL) =   .055

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2

     **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =   13.25
   STREETFLOW MODEL RESULTS:
     STREET FLOWDEPTH(FEET) =   .43
     HALFSTREET FLOODWIDTH(FEET) =   14.50
     AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.94
     PRODUCT OF DEPTH&VELOCITY =    1.28
 STREETFLOW TRAVELTIME(MIN) =   1.90   TC(MIN) =  18.38

   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.965
 SOIL CLASSIFICATION IS "A"
 CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7140
 SUBAREA AREA(ACRES) =    2.48   SUBAREA RUNOFF(CFS) =    3.48
 SUMMED AREA(ACRES) =    9.39   TOTAL RUNOFF(CFS) =     14.99
 END OF SUBAREA STREETFLOW HYDRAULICS:
 DEPTH(FEET) =  .43   HALFSTREET FLOODWIDTH(FEET) = 14.50
 FLOW VELOCITY(FEET/SEC.) =  3.33   DEPTH*VELOCITY =   1.44

****************************************************************************
 FLOW PROCESS FROM NODE   106.00 TO NODE   106.00 IS CODE =  8
----------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.965
 SOIL CLASSIFICATION IS "A"
 CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7140
 SUBAREA AREA(ACRES) =    1.78   SUBAREA RUNOFF(CFS) =    2.50
 TOTAL AREA(ACRES) =     11.17   TOTAL RUNOFF(CFS) =   17.49
 TC(MIN) =  18.38

****************************************************************************
 FLOW PROCESS FROM NODE   106.00 TO NODE   107.00 IS CODE =  6
----------------------------------------------------------------
 >>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM ELEVATION =    457.85   DOWNSTREAM ELEVATION =    453.29
 STREET LENGTH(FEET) =   395.00   CURB HEIGHT(INCHES) = 6.
```

```
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

   **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 18.95
 STREETFLOW MODEL RESULTS:
   STREET FLOWDEPTH(FEET) = .47
   HALFSTREET FLOODWIDTH(FEET) = 16.50
   AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.30
   PRODUCT OF DEPTH&VELOCITY = 1.56
STREETFLOW TRAVELTIME(MIN) = 1.99  TC(MIN) = 20.38

 10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.852
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7095
SUBAREA AREA(ACRES) = 2.23  SUBAREA RUNOFF(CFS) = 2.93
SUMMED AREA(ACRES) = 13.40  TOTAL RUNOFF(CFS) = 20.42
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .49  HALFSTREET FLOODWIDTH(FEET) = 17.50
FLOW VELOCITY(FEET/SEC.) = 3.18  DEPTH*VELOCITY = 1.57

****************************************************************************
FLOW PROCESS FROM NODE 107.00 TO NODE 92.00 IS CODE = 4
----------------------------------------------------------------------------
>>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE<<<<<
============================================================================
DEPTH OF FLOW IN 33.0 INCH PIPE IS 19.7 INCHES
PIPEFLOW VELOCITY(FEET/SEC.) = 5.5
UPSTREAM NODE ELEVATION = 444.84
DOWNSTREAM NODE ELEVATION = 444.04
FLOWLENGTH(FEET) = 201.12  MANNING'S N = .013
GIVEN PIPE DIAMETER(INCH) = 33.00  NUMBER OF PIPES = 1
PIPEFLOW THRU SUBAREA(CFS) = 20.42
TRAVEL TIME(MIN.) = .61  TC(MIN.) = 20.98

****************************************************************************
FLOW PROCESS FROM NODE 92.00 TO NODE 92.10 IS CODE = 1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 20.98
RAINFALL INTENSITY(INCH/HR) = 1.82
TOTAL STREAM AREA(ACRES) = 13.40
PEAK FLOW RATE(CFS) AT CONFLUENCE = 20.42

** CONFLUENCE DATA **
STREAM  RUNOFF   Tc   INTENSITY    AREA
NUMBER   (CFS)  (MIN.) (INCH/HOUR) (ACRE)
  1     18.05  10.04    2.792      12.37
  2     20.42  20.98    1.820      13.40

********************************WARNING*********************************
IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
****************************************************************************

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

```
** PEAK FLOW RATE TABLE **
STREAM    RUNOFF    Tc    INTENSITY
NUMBER    (CFS)  (MIN.)  (INCH/HOUR)
  1    27.82   10.04    2.792
  2    32.19   20.98    1.820

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = .  32.19  Tc(MIN.) =  20.98
TOTAL AREA(ACRES) =    25.77

****************************************************************************
 FLOW PROCESS FROM NODE    92.10 TO NODE    93.00 IS CODE =  4
 ----------------------------------------------------------------
 >>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE<<<<<
============================================================================
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  22.2 INCHES
 PIPEFLOW VELOCITY(FEET/SEC.) =  6.2
 UPSTREAM NODE ELEVATION =  443.28
 DOWNSTREAM NODE ELEVATION =  442.42
 FLOWLENGTH(FEET) =  215.65   MANNING'S N =  .013
 GIVEN PIPE DIAMETER(INCH) =  42.00   NUMBER OF PIPES =  1
 PIPEFLOW THRU SUBAREA(CFS) =    32.19
 TRAVEL TIME(MIN.) =    .58    TC(MIN.) =  21.56

****************************************************************************
 FLOW PROCESS FROM NODE    70.00 TO NODE    71.00 IS CODE =  21
 ----------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
     ASSUMED INITIAL SUBAREA UNIFORM
     DEVELOPMENT IS CONDOMINIUM
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH =  660.00
 UPSTREAM ELEVATION =    467.10
 DOWNSTREAM ELEVATION =    457.36
 ELEVATION DIFFERENCE =      9.74
 TC = .359*[( 660.00**3)/(    9.74)]**.2 =  11.203
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.619
 SOIL CLASSIFICATION IS "A"
 CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7363
 SUBAREA RUNOFF(CFS) =     3.66
 TOTAL AREA(ACRES) =      1.90   TOTAL RUNOFF(CFS) =      3.66

****************************************************************************
 FLOW PROCESS FROM NODE    71.00 TO NODE    72.00 IS CODE =  6
 ----------------------------------------------------------------
 >>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM ELEVATION =    457.36  DOWNSTREAM ELEVATION =    454.75
 STREET LENGTH(FEET) =   520.00   CURB HEIGHT(INCHES) = 6.
 STREET HALFWIDTH(FEET) = 28.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK =  14.00
 INTERIOR STREET CROSSFALL(DECIMAL) =   .020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =   .020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1

     **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =    4.95
   STREETFLOW MODEL RESULTS:
     STREET FLOWDEPTH(FEET) =   .43
     HALFSTREET FLOODWIDTH(FEET) =   15.16
     AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.05
     PRODUCT OF DEPTH&VELOCITY =    .88
 STREETFLOW TRAVELTIME(MIN) =   4.23   TC(MIN) =  15.44
```

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.175
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7218
SUBAREA AREA(ACRES) = 1.62 SUBAREA RUNOFF(CFS) = 2.54
SUMMED AREA(ACRES) = 3.52 TOTAL RUNOFF(CFS) = 6.21
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .46 HALFSTREET FLOODWIDTH(FEET) = 16.82
FLOW VELOCITY(FEET/SEC.) = 2.11 DEPTH*VELOCITY = .97

****

FLOW PROCESS FROM NODE 72.00 TO NODE 93.00 IS CODE = 4

>>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE<<<<<

==

DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.6 INCHES
PIPEFLOW VELOCITY(FEET/SEC.) = 17.4
UPSTREAM NODE ELEVATION = 450.88
DOWNSTREAM NODE ELEVATION = 440.92
FLOWLENGTH(FEET) = 50.19 MANNING'S N = .013
GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPEFLOW THRU SUBAREA(CFS) = 6.21
TRAVEL TIME(MIN.) = .05 TC(MIN.) = 15.49

****

FLOW PROCESS FROM NODE 73.00 TO NODE 74.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

==

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 980.00
UPSTREAM ELEVATION = 467.30
DOWNSTREAM ELEVATION = 459.08
ELEVATION DIFFERENCE = 8.22
TC = .393*[(980.00**3)/(8.22)]**.2 = 16.059
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.126
SOIL CLASSIFICATION IS "A"
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6429
SUBAREA RUNOFF(CFS) = 2.28
TOTAL AREA(ACRES) = 1.67 TOTAL RUNOFF(CFS) = 2.28

****

FLOW PROCESS FROM NODE 74.00 TO NODE 75.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<

==

UPSTREAM ELEVATION = 459.08 DOWNSTREAM ELEVATION = 454.75
STREET LENGTH(FEET) = 782.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 28.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 14.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

**TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 3.81
STREETFLOW MODEL RESULTS:
STREET FLOWDEPTH(FEET) = .40
HALFSTREET FLOODWIDTH(FEET) = 13.51
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.96
PRODUCT OF DEPTH&VELOCITY = .78
STREETFLOW TRAVELTIME(MIN) = 6.65 TC(MIN) = 22.71

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.739

SOIL CLASSIFICATION IS "A"
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6211
SUBAREA AREA(ACRES) = 2.83 SUBAREA RUNOFF(CFS) = 3.06
SUMMED AREA(ACRES) = 4.50 TOTAL RUNOFF(CFS) = 5.34
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .43 HALFSTREET FLOODWIDTH(FEET) = 15.16
FLOW VELOCITY(FEET/SEC.) = 2.21 DEPTH*VELOCITY = .95

****

FLOW PROCESS FROM NODE 75.00 TO NODE 93.00 IS CODE = 4

>>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE<<<<<

==

DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.4 INCHES
PIPEFLOW VELOCITY(FEET/SEC.) = 15.9
UPSTREAM NODE ELEVATION = 450.97
DOWNSTREAM NODE ELEVATION = 442.07
FLOWLENGTH(FEET) = 50.40 MANNING'S N = .013
GIVEN PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPEFLOW THRU SUBAREA(CFS) = 5.34
TRAVEL TIME(MIN.) = .05 TC(MIN.) = 22.76

End Drainage Area “D”

Begin Drainage Area “E”

****

FLOW PROCESS FROM NODE 131.00 TO NODE 131.10 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

==

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS APARTMENT
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 800.00
UPSTREAM ELEVATION = 464.80
DOWNSTREAM ELEVATION = 456.37
ELEVATION DIFFERENCE = 8.43
TC = .323*[(800.00**3)/(8.43)]**.2 = 11.628
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.563
SOIL CLASSIFICATION IS "A"
APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8055
SUBAREA RUNOFF(CFS) = 14.31
TOTAL AREA(ACRES) = 6.93 TOTAL RUNOFF(CFS) = 14.31

****

FLOW PROCESS FROM NODE 131.10 TO NODE 132.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<

==

UPSTREAM ELEVATION = 456.37 DOWNSTREAM ELEVATION = 450.70
STREET LENGTH(FEET) = 724.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

**TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 21.23
STREET FLOWING FULL
STREETFLOW MODEL RESULTS:
NOTE: STREETFLOW EXCEEDS TOP OF CURB.

```
================================================================================
 PIPEFLOW VELOCITY(FEET/SEC.) =  5.3
 UPSTREAM NODE ELEVATION =  430.87
 DOWNSTREAM NODE ELEVATION =  430.64
 FLOWLENGTH(FEET) =   58.74   MANNING'S N = .013
 GIVEN PIPE DIAMETER(INCH) = 18.00   NUMBER OF PIPES =  1
 PIPEFLOW THRU SUBAREA(CFS) =     9.38
 TRAVEL TIME(MIN.) =   .18   TC(MIN.) = 20.00
```

End Drainage Area “G”

Begin Drainage Area “H1”

```
****************************************************************************
 FLOW PROCESS FROM NODE   240.00 TO NODE   245.00 IS CODE =  21
 ----------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
     ASSUMED INITIAL SUBAREA UNIFORM
     DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH =   640.00
 UPSTREAM ELEVATION =    464.00
 DOWNSTREAM ELEVATION =    457.61
 ELEVATION DIFFERENCE =      6.39
 TC =  .393*[(  640.00**3)/(    6.39)]**.2 =   13.078
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.394
 SOIL CLASSIFICATION IS "A"
 SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6561
 SUBAREA RUNOFF(CFS) =      3.06
 TOTAL AREA(ACRES) =      1.95   TOTAL RUNOFF(CFS) =      3.06
****************************************************************************
 FLOW PROCESS FROM NODE   245.00 TO NODE   250.00 IS CODE =  6
 ----------------------------------------------------------------
 >>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
================================================================================
 UPSTREAM ELEVATION =    457.61   DOWNSTREAM ELEVATION =    451.60
 STREET LENGTH(FEET) =   814.00   CURB HEIGHT(INCHES) = 6.
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK =  16.00
 INTERIOR STREET CROSSFALL(DECIMAL) =   .020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =   .055

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2

     **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =    6.91
   STREETFLOW MODEL RESULTS:
     STREET FLOWDEPTH(FEET) =   .39
     HALFSTREET FLOODWIDTH(FEET) =   12.50
     AVERAGE FLOW VELOCITY(FEET/SEC.) =   2.02
     PRODUCT OF DEPTH&VELOCITY =     .79
 STREETFLOW TRAVELTIME(MIN) =   6.72   TC(MIN) =  19.80

  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.883
 SOIL CLASSIFICATION IS "A"
 SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6296
 SUBAREA AREA(ACRES) =    6.28   SUBAREA RUNOFF(CFS) =    7.44
 SUMMED AREA(ACRES) =    8.23   TOTAL RUNOFF(CFS) =     10.51
 END OF SUBAREA STREETFLOW HYDRAULICS:
 DEPTH(FEET) =  .43   HALFSTREET FLOODWIDTH(FEET) = 14.50
 FLOW VELOCITY(FEET/SEC.) =  2.33   DEPTH*VELOCITY =    1.01


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

```
FLOW PROCESS FROM NODE   250.00 TO NODE   250.10 IS CODE =  7
----------------------------------------------------------------------------
>>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN) =  19.80   RAIN INTENSITY(INCH/HOUR) =  1.88
TOTAL AREA(ACRES) =     4.12   TOTAL RUNOFF(CFS) =      5.26


****************************************************************************
FLOW PROCESS FROM NODE   250.10 TO NODE   275.00 IS CODE =  6
----------------------------------------------------------------------------
>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM ELEVATION =    451.60   DOWNSTREAM ELEVATION =    446.89
STREET LENGTH(FEET) =    690.00   CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) =   .020
OUTSIDE STREET CROSSFALL(DECIMAL)  =   .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2

    **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =     7.55
 STREETFLOW MODEL RESULTS:
    STREET FLOWDEPTH(FEET) =   .39
    HALFSTREET FLOODWIDTH(FEET) =   12.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.20
    PRODUCT OF DEPTH&VELOCITY =      .87
STREETFLOW TRAVELTIME(MIN) =    5.22   TC(MIN) =   25.02

  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.644
SOIL CLASSIFICATION IS "A"
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6152
SUBAREA AREA(ACRES) =     4.57   SUBAREA RUNOFF(CFS) =     4.62
SUMMED AREA(ACRES) =     8.69   TOTAL RUNOFF(CFS) =      9.88
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) =  .43   HALFSTREET FLOODWIDTH(FEET) = 14.50
FLOW VELOCITY(FEET/SEC.) =  2.19   DEPTH*VELOCITY =     .95


****************************************************************************
FLOW PROCESS FROM NODE   275.00 TO NODE   265.00 IS CODE =  4
----------------------------------------------------------------------------
>>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE<<<<<
============================================================================
DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.2 INCHES
PIPEFLOW VELOCITY(FEET/SEC.) =  10.5
UPSTREAM NODE ELEVATION =   438.57
DOWNSTREAM NODE ELEVATION =   435.57
FLOWLENGTH(FEET) =     82.83   MANNING'S N =  .013
GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPEFLOW THRU SUBAREA(CFS) =       9.88
TRAVEL TIME(MIN.) =     .13    TC(MIN.) =  25.15
```

End Drainage Area "H1"

Begin Drainage Area "H2"

```
□
FLOW PROCESS FROM NODE   250.00 TO NODE   250.00 IS CODE =
----------------------------------------------------------------------------
>>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
USER-SPECIFIED VALUES ARE AS FOLLOWS:
```

TC(MIN) = 19.80 RAIN INTENSITY(INCH/HOUR) = 1.88
TOTAL AREA(ACRES) = 4.12 TOTAL RUNOFF(CFS) = 5.26

****

FLOW PROCESS FROM NODE 250.00 TO NODE 251.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<

UPSTREAM ELEVATION = 451.60 DOWNSTREAM ELEVATION = 449.76
STREET LENGTH(FEET) = 235.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

**TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 12.57
STREETFLOW MODEL RESULTS:
STREET FLOWDEPTH(FEET) = .45
HALFSTREET FLOODWIDTH(FEET) = 15.50
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.46
PRODUCT OF DEPTH&VELOCITY = 1.12
STREETFLOW TRAVELTIME(MIN) = 1.59 TC(MIN) = 21.39

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.800
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7074
SUBAREA AREA(ACRES) = 11.49 SUBAREA RUNOFF(CFS) = 14.63
SUMMED AREA(ACRES) = 15.61 TOTAL RUNOFF(CFS) = 19.89
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .51 HALFSTREET FLOODWIDTH(FEET) = 18.00 $\Longrightarrow$
FLOW VELOCITY(FEET/SEC.) = 2.79 DEPTH*VELOCITY = 1.43

SEE FIGURE 4
S=0.00783
STREET CAPACITY = 27.91 CFS
OK

****

FLOW PROCESS FROM NODE 251.00 TO NODE 252.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<

UPSTREAM ELEVATION = 449.76 DOWNSTREAM ELEVATION = 447.80
STREET LENGTH(FEET) = 220.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

**TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 24.44
STREET FLOWING FULL
STREETFLOW MODEL RESULTS:
NOTE: STREETFLOW EXCEEDS TOP OF CURB.
THE FOLLOWING STREETFLOW RESULTS ARE BASED ON THE ASSUMPTION
THAT NEGLIBLE FLOW OCCURS OUTSIDE OF THE STREET CHANNEL.
THAT IS, ALL FLOW ALONG THE PARKWAY, ETC., IS NEGLECTED.
STREET FLOWDEPTH(FEET) = .53
HALFSTREET FLOODWIDTH(FEET) = 18.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.12
PRODUCT OF DEPTH&VELOCITY = 1.66
STREETFLOW TRAVELTIME(MIN) = 1.18 TC(MIN) = 22.56

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.745
SOIL CLASSIFICATION IS "A"
CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7051
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 9.11
SUMMED AREA(ACRES) = 23.01 TOTAL RUNOFF(CFS) = 28.99

END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .55 HALFSTREET FLOODWIDTH(FEET) = 18.00
FLOW VELOCITY(FEET/SEC.) = 3.40 DEPTH*VELOCITY = 1.88

SEE FIGURE 4
S=0.00891
STREET CAPACITY= 29.77 CFS
OK

==
END OF STUDY SUMMARY:
PEAK FLOW RATE(CFS) = 28.99 Tc(MIN.) = 22.56
TOTAL AREA(ACRES) = 23.01
==
END OF RATIONAL METHOD ANALYSIS

End Drainage Area "H2"

Begin Drainage Area "H4"

****
FLOW PROCESS FROM NODE 210.00 TO NODE 215.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH = 1090.00
UPSTREAM ELEVATION = 470.00
DOWNSTREAM ELEVATION = 461.72
ELEVATION DIFFERENCE = 8.28
TC = .393*[(1090.00**3)/(8.28)]**.2 = 17.092
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.050
SOIL CLASSIFICATION IS "A"
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6389
SUBAREA RUNOFF(CFS) = 4.78
TOTAL AREA(ACRES) = 3.65 TOTAL RUNOFF(CFS) = 4.78

****
FLOW PROCESS FROM NODE 215.00 TO NODE 225.00 IS CODE = 6

>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
==
UPSTREAM ELEVATION = 461.72 DOWNSTREAM ELEVATION = 455.04
STREET LENGTH(FEET) = 708.00 CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) = .020
OUTSIDE STREET CROSSFALL(DECIMAL) = .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

**TRAVELTIME COMPUTED USING MEAN FLOW(CFS) = 8.63
STREETFLOW MODEL RESULTS:
STREET FLOWDEPTH(FEET) = .39
HALFSTREET FLOODWIDTH(FEET) = 12.50
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.52
PRODUCT OF DEPTH&VELOCITY = .99
STREETFLOW TRAVELTIME(MIN) = 4.68 TC(MIN) = 21.77

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.782
SOIL CLASSIFICATION IS "A"
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6237
SUBAREA AREA(ACRES) = 6.85 SUBAREA RUNOFF(CFS) = 7.61
SUMMED AREA(ACRES) = 10.50 TOTAL RUNOFF(CFS) = 12.39
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .43 HALFSTREET FLOODWIDTH(FEET) = 14.50
FLOW VELOCITY(FEET/SEC.) = 2.75 DEPTH*VELOCITY = 1.19

```
****************************************************************************
 FLOW PROCESS FROM NODE   225.00 TO NODE   225.10 IS CODE =  1
 ----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) = 21.77
 RAINFALL INTENSITY(INCH/HR) =  1.78
 TOTAL STREAM AREA(ACRES) =  10.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.39

****************************************************************************
 FLOW PROCESS FROM NODE   220.00 TO NODE   221.00 IS CODE = 21
 ----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
     ASSUMED INITIAL SUBAREA UNIFORM
     DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH =  750.00
 UPSTREAM ELEVATION =   469.00
 DOWNSTREAM ELEVATION =   459.50
 ELEVATION DIFFERENCE =      9.50
 TC = .393*[( 750.00**3)/(    9.50)]**.2 =  13.287
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.373
 SOIL CLASSIFICATION IS "A"
 SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6551
 SUBAREA RUNOFF(CFS) =    10.43
 TOTAL AREA(ACRES) =     6.71   TOTAL RUNOFF(CFS) =     10.43

****************************************************************************
 FLOW PROCESS FROM NODE   221.00 TO NODE   225.00 IS CODE =  6
 ----------------------------------------------------------------------------
 >>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM ELEVATION =   459.50  DOWNSTREAM ELEVATION =    455.04
 STREET LENGTH(FEET) =  610.00   CURB HEIGHT(INCHES) = 6.
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
 INTERIOR STREET CROSSFALL(DECIMAL) =  .020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  .055

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

     **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =  11.39
   STREETFLOW MODEL RESULTS:
     STREET FLOWDEPTH(FEET) =  .43
     HALFSTREET FLOODWIDTH(FEET) =  14.50
     AVERAGE FLOW VELOCITY(FEET/SEC.) =   2.53
     PRODUCT OF DEPTH&VELOCITY =    1.10
 STREETFLOW TRAVELTIME(MIN) =   4.02   TC(MIN) =  17.31

  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.035
 SOIL CLASSIFICATION IS "A"
 SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6381
 SUBAREA AREA(ACRES) =   1.47   SUBAREA RUNOFF(CFS) =    1.91
 SUMMED AREA(ACRES) =    8.18  TOTAL RUNOFF(CFS) =     12.34
 END OF SUBAREA STREETFLOW HYDRAULICS:
 DEPTH(FEET) = .45   HALFSTREET FLOODWIDTH(FEET) = 15.50
 FLOW VELOCITY(FEET/SEC.) = 2.42   DEPTH*VELOCITY =   1.10

****************************************************************************
 FLOW PROCESS FROM NODE   225.00 TO NODE   225.10 IS CODE =  1
 ----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==========================================================================
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 17.31
RAINFALL INTENSITY(INCH/HR) = 2.04
TOTAL STREAM AREA(ACRES) = 8.18
PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.34

** CONFLUENCE DATA **
STREAM   RUNOFF    Tc    INTENSITY    AREA
NUMBER    (CFS)  (MIN.) (INCH/HOUR)  (ACRE)
  1      12.39   21.77   1.782       10.50
  2      12.34   17.31   2.035        8.18

*********************************WARNING**********************************
IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
**************************************************************************

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

** PEAK FLOW RATE TABLE **
STREAM   RUNOFF    Tc    INTENSITY
NUMBER    (CFS)  (MIN.) (INCH/HOUR)
  1      22.19   17.31   2.035
  2      23.19   21.77   1.782

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =    23.19   Tc(MIN.) = 21.77
TOTAL AREA(ACRES) =    18.68


**************************************************************************
FLOW PROCESS FROM NODE  225.10 TO NODE  200.00 IS CODE =  6
--------------------------------------------------------------------------
>>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
UPSTREAM ELEVATION =   455.04  DOWNSTREAM ELEVATION =   453.60
STREET LENGTH(FEET) =  210.00  CURB HEIGHT(INCHES) = 6.
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK = 16.00
INTERIOR STREET CROSSFALL(DECIMAL) =  .020
OUTSIDE STREET CROSSFALL(DECIMAL) =  .055

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

    **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =  26.31
***STREET FLOWING FULL***
  STREETFLOW MODEL RESULTS:
    NOTE: STREETFLOW EXCEEDS TOP OF CURB.
    THE FOLLOWING STREETFLOW RESULTS ARE BASED ON THE ASSUMPTION
    THAT NEGLIBLE FLOW OCCURS OUTSIDE OF THE STREET CHANNEL.
    THAT IS, ALL FLOW ALONG THE PARKWAY, ETC., IS NEGLECTED.
    STREET FLOWDEPTH(FEET) =  .55
    HALFSTREET FLOODWIDTH(FEET) =  18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =   3.08
    PRODUCT OF DEPTH&VELOCITY =   1.70
STREETFLOW TRAVELTIME(MIN) =  1.14   TC(MIN) = 22.91

 10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.730
SOIL CLASSIFICATION IS "A"
SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6206
SUBAREA AREA(ACRES) =    5.81  SUBAREA RUNOFF(CFS) =   6.24
SUMMED AREA(ACRES) =  24.49  TOTAL RUNOFF(CFS) =    29.43
END OF SUBAREA STREETFLOW HYDRAULICS:
DEPTH(FEET) = .57   HALFSTREET FLOODWIDTH(FEET) = 18.00
```

⟹ THIS PORTION IS NOT WITHIN TRACT 28639-1 IMPROVEMENTS

```
FLOW VELOCITY(FEET/SEC.) = 3.19   DEPTH*VELOCITY =  1.82
```

End Drainage Area "H4"

Begin Drainage Area "I"

```
****************************************************************************
 FLOW PROCESS FROM NODE   315.00 TO NODE   320.00 IS CODE = 21
----------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS CONDOMINIUM
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH =  840.00
 UPSTREAM ELEVATION =   453.10
 DOWNSTREAM ELEVATION =    445.18
 ELEVATION DIFFERENCE =      7.92
 TC = .359*[( 840.00**3)/(    7.92)]**.2 =  13.495
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.351
 SOIL CLASSIFICATION IS "A"
 CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7279
 SUBAREA RUNOFF(CFS) =      9.50
 TOTAL AREA(ACRES) =      5.55   TOTAL RUNOFF(CFS) =      9.50

****************************************************************************
 FLOW PROCESS FROM NODE   320.00 TO NODE   325.00 IS CODE =  6
----------------------------------------------------------------
 >>>>>COMPUTE STREETFLOW TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
 UPSTREAM ELEVATION =    445.18   DOWNSTREAM ELEVATION =    442.57
 STREET LENGTH(FEET) =  238.00   CURB HEIGHT(INCHES) = 6.
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK =  16.00
 INTERIOR STREET CROSSFALL(DECIMAL) =  .020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  .055

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2

     **TRAVELTIME COMPUTED USING MEAN FLOW(CFS) =   11.63
   STREETFLOW MODEL RESULTS:
     STREET FLOWDEPTH(FEET) =  .41
     HALFSTREET FLOODWIDTH(FEET) =  13.50
     AVERAGE FLOW VELOCITY(FEET/SEC.) =  2.95
     PRODUCT OF DEPTH&VELOCITY =   1.22
 STREETFLOW TRAVELTIME(MIN) =  1.34   TC(MIN) =  14.84

  10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.225
 SOIL CLASSIFICATION IS "A"
 CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7236
 SUBAREA AREA(ACRES) =    2.65   SUBAREA RUNOFF(CFS) =    4.27
 SUMMED AREA(ACRES) =    8.20   TOTAL RUNOFF(CFS) =     13.77
 END OF SUBAREA STREETFLOW HYDRAULICS:
 DEPTH(FEET) = .43   HALFSTREET FLOODWIDTH(FEET) = 14.50
 FLOW VELOCITY(FEET/SEC.) = 3.06   DEPTH*VELOCITY =   1.33

****************************************************************************
 FLOW PROCESS FROM NODE   325.00 TO NODE   326.00 IS CODE =  4
----------------------------------------------------------------
 >>>>>COMPUTE PIPEFLOW TRAVELTIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE<<<<<
==========================================================================
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.2 INCHES
 PIPEFLOW VELOCITY(FEET/SEC.) =  17.5
```

Unit Hydrograph Analyses

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

           U N I T - H Y D R O G R A P H   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
                     (RCFC&WCD) 1978 HYDROLOGY MANUAL

****************************************************************************

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

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                         Especially prepared for:

                       MAINIERO, SMITH AND ASSOCIATES

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>


**********DESCRIPTION OF RESULTS********************************************
* Rio Vista Village                                                        *
* Area B                                                                   *
* 100 Year, 24 Hour Storm                                                  *
****************************************************************************

****************************************************************************
         WATERCOURSE LENGTH =     2095.000 FEET
         LENGTH FROM CONCENTRATION POINT TO CENTROID =     1145.000 FEET
         ELEVATION VARIATION ALONG WATERCOURSE =      16.150 FEET
         MANNINGS FRICTION FACTOR ALONG WATERCOURSE =  .015
         WATERSHED AREA =      22.260 ACRES
         UNIT HYDROGRAPH TIME UNIT =  15.000 MINUTES
         DESERT S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =   .325
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) =  .900
         MINIMUM SOIL-LOSS RATE(INCH/HOUR) =    .160
         BASEFLOW =    .000 CFS/SQUARE-MILE
         USER-ENTERED RAINFALL =  4.50 INCHES
         PROGRAM NUMBER  9 SELECTED


         WATERCOURSE "LAG" TIME =      .070 HOURS
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 356.674
         HYDROGRAPH BASEFLOW =      .000 CFS
         RCFC&WCD AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

                   Advanced Engineering Software [AES]
                           SERIAL No.I06181
                   VER. 1.6C     RELEASE DATE: 2/21/86

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

****************************************************************************
                      UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	61.581	55.260
2	96.909	31.702
3	99.901	2.685
4	100.000	.089

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

****

UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	.0090	.0081	.0009
2	.0135	.0121	.0013
3	.0135	.0121	.0013
4	.0180	.0162	.0018
5	.0135	.0121	.0013
6	.0135	.0121	.0013
7	.0135	.0121	.0013
8	.0180	.0162	.0018
9	.0180	.0162	.0018
10	.0180	.0162	.0018
11	.0225	.0202	.0022
12	.0225	.0202	.0022
13	.0225	.0202	.0022
14	.0225	.0202	.0022
15	.0225	.0202	.0022
16	.0270	.0243	.0027
17	.0270	.0243	.0027
18	.0315	.0283	.0031
19	.0315	.0283	.0031
20	.0360	.0324	.0036
21	.0270	.0243	.0027
22	.0315	.0283	.0031
23	.0360	.0324	.0036
24	.0360	.0324	.0036
25	.0405	.0364	.0040
26	.0405	.0364	.0040
27	.0450	.0405	.0045
28	.0450	.0405	.0045
29	.0450	.0405	.0045
30	.0495	.0445	.0049
31	.0540	.0486	.0054
32	.0585	.0526	.0058
33	.0675	.0607	.0067
34	.0675	.0607	.0067
35	.0720	.0648	.0072
36	.0765	.0688	.0076
37	.0855	.0769	.0085
38	.0900	.0810	.0090
39	.0945	.0850	.0094
40	.0990	.0863	.0127
41	.0675	.0607	.0067
42	.0675	.0607	.0067
43	.0900	.0810	.0090
44	.0900	.0810	.0090
45	.0855	.0769	.0085
46	.0855	.0769	.0085
47	.0765	.0688	.0076
48	.0810	.0729	.0081
49	.1125	.0754	.0371
50	.1170	.0742	.0428
51	.1260	.0731	.0529
52	.1305	.0720	.0585
53	.1530	.0709	.0821
54	.1530	.0698	.0832
55	.1035	.0687	.0348
56	.1035	.0676	.0359
57	.1215	.0666	.0549
58	.1170	.0655	.0515
59	.1170	.0645	.0525
60	.1125	.0635	.0490
61	.1080	.0625	.0455
62	.1035	.0616	.0419
63	.0855	.0606	.0249
64	.0855	.0596	.0259
65	.0180	.0162	.0018

66	.0180	.0162	.0018
67	.0135	.0121	.0013
68	.0135	.0121	.0013
69	.0225	.0202	.0022
70	.0225	.0202	.0022
71	.0225	.0202	.0022
72	.0180	.0162	.0018
73	.0180	.0162	.0018
74	.0180	.0162	.0018
75	.0135	.0121	.0013
76	.0090	.0081	.0009
77	.0135	.0121	.0013
78	.0180	.0162	.0018
79	.0135	.0121	.0013
80	.0090	.0081	.0009
81	.0135	.0121	.0013
82	.0135	.0121	.0013
83	.0135	.0121	.0013
84	.0090	.0081	.0009
85	.0135	.0121	.0013
86	.0090	.0081	.0009
87	.0135	.0121	.0013
88	.0090	.0081	.0009
89	.0135	.0121	.0013
90	.0090	.0081	.0009
91	.0090	.0081	.0009
92	.0090	.0081	.0009
93	.0090	.0081	.0009
94	.0090	.0081	.0009
95	.0090	.0081	.0009
96	.0090	.0081	.0009

TOTAL STORM RAINFALL(INCHES) = 4.50
TOTAL SOIL-LOSS(INCHES) = 3.46
TOTAL EFFECTIVE RAINFALL(INCHES) = 1.04

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 6.4158
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.9303

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

         RCFC&WCD 24-HOUR RUNOFF HYDROGRAPH

***************************************************************************

         HYDROGRAPH IN FIFTEEN-MINUTE INTERVALS(CFS)

---------------------------------------------------------------------------
INTERVAL# VOLUME(AF)   Q(CFS) 0.        2.5       5.0       7.5      10.0
---------------------------------------------------------------------------
      1       .0010       .05  Q         .         .         .         .
      2       .0032       .10  Q         .         .         .         .
      3       .0056       .12  Q         .         .         .         .
      4       .0086       .15  Q         .         .         .         .
      5       .0114       .14  Q         .         .         .         .
      6       .0140       .12  Q         .         .         .         .
      7       .0165       .12  Q         .         .         .         .
      8       .0195       .15  Q         .         .         .         .
      9       .0228       .16  Q         .         .         .         .
     10       .0261       .16  Q         .         .         .         .
     11       .0300       .19  Q         .         .         .         .
     12       .0341       .20  Q         .         .         .         .
     13       .0383       .20  Q         .         .         .         .
     14       .0425       .20  Q         .         .         .         .
     15       .0467       .20  Q         .         .         .         .
     16       .0513       .23  QV        .         .         .         .
     17       .0563       .24  QV        .         .         .         .
     18       .0618       .27  .Q        .         .         .         .
     19       .0677       .28  .Q        .         .         .         .
     20       .0740       .31  .Q        .         .         .         .
     21       .0796       .27  .Q        .         .         .         .
     22       .0852       .27  .Q        .         .         .         .
     23       .0915       .31  .Q        .         .         .         .
     24       .0982       .32  .QV       .         .         .         .
     25       .1054       .35  .QV       .         .         .         .
     26       .1128       .36  .QV       .         .         .         .
     27       .1209       .39  .QV       .         .         .         .
     28       .1292       .40  .QV       .         .         .         .
     29       .1375       .40  .QV       .         .         .         .
     30       .1464       .43  .Q V      .         .         .         .
     31       .1560       .47  .Q V      .         .         .         .
     32       .1665       .51  . QV      .         .         .         .
     33       .1784       .57  . QV      .         .         .         .
     34       .1909       .60  . QV      .         .         .         .
     35       .2039       .63  . Q V     .         .         .         .
     36       .2177       .67  . Q V     .         .         .         .
     37       .2329       .73  . Q V     .         .         .         .
     38       .2492       .79  .  Q V    .         .         .         .
     39       .2664       .83  .  Q V    .         .         .         .
     40       .2876      1.03  .   QV    .         .         .         .
     41       .3042       .80  .  Q  V   .         .         .         .
     42       .3170       .62  . Q   V   .         .         .         .
     43       .3321       .73  . Q   V   .         .         .         .
     44       .3487       .80  .  Q   V  .         .         .         .
     45       .3648       .78  .  Q   V  .         .         .         .
     46       .3807       .77  .  Q   V  .         .         .         .
     47       .3955       .72  . Q     V .         .         .         .
     48       .4103       .71  . Q     V .         .         .         .
     49       .4584      2.33  .        Q.         .         .         .
     50       .5320      3.56  .         .V  Q     .         .         .
     51       .6225      4.38  .         . V    Q  .         .         .
     52       .7264      5.03  .         .    V    Q         .         .
     53       .8615      6.54  .         .      V  .     Q   .         .
     54      1.0137      7.36  .         .         .V       Q.         .
     55      1.1126      4.79  .         .        Q.  V      .         .
     56      1.1811      3.32  .         .  Q      .   V     .         .
     57      1.2693      4.27  .         .      Q  .     V   .         .
     58      1.3661      4.68  .         .       Q .       V .         .
     59      1.4628      4.68  .         .       Q .         V         .
```

```
    60      1.5561      4.51   .         .       Q .         . V       .
    61      1.6431      4.21   .         .     Q   .         .   V     .
    62      1.7236      3.90   .         .    Q    .         .    V    .
    63      1.7821      2.83   .         .Q        .         .     V   .
    64      1.8303      2.33   .        Q.         .         .      V  .
    65      1.8508       .99   . Q       .         .         .       V .
    66      1.8555       .23   Q         .         .         .       V .
    67      1.8584       .14   Q         .         .         .       V .
    68      1.8609       .12   Q         .         .         .       V .
    69      1.8644       .17   Q         .         .         .       V .
    70      1.8685       .20   Q         .         .         .       V .
    71      1.8727       .20   Q         .         .         .       V .
    72      1.8764       .18   Q         .         .         .       V .
    73      1.8797       .16   Q         .         .         .       V .
    74      1.8831       .16   Q         .         .         .        V.
    75      1.8859       .14   Q         .         .         .        V.
    76      1.8879       .10   Q         .         .         .        V.
    77      1.8901       .11   Q         .         .         .        V.
    78      1.8931       .14   Q         .         .         .        V.
    79      1.8959       .14   Q         .         .         .        V.
    80      1.8979       .10   Q         .         .         .        V.
    81      1.9001       .11   Q         .         .         .        V.
    82      1.9026       .12   Q         .         .         .        V.
    83      1.9051       .12   Q         .         .         .        V.
    84      1.9071       .10   Q         .         .         .        V.
    85      1.9093       .11   Q         .         .         .        V.
    86      1.9113       .10   Q         .         .         .        V.
    87      1.9135       .11   Q         .         .         .        V.
    88      1.9154       .10   Q         .         .         .        V.
    89      1.9176       .11   Q         .         .         .        V.
    90      1.9196       .10   Q         .         .         .        V.
    91      1.9213       .08   Q         .         .         .        V.
    92      1.9230       .08   Q         .         .         .        V.
    93      1.9246       .08   Q         .         .         .        V.
    94      1.9263       .08   Q         .         .         .        V.
    95      1.9280       .08   Q         .         .         .        V.
    96      1.9296       .08   Q         .         .         .        V.
    97      1.9303       .03   Q         .         .         .        V.
    98      1.9303       .00   Q         .         .         .        V.
    99      1.9303       .00   Q         .         .         .        V.
****************************************************************************
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          U N I T - H Y D R O G R A P H   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL

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         (C) Copyright 1982,1986 Advanced Engineering Software [AES]

                        Especially prepared for:

                     MAINIERO, SMITH AND ASSOCIATES

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>


**********DESCRIPTION OF RESULTS********************************************
* Rio Vista Village                                                        *
* Area C                                                                   *
* 100 Year, 24 Hour Storm                                                  *
****************************************************************************

****************************************************************************
         WATERCOURSE LENGTH =     1055.000 FEET
         LENGTH FROM CONCENTRATION POINT TO CENTROID =     565.000 FEET
         ELEVATION VARIATION ALONG WATERCOURSE =      13.400 FEET
         MANNINGS FRICTION FACTOR ALONG WATERCOURSE =  .015
         WATERSHED AREA =       10.000 ACRES
         UNIT HYDROGRAPH TIME UNIT =  15.000 MINUTES
         DESERT S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =    .350
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) =  .900
         MINIMUM SOIL-LOSS RATE(INCH/HOUR) =    .175
         BASEFLOW =    .000 CFS/SQUARE-MILE
         USER-ENTERED RAINFALL =  4.50 INCHES
         PROGRAM NUMBER  9 SELECTED

         WATERCOURSE "LAG" TIME =      .038 HOURS
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 665.667
         HYDROGRAPH BASEFLOW =     .000 CFS
         RCFC&WCD AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


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                   Advanced Engineering Software [AES]
                          SERIAL No.I06181
                   VER. 1.6C     RELEASE DATE: 2/21/86

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

****************************************************************************
                       UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	77.804	31.365
2	99.897	8.906
3	100.000	.041

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

****

UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	.0090	.0081	.0009
2	.0135	.0121	.0013
3	.0135	.0121	.0013
4	.0180	.0162	.0018
5	.0135	.0121	.0013
6	.0135	.0121	.0013
7	.0135	.0121	.0013
8	.0180	.0162	.0018
9	.0180	.0162	.0018
10	.0180	.0162	.0018
11	.0225	.0202	.0022
12	.0225	.0202	.0022
13	.0225	.0202	.0022
14	.0225	.0202	.0022
15	.0225	.0202	.0022
16	.0270	.0243	.0027
17	.0270	.0243	.0027
18	.0315	.0283	.0031
19	.0315	.0283	.0031
20	.0360	.0324	.0036
21	.0270	.0243	.0027
22	.0315	.0283	.0031
23	.0360	.0324	.0036
24	.0360	.0324	.0036
25	.0405	.0364	.0040
26	.0405	.0364	.0040
27	.0450	.0405	.0045
28	.0450	.0405	.0045
29	.0450	.0405	.0045
30	.0495	.0445	.0049
31	.0540	.0486	.0054
32	.0585	.0526	.0058
33	.0675	.0607	.0067
34	.0675	.0607	.0067
35	.0720	.0648	.0072
36	.0765	.0688	.0076
37	.0855	.0769	.0085
38	.0900	.0810	.0090
39	.0945	.0850	.0094
40	.0990	.0891	.0099
41	.0675	.0607	.0067
42	.0675	.0607	.0067
43	.0900	.0810	.0090
44	.0900	.0810	.0090
45	.0855	.0769	.0085
46	.0855	.0769	.0085
47	.0765	.0688	.0076
48	.0810	.0729	.0081
49	.1125	.0813	.0312
50	.1170	.0801	.0369
51	.1260	.0789	.0471
52	.1305	.0777	.0528
53	.1530	.0765	.0765
54	.1530	.0753	.0777
55	.1035	.0742	.0293
56	.1035	.0731	.0304
57	.1215	.0719	.0496
58	.1170	.0708	.0462
59	.1170	.0698	.0472
60	.1125	.0687	.0438
61	.1080	.0676	.0404
62	.1035	.0666	.0369
63	.0855	.0656	.0199
64	.0855	.0646	.0209
65	.0180	.0162	.0018

66	.0180	.0162	.0018
67	.0135	.0121	.0013
68	.0135	.0121	.0013
69	.0225	.0202	.0022
70	.0225	.0202	.0022
71	.0225	.0202	.0022
72	.0180	.0162	.0018
73	.0180	.0162	.0018
74	.0180	.0162	.0018
75	.0135	.0121	.0013
76	.0090	.0081	.0009
77	.0135	.0121	.0013
78	.0180	.0162	.0018
79	.0135	.0121	.0013
80	.0090	.0081	.0009
81	.0135	.0121	.0013
82	.0135	.0121	.0013
83	.0135	.0121	.0013
84	.0090	.0081	.0009
85	.0135	.0121	.0013
86	.0090	.0081	.0009
87	.0135	.0121	.0013
88	.0090	.0081	.0009
89	.0135	.0121	.0013
90	.0090	.0081	.0009
91	.0090	.0081	.0009
92	.0090	.0081	.0009
93	.0090	.0081	.0009
94	.0090	.0081	.0009
95	.0090	.0081	.0009
96	.0090	.0081	.0009

TOTAL STORM RAINFALL(INCHES) = 4.50
TOTAL SOIL-LOSS(INCHES) = 3.55
TOTAL EFFECTIVE RAINFALL(INCHES) = .95

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 2.9566
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = .7929

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         RCFC&WCD 24-HOUR RUNOFF HYDROGRAPH

****************************************************************************

         HYDROGRAPH IN FIFTEEN-MINUTE INTERVALS(CFS)

----------------------------------------------------------------------------
INTERVAL# VOLUME(AF)   Q(CFS) 0.        2.5       5.0       7.5      10.0
----------------------------------------------------------------------------
      1       .0006       .03  Q         .         .         .         .
      2       .0016       .05  Q         .         .         .         .
      3       .0027       .05  Q         .         .         .         .
      4       .0042       .07  Q         .         .         .         .
      5       .0054       .06  Q         .         .         .         .
      6       .0065       .05  Q         .         .         .         .
      7       .0076       .05  Q         .         .         .         .
      8       .0090       .07  Q         .         .         .         .
      9       .0105       .07  Q         .         .         .         .
     10       .0120       .07  Q         .         .         .         .
     11       .0138       .09  Q         .         .         .         .
     12       .0157       .09  Q         .         .         .         .
     13       .0176       .09  Q         .         .         .         .
     14       .0194       .09  Q         .         .         .         .
     15       .0213       .09  QV        .         .         .         .
     16       .0235       .10  QV        .         .         .         .
     17       .0257       .11  QV        .         .         .         .
     18       .0283       .12  QV        .         .         .         .
     19       .0309       .13  QV        .         .         .         .
     20       .0338       .14  QV        .         .         .         .
     21       .0362       .12  QV        .         .         .         .
     22       .0388       .12  QV        .         .         .         .
     23       .0417       .14  Q V       .         .         .         .
     24       .0447       .15  Q V       .         .         .         .
     25       .0480       .16  Q V       .         .         .         .
     26       .0513       .16  Q V       .         .         .         .
     27       .0550       .18  Q V       .         .         .         .
     28       .0588       .18  Q V       .         .         .         .
     29       .0625       .18  Q  V      .         .         .         .
     30       .0665       .20  Q  V      .         .         .         .
     31       .0710       .21  Q  V      .         .         .         .
     32       .0757       .23  Q  V      .         .         .         .
     33       .0812       .26  .Q  V     .         .         .         .
     34       .0868       .27  .Q  V     .         .         .         .
     35       .0927       .29  .Q  V     .         .         .         .
     36       .0990       .30  .Q  V     .         .         .         .
     37       .1060       .34  .Q   V    .         .         .         .
     38       .1134       .36  .Q   V    .         .         .         .
     39       .1212       .38  .Q    V   .         .         .         .
     40       .1293       .40  .Q    V   .         .         .         .
     41       .1355       .30  .Q    V   .         .         .         .
     42       .1412       .27  .Q     V  .         .         .         .
     43       .1483       .34  .Q     V  .         .         .         .
     44       .1557       .36  .Q     V  .         .         .         .
     45       .1629       .35  .Q      V .         .         .         .
     46       .1701       .34  .Q      V .         .         .         .
     47       .1766       .32  .Q      V .         .         .         .
     48       .1833       .32  .Q       V.         .         .         .
     49       .2050      1.05  .   Q     V         .         .         .
     50       .2347      1.44  .    Q    .V        .         .         .
     51       .2721      1.81  .      Q  .  V      .         .         .
     52       .3150      2.08  .       Q .    V    .         .         .
     53       .3744      2.87  .         .Q      V .         .         .
     54       .4388      3.12  .         . Q       . V       .         .
     55       .4722      1.61  .     Q   .         .  V      .         .
     56       .4974      1.22  .   Q     .         .    V    .         .
     57       .5351      1.83  .      Q  .         .     V   .         .
     58       .5742      1.89  .      Q  .         .       V .         .
     59       .6133      1.89  .      Q  .         .         V         .
```

```
     60       .6504      1.80  .      Q  .         .         . V       .
     61       .6847      1.66  .     Q   .         .         .   V     .
     62       .7161      1.52  .     Q   .         .         .     V   .
     63       .7358       .95  .  Q      .         .         .      V  .
     64       .7530       .83  .  Q      .         .         .      V  .
     65       .7581       .24  Q         .         .         .       V .
     66       .7596       .07  Q         .         .         .       V .
     67       .7608       .06  Q         .         .         .       V .
     68       .7619       .05  Q         .         .         .       V .
     69       .7636       .08  Q         .         .         .       V .
     70       .7655       .09  Q         .         .         .       V .
     71       .7674       .09  Q         .         .         .       V .
     72       .7689       .08  Q         .         .         .       V .
     73       .7704       .07  Q         .         .         .       V .
     74       .7719       .07  Q         .         .         .       V .
     75       .7732       .06  Q         .         .         .        V.
     76       .7740       .04  Q         .         .         .        V.
     77       .7750       .05  Q         .         .         .        V.
     78       .7764       .07  Q         .         .         .        V.
     79       .7776       .06  Q         .         .         .        V.
     80       .7785       .04  Q         .         .         .        V.
     81       .7795       .05  Q         .         .         .        V.
     82       .7806       .05  Q         .         .         .        V.
     83       .7818       .05  Q         .         .         .        V.
     84       .7826       .04  Q         .         .         .        V.
     85       .7836       .05  Q         .         .         .        V.
     86       .7845       .04  Q         .         .         .        V.
     87       .7855       .05  Q         .         .         .        V.
     88       .7864       .04  Q         .         .         .        V.
     89       .7874       .05  Q         .         .         .        V.
     90       .7882       .04  Q         .         .         .        V.
     91       .7890       .04  Q         .         .         .        V.
     92       .7897       .04  Q         .         .         .        V.
     93       .7905       .04  Q         .         .         .        V.
     94       .7912       .04  Q         .         .         .        V.
     95       .7920       .04  Q         .         .         .        V.
     96       .7927       .04  Q         .         .         .        V.
     97       .7929       .01  Q         .         .         .        V.
     98       .7929       .00  Q         .         .         .        V.
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U N I T - H Y D R O G R A P H   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
(RCFC&WCD) 1978 HYDROLOGY MANUAL

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Especially prepared for:

MAINIERO, SMITH AND ASSOCIATES

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**********DESCRIPTION OF RESULTS********************************************
* Rio Vista Village                                                        *
* Area D                                                                   *
* 100 Year, 24 Hour Storm                                                  *
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****************************************************************************
         WATERCOURSE LENGTH =     2260.000 FEET
         LENGTH FROM CONCENTRATION POINT TO CENTROID =     760.000 FEET
         ELEVATION VARIATION ALONG WATERCOURSE =      26.400 FEET
         MANNINGS FRICTION FACTOR ALONG WATERCOURSE =  .015
         WATERSHED AREA =        35.260 ACRES
         UNIT HYDROGRAPH TIME UNIT =  15.000 MINUTES
         DESERT S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =    .330
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) =  .900
         MINIMUM SOIL-LOSS RATE(INCH/HOUR) =    .170
         BASEFLOW =   .000 CFS/SQUARE-MILE
         USER-ENTERED RAINFALL =  4.50 INCHES
         PROGRAM NUMBER  9 SELECTED


         WATERCOURSE "LAG" TIME =      .057 HOURS
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 438.221
         HYDROGRAPH BASEFLOW =      .000 CFS
         RCFC&WCD AREA ADJUSTMENT FACTOR(PLATE E-5.8) =  .9999



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Advanced Engineering Software [AES]
SERIAL No.I0618I
VER. 1.6C   RELEASE DATE: 2/21/86

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UNIT HYDROGRAPH DETERMINATION

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	67.556	96.025
2	98.590	44.112
3	99.982	1.979
4	100.000	.025

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UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	.0090	.0081	.0009
2	.0135	.0121	.0013
3	.0135	.0121	.0013
4	.0180	.0162	.0018
5	.0135	.0121	.0013
6	.0135	.0121	.0013
7	.0135	.0121	.0013
8	.0180	.0162	.0018
9	.0180	.0162	.0018
10	.0180	.0162	.0018
11	.0225	.0202	.0022
12	.0225	.0202	.0022
13	.0225	.0202	.0022
14	.0225	.0202	.0022
15	.0225	.0202	.0022
16	.0270	.0243	.0027
17	.0270	.0243	.0027
18	.0315	.0283	.0031
19	.0315	.0283	.0031
20	.0360	.0324	.0036
21	.0270	.0243	.0027
22	.0315	.0283	.0031
23	.0360	.0324	.0036
24	.0360	.0324	.0036
25	.0405	.0364	.0040
26	.0405	.0364	.0040
27	.0450	.0405	.0045
28	.0450	.0405	.0045
29	.0450	.0405	.0045
30	.0495	.0445	.0049
31	.0540	.0486	.0054
32	.0585	.0526	.0058
33	.0675	.0607	.0067
34	.0675	.0607	.0067
35	.0720	.0648	.0072
36	.0765	.0688	.0076
37	.0855	.0769	.0085
38	.0900	.0810	.0090
39	.0945	.0850	.0094
40	.0990	.0874	.0116
41	.0675	.0607	.0067
42	.0675	.0607	.0067
43	.0900	.0810	.0090
44	.0900	.0810	.0090
45	.0855	.0769	.0085
46	.0855	.0769	.0085
47	.0765	.0688	.0076
48	.0810	.0729	.0081
49	.1125	.0768	.0357
50	.1170	.0757	.0413
51	.1260	.0746	.0514
52	.1305	.0735	.0570
53	.1530	.0724	.0806
54	.1530	.0714	.0816
55	.1035	.0703	.0332
56	.1035	.0693	.0342
57	.1215	.0683	.0532
58	.1170	.0673	.0497
59	.1170	.0663	.0507
60	.1125	.0653	.0472
61	.1080	.0643	.0436
62	.1035	.0634	.0401
63	.0855	.0625	.0230
64	.0855	.0615	.0239
65	.0180	.0162	.0018

66	.0180	.0162	.0018
67	.0135	.0121	.0013
68	.0135	.0121	.0013
69	.0225	.0202	.0022
70	.0225	.0202	.0022
71	.0225	.0202	.0022
72	.0180	.0162	.0018
73	.0180	.0162	.0018
74	.0180	.0162	.0018
75	.0135	.0121	.0013
76	.0090	.0081	.0009
77	.0135	.0121	.0013
78	.0180	.0162	.0018
79	.0135	.0121	.0013
80	.0090	.0081	.0009
81	.0135	.0121	.0013
82	.0135	.0121	.0013
83	.0135	.0121	.0013
84	.0090	.0081	.0009
85	.0135	.0121	.0013
86	.0090	.0081	.0009
87	.0135	.0121	.0013
88	.0090	.0081	.0009
89	.0135	.0121	.0013
90	.0090	.0081	.0009
91	.0090	.0081	.0009
92	.0090	.0081	.0009
93	.0090	.0081	.0009
94	.0090	.0081	.0009
95	.0090	.0081	.0009
96	.0090	.0081	.0009

TOTAL STORM RAINFALL(INCHES) = 4.50
TOTAL SOIL-LOSS(INCHES) = 3.49
TOTAL EFFECTIVE RAINFALL(INCHES) = 1.01

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 10.2445
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 2.9756

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         RCFC&WCD 24-HOUR RUNOFF HYDROGRAPH

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         HYDROGRAPH IN FIFTEEN-MINUTE INTERVALS(CFS)

----------------------------------------------------------------------------
INTERVAL# VOLUME(AF)   Q(CFS) 0.        5.0      10.0      15.0      20.0
----------------------------------------------------------------------------
       1       .0018       .09  Q         .         .         .         .
       2       .0053       .17  Q         .         .         .         .
       3       .0092       .19  Q         .         .         .         .
       4       .0141       .24  Q         .         .         .         .
       5       .0185       .21  Q         .         .         .         .
       6       .0224       .19  Q         .         .         .         .
       7       .0264       .19  Q         .         .         .         .
       8       .0313       .24  Q         .         .         .         .
       9       .0365       .25  Q         .         .         .         .
      10       .0418       .26  Q         .         .         .         .
      11       .0480       .30  Q         .         .         .         .
      12       .0546       .32  Q         .         .         .         .
      13       .0612       .32  Q         .         .         .         .
      14       .0678       .32  Q         .         .         .         .
      15       .0744       .32  QV        .         .         .         .
      16       .0819       .36  QV        .         .         .         .
      17       .0898       .38  QV        .         .         .         .
      18       .0986       .43  QV        .         .         .         .
      19       .1079       .45  QV        .         .         .         .
      20       .1180       .49  QV        .         .         .         .
      21       .1268       .42  QV        .         .         .         .
      22       .1356       .43  QV        .         .         .         .
      23       .1458       .49  QV        .         .         .         .
      24       .1563       .51  .QV       .         .         .         .
      25       .1678       .55  .QV       .         .         .         .
      26       .1797       .57  .QV       .         .         .         .
      27       .1924       .62  .QV       .         .         .         .
      28       .2056       .64  .QV       .         .         .         .
      29       .2189       .64  .QV       .         .         .         .
      30       .2330       .68  .Q V      .         .         .         .
      31       .2484       .75  .Q V      .         .         .         .
      32       .2651       .81  .Q V      .         .         .         .
      33       .2840       .92  .Q V      .         .         .         .
      34       .3038       .96  .Q  V     .         .         .         .
      35       .3245      1.00  . Q V     .         .         .         .
      36       .3466      1.07  . Q V     .         .         .         .
      37       .3708      1.17  . Q V     .         .         .         .
      38       .3968      1.26  . Q  V    .         .         .         .
      39       .4241      1.32  . Q  V    .         .         .         .
      40       .4561      1.55  .  Q  V   .         .         .         .
      41       .4804      1.18  . Q   V   .         .         .         .
      42       .5005       .97  .Q    V   .         .         .         .
      43       .5247      1.18  . Q    V  .         .         .         .
      44       .5511      1.27  . Q    V  .         .         .         .
      45       .5766      1.24  . Q    V  .         .         .         .
      46       .6017      1.22  . Q     V .         .         .         .
      47       .6251      1.13  . Q     V .         .         .         .
      48       .6485      1.13  . Q     V .         .         .         .
      49       .7270      3.80  .      Q V.         .         .         .
      50       .8418      5.56  .         .Q        .         .         .
      51       .9829      6.83  .         .  Q      .         .         .
      52      1.1445      7.82  .         .    Q    .         .         .
      53      1.3584     10.35  .         .       V Q         .         .
      54      1.5961     11.51  .         .         .V Q       .         .
      55      1.7396      6.95  .         .  Q      .  V      .         .
      56      1.8410      4.91  .        Q.         .   V     .         .
      57      1.9792      6.69  .         .  Q      .     V   .         .
      58      2.1278      7.19  .         .   Q     .       V .         .
      59      2.2759      7.17  .         .   Q     .         V         .
```

```
    60      2.4178      6.87   .         .  Q      .         . V       .
    61      2.5495      6.37   .         . Q       .         .   V     .
    62      2.6708      5.87   .         .Q        .         .    V    .
    63      2.7548      4.07   .       Q .         .         .      V  .
    64      2.8250      3.40   .     Q   .         .         .      V  .
    65      2.8513      1.28   . Q       .         .         .       V .
    66      2.8575       .30   Q         .         .         .       V .
    67      2.8619       .21   Q         .         .         .       V .
    68      2.8659       .19   Q         .         .         .       V .
    69      2.8717       .28   Q         .         .         .       V .
    70      2.8782       .32   Q         .         .         .       V .
    71      2.8849       .32   Q         .         .         .       V .
    72      2.8906       .28   Q         .         .         .       V .
    73      2.8959       .26   Q         .         .         .       V .
    74      2.9012       .26   Q         .         .         .       V .
    75      2.9056       .21   Q         .         .         .        V.
    76      2.9086       .15   Q         .         .         .        V.
    77      2.9122       .17   Q         .         .         .        V.
    78      2.9170       .23   Q         .         .         .        V.
    79      2.9214       .21   Q         .         .         .        V.
    80      2.9245       .15   Q         .         .         .        V.
    81      2.9281       .17   Q         .         .         .        V.
    82      2.9320       .19   Q         .         .         .        V.
    83      2.9360       .19   Q         .         .         .        V.
    84      2.9390       .15   Q         .         .         .        V.
    85      2.9426       .17   Q         .         .         .        V.
    86      2.9456       .15   Q         .         .         .        V.
    87      2.9492       .17   Q         .         .         .        V.
    88      2.9523       .15   Q         .         .         .        V.
    89      2.9558       .17   Q         .         .         .        V.
    90      2.9589       .15   Q         .         .         .        V.
    91      2.9615       .13   Q         .         .         .        V.
    92      2.9642       .13   Q         .         .         .        V.
    93      2.9668       .13   Q         .         .         .        V.
    94      2.9694       .13   Q         .         .         .        V.
    95      2.9721       .13   Q         .         .         .        V.
    96      2.9747       .13   Q         .         .         .        V.
    97      2.9756       .04   Q         .         .         .        V.
    98      2.9756       .00   Q         .         .         .         V
    99      2.9756       .00   Q         .         .         .         V
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           U N I T - H Y D R O G R A P H   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
                  (RCFC&WCD) 1978 HYDROLOGY MANUAL

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                       Especially prepared for:

                     MAINIERO, SMITH AND ASSOCIATES

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**********DESCRIPTION OF RESULTS********************************************
* Rio Vista Village                                                        *
* Area H4                                                                  *
* 100 Year, 24 Hour Storm                                                  *
****************************************************************************

****************************************************************************
         WATERCOURSE LENGTH =     2000.000 FEET
         LENGTH FROM CONCENTRATION POINT TO CENTROID =     500.000 FEET
         ELEVATION VARIATION ALONG WATERCOURSE =      14.960 FEET
         MANNINGS FRICTION FACTOR ALONG WATERCOURSE =  .015
         WATERSHED AREA =       24.490 ACRES
         UNIT HYDROGRAPH TIME UNIT =  15.000 MINUTES
         DESERT S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =   .410
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) =  .900
         MINIMUM SOIL-LOSS RATE(INCH/HOUR) =    .205
         BASEFLOW =   .000 CFS/SQUARE-MILE
         USER-ENTERED RAINFALL =  4.50 INCHES
         PROGRAM NUMBER  9 SELECTED


         WATERCOURSE "LAG" TIME =      .051 HOURS
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 494.517
         HYDROGRAPH BASEFLOW =     .000 CFS
         RCFC&WCD AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000



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                  Advanced Engineering Software [AES]
                            SERIAL No.I0618I
                  VER. 1.6C     RELEASE DATE: 2/21/86

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                     UNIT HYDROGRAPH DETERMINATION
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INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	70.796	69.893
2	99.195	28.037
3	99.990	.785
4	100.000	.010

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UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	.0090	.0081	.0009
2	.0135	.0121	.0013
3	.0135	.0121	.0013
4	.0180	.0162	.0018
5	.0135	.0121	.0013
6	.0135	.0121	.0013
7	.0135	.0121	.0013
8	.0180	.0162	.0018
9	.0180	.0162	.0018
10	.0180	.0162	.0018
11	.0225	.0202	.0022
12	.0225	.0202	.0022
13	.0225	.0202	.0022
14	.0225	.0202	.0022
15	.0225	.0202	.0022
16	.0270	.0243	.0027
17	.0270	.0243	.0027
18	.0315	.0283	.0031
19	.0315	.0283	.0031
20	.0360	.0324	.0036
21	.0270	.0243	.0027
22	.0315	.0283	.0031
23	.0360	.0324	.0036
24	.0360	.0324	.0036
25	.0405	.0364	.0040
26	.0405	.0364	.0040
27	.0450	.0405	.0045
28	.0450	.0405	.0045
29	.0450	.0405	.0045
30	.0495	.0445	.0049
31	.0540	.0486	.0054
32	.0585	.0526	.0058
33	.0675	.0607	.0067
34	.0675	.0607	.0067
35	.0720	.0648	.0072
36	.0765	.0688	.0076
37	.0855	.0769	.0085
38	.0900	.0810	.0090
39	.0945	.0850	.0094
40	.0990	.0891	.0099
41	.0675	.0607	.0067
42	.0675	.0607	.0067
43	.0900	.0810	.0090
44	.0900	.0810	.0090
45	.0855	.0769	.0085
46	.0855	.0769	.0085
47	.0765	.0688	.0076
48	.0810	.0729	.0081
49	.1125	.0952	.0173
50	.1170	.0938	.0232
51	.1260	.0924	.0336
52	.1305	.0910	.0395
53	.1530	.0896	.0634
54	.1530	.0882	.0648
55	.1035	.0869	.0166
56	.1035	.0856	.0179
57	.1215	.0843	.0372
58	.1170	.0830	.0340
59	.1170	.0817	.0353
60	.1125	.0805	.0320
61	.1080	.0792	.0288
62	.1035	.0780	.0255
63	.0855	.0768	.0087
64	.0855	.0757	.0098
65	.0180	.0162	.0018

66	.0180	.0162	.0018
67	.0135	.0121	.0013
68	.0135	.0121	.0013
69	.0225	.0202	.0022
70	.0225	.0202	.0022
71	.0225	.0202	.0022
72	.0180	.0162	.0018
73	.0180	.0162	.0018
74	.0180	.0162	.0018
75	.0135	.0121	.0013
76	.0090	.0081	.0009
77	.0135	.0121	.0013
78	.0180	.0162	.0018
79	.0135	.0121	.0013
80	.0090	.0081	.0009
81	.0135	.0121	.0013
82	.0135	.0121	.0013
83	.0135	.0121	.0013
84	.0090	.0081	.0009
85	.0135	.0121	.0013
86	.0090	.0081	.0009
87	.0135	.0121	.0013
88	.0090	.0081	.0009
89	.0135	.0121	.0013
90	.0090	.0081	.0009
91	.0090	.0081	.0009
92	.0090	.0081	.0009
93	.0090	.0081	.0009
94	.0090	.0081	.0009
95	.0090	.0081	.0009
96	.0090	.0081	.0009

TOTAL STORM RAINFALL(INCHES) = 4.50
TOTAL SOIL-LOSS(INCHES) = 3.75
TOTAL EFFECTIVE RAINFALL(INCHES) = .75

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 7.6474
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.5352

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        RCFC&WCD 24-HOUR RUNOFF HYDROGRAPH

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        HYDROGRAPH IN FIFTEEN-MINUTE INTERVALS(CFS)

---------------------------------------------------------------------------
INTERVAL# VOLUME(AF)   Q(CFS) 0.        2.5       5.0       7.5      10.0
---------------------------------------------------------------------------
      1       .0013       .06  Q         .         .         .         .
      2       .0038       .12  Q         .         .         .         .
      3       .0065       .13  Q         .         .         .         .
      4       .0099       .16  Q         .         .         .         .
      5       .0129       .15  Q         .         .         .         .
      6       .0157       .13  Q         .         .         .         .
      7       .0184       .13  Q         .         .         .         .
      8       .0219       .16  Q         .         .         .         .
      9       .0255       .18  Q         .         .         .         .
     10       .0292       .18  Q         .         .         .         .
     11       .0335       .21  Q         .         .         .         .
     12       .0381       .22  Q         .         .         .         .
     13       .0427       .22  QV        .         .         .         .
     14       .0473       .22  QV        .         .         .         .
     15       .0519       .22  QV        .         .         .         .
     16       .0571       .25  .Q        .         .         .         .
     17       .0626       .27  .Q        .         .         .         .
     18       .0688       .30  .Q        .         .         .         .
     19       .0752       .31  .Q        .         .         .         .
     20       .0822       .34  .QV       .         .         .         .
     21       .0883       .29  .QV       .         .         .         .
     22       .0945       .30  .QV       .         .         .         .
     23       .1015       .34  .QV       .         .         .         .
     24       .1089       .36  .QV       .         .         .         .
     25       .1168       .39  .Q V      .         .         .         .
     26       .1251       .40  .Q V      .         .         .         .
     27       .1340       .43  .Q V      .         .         .         .
     28       .1432       .44  .Q V      .         .         .         .
     29       .1524       .44  .Q V      .         .         .         .
     30       .1622       .48  .Q  V     .         .         .         .
     31       .1729       .52  . Q V     .         .         .         .
     32       .1846       .56  . Q V     .         .         .         .
     33       .1978       .64  . Q  V    .         .         .         .
     34       .2116       .67  . Q  V    .         .         .         .
     35       .2260       .70  . Q  V    .         .         .         .
     36       .2413       .74  . Q   V   .         .         .         .
     37       .2582       .82  .  Q  V   .         .         .         .
     38       .2763       .87  .  Q   V  .         .         .         .
     39       .2953       .92  .  Q   V  .         .         .         .
     40       .3152       .96  .  Q    V .         .         .         .
     41       .3308       .76  .  Q    V .         .         .         .
     42       .3447       .67  . Q     V .         .         .         .
     43       .3617       .82  .  Q     V.         .         .         .
     44       .3800       .89  .  Q     V.         .         .         .
     45       .3977       .86  .  Q      V         .         .         .
     46       .4151       .84  .  Q      V         .         .         .
     47       .4313       .78  .  Q      .V        .         .         .
     48       .4476       .79  .  Q      .V        .         .         .
     49       .4773      1.44  .    Q    . V       .         .         .
     50       .5210      2.11  .       Q .  V      .         .         .
     51       .5833      3.01  .         . Q  V    .         .         .
     52       .6602      3.72  .         .   Q  V  .         .         .
     53       .7752      5.57  .         .         V Q       .         .
     54       .9061      6.33  .         .         .  V Q    .         .
     55       .9686      3.03  .         . Q       .    V    .         .
     56      1.0052      1.77  .      Q  .         .     V   .         .
     57      1.0696      3.12  .         . Q       .      V  .         .
     58      1.1405      3.43  .         .  Q      .        V.         .
     59      1.2118      3.45  .         .  Q      .         .V        .
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    60      1.2790      3.25   .         .  Q      .         .  V      .
    61      1.3397      2.94   .         .Q        .         .   V     .
    62      1.3937      2.61   .         Q         .         .     V   .
    63      1.4214      1.34   .    Q    .         .         .      V  .
    64      1.4410       .95   .  Q      .         .         .      V  .
    65      1.4495       .41   .Q        .         .         .      V  .
    66      1.4533       .18   Q         .         .         .      V  .
    67      1.4563       .15   Q         .         .         .      V  .
    68      1.4591       .13   Q         .         .         .       V .
    69      1.4631       .20   Q         .         .         .       V .
    70      1.4677       .22   Q         .         .         .       V .
    71      1.4723       .22   Q         .         .         .       V .
    72      1.4762       .19   Q         .         .         .       V .
    73      1.4799       .18   Q         .         .         .       V .
    74      1.4836       .18   Q         .         .         .       V .
    75      1.4866       .15   Q         .         .         .       V .
    76      1.4887       .10   Q         .         .         .       V .
    77      1.4912       .12   Q         .         .         .       V .
    78      1.4946       .16   Q         .         .         .       V .
    79      1.4976       .15   Q         .         .         .        V.
    80      1.4997       .10   Q         .         .         .        V.
    81      1.5022       .12   Q         .         .         .        V.
    82      1.5050       .13   Q         .         .         .        V.
    83      1.5077       .13   Q         .         .         .        V.
    84      1.5098       .10   Q         .         .         .        V.
    85      1.5123       .12   Q         .         .         .        V.
    86      1.5144       .10   Q         .         .         .        V.
    87      1.5169       .12   Q         .         .         .        V.
    88      1.5190       .10   Q         .         .         .        V.
    89      1.5215       .12   Q         .         .         .        V.
    90      1.5236       .10   Q         .         .         .        V.
    91      1.5254       .09   Q         .         .         .        V.
    92      1.5273       .09   Q         .         .         .        V.
    93      1.5291       .09   Q         .         .         .        V.
    94      1.5309       .09   Q         .         .         .        V.
    95      1.5328       .09   Q         .         .         .        V.
    96      1.5346       .09   Q         .         .         .        V.
    97      1.5351       .03   Q         .         .         .        V.
    98      1.5352       .00   Q         .         .         .        V.
    99      1.5352       .00   Q         .         .         .        V.
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Simplified Method to Establish the 100-Year, 1-Hour Storm Hydraulic Grade in Retention Basins

Simplified Method to Establish the 100-Year, 1-Hour Storm Hydraulic Grade Line in Retention Basins

Criteria:

In the Rio Vista project, several storm drains drain into retention basins during storm events. The retention basins are designed to retain 100% of the 100-year, 24-storm runoff. However, the storm drain and catch basin systems are designed to convey the 100-year, 1-hour storm. The following is our approach to establish the appropriate elevation for the hydraulic grade line at the outlet of each storm drain system.

Proposed Hydraulic Approach:

Using the "Shortcut Method" Synthetic Unit Hydrograph from the RCFC & WCD Hydrology Manual, we adjust the percentage rainfall in accordance with the Rainfall Pattern for the 100-year, 1-hour storm graph attached. We adjust the "constant loss rate" until the peak 100-year, 1-hour storm runoff rate equals the Rational Method peak runoff rate. In our sample problem, 15.20 acres produce 46.7 cubic feet per second of peak runoff. The Runoff Pattern graph attached indicates the runoff per 2.5-minute periods from the Shortcut Method calculations. In the "Shortcut Method", we allow a small portion of the runoff to percolate in the bottom of the basin. This percolation value is based on the size of the basin and the allowable percolation rate. Using the "Accumulated Volume" information for unit time period #13, we can estimate the maximum volume in each retention basin at the time of peak 100-year runoff. This volume will provide the Hydraulic Grade Line elevation for each storm drain system.

Results:

Results from the "Shortcut Method" indicate the depth in the retention basin is shallow at the time of peak runoff. This result is anticipated due to the nature of the 1-hour storm (thunderstorm type event).

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph, Effective Rain and Retention Basin Calculation Form	Project 1064 "Sample Problem" Net rain 100 yr. 1 hr. By JAD Date Checked Date	Sheet 1 of 1

[1] CONCENTRATION POINT	0	[2] AREA DESIGNATION	
[3] DRAINAGE AREA-ACRES	15.2	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	0
[5] UNIT TIME-MINUTES	2.5	[6] LAG TIME-MINUTES	0
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	0	[8] S-CURVE	0
[9] STORM FREQUENCY & DURATION 100 YEAR-	1 HOUR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.6
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0
[13] CONSTANT LOSS RATE-INCHES/HOUR	2.7	[14] LOW LOSS RATE-PERCENT	90
[15] RETENTION BASIN AREA-ACRES	0.35	[16] RETENTION BASIN PERCOLATION-INCHES	2

	EFFECTIVE RAIN					FLOOD HYDROGRAPH	RETENTION BASIN PERCOLATION			
[17] UNIT TIME PERIOD minutes	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN in [10][20] / 100	[22] LOSS RATE in MAX	[22] LOSS RATE in LOW	[23] EFFECTIVE RAIN in [21]-[22]	[24] FLOW cfs	[25] EFFECTIVE RUNOFF acre-ft [23][3]/12	[26] PERCOLATION acre-ft [15][16]	[27] RETENTION PER PERIOD [25]-[26]	[28] ACCUMULATED VOLUME
1.000	0.030	0.000	0.113	0.000	0.000	0.018	0.0001	0.0024	-0.0024	0.000
2.000	0.210	0.003	0.113	0.003	0.000	0.124	0.0004	0.0024	-0.0020	0.000
3.000	0.520	0.008	0.113	0.007	0.001	0.306	0.0011	0.0024	-0.0014	0.000
4.000	0.890	0.014	0.113	0.013	0.001	0.524	0.0018	0.0024	-0.0006	0.000
5.000	1.410	0.023	0.113	0.020	0.002	0.830	0.0029	0.0024	0.0004	0.000
6.000	2.110	0.034	0.113	0.030	0.003	1.242	0.0043	0.0024	0.0018	0.002
7.000	3.060	0.049	0.113	0.044	0.005	1.801	0.0062	0.0024	0.0038	0.006
8.000	4.190	0.067	0.113	0.060	0.007	2.466	0.0085	0.0024	0.0061	0.012
9.000	5.600	0.090	0.113	0.081	0.009	3.296	0.0113	0.0024	0.0089	0.021
10.000	7.410	0.119	0.113	0.107	0.012	4.361	0.0150	0.0024	0.0126	0.034
11.000	9.790	0.157	0.113	0.141	0.044	16.236	0.0559	0.0024	0.0535	0.087
12.000	14.980	0.240	0.113	0.216	0.127	46.782	0.1611	0.0024	0.1587	0.246
13.000	14.980	0.240	0.113	0.216	0.127	46.782	0.1611	0.0024	0.1587	0.404
14.000	9.790	0.157	0.113	0.141	0.044	16.236	0.0559	0.0024	0.0535	0.458
15.000	7.410	0.119	0.113	0.107	0.012	4.361	0.0150	0.0024	0.0126	0.470
16.000	5.600	0.090	0.113	0.081	0.009	3.296	0.0113	0.0024	0.0089	0.479
17.000	4.190	0.067	0.113	0.060	0.007	2.466	0.0085	0.0024	0.0061	0.485
18.000	3.060	0.049	0.113	0.044	0.005	1.801	0.0062	0.0024	0.0038	0.489
19.000	2.110	0.034	0.113	0.030	0.003	1.242	0.0043	0.0024	0.0018	0.491
20.000	1.410	0.023	0.113	0.020	0.002	0.830	0.0029	0.0024	0.0004	0.492
21.000	0.890	0.014	0.113	0.013	0.001	0.524	0.0018	0.0024	-0.0006	0.491
22.000	0.520	0.008	0.113	0.007	0.001	0.306	0.0011	0.0024	-0.0014	0.490
23.000	0.210	0.003	0.113	0.003	0.000	0.124	0.0004	0.0024	-0.0020	0.488
24.000	0.030	0.000	0.113	0.000	0.000	0.018	0.0001	0.0024	-0.0024	0.485
TOTALS					0.4240	155.9700				MAX: .492

" SAMPLE PROBLEM "

EFFECTIVE RAIN = 0.018 INCHES/ACRE

MAX RETENTION = 0.492 ACRE-FT

MAINIERO, SMITH AND ASSOCIATES, INC.
Planning/Civil Engineering/Land Surveying
777 E. Tahquitz Canyon Way Suite 301
PALM SPRINGS, CALIFORNIA 92262-6784
(760) 320-9811 FAX (760) 323-7893

JOB 1064 RIO VISTA

SHEET NO. ______ OF ______

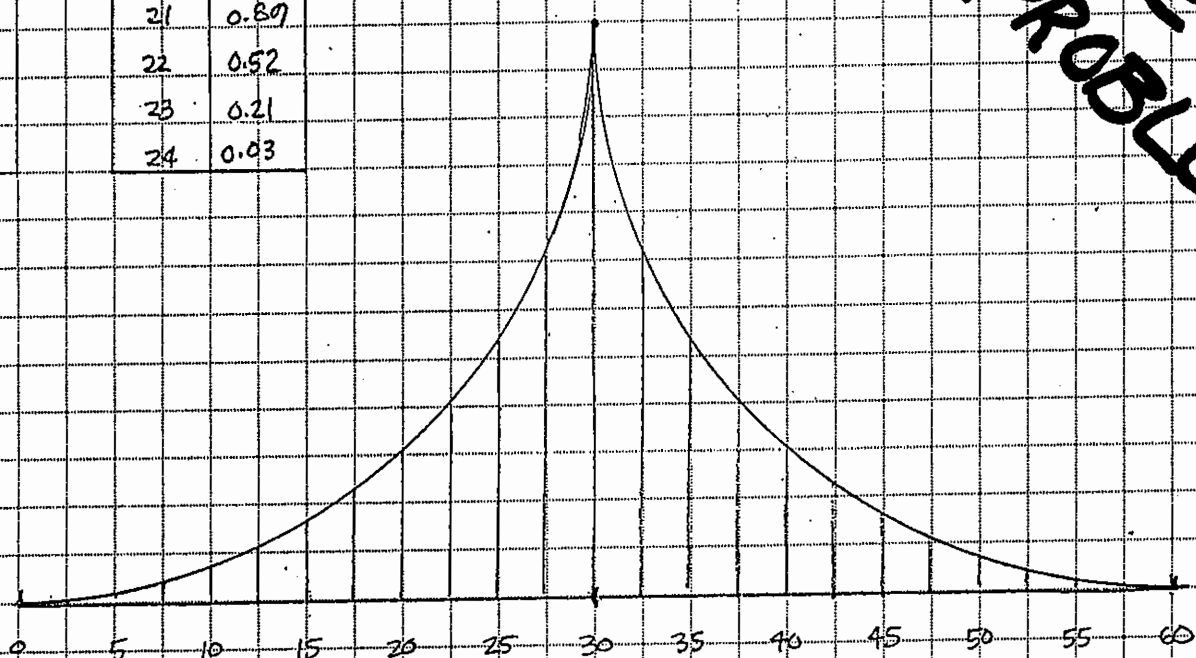
CALCULATED BY ______ DATE 2-12-01

CHECKED BY ______ DATE ______

SCALE ______

"SAMPLE PROBLEM"

PERIOD	% STORM	PERIOD	% STORM
1	0.03	13	14.78
2	0.21	14	9.79
3	0.52	15	7.41
4	0.89	16	5.60
5	1.41	17	4.19
6	2.11	18	3.06
7	3.06	19	2.11
8	4.19	20	1.41
9	5.60	21	0.89
10	7.41	22	0.52
11	9.79	23	0.21
12	14.78	24	0.03



RAINFALL PATTERN FOR
100-YEAR, 1-HOUR STORM

MAINIERO, SMITH AND ASSOCIATES, INC.
Planning/Civil Engineering/Land Surveying
777 E. Tahquitz Canyon Way Suite 301
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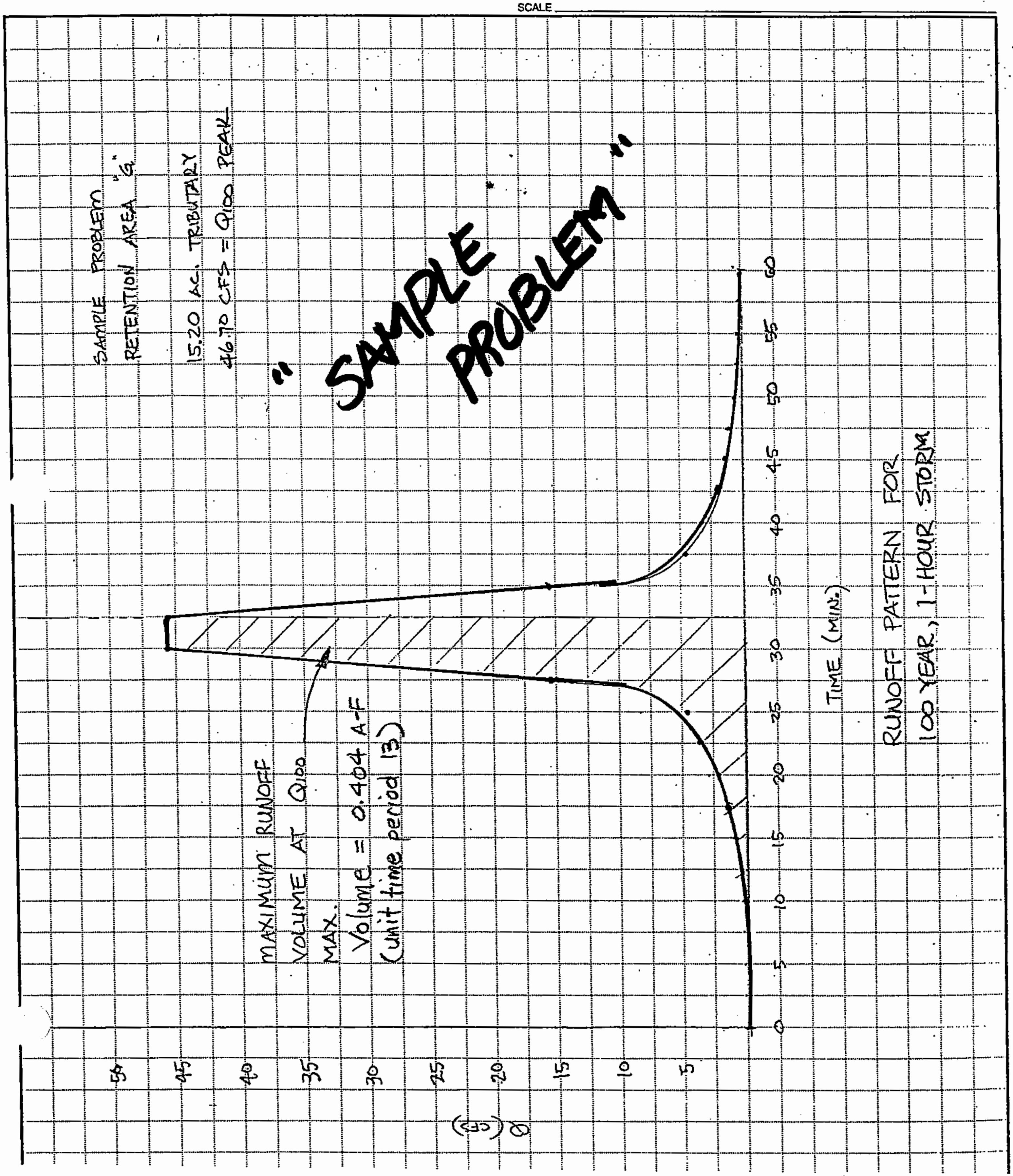
(760) 320-9811 FAX (760) 323-7893

JOB 1064 RIO VISTA
SHEET NO. ____ OF ____
CALCULATED BY ____ DATE 2-12-01
CHECKED BY ____ DATE ____
SCALE ____



RCFC&WCD HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph, Effective Rain and Retention Basin Calculation Form	Project 1064 Retention Basin B Net rain 100 yr. 1 hr. By JAD Date Checked Date	Sheet 1 of 1

[1] CONCENTRATION POINT	0	[2] AREA DESIGNATION	
[3] DRAINAGE AREA-ACRES	21.04	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	0
[5] UNIT TIME-MINUTES	2.5	[6] LAG TIME-MINUTES	0
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	0	[8] S-CURVE	0
[9] STORM FREQUENCY & DURATION 100 YEAR-	1 HOUR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.6
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0
[13] CONSTANT LOSS RATE-INCHES/HOUR	3.18	[14] LOW LOSS RATE-PERCENT	90
[15] RETENTION BASIN AREA-ACRES	0.36835	[16] RETENTION BASIN PERCOLATION-INCHES	2

	EFFECTIVE RAIN					FLOOD HYDROGRAPH	RETENTION BASIN PERCOLATION			
[17] UNIT TIME PERIOD minutes	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN in [10][20] 100	[22] LOSS RATE in MAX	[22] LOSS RATE in LOW	[23] EFFECTIVE RAIN in [21]-[22]	[24] FLOW cfs	[25] EFFECTIVE RUNOFF acre-ft [23][3]/12	[26] PERCOLATION acre-ft [15][16]	[27] RETENTION PER PERIOD [25]-[26]	[28] ACCUMULATED VOLUME
1.000	0.030	0.000	0.133	0.000	0.000	0.024	0.0001	0.0026	-0.0025	0.000
2.000	0.210	0.003	0.133	0.003	0.000	0.171	0.0006	0.0026	-0.0020	0.000
3.000	0.520	0.008	0.133	0.007	0.001	0.424	0.0015	0.0026	-0.0011	0.000
4.000	0.890	0.014	0.133	0.013	0.001	0.725	0.0025	0.0026	-0.0001	0.000
5.000	1.410	0.023	0.133	0.020	0.002	1.149	0.0040	0.0026	0.0014	0.001
6.000	2.110	0.034	0.133	0.030	0.003	1.719	0.0059	0.0026	0.0034	0.005
7.000	3.060	0.049	0.133	0.044	0.005	2.493	0.0086	0.0026	0.0060	0.011
8.000	4.190	0.067	0.133	0.060	0.007	3.413	0.0118	0.0026	0.0092	0.020
9.000	5.600	0.090	0.133	0.081	0.009	4.562	0.0157	0.0026	0.0132	0.033
10.000	7.410	0.119	0.133	0.107	0.012	6.037	0.0208	0.0026	0.0182	0.051
11.000	9.790	0.157	0.133	0.141	0.024	12.291	0.0423	0.0026	0.0398	0.091
12.000	14.980	0.240	0.133	0.216	0.107	54.573	0.1879	0.0026	0.1854	0.276
13.000	14.980	0.240	0.133	0.216	0.107	54.573	0.1879	0.0026	0.1854	0.462
14.000	9.790	0.157	0.133	0.141	0.024	12.291	0.0423	0.0026	0.0398	0.502
15.000	7.410	0.119	0.133	0.107	0.012	6.037	0.0208	0.0026	0.0182	0.520
16.000	5.600	0.090	0.133	0.081	0.009	4.562	0.0157	0.0026	0.0132	0.533
17.000	4.190	0.067	0.133	0.060	0.007	3.413	0.0118	0.0026	0.0092	0.542
18.000	3.060	0.049	0.133	0.044	0.005	2.493	0.0086	0.0026	0.0060	0.548
19.000	2.110	0.034	0.133	0.030	0.003	1.719	0.0059	0.0026	0.0034	0.552
20.000	1.410	0.023	0.133	0.020	0.002	1.149	0.0040	0.0026	0.0014	0.553
21.000	0.890	0.014	0.133	0.013	0.001	0.725	0.0025	0.0026	-0.0001	0.553
22.000	0.520	0.008	0.133	0.007	0.001	0.424	0.0015	0.0026	-0.0011	0.552
23.000	0.210	0.003	0.133	0.003	0.000	0.171	0.0006	0.0026	-0.0020	0.550
24.000	0.030	0.000	0.133	0.000	0.000	0.024	0.0001	0.0026	-0.0025	0.547
TOTALS					0.3440	175.1619				MAX: .553

EFFECTIVE RAIN = 0.014 INCHES/ACRE

MAX RETENTION = 0.553 ACRE-FT

R:\Documents\1064\Originals\STORMDRAIN CALCS\[jad Unit Hydrograph Effective Rain and C Basin 100 1hr.xls],

3/13/01 7:56 AM MAINIERO, SMITH ASSOCIATES, INC.

RCFC & WCD HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph, Effective Rain and Retention Basin Calculation Form	Project 1064 Retention Basin C Net rain 100 yr. 1 hr. By JAD Date Checked Date	Sheet 1 of 1

[1] CONCENTRATION POINT	0	[2] AREA DESIGNATION	
[3] DRAINAGE AREA-ACRES	8.46	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	0
[5] UNIT TIME-MINUTES	2.5	[6] LAG TIME-MINUTES	0
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	0	[8] S-CURVE	0
[9] STORM FREQUENCY & DURATION 100 YEAR-	1 HOUR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.6
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0
[13] CONSTANT LOSS RATE-INCHES/HOUR	2.66	[14] LOW LOSS RATE-PERCENT	90
[15] RETENTION BASIN AREA-ACRES	0.259	[16] RETENTION BASIN PERCOLATION-INCHES	2

	EFFECTIVE RAIN					FLOOD HYDROGRAPH	RETENTION BASIN PERCOLATION			
[17] UNIT TIME PERIOD minutes	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN in [10][20] / 100	[22] LOSS RATE in MAX	LOW	[23] EFFECTIVE RAIN in [21]-[22]	[24] FLOW cfs	[25] EFFECTIVE RUNOFF acre-ft [23][3]/12	[26] PERCOLATION acre-ft [15][16]	[27] RETENTION PER PERIOD [25]-[26]	[28] ACCUMULATED VOLUME
1.000	0.030	0.000	0.111	0.000	0.000	0.010	0.0000	0.0018	-0.0018	0.000
2.000	0.210	0.003	0.111	0.003	0.000	0.069	0.0002	0.0018	-0.0016	0.000
3.000	0.520	0.008	0.111	0.007	0.001	0.170	0.0006	0.0018	-0.0012	0.000
4.000	0.890	0.014	0.111	0.013	0.001	0.292	0.0010	0.0018	-0.0008	0.000
5.000	1.410	0.023	0.111	0.020	0.002	0.462	0.0016	0.0018	-0.0002	0.000
6.000	2.110	0.034	0.111	0.030	0.003	0.691	0.0024	0.0018	0.0006	0.001
7.000	3.060	0.049	0.111	0.044	0.005	1.002	0.0035	0.0018	0.0017	0.002
8.000	4.190	0.067	0.111	0.060	0.007	1.373	0.0047	0.0018	0.0029	0.005
9.000	5.600	0.090	0.111	0.081	0.009	1.834	0.0063	0.0018	0.0045	0.010
10.000	7.410	0.119	0.111	0.107	0.012	2.427	0.0084	0.0018	0.0066	0.016
11.000	9.790	0.157	0.111	0.141	0.046	9.378	0.0323	0.0018	0.0305	0.047
12.000	14.980	0.240	0.111	0.216	0.129	26.379	0.0908	0.0018	0.0890	0.136
13.000	14.980	0.240	0.111	0.216	0.129	26.379	0.0908	0.0018	0.0890	0.225
14.000	9.790	0.157	0.111	0.141	0.046	9.378	0.0323	0.0018	0.0305	0.255
15.000	7.410	0.119	0.111	0.107	0.012	2.427	0.0084	0.0018	0.0066	0.262
16.000	5.600	0.090	0.111	0.081	0.009	1.834	0.0063	0.0018	0.0045	0.266
17.000	4.190	0.067	0.111	0.060	0.007	1.373	0.0047	0.0018	0.0029	0.269
18.000	3.060	0.049	0.111	0.044	0.005	1.002	0.0035	0.0018	0.0017	0.271
19.000	2.110	0.034	0.111	0.030	0.003	0.691	0.0024	0.0018	0.0006	0.272
20.000	1.410	0.023	0.111	0.020	0.002	0.462	0.0016	0.0018	-0.0002	0.271
21.000	0.890	0.014	0.111	0.013	0.001	0.292	0.0010	0.0018	-0.0008	0.271
22.000	0.520	0.008	0.111	0.007	0.001	0.170	0.0006	0.0018	-0.0012	0.269
23.000	0.210	0.003	0.111	0.003	0.000	0.069	0.0002	0.0018	-0.0016	0.268
24.000	0.030	0.000	0.111	0.000	0.000	0.010	0.0000	0.0018	-0.0018	0.266
TOTALS					0.4307	88.1745				MAX: .272

EFFECTIVE RAIN = 0.018 INCHES/ACRE

MAX RETENTION = 0.272 ACRE-FT

RCFC & WCD HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph, Effective Rain and Retention Basin Calculation Form	Project 1064 Retention Basin D Net rain 100 yr. 1 hr. By JAD Date Checked Date	Sheet 1 of 1

[1] CONCENTRATION POINT	0	[2] AREA DESIGNATION	
[3] DRAINAGE AREA-ACRES	33.79	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	0
[5] UNIT TIME-MINUTES	2.5	[6] LAG TIME-MINUTES	0
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	0	[8] S-CURVE	0
[9] STORM FREQUENCY & DURATION 100 YEAR-	1 HOUR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.6
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0
[13] CONSTANT LOSS RATE-INCHES/HOUR	3.18	[14] LOW LOSS RATE-PERCENT	90
[15] RETENTION BASIN AREA-ACRES	0.738	[16] RETENTION BASIN PERCOLATION-INCHES	2

	EFFECTIVE RAIN					FLOOD HYDROGRAPH	RETENTION BASIN PERCOLATION			
[17] UNIT TIME PERIOD minutes	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN in [10][20] / 100	[22] LOSS RATE in MAX	LOW	[23] EFFECTIVE RAIN in [21]-[22]	[24] FLOW cfs	[25] EFFECTIVE RUNOFF acre-ft [23][3]/12	[26] PERCOLATION acre-ft [15][16]	[27] RETENTION PER PERIOD [25]-[26]	[28] ACCUMULATED VOLUME
1.000	0.030	0.000	0.133	0.000	0.000	0.039	0.0001	0.0051	-0.0050	0.000
2.000	0.210	0.003	0.133	0.003	0.000	0.275	0.0009	0.0051	-0.0042	0.000
3.000	0.520	0.008	0.133	0.007	0.001	0.680	0.0023	0.0051	-0.0028	0.000
4.000	0.890	0.014	0.133	0.013	0.001	1.164	0.0040	0.0051	-0.0011	0.000
5.000	1.410	0.023	0.133	0.020	0.002	1.845	0.0064	0.0051	0.0012	0.001
6.000	2.110	0.034	0.133	0.030	0.003	2.761	0.0095	0.0051	0.0044	0.006
7.000	3.060	0.049	0.133	0.044	0.005	4.004	0.0138	0.0051	0.0087	0.014
8.000	4.190	0.067	0.133	0.060	0.007	5.482	0.0189	0.0051	0.0138	0.028
9.000	5.600	0.090	0.133	0.081	0.009	7.327	0.0252	0.0051	0.0201	0.048
10.000	7.410	0.119	0.133	0.107	0.012	9.695	0.0334	0.0051	0.0283	0.076
11.000	9.790	0.157	0.133	0.141	0.024	19.740	0.0680	0.0051	0.0628	0.139
12.000	14.980	0.240	0.133	0.216	0.107	87.643	0.3018	0.0051	0.2967	0.436
13.000	14.980	0.240	0.133	0.216	0.107	87.643	0.3018	0.0051	0.2967	0.733
14.000	9.790	0.157	0.133	0.141	0.024	19.740	0.0680	0.0051	0.0628	0.795
15.000	7.410	0.119	0.133	0.107	0.012	9.695	0.0334	0.0051	0.0283	0.824
16.000	5.600	0.090	0.133	0.081	0.009	7.327	0.0252	0.0051	0.0201	0.844
17.000	4.190	0.067	0.133	0.060	0.007	5.482	0.0189	0.0051	0.0138	0.858
18.000	3.060	0.049	0.133	0.044	0.005	4.004	0.0138	0.0051	0.0087	0.866
19.000	2.110	0.034	0.133	0.030	0.003	2.761	0.0095	0.0051	0.0044	0.871
20.000	1.410	0.023	0.133	0.020	0.002	1.845	0.0064	0.0051	0.0012	0.872
21.000	0.890	0.014	0.133	0.013	0.001	1.164	0.0040	0.0051	-0.0011	0.871
22.000	0.520	0.008	0.133	0.007	0.001	0.680	0.0023	0.0051	-0.0028	0.868
23.000	0.210	0.003	0.133	0.003	0.000	0.275	0.0009	0.0051	-0.0042	0.864
24.000	0.030	0.000	0.133	0.000	0.000	0.039	0.0001	0.0051	-0.0050	0.859
TOTALS					0.3440	281.3081				MAX: .872

EFFECTIVE RAIN = 0.014 INCHES/ACRE

MAX RETENTION = 0.872 ACRE-FT

RCFC&WCD HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph, Effective Rain and Retention Basin Calculation Form	Project 1064 Retention Basin H1 Net rain 100 yr. 1 hr. By JAD Date Checked Date	Sheet 1 of 1

[1] CONCENTRATION POINT	0	[2] AREA DESIGNATION	
[3] DRAINAGE AREA-ACRES	8.69	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	0
[5] UNIT TIME-MINUTES	2.5	[6] LAG TIME-MINUTES	0
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	0	[8] S-CURVE	0
[9] STORM FREQUENCY & DURATION 100 YEAR-	1 HOUR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.6
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0
[13] CONSTANT LOSS RATE-INCHES/HOUR	3.69	[14] LOW LOSS RATE-PERCENT	90
[15] RETENTION BASIN AREA-ACRES	0.1218	[16] RETENTION BASIN PERCOLATION-INCHES	2

	EFFECTIVE RAIN					FLOOD HYDROGRAPH	RETENTION BASIN PERCOLATION			
[17] UNIT TIME PERIOD minutes	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN in [10][20] / 100	[22] LOSS RATE in		[23] EFFECTIVE RAIN in [21]-[22]	[24] FLOW cfs	[25] EFFECTIVE RUNOFF acre-ft [23][3]/12	[26] PERCOLATION acre-ft [15][16]	[27] RETENTION PER PERIOD [25]-[26]	[28] ACCUMULATED VOLUME
			MAX	LOW						
1.000	0.030	0.000	0.154	0.000	0.000	0.010	0.0000	0.0008	-0.0008	0.000
2.000	0.210	0.003	0.154	0.003	0.000	0.071	0.0002	0.0008	-0.0006	0.000
3.000	0.520	0.008	0.154	0.007	0.001	0.175	0.0006	0.0008	-0.0002	0.000
4.000	0.890	0.014	0.154	0.013	0.001	0.299	0.0010	0.0008	0.0002	0.000
5.000	1.410	0.023	0.154	0.020	0.002	0.474	0.0016	0.0008	0.0008	0.001
6.000	2.110	0.034	0.154	0.030	0.003	0.710	0.0024	0.0008	0.0016	0.003
7.000	3.060	0.049	0.154	0.044	0.005	1.030	0.0035	0.0008	0.0027	0.005
8.000	4.190	0.067	0.154	0.060	0.007	1.410	0.0049	0.0008	0.0040	0.009
9.000	5.600	0.090	0.154	0.081	0.009	1.884	0.0065	0.0008	0.0056	0.015
10.000	7.410	0.119	0.154	0.107	0.012	2.493	0.0086	0.0008	0.0077	0.023
11.000	9.790	0.157	0.154	0.141	0.016	3.294	0.0113	0.0008	0.0105	0.033
12.000	14.980	0.240	0.154	0.216	0.086	18.071	0.0622	0.0008	0.0614	0.095
13.000	14.980	0.240	0.154	0.216	0.086	18.071	0.0622	0.0008	0.0614	0.156
14.000	9.790	0.157	0.154	0.141	0.016	3.294	0.0113	0.0008	0.0105	0.166
15.000	7.410	0.119	0.154	0.107	0.012	2.493	0.0086	0.0008	0.0077	0.174
16.000	5.600	0.090	0.154	0.081	0.009	1.884	0.0065	0.0008	0.0056	0.180
17.000	4.190	0.067	0.154	0.060	0.007	1.410	0.0049	0.0008	0.0040	0.184
18.000	3.060	0.049	0.154	0.044	0.005	1.030	0.0035	0.0008	0.0027	0.187
19.000	2.110	0.034	0.154	0.030	0.003	0.710	0.0024	0.0008	0.0016	0.188
20.000	1.410	0.023	0.154	0.020	0.002	0.474	0.0016	0.0008	0.0008	0.189
21.000	0.890	0.014	0.154	0.013	0.001	0.299	0.0010	0.0008	0.0002	0.189
22.000	0.520	0.008	0.154	0.007	0.001	0.175	0.0006	0.0008	-0.0002	0.189
23.000	0.210	0.003	0.154	0.003	0.000	0.071	0.0002	0.0008	-0.0006	0.188
24.000	0.030	0.000	0.154	0.000	0.000	0.010	0.0000	0.0008	-0.0008	0.187
TOTALS					0.2846	59.8432				MAX: .189

EFFECTIVE RAIN = 0.012 INCHES/ACRE

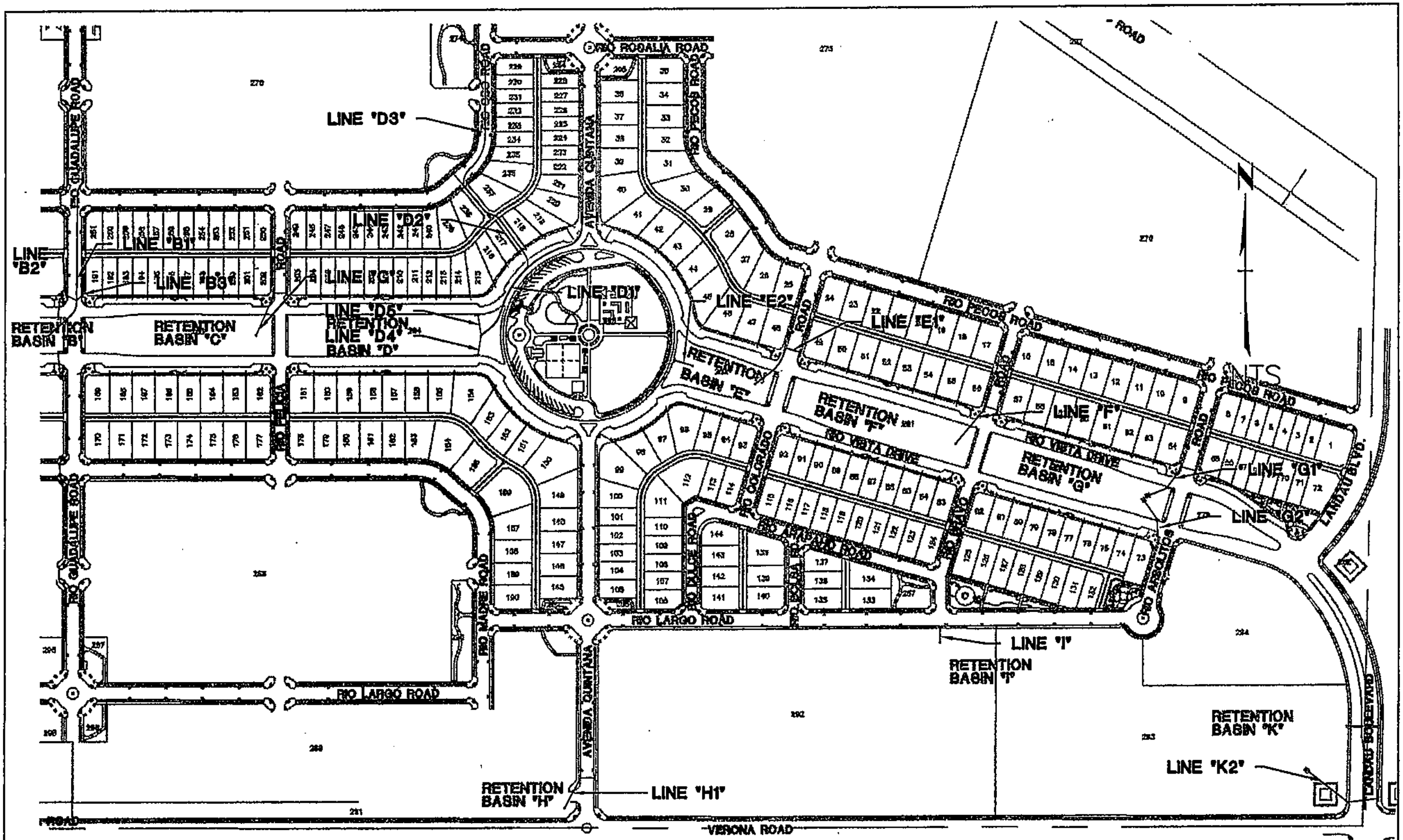
MAX RETENTION = 0.189 ACRE-FT

R:\Documents\1064\Originals\STORMDRAIN CALCS\[jad Unit Hydrograph Effective Rain and H1 and H2 Basin 100 1hr.xls],

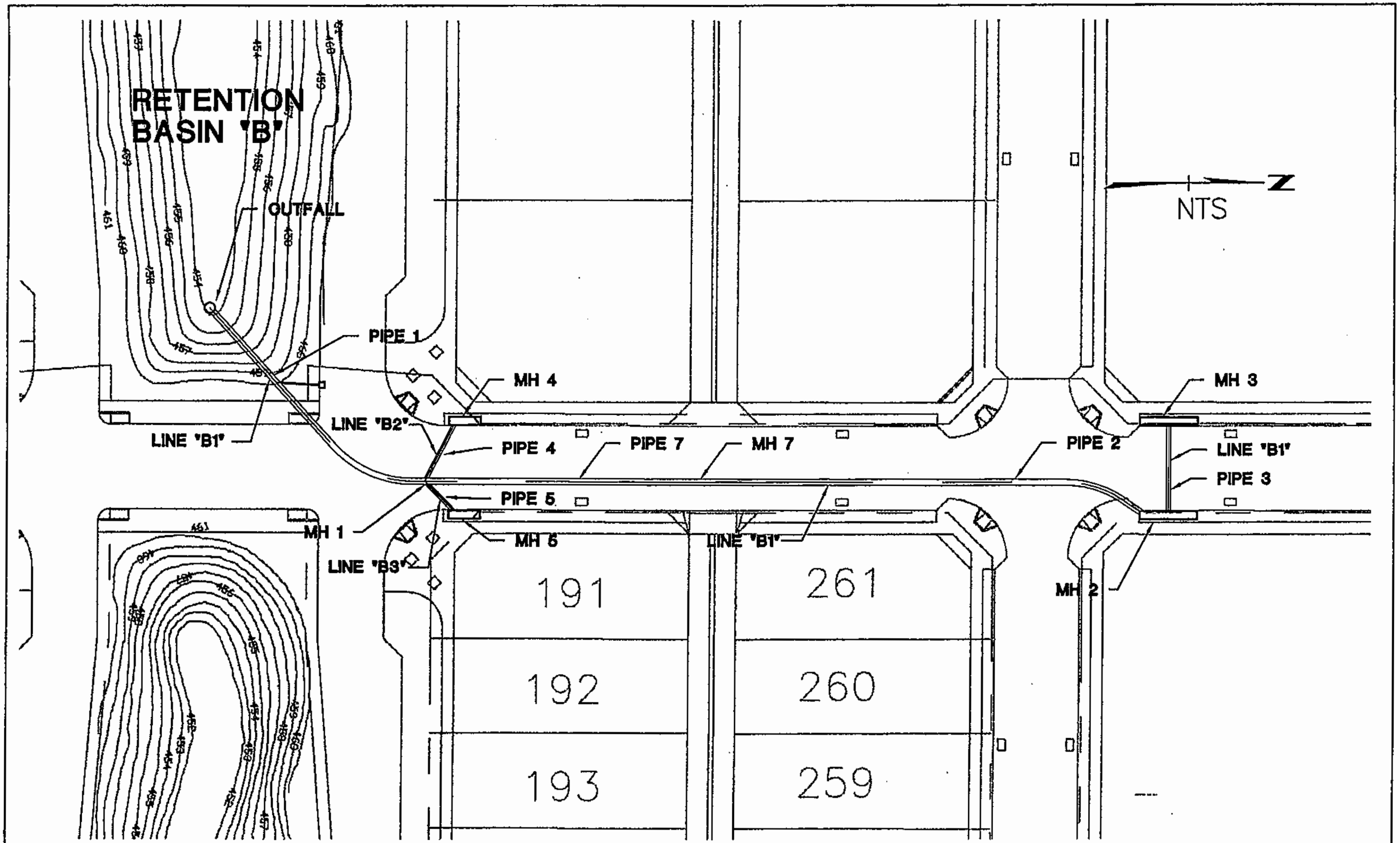
3/19/01 10:18 AM

MAINIERO, SMITH ASSOCIATES, INC.

Storm Drain System
Hydraulic Calculations



STORM DRAIN MAP



STORM DRAIN LINE "B1,B2,B3"

Storm Drain Line "B-1, B-2, B-3"

PIPE DESCRIPTION: Pipe 1
---RAINFALL INFORMATION---
Return Period = 100 Year
Rainfall File = Tutorial

---PIPE INFORMATION---
Current Pipe = Pipe 1
Downstream Pipe = Outfall
Pipe Material = CONC
Pipe Length = 118.77 ft
Plan Length = 118.77 ft
Pipe Type = Circular
Pipe Dimensions = 33.00 in
Pipe Manning's "n" = 0.013
Pipe Capacity at Invert Slope = 79.62 cfs
Invert Elevation Downstream = 447.35 ft
Invert Elevation Upstream = 450.04 ft
Invert Slope = 2.33%
Invert Slope (Plan Length) = 2.27%
Rim Elevation Downstream = 454.00 ft
Rim Elevation Upstream = 461.92 ft
Natural Ground Slope = 6.67%
Crown Elevation Downstream = 450.10 ft
Crown Elevation Upstream = 452.79 ft

---FLOW INFORMATION---
Catchment Area = 0.00 ac
Runoff Coefficient = 0.500
Inlet Time = 0.00 min
Inlet Intensity = 0.00 in/hr
Inlet Rational Flow = 0.00 cfs
Inlet Input Flow = 0.00 cfs
Inlet Hydrograph Flow = 0.00 cfs
Total Area = 0.00 ac
Weighted Coefficient = 0.500
Total Time of Concentration = 0.46 min
Total Intensity = 12.77 in/hr
Total Rational Flow = 0.00 cfs
Total Flow = 54.55 cfs
Uniform Capacity = 79.62 cfs
Skipped flow = 0.00 cfs
Infiltration = 0.00 gpd

---HYDRAULIC INFORMATION---
HGL Elevation Downstream = 455.20 ft
HGL Elevation Upstream = 456.46 ft
HGL Slope = 1.09 %
EGL Elevation Downstream = 456.51 ft
EGL Elevation Upstream = 457.78 ft
EGL Slope = 1.09 %
Critical Depth = 28.90 in
Depth Downstream = 33.00 in
Depth Upstream = 33.00 in
Velocity Downstream = 9.18 ft/s
Velocity Upstream = 9.18 ft/s
Uniform Velocity Downstream = NA
Uniform Velocity Upstream = NA
Area Downstream = 5.94 ft^2
Area Upstream = 5.94 ft^2
Kj (JLC) = 0.50
Calculated Junction Loss = 0.656 ft

---INLET INFORMATION---
Downstream Inlet = Outfall
Inlet Description = <None>
Inlet Type = Undefined
Computation Case = Sag
Longitudinal Slope = 0.00 ft/ft
Mannings n-value = 0.000

Storm Drain Line "B-1, B-2, B-3"

Pavement Cross-Slope = 0.00 ft/ft
Gutter Cross-Slope = 0.00 ft/ft
Gutter Local Depression = 0.00 in
Gutter Width = 0.00 ft
Ponding Width = 0.00 ft
Intercept Efficiency = * %
Flow from Catchment = 0.00 cfs
Carryover from previous inlet = 0.00 cfs
Total Flow to Current Inlet = 0.00 cfs
Flow Intercepted by Current Inlet = 0.00 cfs
Bypassed Flow = 0.00 cfs
Pavement Flow = 0.00 cfs
Gutter Flow = 0.00 cfs
Depth at Curb = 0.00 in
Depth at Pavement/Gutter Joint = 0.00 in
Pavement Spread = 0.00 ft
Total Spread = 0.00 ft
Gutter Velocity = 0.00 ft/s
Curb Efficiency = * %
Grate Efficiency = * %
Slot Efficiency = * %
Total Efficiency = 0.00 %

PIPE DESCRIPTION: Pipe 7
---RAINFALL INFORMATION---
Return Period = 100 Year
Rainfall File = Tutorial

---PIPE INFORMATION---
Current Pipe = Pipe 7
Downstream Pipe = Pipe 1
Pipe Material = CONC
Pipe Length = 121.77 ft
Plan Length = 121.77 ft
Pipe Type = Circular
Pipe Dimensions = 27.00 in
Pipe Manning's "n" = 0.013
Pipe Capacity at Invert Slope = 41.59 cfs
Invert Elevation Downstream = 450.67 ft
Invert Elevation Upstream = 452.87 ft
Invert Slope = 1.81%
Invert Slope (Plan Length) = 1.81%
Rim Elevation Downstream = 461.92 ft
Rim Elevation Upstream = 463.00 ft
Natural Ground Slope = 0.89%
Crown Elevation Downstream = 452.92 ft
Crown Elevation Upstream = 455.12 ft

---FLOW INFORMATION---
Catchment Area = 0.00 ac
Runoff Coefficient = 0.500
Inlet Time = 0.00 min
Inlet Intensity = 0.00 in/hr
Inlet Rational Flow = 0.00 cfs
Inlet Input Flow = 0.00 cfs
Inlet Hydrograph Flow = 0.00 cfs
Total Area = 0.00 ac
Weighted Coefficient = 0.500
Total Time of Concentration = 0.29 min
Total Intensity = 12.89 in/hr
Total Rational Flow = 0.00 cfs
Total Flow = 41.52 cfs
Uniform Capacity = 41.59 cfs
Skipped flow = 0.00 cfs
Infiltration = 0.00 gpd

---HYDRAULIC INFORMATION---
HGL Elevation Downstream = 457.12 ft
HGL Elevation Upstream = 459.31 ft

Storm Drain Line "B-1, B-2, B-3"

HGL Slope = 1.80 %
EGL Elevation Downstream = 458.81 ft
EGL Elevation Upstream = 461.00 ft
EGL Slope = 1.80 %
Critical Depth = 25.33 in
Depth Downstream = 27.00 in
Depth Upstream = 27.00 in
Velocity Downstream = 10.44 ft/s
Velocity Upstream = 10.44 ft/s
Uniform Velocity Downstream = NA
Uniform Velocity Upstream = NA
Area Downstream = 3.98 ft^2
Area Upstream = 3.98 ft^2
Kj (JLC) = 0.00
Calculated Junction Loss = 0.002 ft

—-INLET INFORMATION—-
Downstream Inlet = MH 1
Inlet Description = <None>
Inlet Type = Undefined
Computation Case = Sag
Longitudinal Slope = 0.00 ft/ft
Mannings n-value = 0.000
Pavement Cross-Slope = 0.00 ft/ft
Gutter Cross-Slope = 0.00 ft/ft
Gutter Local Depression = 0.00 in
Gutter Width = 0.00 ft
Ponding Width = 0.00 ft
Intercept Efficiency = * %
Flow from Catchment = 0.00 cfs
Carryover from previous inlet = 0.00 cfs
Total Flow to Current Inlet = 0.00 cfs
Flow Intercepted by Current Inlet = 0.00 cfs
Bypassed Flow = 0.00 cfs
Pavement Flow = 0.00 cfs
Gutter Flow = 0.00 cfs
Depth at Curb = 0.00 in
Depth at Pavement/Gutter Joint = 0.00 in
Pavement Spread = 0.00 ft
Total Spread = 0.00 ft
Gutter Velocity = 0.00 ft/s
Curb Efficiency = * %
Grate Efficiency = * %
Slot Efficiency = * %
Total Efficiency = 0.00 %

PIPE DESCRIPTION: Pipe 2
—-RAINFALL INFORMATION—-
Return Period = 100 Year
Rainfall File = Tutorial

—-PIPE INFORMATION—-
Current Pipe = Pipe 2
Downstream Pipe = Pipe 7
Pipe Material = CONC
Pipe Length = 180.99 ft
Plan Length = 180.99 ft
Pipe Type = Circular
Pipe Dimensions = 27.00 in
Pipe Manning's "n" = 0.013
Pipe Capacity at Invert Slope = 54.45 cfs
Invert Elevation Downstream = 452.87 ft
Invert Elevation Upstream = 458.47 ft
Invert Slope = 3.36%
Invert Slope (Plan Length) = 3.09%
Rim Elevation Downstream = 463.00 ft
Rim Elevation Upstream = 465.73 ft
Natural Ground Slope = 1.51%
Crown Elevation Downstream = 455.12 ft

Crown Elevation Upstream = 460.72 ft

---FLOW INFORMATION---
Catchment Area = 0.00 ac
Runoff Coefficient = 0.500
Inlet Time = 0.00 min
Inlet Intensity = 0.00 in/hr
Inlet Rational Flow = 0.00 cfs
Inlet Input Flow = 20.76 cfs
Inlet Hydrograph Flow = 0.00 cfs
Total Area = 0.00 ac
Weighted Coefficient = 0.500
Total Time of Concentration = 0.09 min
Total Intensity = 13.04 in/hr
Total Rational Flow = 0.00 cfs
Total Flow = 41.52 cfs
Uniform Capacity = 54.45 cfs
Skipped flow = 0.00 cfs
Infiltration = 0.00 gpd

---HYDRAULIC INFORMATION---
HGL Elevation Downstream = 459.31 ft
HGL Elevation Upstream = 462.57 ft
HGL Slope = 1.96 %
EGL Elevation Downstream = 461.01 ft
EGL Elevation Upstream = 464.26 ft
EGL Slope = 1.96 %
Critical Depth = 25.33 in
Depth Downstream = 27.00 in
Depth Upstream = 27.00 in
Velocity Downstream = 10.44 ft/s
Velocity Upstream = 10.44 ft/s
Uniform Velocity Downstream = NA
Uniform Velocity Upstream = NA
Area Downstream = 3.98 ft^2
Area Upstream = 3.98 ft^2
Kj (JLC) = 0.50
Calculated Junction Loss = 0.848 ft

---INLET INFORMATION---
Downstream Inlet = MH 7
Inlet Description = Grate 19-3/8x17-3/4
Inlet Type = Undefined
Computation Case = Sag
Longitudinal Slope = 0.00 ft/ft
Mannings n-value = 0.000
Pavement Cross-Slope = 0.00 ft/ft
Gutter Cross-Slope = 0.00 ft/ft
Gutter Local Depression = 0.00 in
Gutter Width = 0.00 ft
Ponding Width = 0.00 ft
Intercept Efficiency = * %
Flow from Catchment = 0.00 cfs
Carryover from previous inlet = 0.00 cfs
Total Flow to Current Inlet = 0.00 cfs
Flow Intercepted by Current Inlet = 0.00 cfs
Bypassed Flow = 0.00 cfs
Pavement Flow = 0.00 cfs
Gutter Flow = 0.00 cfs
Depth at Curb = 0.00 in
Depth at Pavement/Gutter Joint = 0.00 in
Pavement Spread = 0.00 ft
Total Spread = 0.00 ft
Gutter Velocity = 0.00 ft/s
Curb Efficiency = * %
Grate Efficiency = * %
Slot Efficiency = * %
Total Efficiency = 0.00 %
PIPE DESCRIPTION: Pipe 3

Storm Drain Line "B-1, B-2, B-3"

---RAINFALL INFORMATION---	
Return Period	= 100 Year
Rainfall File	= Tutorial
---PIPE INFORMATION---	
Current Pipe	= Pipe 3
Downstream Pipe	= Pipe 2
Pipe Material	= CONC
Pipe Length	= 37.00 ft
Plan Length	= 37.00 ft
Pipe Type	= Circular
Pipe Dimensions	= 24.00 in
Pipe Manning's "n"	= 0.013
Pipe Capacity at Invert Slope	= 14.40 cfs
Invert Elevation Downstream	= 458.97 ft
Invert Elevation Upstream	= 459.12 ft
Invert Slope	= 0.42%
Invert Slope (Plan Length)	= 0.41%
Rim Elevation Downstream	= 465.73 ft
Rim Elevation Upstream	= 465.72 ft
Natural Ground Slope	= -0.03%
Crown Elevation Downstream	= 460.97 ft
Crown Elevation Upstream	= 461.12 ft
---FLOW INFORMATION---	
Catchment Area	= 0.00 ac
Runoff Coefficient	= 0.500
Inlet Time	= 0.00 min
Inlet Intensity	= 0.00 in/hr
Inlet Rational Flow	= 0.00 cfs
Inlet Input Flow	= 20.76 cfs
Inlet Hydrograph Flow	= 0.00 cfs
Total Area	= 0.00 ac
Weighted Coefficient	= 0.500
Total Time of Concentration	= 0.00 min
Total Intensity	= 13.11 in/hr
Total Rational Flow	= 0.00 cfs
Total Flow	= 20.76 cfs
Uniform Capacity	= 14.40 cfs
Skipped flow	= 0.00 cfs
Infiltration	= 0.00 gpd
---HYDRAULIC INFORMATION---	
HGL Elevation Downstream	= 463.41 ft
HGL Elevation Upstream	= 464.06 ft
HGL Slope	= 1.82 %
EGL Elevation Downstream	= 464.09 ft
EGL Elevation Upstream	= 464.74 ft
EGL Slope	= 1.82 %
Critical Depth	= 19.60 in
Depth Downstream	= 24.00 in
Depth Upstream	= 24.00 in
Velocity Downstream	= 6.61 ft/s
Velocity Upstream	= 6.61 ft/s
Uniform Velocity Downstream	= NA
Uniform Velocity Upstream	= NA
Area Downstream	= 3.14 ft^2
Area Upstream	= 3.14 ft^2
Kj (JLC)	= 0.50
Calculated Junction Loss	= NA
---INLET INFORMATION---	
Downstream Inlet	= MH 2
Inlet Description	= Grate 19-3/8x17-3/4
Inlet Type	= Undefined
Computation Case	= Sag
Longitudinal Slope	= 0.00 ft/ft
Mannings n-value	= 0.000
Pavement Cross-Slope	= 0.00 ft/ft

Storm Drain Line "B-1, B-2, B-3"

Gutter Cross-Slope = 0.00 ft/ft
Gutter Local Depression = 0.00 in
Gutter Width = 0.00 ft
Ponding Width = 0.00 ft
Intercept Efficiency = * %
Flow from Catchment = 0.00 cfs
Carryover from previous inlet = 0.00 cfs
Total Flow to Current Inlet = 0.00 cfs
Flow Intercepted by Current Inlet = 0.00 cfs
Bypassed Flow = 0.00 cfs
Pavement Flow = 0.00 cfs
Gutter Flow = 0.00 cfs
Depth at Curb = 0.00 in
Depth at Pavement/Gutter Joint = 0.00 in
Pavement Spread = 0.00 ft
Total Spread = 0.00 ft
Gutter Velocity = 0.00 ft/s
Curb Efficiency = * %
Grate Efficiency = * %
Slot Efficiency = * %
Total Efficiency = 0.00 %

PIPE DESCRIPTION: Pipe 4
—-RAINFALL INFORMATION—-
Return Period = 100 Year
Rainfall File = Tutorial

—-PIPE INFORMATION—-
Current Pipe = Pipe 4
Downstream Pipe = Pipe 1
Pipe Material = RCP
Pipe Length = 27.51 ft
Plan Length = 27.51 ft
Pipe Type = Circular
Pipe Dimensions = 18.00 in
Pipe Manning's "n" = 0.013
Pipe Capacity at Invert Slope = 59.76 cfs
Invert Elevation Downstream = 449.56 ft
Invert Elevation Upstream = 458.47 ft
Invert Slope = 38.75%
Invert Slope (Plan Length) = 32.39%
Rim Elevation Downstream = 461.92 ft
Rim Elevation Upstream = 462.08 ft
Natural Ground Slope = 0.58%
Crown Elevation Downstream = 451.06 ft
Crown Elevation Upstream = 459.97 ft

—-FLOW INFORMATION—-
Catchment Area = 0.00 ac
Runoff Coefficient = 0.500
Inlet Time = 0.00 min
Inlet Intensity = 0.00 in/hr
Inlet Rational Flow = 0.00 cfs
Inlet Input Flow = 6.51 cfs
Inlet Hydrograph Flow = 0.00 cfs
Total Area = 0.00 ac
Weighted Coefficient = 0.500
Total Time of Concentration = 0.00 min
Total Intensity = 13.11 in/hr
Total Rational Flow = 0.00 cfs
Total Flow = 6.51 cfs
Uniform Capacity = 59.76 cfs
Skipped flow = 0.00 cfs
Infiltration = 0.00 gpd

—-HYDRAULIC INFORMATION—-
HGL Elevation Downstream = 457.12 ft
HGL Elevation Upstream = 459.68 ft
HGL Slope = 11.12 %

Storm Drain Line "B-1, B-2, B-3"

EGL Elevation Downstream	= 457.33 ft
EGL Elevation Upstream	= 460.11 ft
EGL Slope	= 12.08 %
Critical Depth	= 11.85 in
Depth Downstream	= 18.00 in
Depth Upstream	= 11.85 in
Velocity Downstream	= 3.69 ft/s
Velocity Upstream	= 5.28 ft/s
Uniform Velocity Downstream	= NA
Uniform Velocity Upstream	= NA
Area Downstream	= 1.77 ft^2
Area Upstream	= 1.23 ft^2
Kj (JLC)	= 0.50
Calculated Junction Loss	= NA

—-INLET INFORMATION—-

Downstream Inlet	= MH 1
Inlet Description	= Grate 19-3/8x17-3/4
Inlet Type	= Undefined
Computation Case	= Sag
Longitudinal Slope	= 0.00 ft/ft
Mannings n-value	= 0.000
Pavement Cross-Slope	= 0.00 ft/ft
Gutter Cross-Slope	= 0.00 ft/ft
Gutter Local Depression	= 0.00 in
Gutter Width	= 0.00 ft
Ponding Width	= 0.00 ft
Intercept Efficiency	= * %
Flow from Catchment	= 0.00 cfs
Carryover from previous inlet	= 0.00 cfs
Total Flow to Current Inlet	= 0.00 cfs
Flow Intercepted by Current Inlet	= 0.00 cfs
Bypassed Flow	= 0.00 cfs
Pavement Flow	= 0.00 cfs
Gutter Flow	= 0.00 cfs
Depth at Curb	= 0.00 in
Depth at Pavement/Gutter Joint	= 0.00 in
Pavement Spread	= 0.00 ft
Total Spread	= 0.00 ft
Gutter Velocity	= 0.00 ft/s
Curb Efficiency	= * %
Grate Efficiency	= * %
Slot Efficiency	= * %
Total Efficiency	= 0.00 %

PIPE DESCRIPTION: Pipe 5

—-RAINFALL INFORMATION—-

Return Period	= 100 Year
Rainfall File	= Tutorial

—-PIPE INFORMATION—-

Current Pipe	= Pipe 5
Downstream Pipe	= Pipe 1
Pipe Material	= RCP
Pipe Length	= 16.35 ft
Plan Length	= 16.35 ft
Pipe Type	= Circular
Pipe Dimensions	= 18.00 in
Pipe Manning's "n"	= 0.013
Pipe Capacity at Invert Slope	= 69.72 cfs
Invert Elevation Downstream	= 451.26 ft
Invert Elevation Upstream	= 458.47 ft
Invert Slope	= 54.86%
Invert Slope (Plan Length)	= 44.10%
Rim Elevation Downstream	= 461.92 ft
Rim Elevation Upstream	= 462.02 ft
Natural Ground Slope	= 0.61%
Crown Elevation Downstream	= 452.76 ft
Crown Elevation Upstream	= 459.97 ft

Storm Drain Line "B-1, B-2, B-3"

—FLOW INFORMATION—

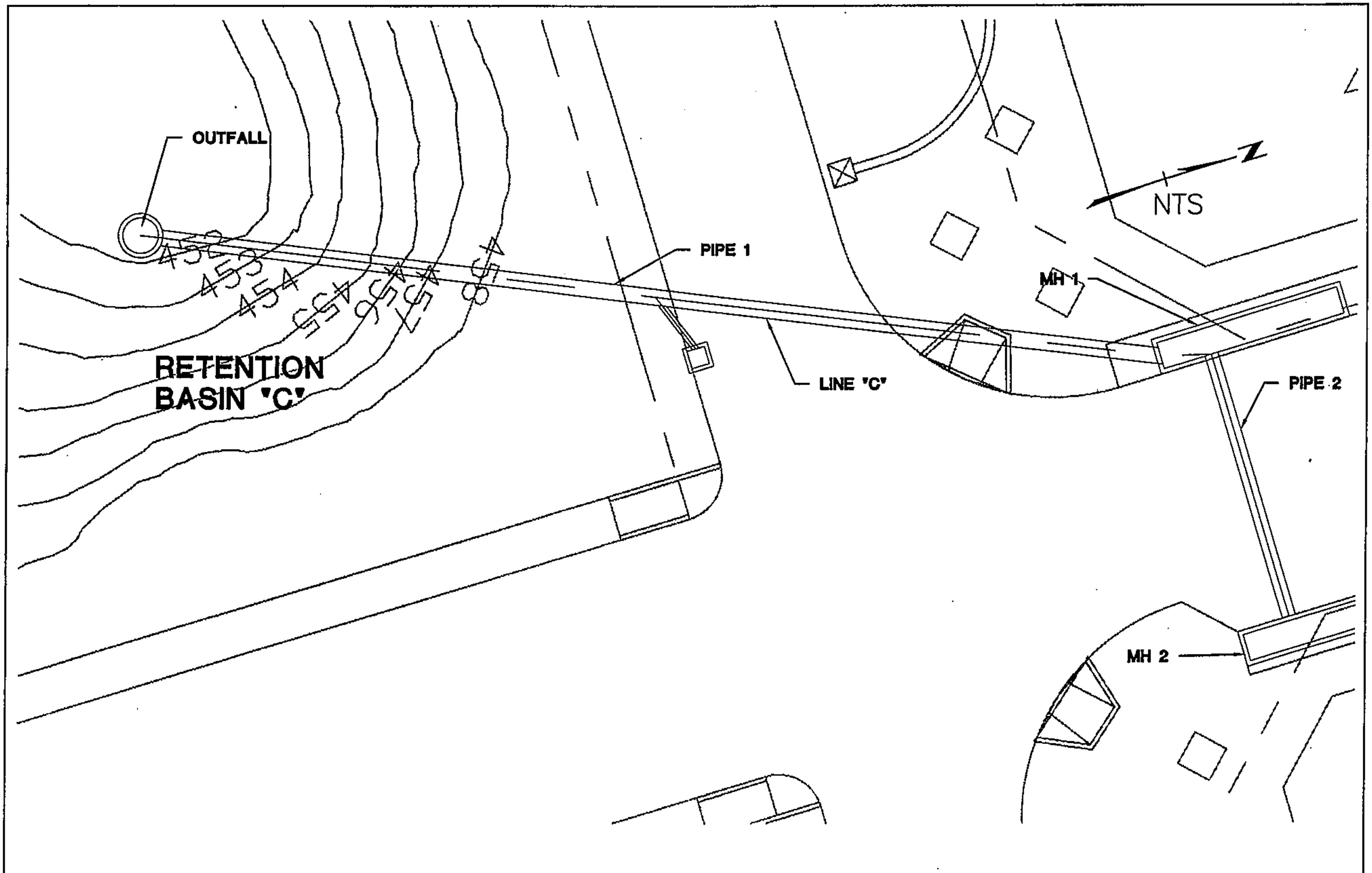
Catchment Area	= 0.00 ac
Runoff Coefficient	= 0.500
Inlet Time	= 0.00 min
Inlet Intensity	= 0.00 in/hr
Inlet Rational Flow	= 0.00 cfs
Inlet Input Flow	= 6.51 cfs
Inlet Hydrograph Flow	= 0.00 cfs
Total Area	= 0.00 ac
Weighted Coefficient	= 0.500
Total Time of Concentration	= 0.00 min
Total Intensity	= 13.11 in/hr
Total Rational Flow	= 0.00 cfs
Total Flow	= 6.51 cfs
Uniform Capacity	= 69.72 cfs
Skipped flow	= 0.00 cfs
Infiltration	= 0.00 gpd

—HYDRAULIC INFORMATION—

HGL Elevation Downstream	= 457.12 ft
HGL Elevation Upstream	= 459.67 ft
HGL Slope	= 19.44 %
EGL Elevation Downstream	= 457.33 ft
EGL Elevation Upstream	= 460.11 ft
EGL Slope	= 21.13 %
Critical Depth	= 11.85 in
Depth Downstream	= 18.00 in
Depth Upstream	= 11.85 in
Velocity Downstream	= 3.69 ft/s
Velocity Upstream	= 5.28 ft/s
Uniform Velocity Downstream	= NA
Uniform Velocity Upstream	= NA
Area Downstream	= 1.77 ft^2
Area Upstream	= 1.23 ft^2
Kj (JLC)	= 0.50
Calculated Junction Loss	= NA

—INLET INFORMATION—

Downstream Inlet	= MH 1
Inlet Description	= Grate 19-3/8x17-3/4
Inlet Type	= Undefined
Computation Case	= Sag
Longitudinal Slope	= 0.00 ft/ft
Mannings n-value	= 0.000
Pavement Cross-Slope	= 0.00 ft/ft
Gutter Cross-Slope	= 0.00 ft/ft
Gutter Local Depression	= 0.00 in
Gutter Width	= 0.00 ft
Ponding Width	= 0.00 ft
Intercept Efficiency	= * %
Flow from Catchment	= 0.00 cfs
Carryover from previous inlet	= 0.00 cfs
Total Flow to Current Inlet	= 0.00 cfs
Flow Intercepted by Current Inlet	= 0.00 cfs
Bypassed Flow	= 0.00 cfs
Pavement Flow	= 0.00 cfs
Gutter Flow	= 0.00 cfs
Depth at Curb	= 0.00 in
Depth at Pavement/Gutter Joint	= 0.00 in
Pavement Spread	= 0.00 ft
Total Spread	= 0.00 ft
Gutter Velocity	= 0.00 ft/s
Curb Efficiency	= * %
Grate Efficiency	= * %
Slot Efficiency	= * %
Total Efficiency	= 0.00 %



STORM DRAIN LINE "C"

Storm Drain Line "C"

PIPE DESCRIPTION: Pipe 1
—RAINFALL INFORMATION—
Return Period = 100 Year
Rainfall File = Tutorial

—PIPE INFORMATION—
Current Pipe = Pipe 1
Downstream Pipe = Outfall
Pipe Material = CONC
Pipe Length = 113.10 ft
Plan Length = 113.10 ft
Pipe Type = Circular
Pipe Dimensions = 24.00 in
Pipe Manning's "n" = 0.013
Pipe Capacity at Invert Slope = 40.23 cfs
Invert Elevation Downstream = 447.75 ft
Invert Elevation Upstream = 451.33 ft
Invert Slope = 3.44%
Invert Slope (Plan Length) = 3.17%
Rim Elevation Downstream = 452.00 ft
Rim Elevation Upstream = 458.41 ft
Natural Ground Slope = 5.67%
Crown Elevation Downstream = 449.75 ft
Crown Elevation Upstream = 453.33 ft

—FLOW INFORMATION—
Catchment Area = 0.00 ac
Runoff Coefficient = 0.500
Inlet Time = 0.00 min
Inlet Intensity = 0.00 in/hr
Inlet Rational Flow = 0.00 cfs
Inlet Input Flow = 13.19 cfs
Inlet Hydrograph Flow = 0.00 cfs
Total Area = 0.00 ac
Weighted Coefficient = 0.500
Total Time of Concentration = 0.17 min
Total Intensity = 12.98 in/hr
Total Rational Flow = 0.00 cfs
Total Flow = 26.37 cfs
Uniform Capacity = 40.23 cfs
Skipped flow = 0.00 cfs
Infiltration = 0.00 gpd

—HYDRAULIC INFORMATION—
HGL Elevation Downstream = 452.75 ft
HGL Elevation Upstream = 454.29 ft
HGL Slope = 1.48 %
EGL Elevation Downstream = 453.85 ft
EGL Elevation Upstream = 455.38 ft
EGL Slope = 1.48 %
Critical Depth = 21.54 in
Depth Downstream = 24.00 in
Depth Upstream = 24.00 in
Velocity Downstream = 8.39 ft/s
Velocity Upstream = 8.39 ft/s
Uniform Velocity Downstream = NA
Uniform Velocity Upstream = NA
Area Downstream = 3.14 ft^2
Area Upstream = 3.14 ft^2
Kj (JLC) = 0.50
Calculated Junction Loss = 0.548 ft

—INLET INFORMATION—
Downstream Inlet = Outfall
Inlet Description = Grate 19-3/8x17-3/4
Inlet Type = Undefined
Computation Case = Sag

Storm Drain Line "C"

Longitudinal Slope	= 0.00 ft/ft
Mannings n-value	= 0.000
Pavement Cross-Slope	= 0.00 ft/ft
Gutter Cross-Slope	= 0.00 ft/ft
Gutter Local Depression	= 0.00 in
Gutter Width	= 0.00 ft
Ponding Width	= 0.00 ft
Intercept Efficiency	= * %
Flow from Catchment	= 0.00 cfs
Carryover from previous inlet	= 0.00 cfs
Total Flow to Current Inlet	= 0.00 cfs
Flow Intercepted by Current Inlet	= 0.00 cfs
Bypassed Flow	= 0.00 cfs
Pavement Flow	= 0.00 cfs
Gutter Flow	= 0.00 cfs
Depth at Curb	= 0.00 in
Depth at Pavement/Gutter Joint	= 0.00 in
Pavement Spread	= 0.00 ft
Total Spread	= 0.00 ft
Gutter Velocity	= 0.00 ft/s
Curb Efficiency	= * %
Grate Efficiency	= * %
Slot Efficiency	= * %
Total Efficiency	= 0.00 %

PIPE DESCRIPTION: Pipe 2

—RAINFALL INFORMATION—

Return Period	= 100 Year
Rainfall File	= Tutorial

—PIPE INFORMATION—

Current Pipe	= Pipe 2
Downstream Pipe	= Pipe 1
Pipe Material	= RCP
Pipe Length	= 31.00 ft
Plan Length	= 31.00 ft
Pipe Type	= Circular
Pipe Dimensions	= 18.00 in
Pipe Manning's "n"	= 0.013
Pipe Capacity at Invert Slope	= 6.77 cfs
Invert Elevation Downstream	= 452.06 ft
Invert Elevation Upstream	= 452.19 ft
Invert Slope	= 0.47%
Invert Slope (Plan Length)	= 0.42%
Rim Elevation Downstream	= 458.41 ft
Rim Elevation Upstream	= 458.41 ft
Natural Ground Slope	= 0.00%
Crown Elevation Downstream	= 453.56 ft
Crown Elevation Upstream	= 453.69 ft

—FLOW INFORMATION—

Catchment Area	= 0.00 ac
Runoff Coefficient	= 0.500
Inlet Time	= 0.00 min
Inlet Intensity	= 0.00 in/hr
Inlet Rational Flow	= 0.00 cfs
Inlet Input Flow	= 13.19 cfs
Inlet Hydrograph Flow	= 0.00 cfs
Total Area	= 0.00 ac
Weighted Coefficient	= 0.500
Total Time of Concentration	= 0.00 min
Total Intensity	= 13.11 in/hr
Total Rational Flow	= 0.00 cfs
Total Flow	= 13.19 cfs
Uniform Capacity	= 6.77 cfs
Skipped flow	= 0.00 cfs
Infiltration	= 0.00 gpd

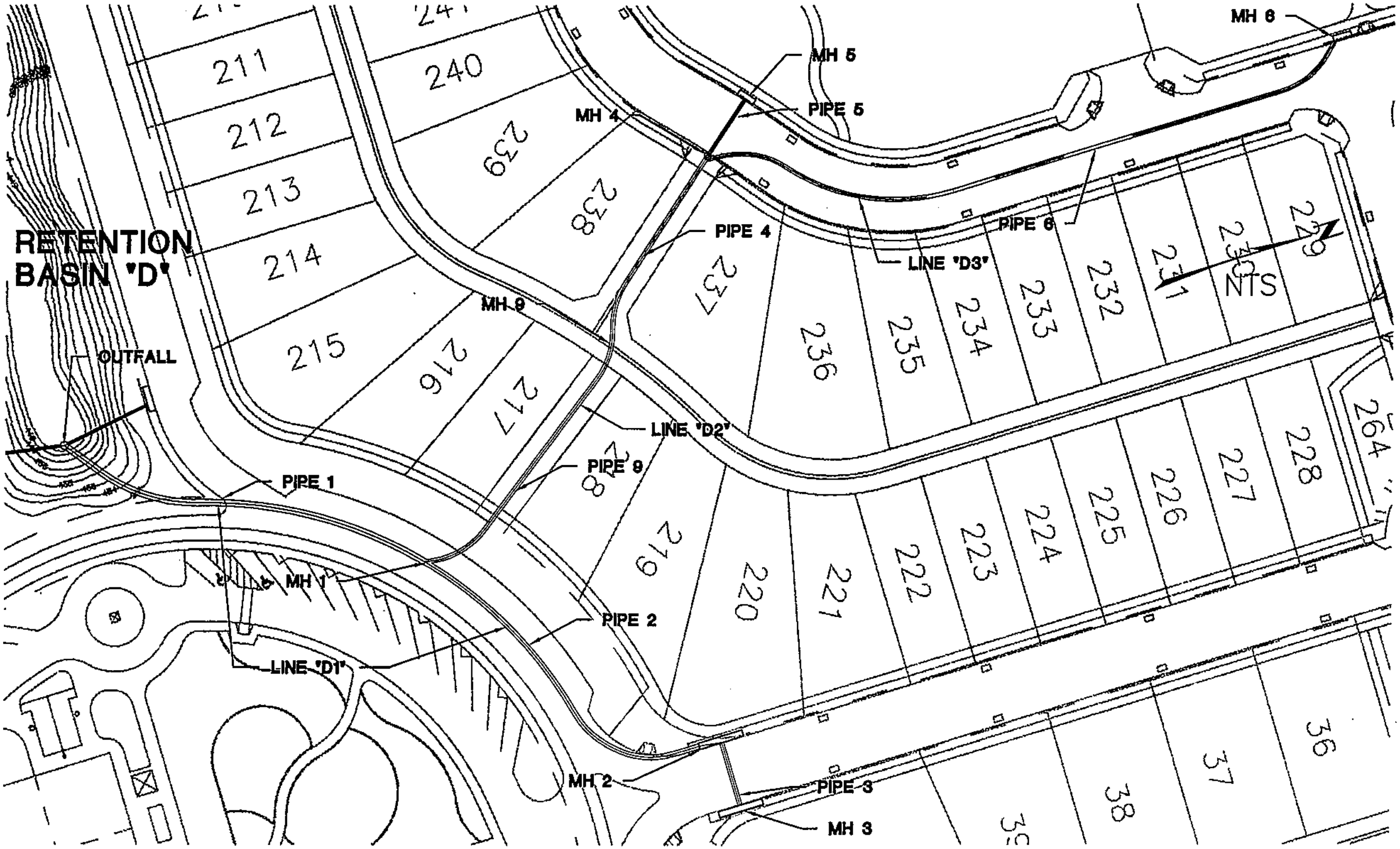
—HYDRAULIC INFORMATION—

Storm Drain Line "C"

HGL Elevation Downstream	= 454.84 ft
HGL Elevation Upstream	= 455.76 ft
HGL Slope	= 3.33 %
EGL Elevation Downstream	= 455.70 ft
EGL Elevation Upstream	= 456.62 ft
EGL Slope	= 3.33 %
Critical Depth	= 16.29 in
Depth Downstream	= 18.00 in
Depth Upstream	= 18.00 in
Velocity Downstream	= 7.46 ft/s
Velocity Upstream	= 7.46 ft/s
Uniform Velocity Downstream	= NA
Uniform Velocity Upstream	= NA
Area Downstream	= 1.77 ft^2
Area Upstream	= 1.77 ft^2
Kj (JLC)	= 0.50
Calculated Junction Loss	= NA

—INLET INFORMATION—

Downstream Inlet	= MH 1
Inlet Description	= Grate 19-3/8x17-3/4
Inlet Type	= Undefined
Computation Case	= Sag
Longitudinal Slope	= 0.00 ft/ft
Mannings n-value	= 0.000
Pavement Cross-Slope	= 0.00 ft/ft
Gutter Cross-Slope	= 0.00 ft/ft
Gutter Local Depression	= 0.00 in
Gutter Width	= 0.00 ft
Ponding Width	= 0.00 ft
Intercept Efficiency	= * %
Flow from Catchment	= 0.00 cfs
Carryover from previous inlet	= 0.00 cfs
Total Flow to Current Inlet	= 0.00 cfs
Flow Intercepted by Current Inlet	= 0.00 cfs
Bypassed Flow	= 0.00 cfs
Pavement Flow	= 0.00 cfs
Gutter Flow	= 0.00 cfs
Depth at Curb	= 0.00 in
Depth at Pavement/Gutter Joint	= 0.00 in
Pavement Spread	= 0.00 ft
Total Spread	= 0.00 ft
Gutter Velocity	= 0.00 ft/s
Curb Efficiency	= * %
Grate Efficiency	= * %
Slot Efficiency	= * %
Total Efficiency	= 0.00 %



STORM DRAIN LINE "D1,D2,D3"

Storm Drain Line "D-1, D-2, D-3"

PIPE DESCRIPTION: Pipe 1

—RAINFALL INFORMATION—

Return Period	= 100 Year
Rainfall File	= Tutorial

—PIPE INFORMATION—

Current Pipe	= Pipe 1
Downstream Pipe	= Outfall
Pipe Material	= CONC
Pipe Length	= 216.07 ft
Plan Length	= 216.07 ft
Pipe Type	= Circular
Pipe Dimensions	= 42.00 in
Pipe Manning's "n"	= 0.013
Pipe Capacity at Invert Slope	= 63.30 cfs
Invert Elevation Downstream	= 442.42 ft
Invert Elevation Upstream	= 443.28 ft
Invert Slope	= 0.41%
Invert Slope (Plan Length)	= 0.40%
Rim Elevation Downstream	= 447.00 ft
Rim Elevation Upstream	= 453.74 ft
Natural Ground Slope	= 3.12%
Crown Elevation Downstream	= 445.92 ft
Crown Elevation Upstream	= 446.78 ft

—FLOW INFORMATION—

Catchment Area	= 0.00 ac
Runoff Coefficient	= 0.500
Inlet Time	= 0.00 min
Inlet Intensity	= 0.00 in/hr
Inlet Rational Flow	= 0.00 cfs
Inlet Input Flow	= 0.00 cfs
Inlet Hydrograph Flow	= 0.00 cfs
Total Area	= 0.00 ac
Weighted Coefficient	= 0.500
Total Time of Concentration	= 2.97 min
Total Intensity	= 11.21 in/hr
Total Rational Flow	= 0.00 cfs
Total Flow	= 67.30 cfs
Uniform Capacity	= 63.30 cfs
Skipped flow	= 0.00 cfs
Infiltration	= 0.00 gpd

—HYDRAULIC INFORMATION—

HGL Elevation Downstream	= 449.00 ft
HGL Elevation Upstream	= 449.97 ft
HGL Slope	= 0.46 %
EGL Elevation Downstream	= 449.76 ft
EGL Elevation Upstream	= 450.73 ft
EGL Slope	= 0.46 %
Critical Depth	= 30.87 in
Depth Downstream	= 42.00 in
Depth Upstream	= 42.00 in
Velocity Downstream	= 7.00 ft/s
Velocity Upstream	= 7.00 ft/s
Uniform Velocity Downstream	= NA
Uniform Velocity Upstream	= NA
Area Downstream	= 9.62 ft^2
Area Upstream	= 9.62 ft^2
Kj (JLC)	= 0.50
Calculated Junction Loss	= 0.380 ft

—INLET INFORMATION—

Downstream Inlet	= Outfall
Inlet Description	= <None>
Inlet Type	= Undefined
Computation Case	= Sag

Storm Drain Line "D-1, D-2, D-3"

Longitudinal Slope = 0.00 ft/ft
Mannings n-value = 0.000
Pavement Cross-Slope = 0.00 ft/ft
Gutter Cross-Slope = 0.00 ft/ft
Gutter Local Depression = 0.00 in
Gutter Width = 0.00 ft
Ponding Width = 0.00 ft
Intercept Efficiency = * %
Flow from Catchment = 0.00 cfs
Carryover from previous inlet = 0.00 cfs
Total Flow to Current Inlet = 0.00 cfs
Flow Intercepted by Current Inlet = 0.00 cfs
Bypassed Flow = 0.00 cfs
Pavement Flow = 0.00 cfs
Gutter Flow = 0.00 cfs
Depth at Curb = 0.00 in
Depth at Pavement/Gutter Joint = 0.00 in
Pavement Spread = 0.00 ft
Total Spread = 0.00 ft
Gutter Velocity = 0.00 ft/s
Curb Efficiency = * %
Grate Efficiency = * %
Slot Efficiency = * %
Total Efficiency = 0.00 %

PIPE DESCRIPTION: Pipe 2
—RAINFALL INFORMATION—
Return Period = 100 Year
Rainfall File = Tutorial

—PIPE INFORMATION—
Current Pipe = Pipe 2
Downstream Pipe = Pipe 1
Pipe Material = CONC
Pipe Length = 194.96 ft
Plan Length = 194.96 ft
Pipe Type = Circular
Pipe Dimensions = 33.00 in
Pipe Manning's "n" = 0.013
Pipe Capacity at Invert Slope = 33.22 cfs
Invert Elevation Downstream = 444.07 ft
Invert Elevation Upstream = 444.84 ft
Invert Slope = 0.45%
Invert Slope (Plan Length) = 0.39%
Rim Elevation Downstream = 453.74 ft
Rim Elevation Upstream = 453.40 ft
Natural Ground Slope = -0.17%
Crown Elevation Downstream = 446.82 ft
Crown Elevation Upstream = 447.59 ft

—FLOW INFORMATION—
Catchment Area = 0.00 ac
Runoff Coefficient = 0.500
Inlet Time = 0.00 min
Inlet Intensity = 0.00 in/hr
Inlet Rational Flow = 0.00 cfs
Inlet Input Flow = 17.88 cfs
Inlet Hydrograph Flow = 0.00 cfs
Total Area = 0.00 ac
Weighted Coefficient = 0.500
Total Time of Concentration = 0.21 min
Total Intensity = 12.96 in/hr
Total Rational Flow = 0.00 cfs
Total Flow = 35.75 cfs
Uniform Capacity = 33.22 cfs
Skipped flow = 0.00 cfs
Infiltration = 0.00 gpd

—HYDRAULIC INFORMATION—

Storm Drain Line "D-1, D-2, D-3"

HGL Elevation Downstream = 450.35 ft
HGL Elevation Upstream = 451.24 ft
HGL Slope = 0.52 %
EGL Elevation Downstream = 450.91 ft
EGL Elevation Upstream = 451.80 ft
EGL Slope = 0.52 %
Critical Depth = 23.90 in
Depth Downstream = 33.00 in
Depth Upstream = 33.00 in
Velocity Downstream = 6.02 ft/s
Velocity Upstream = 6.02 ft/s
Uniform Velocity Downstream = NA
Uniform Velocity Upstream = NA
Area Downstream = 5.94 ft^2
Area Upstream = 5.94 ft^2
Kj (JLC) = 0.50
Calculated Junction Loss = 0.282 ft

---INLET INFORMATION---
Downstream Inlet = MH 1
Inlet Description = Grate 19-3/8x17-3/4
Inlet Type = Undefined
Computation Case = Sag
Longitudinal Slope = 0.00 ft/ft
Mannings n-value = 0.000
Pavement Cross-Slope = 0.00 ft/ft
Gutter Cross-Slope = 0.00 ft/ft
Gutter Local Depression = 0.00 in
Gutter Width = 0.00 ft
Ponding Width = 0.00 ft
Intercept Efficiency = * %
Flow from Catchment = 0.00 cfs
Carryover from previous inlet = 0.00 cfs
Total Flow to Current Inlet = 0.00 cfs
Flow Intercepted by Current Inlet = 0.00 cfs
Bypassed Flow = 0.00 cfs
Pavement Flow = 0.00 cfs
Gutter Flow = 0.00 cfs
Depth at Curb = 0.00 in
Depth at Pavement/Gutter Joint = 0.00 in
Pavement Spread = 0.00 ft
Total Spread = 0.00 ft
Gutter Velocity = 0.00 ft/s
Curb Efficiency = * %
Grate Efficiency = * %
Slot Efficiency = * %
Total Efficiency = 0.00 %

PIPE DESCRIPTION: Pipe 3
---RAINFALL INFORMATION---
Return Period = 100 Year
Rainfall File = Tutorial

---PIPE INFORMATION---
Current Pipe = Pipe 3
Downstream Pipe = Pipe 2
Pipe Material = CONC
Pipe Length = 37.00 ft
Plan Length = 37.00 ft
Pipe Type = Circular
Pipe Dimensions = 27.00 in
Pipe Manning's "n" = 0.013
Pipe Capacity at Invert Slope = 19.04 cfs
Invert Elevation Downstream = 445.75 ft
Invert Elevation Upstream = 445.89 ft
Invert Slope = 0.41%
Invert Slope (Plan Length) = 0.38%
Rim Elevation Downstream = 453.40 ft
Rim Elevation Upstream = 453.38 ft

Storm Drain Line "D-1, D-2, D-3"

Natural Ground Slope	= -0.05%
Crown Elevation Downstream	= 448.00 ft
Crown Elevation Upstream	= 448.14 ft

—FLOW INFORMATION—

Catchment Area	= 0.00 ac
Runoff Coefficient	= 0.500
Inlet Time	= 0.00 min
Inlet Intensity	= 0.00 in/hr
Inlet Rational Flow	= 0.00 cfs
Inlet Input Flow	= 17.88 cfs
Inlet Hydrograph Flow	= 0.00 cfs
Total Area	= 0.00 ac
Weighted Coefficient	= 0.500
Total Time of Concentration	= 0.00 min
Total Intensity	= 13.11 in/hr
Total Rational Flow	= 0.00 cfs
Total Flow	= 17.88 cfs
Uniform Capacity	= 19.04 cfs
Skipped flow	= 0.00 cfs
Infiltration	= 0.00 gpd

—HYDRAULIC INFORMATION—

HGL Elevation Downstream	= 451.52 ft
HGL Elevation Upstream	= 451.80 ft
HGL Slope	= 0.82 %
EGL Elevation Downstream	= 451.83 ft
EGL Elevation Upstream	= 452.11 ft
EGL Slope	= 0.82 %
Critical Depth	= 17.73 in
Depth Downstream	= 27.00 in
Depth Upstream	= 27.00 in
Velocity Downstream	= 4.50 ft/s
Velocity Upstream	= 4.50 ft/s
Uniform Velocity Downstream	= NA
Uniform Velocity Upstream	= NA
Area Downstream	= 3.98 ft^2
Area Upstream	= 3.98 ft^2
Kj (JLC)	= 0.50
Calculated Junction Loss	= NA

—INLET INFORMATION—

Downstream Inlet	= MH 2
Inlet Description	= Grate 19-3/8x17-3/4
Inlet Type	= Undefined
Computation Case	= Sag
Longitudinal Slope	= 0.00 ft/ft
Mannings n-value	= 0.000
Pavement Cross-Slope	= 0.00 ft/ft
Gutter Cross-Slope	= 0.00 ft/ft
Gutter Local Depression	= 0.00 in
Gutter Width	= 0.00 ft
Ponding Width	= 0.00 ft
Intercept Efficiency	= * %
Flow from Catchment	= 0.00 cfs
Carryover from previous inlet	= 0.00 cfs
Total Flow to Current Inlet	= 0.00 cfs
Flow Intercepted by Current Inlet	= 0.00 cfs
Bypassed Flow	= 0.00 cfs
Pavement Flow	= 0.00 cfs
Gutter Flow	= 0.00 cfs
Depth at Curb	= 0.00 in
Depth at Pavement/Gutter Joint	= 0.00 in
Pavement Spread	= 0.00 ft
Total Spread	= 0.00 ft
Gutter Velocity	= 0.00 ft/s
Curb Efficiency	= * %
Grate Efficiency	= * %
Slot Efficiency	= * %

Total Efficiency	= 0.00 %

PIPE DESCRIPTION: Pipe 9

—RAINFALL INFORMATION—

Return Period	= 100 Year
Rainfall File	= Tutorial

—PIPE INFORMATION—

Current Pipe	= Pipe 9
Downstream Pipe	= Pipe 1
Pipe Material	= CONC
Pipe Length	= 166.71 ft
Plan Length	= 166.71 ft
Pipe Type	= Circular
Pipe Dimensions	= 27.00 in
Pipe Manning's "n"	= 0.013
Pipe Capacity at Invert Slope	= 41.18 cfs
Invert Elevation Downstream	= 444.02 ft
Invert Elevation Upstream	= 446.97 ft
Invert Slope	= 1.86%
Invert Slope (Plan Length)	= 1.77%
Rim Elevation Downstream	= 453.74 ft
Rim Elevation Upstream	= 460.50 ft
Natural Ground Slope	= 4.05%
Crown Elevation Downstream	= 446.27 ft
Crown Elevation Upstream	= 449.22 ft

—FLOW INFORMATION—

Catchment Area	= 0.00 ac
Runoff Coefficient	= 0.500
Inlet Time	= 0.00 min
Inlet Intensity	= 0.00 in/hr
Inlet Rational Flow	= 0.00 cfs
Inlet Input Flow	= 0.00 cfs
Inlet Hydrograph Flow	= 0.00 cfs
Total Area	= 0.00 ac
Weighted Coefficient	= 0.500
Total Time of Concentration	= 2.72 min
Total Intensity	= 11.34 in/hr
Total Rational Flow	= 0.00 cfs
Total Flow	= 31.55 cfs
Uniform Capacity	= 41.18 cfs
Skipped flow	= 0.00 cfs
Infiltration	= 0.00 gpd

—HYDRAULIC INFORMATION—

HGL Elevation Downstream	= 450.35 ft
HGL Elevation Upstream	= 452.08 ft
HGL Slope	= 1.09 %
EGL Elevation Downstream	= 451.33 ft
EGL Elevation Upstream	= 453.06 ft
EGL Slope	= 1.09 %
Critical Depth	= 23.24 in
Depth Downstream	= 27.00 in
Depth Upstream	= 27.00 in
Velocity Downstream	= 7.93 ft/s
Velocity Upstream	= 7.93 ft/s
Uniform Velocity Downstream	= NA
Uniform Velocity Upstream	= NA
Area Downstream	= 3.98 ft^2
Area Upstream	= 3.98 ft^2
Kj (JLC)	= 0.00
Calculated Junction Loss	= 0.003 ft

—INLET INFORMATION—

Downstream Inlet	= MH 1
Inlet Description	= <None>
Inlet Type	= Undefined
Computation Case	= Sag

Storm Drain Line "D-1, D-2, D-3"

Longitudinal Slope	= 0.00 ft/ft
Mannings n-value	= 0.000
Pavement Cross-Slope	= 0.00 ft/ft
Gutter Cross-Slope	= 0.00 ft/ft
Gutter Local Depression	= 0.00 in
Gutter Width	= 0.00 ft
Ponding Width	= 0.00 ft
Intercept Efficiency	= * %
Flow from Catchment	= 0.00 cfs
Carryover from previous inlet	= 0.00 cfs
Total Flow to Current Inlet	= 0.00 cfs
Flow Intercepted by Current Inlet	= 0.00 cfs
Bypassed Flow	= 0.00 cfs
Pavement Flow	= 0.00 cfs
Gutter Flow	= 0.00 cfs
Depth at Curb	= 0.00 in
Depth at Pavement/Gutter Joint	= 0.00 in
Pavement Spread	= 0.00 ft
Total Spread	= 0.00 ft
Gutter Velocity	= 0.00 ft/s
Curb Efficiency	= * %
Grate Efficiency	= * %
Slot Efficiency	= * %
Total Efficiency	= 0.00 %

PIPE DESCRIPTION: Pipe 4

—RAINFALL INFORMATION—

Return Period	= 100 Year
Rainfall File	= Tutorial

—PIPE INFORMATION—

Current Pipe	= Pipe 4
Downstream Pipe	= Pipe 9
Pipe Material	= CONC
Pipe Length	= 111.68 ft
Plan Length	= 111.68 ft
Pipe Type	= Circular
Pipe Dimensions	= 27.00 in
Pipe Manning's "n"	= 0.013
Pipe Capacity at Invert Slope	= 60.81 cfs
Invert Elevation Downstream	= 446.97 ft
Invert Elevation Upstream	= 451.28 ft
Invert Slope	= 3.86%
Invert Slope (Plan Length)	= 3.86%
Rim Elevation Downstream	= 460.50 ft
Rim Elevation Upstream	= 459.28 ft
Natural Ground Slope	= -1.09%
Crown Elevation Downstream	= 449.22 ft
Crown Elevation Upstream	= 453.53 ft

—FLOW INFORMATION—

Catchment Area	= 0.00 ac
Runoff Coefficient	= 0.500
Inlet Time	= 0.00 min
Inlet Intensity	= 0.00 in/hr
Inlet Rational Flow	= 0.00 cfs
Inlet Input Flow	= 0.00 cfs
Inlet Hydrograph Flow	= 0.00 cfs
Total Area	= 0.00 ac
Weighted Coefficient	= 0.500
Total Time of Concentration	= 2.10 min
Total Intensity	= 11.69 in/hr
Total Rational Flow	= 0.00 cfs
Total Flow	= 31.55 cfs
Uniform Capacity	= 60.81 cfs
Skipped flow	= 0.00 cfs
Infiltration	= 0.00 gpd

—HYDRAULIC INFORMATION—

HGL Elevation Downstream	= 452.08 ft
HGL Elevation Upstream	= 453.22 ft
HGL Slope	= 1.02 %
EGL Elevation Downstream	= 453.06 ft
EGL Elevation Upstream	= 454.38 ft
EGL Slope	= 1.19 %
Critical Depth	= 23.24 in
Depth Downstream	= 27.00 in
Depth Upstream	= 23.24 in
Velocity Downstream	= 7.93 ft/s
Velocity Upstream	= 8.67 ft/s
Uniform Velocity Downstream	= NA
Uniform Velocity Upstream	= NA
Area Downstream	= 3.98 ft^2
Area Upstream	= 3.64 ft^2
Kj (JLC)	= 0.50
Calculated Junction Loss	= 0.584 ft

---INLET INFORMATION---

Downstream Inlet	= MH 9
Inlet Description	= <None>
Inlet Type	= Undefined
Computation Case	= Sag
Longitudinal Slope	= 0.00 ft/ft
Mannings n-value	= 0.000
Pavement Cross-Slope	= 0.00 ft/ft
Gutter Cross-Slope	= 0.00 ft/ft
Gutter Local Depression	= 0.00 in
Gutter Width	= 0.00 ft
Ponding Width	= 0.00 ft
Intercept Efficiency	= * %
Flow from Catchment	= 0.00 cfs
Carryover from previous inlet	= 0.00 cfs
Total Flow to Current Inlet	= 0.00 cfs
Flow Intercepted by Current Inlet	= 0.00 cfs
Bypassed Flow	= 0.00 cfs
Pavement Flow	= 0.00 cfs
Gutter Flow	= 0.00 cfs
Depth at Curb	= 0.00 in
Depth at Pavement/Gutter Joint	= 0.00 in
Pavement Spread	= 0.00 ft
Total Spread	= 0.00 ft
Gutter Velocity	= 0.00 ft/s
Curb Efficiency	= * %
Grate Efficiency	= * %
Slot Efficiency	= * %
Total Efficiency	= 0.00 %

PIPE DESCRIPTION: Pipe 5

---RAINFALL INFORMATION---

Return Period	= 100 Year
Rainfall File	= Tutorial

---PIPE INFORMATION---

Current Pipe	= Pipe 5
Downstream Pipe	= Pipe 4
Pipe Material	= CONC
Pipe Length	= 35.76 ft
Plan Length	= 35.76 ft
Pipe Type	= Circular
Pipe Dimensions	= 21.00 in
Pipe Manning's "n"	= 0.013
Pipe Capacity at Invert Slope	= 37.56 cfs
Invert Elevation Downstream	= 451.88 ft
Invert Elevation Upstream	= 453.89 ft
Invert Slope	= 6.01%
Invert Slope (Plan Length)	= 5.63%
Rim Elevation Downstream	= 459.28 ft
Rim Elevation Upstream	= 458.65 ft

Storm Drain Line "D-1, D-2, D-3"

Natural Ground Slope	= -1.76%
Crown Elevation Downstream	= 453.63 ft
Crown Elevation Upstream	= 455.64 ft

---FLOW INFORMATION---

Catchment Area	= 0.00 ac
Runoff Coefficient	= 0.500
Inlet Time	= 0.00 min
Inlet Intensity	= 0.00 in/hr
Inlet Rational Flow	= 0.00 cfs
Inlet Input Flow	= 11.66 cfs
Inlet Hydrograph Flow	= 0.00 cfs
Total Area	= 0.00 ac
Weighted Coefficient	= 0.500
Total Time of Concentration	= 0.00 min
Total Intensity	= 13.11 in/hr
Total Rational Flow	= 0.00 cfs
Total Flow	= 11.66 cfs
Uniform Capacity	= 37.56 cfs
Skipped flow	= 0.00 cfs
Infiltration	= 0.00 gpd

---HYDRAULIC INFORMATION---

HGL Elevation Downstream	= 453.80 ft
HGL Elevation Upstream	= 455.47 ft
HGL Slope	= 4.97 %
EGL Elevation Downstream	= 454.17 ft
EGL Elevation Upstream	= 456.07 ft
EGL Slope	= 5.68 %
Critical Depth	= 15.28 in
Depth Downstream	= 21.00 in
Depth Upstream	= 15.28 in
Velocity Downstream	= 4.85 ft/s
Velocity Upstream	= 6.22 ft/s
Uniform Velocity Downstream	= NA
Uniform Velocity Upstream	= NA
Area Downstream	= 2.41 ft^2
Area Upstream	= 1.87 ft^2
Kj (JLC)	= 0.50
Calculated Junction Loss	= NA

---INLET INFORMATION---

Downstream Inlet	= MH 4
Inlet Description	= Grate 19-3/8x17-3/4
Inlet Type	= Undefined
Computation Case	= Sag
Longitudinal Slope	= 0.00 ft/ft
Mannings n-value	= 0.000
Pavement Cross-Slope	= 0.00 ft/ft
Gutter Cross-Slope	= 0.00 ft/ft
Gutter Local Depression	= 0.00 in
Gutter Width	= 0.00 ft
Ponding Width	= 0.00 ft
Intercept Efficiency	= * %
Flow from Catchment	= 0.00 cfs
Carryover from previous inlet	= 0.00 cfs
Total Flow to Current Inlet	= 0.00 cfs
Flow Intercepted by Current Inlet	= 0.00 cfs
Bypassed Flow	= 0.00 cfs
Pavement Flow	= 0.00 cfs
Gutter Flow	= 0.00 cfs
Depth at Curb	= 0.00 in
Depth at Pavement/Gutter Joint	= 0.00 in
Pavement Spread	= 0.00 ft
Total Spread	= 0.00 ft
Gutter Velocity	= 0.00 ft/s
Curb Efficiency	= * %
Grate Efficiency	= * %
Slot Efficiency	= * %

Total Efficiency = 0.00 %

PIPE DESCRIPTION: Pipe 6
—RAINFALL INFORMATION—
Return Period = 100 Year
Rainfall File = Tutorial

—PIPE INFORMATION—
Current Pipe = Pipe 6
Downstream Pipe = Pipe 4
Pipe Material = CONC
Pipe Length = 378.79 ft
Plan Length = 378.79 ft
Pipe Type = Circular
Pipe Dimensions = 24.00 in
Pipe Manning's "n" = 0.013
Pipe Capacity at Invert Slope = 26.85 cfs
Invert Elevation Downstream = 451.51 ft
Invert Elevation Upstream = 456.85 ft
Invert Slope = 1.52%
Invert Slope (Plan Length) = 1.41%
Rim Elevation Downstream = 459.28 ft
Rim Elevation Upstream = 461.47 ft
Natural Ground Slope = 0.58%
Crown Elevation Downstream = 453.51 ft
Crown Elevation Upstream = 458.85 ft

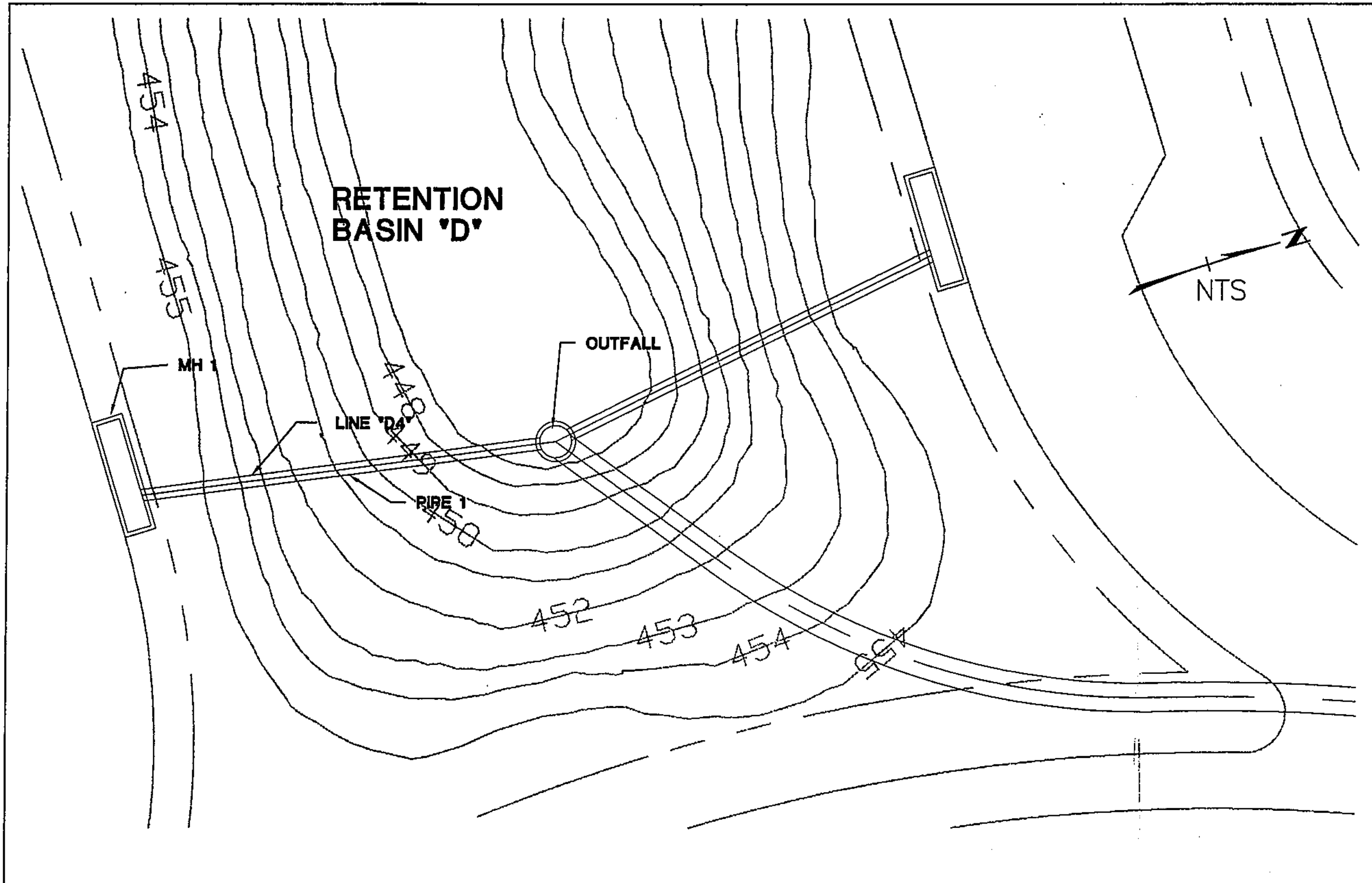
—FLOW INFORMATION—
Catchment Area = 0.00 ac
Runoff Coefficient = 0.500
Inlet Time = 0.00 min
Inlet Intensity = 0.00 in/hr
Inlet Rational Flow = 0.00 cfs
Inlet Input Flow = 19.89 cfs
Inlet Hydrograph Flow = 0.00 cfs
Total Area = 0.00 ac
Weighted Coefficient = 0.500
Total Time of Concentration = 0.00 min
Total Intensity = 13.11 in/hr
Total Rational Flow = 0.00 cfs
Total Flow = 19.89 cfs
Uniform Capacity = 26.85 cfs
Skipped flow = 0.00 cfs
Infiltration = 0.00 gpd

—HYDRAULIC INFORMATION—
HGL Elevation Downstream = 453.80 ft
HGL Elevation Upstream = 458.87 ft
HGL Slope = 1.44 %
EGL Elevation Downstream = 454.42 ft
EGL Elevation Upstream = 459.72 ft
EGL Slope = 1.51 %
Critical Depth = 19.23 in
Depth Downstream = 24.00 in
Depth Upstream = 19.23 in
Velocity Downstream = 6.33 ft/s
Velocity Upstream = 7.37 ft/s
Uniform Velocity Downstream = NA
Uniform Velocity Upstream = NA
Area Downstream = 3.14 ft^2
Area Upstream = 2.70 ft^2
Kj (JLC) = 0.50
Calculated Junction Loss = NA

—INLET INFORMATION—
Downstream Inlet = MH 4
Inlet Description = Grate 19-3/8x17-3/4
Inlet Type = Undefined
Computation Case = Sag

Storm Drain Line "D-1, D-2, D-3"

Longitudinal Slope	= 0.00 ft/ft
Mannings n-value	= 0.000
Pavement Cross-Slope	= 0.00 ft/ft
Gutter Cross-Slope	= 0.00 ft/ft
Gutter Local Depression	= 0.00 in
Gutter Width	= 0.00 ft
Ponding Width	= 0.00 ft
Intercept Efficiency	= * %
Flow from Catchment	= 0.00 cfs
Carryover from previous inlet	= 0.00 cfs
Total Flow to Current Inlet	= 0.00 cfs
Flow Intercepted by Current Inlet	= 0.00 cfs
Bypassed Flow	= 0.00 cfs
Pavement Flow	= 0.00 cfs
Gutter Flow	= 0.00 cfs
Depth at Curb	= 0.00 in
Depth at Pavement/Gutter Joint	= 0.00 in
Pavement Spread	= 0.00 ft
Total Spread	= 0.00 ft
Gutter Velocity	= 0.00 ft/s
Curb Efficiency	= * %
Grate Efficiency	= * %
Slot Efficiency	= * %
Total Efficiency	= 0.00 %



STORM DRAIN LINE "D4"

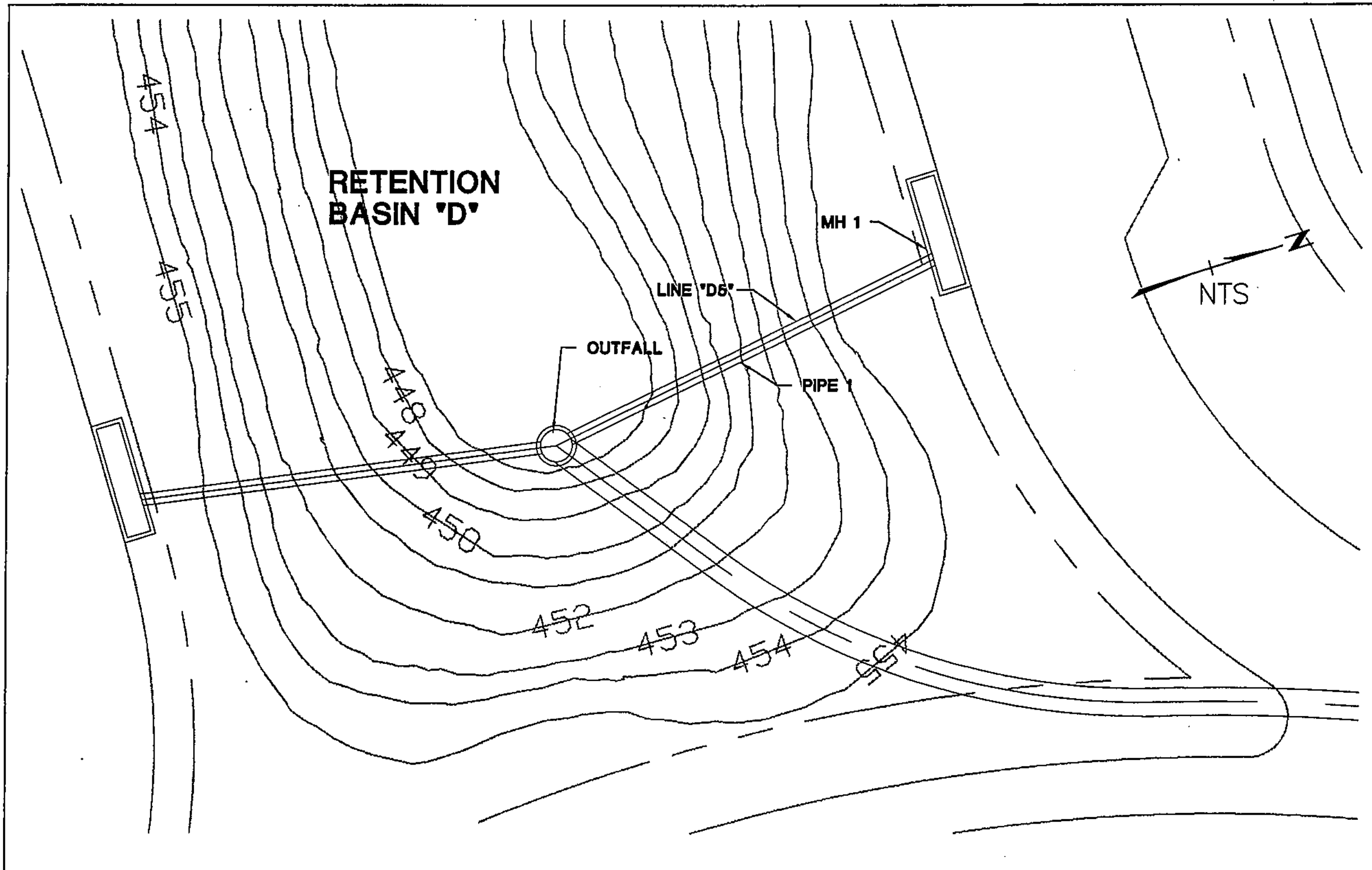
Storm Drain Line "D-4"

PIPE DESCRIPTION: Pipe 1

---RAINFALL INFORMATION---	
Return Period	= 100 Year
Rainfall File	= Tutorial
---PIPE INFORMATION---	
Current Pipe	= Pipe 1
Downstream Pipe	= Outfall
Pipe Material	= RCP
Pipe Length	= 50.19 ft
Plan Length	= 50.19 ft
Pipe Type	= Circular
Pipe Dimensions	= 18.00 in
Pipe Manning's "n"	= 0.013
Pipe Capacity at Invert Slope	= 44.21 cfs
Invert Elevation Downstream	= 442.07 ft
Invert Elevation Upstream	= 450.97 ft
Invert Slope	= 17.81%
Invert Slope (Plan Length)	= 17.73%
Rim Elevation Downstream	= 447.00 ft
Rim Elevation Upstream	= 454.71 ft
Natural Ground Slope	= 15.36%
Crown Elevation Downstream	= 443.57 ft
Crown Elevation Upstream	= 452.47 ft
---FLOW INFORMATION---	
Catchment Area	= 0.00 ac
Runoff Coefficient	= 0.500
Inlet Time	= 0.00 min
Inlet Intensity	= 0.00 in/hr
Inlet Rational Flow	= 0.00 cfs
Inlet Input Flow	= 9.52 cfs
Inlet Hydrograph Flow	= 0.00 cfs
Total Area	= 0.00 ac
Weighted Coefficient	= 0.500
Total Time of Concentration	= 0.00 min
Total Intensity	= 13.11 in/hr
Total Rational Flow	= 0.00 cfs
Total Flow	= 9.52 cfs
Uniform Capacity	= 44.21 cfs
Skipped flow	= 0.00 cfs
Infiltration	= 0.00 gpd
---HYDRAULIC INFORMATION---	
HGL Elevation Downstream	= 449.00 ft
HGL Elevation Upstream	= 452.47 ft
HGL Slope	= 6.95 %
EGL Elevation Downstream	= 449.45 ft
EGL Elevation Upstream	= 453.10 ft
EGL Slope	= 7.29 %
Critical Depth	= 14.30 in
Depth Downstream	= 18.00 in
Depth Upstream	= 14.30 in
Velocity Downstream	= 5.39 ft/s
Velocity Upstream	= 6.32 ft/s
Uniform Velocity Downstream	= NA
Uniform Velocity Upstream	= NA
Area Downstream	= 1.77 ft^2
Area Upstream	= 1.51 ft^2
Kj (JLC)	= 0.50
Calculated Junction Loss	= NA
---INLET INFORMATION---	
Downstream Inlet	= Outfall
Inlet Description	= Grate 19-3/8x17-3/4
Inlet Type	= Undefined
Computation Case	= Sag

Storm Drain Line "D-4"

Longitudinal Slope	= 0.00 ft/ft
Mannings n-value	= 0.000
Pavement Cross-Slope	= 0.00 ft/ft
Gutter Cross-Slope	= 0.00 ft/ft
Gutter Local Depression	= 0.00 in
Gutter Width	= 0.00 ft
Ponding Width	= 0.00 ft
Intercept Efficiency	= * %
Flow from Catchment	= 0.00 cfs
Carryover from previous inlet	= 0.00 cfs
Total Flow to Current Inlet	= 0.00 cfs
Flow Intercepted by Current Inlet	= 0.00 cfs
Bypassed Flow	= 0.00 cfs
Pavement Flow	= 0.00 cfs
Gutter Flow	= 0.00 cfs
Depth at Curb	= 0.00 in
Depth at Pavement/Gutter Joint	= 0.00 in
Pavement Spread	= 0.00 ft
Total Spread	= 0.00 ft
Gutter Velocity	= 0.00 ft/s
Curb Efficiency	= * %
Grate Efficiency	= * %
Slot Efficiency	= * %
Total Efficiency	= 0.00 %



STORM DRAIN LINE "D5"

Storm Drain Line "D-5"

PIPE DESCRIPTION: Pipe 1

—RAINFALL INFORMATION—

Return Period	= 100 Year
Rainfall File	= Tutorial

—PIPE INFORMATION—

Current Pipe	= Pipe 1
Downstream Pipe	= Outfall
Pipe Material	= RCP
Pipe Length	= 50.19 ft
Plan Length	= 50.19 ft
Pipe Type	= Circular
Pipe Dimensions	= 18.00 in
Pipe Manning's "n"	= 0.013
Pipe Capacity at Invert Slope	= 46.77 cfs
Invert Elevation Downstream	= 440.92 ft
Invert Elevation Upstream	= 450.88 ft
Invert Slope	= 19.93%
Invert Slope (Plan Length)	= 19.84%
Rim Elevation Downstream	= 447.00 ft
Rim Elevation Upstream	= 454.71 ft
Natural Ground Slope	= 15.36%
Crown Elevation Downstream	= 442.42 ft
Crown Elevation Upstream	= 452.38 ft

—FLOW INFORMATION—

Catchment Area	= 0.00 ac
Runoff Coefficient	= 0.500
Inlet Time	= 0.00 min
Inlet Intensity	= 0.00 in/hr
Inlet Rational Flow	= 0.00 cfs
Inlet Input Flow	= 10.66 cfs
Inlet Hydrograph Flow	= 0.00 cfs
Total Area	= 0.00 ac
Weighted Coefficient	= 0.500
Total Time of Concentration	= 0.00 min
Total Intensity	= 13.11 in/hr
Total Rational Flow	= 0.00 cfs
Total Flow	= 10.66 cfs
Uniform Capacity	= 46.77 cfs
Skipped flow	= 0.00 cfs
Infiltration	= 0.00 gpd

—HYDRAULIC INFORMATION—

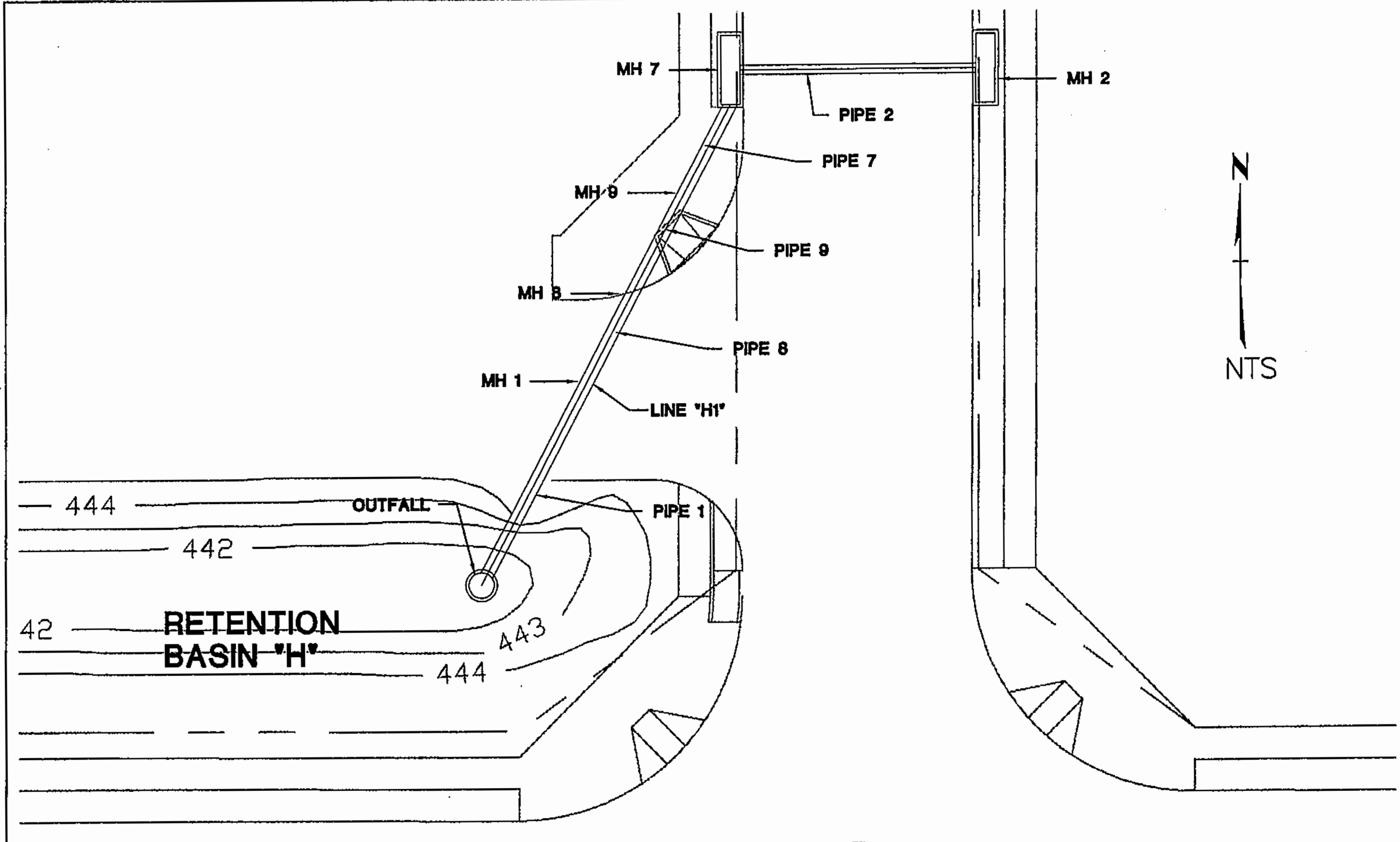
HGL Elevation Downstream	= 449.00 ft
HGL Elevation Upstream	= 452.49 ft
HGL Slope	= 6.98 %
EGL Elevation Downstream	= 449.57 ft
EGL Elevation Upstream	= 453.20 ft
EGL Slope	= 7.27 %
Critical Depth	= 15.04 in
Depth Downstream	= 18.00 in
Depth Upstream	= 15.04 in
Velocity Downstream	= 6.03 ft/s
Velocity Upstream	= 6.76 ft/s
Uniform Velocity Downstream	= NA
Uniform Velocity Upstream	= NA
Area Downstream	= 1.77 ft^2
Area Upstream	= 1.58 ft^2
Kj (JLC)	= 0.50
Calculated Junction Loss	= NA

—INLET INFORMATION—

Downstream Inlet	= Outfall
Inlet Description	= Grate 19-3/8x17-3/4
Inlet Type	= Undefined
Computation Case	= Sag

Storm Drain Line "D-5"

Longitudinal Slope	= 0.00 ft/ft
Mannings n-value	= 0.000
Pavement Cross-Slope	= 0.00 ft/ft
Gutter Cross-Slope	= 0.00 ft/ft
Gutter Local Depression	= 0.00 in
Gutter Width	= 0.00 ft
Ponding Width	= 0.00 ft
Intercept Efficiency	= * %
Flow from Catchment	= 0.00 cfs
Carryover from previous inlet	= 0.00 cfs
Total Flow to Current Inlet	= 0.00 cfs
Flow Intercepted by Current Inlet	= 0.00 cfs
Bypassed Flow	= 0.00 cfs
Pavement Flow	= 0.00 cfs
Gutter Flow	= 0.00 cfs
Depth at Curb	= 0.00 in
Depth at Pavement/Gutter Joint	= 0.00 in
Pavement Spread	= 0.00 ft
Total Spread	= 0.00 ft
Gutter Velocity	= 0.00 ft/s
Curb Efficiency	= * %
Grate Efficiency	= * %
Slot Efficiency	= * %
Total Efficiency	= 0.00 %



NOTE: MANHOLES 1, 8 AND 9 ARE
PIPE DEFLECTIONS.

STORM DRAIN LINE "H1"

Storm Drain Line "H1"

PIPE DESCRIPTION: Pipe 1
---RAINFALL INFORMATION---
Return Period = 100 Year
Rainfall File = Tutorial

---PIPE INFORMATION---
Current Pipe = Pipe 1
Downstream Pipe = Outfall
Pipe Material = CONC
Pipe Length = 40.19 ft
Plan Length = 40.19 ft
Pipe Type = Circular
Pipe Dimensions = 24.00 in
Pipe Manning's "n" = 0.013
Pipe Capacity at Invert Slope = 14.30 cfs
Invert Elevation Downstream = 435.57 ft
Invert Elevation Upstream = 435.73 ft
Invert Slope = 0.41%
Invert Slope (Plan Length) = 0.40%
Rim Elevation Downstream = 442.00 ft
Rim Elevation Upstream = 448.90 ft
Natural Ground Slope = 17.17%
Crown Elevation Downstream = 437.57 ft
Crown Elevation Upstream = 437.73 ft

---FLOW INFORMATION---
Catchment Area = 0.00 ac
Runoff Coefficient = 0.500
Inlet Time = 0.00 min
Inlet Intensity = 0.00 in/hr
Inlet Rational Flow = 0.00 cfs
Inlet Input Flow = 0.00 cfs
Total Area = 0.00 ac
Weighted Coefficient = 0.500
Total Time of Concentration = 0.25 min
Total Intensity = 12.92 in/hr
Total Rational Flow = 0.00 cfs
Total Flow = 17.87 cfs
Uniform Capacity = 14.30 cfs
Skipped flow = 0.00 cfs
Infiltration = 0.00 gpd

---HYDRAULIC INFORMATION---
HGL Elevation Downstream = 444.32 ft
HGL Elevation Upstream = 444.57 ft
HGL Slope = 0.64 %
EGL Elevation Downstream = 444.82 ft
EGL Elevation Upstream = 445.07 ft
EGL Slope = 0.64 %
Critical Depth = 18.28 in
Depth Downstream = 24.00 in
Depth Upstream = 24.00 in
Velocity Downstream = 5.69 ft/s
Velocity Upstream = 5.69 ft/s
Uniform Velocity Downstream = NA
Uniform Velocity Upstream = NA
Area Downstream = 3.14 ft^2
Area Upstream = 3.14 ft^2
Kj (JLC) = 0.01
Calculated Junction Loss = 0.003 ft

---INLET INFORMATION---
Downstream Inlet = Outfall
Inlet Description = <None>
Inlet Type = Undefined
Computation Case = Sag
Longitudinal Slope = 0.00 ft/ft
Mannings n-value = 0.000

Pavement Cross-Slope	= 0.00 ft/ft
Gutter Cross-Slope	= 0.00 ft/ft
Gutter Local Depression	= 0.00 in
Gutter Width	= 0.00 ft
Ponding Width	= 0.00 ft
Intercept Efficiency	= * %
Flow from Catchment	= 0.00 cfs
Carryover from previous inlet	= 0.00 cfs
Total Flow to Current Inlet	= 0.00 cfs
Flow Intercepted by Current Inlet	= 0.00 cfs
Bypassed Flow	= 0.00 cfs
Pavement Flow	= 0.00 cfs
Gutter Flow	= 0.00 cfs
Depth at Curb	= 0.00 in
Depth at Pavement/Gutter Joint	= 0.00 in
Pavement Spread	= 0.00 ft
Total Spread	= 0.00 ft
Gutter Velocity	= 0.00 ft/s
Curb Efficiency	= * %
Grate Efficiency	= * %
Slot Efficiency	= * %
Total Efficiency	= 0.00 %

PIPE DESCRIPTION: Pipe 8

—RAINFALL INFORMATION—

Return Period	= 100 Year
Rainfall File	= Tutorial

—PIPE INFORMATION—

Current Pipe	= Pipe 8
Downstream Pipe	= Pipe 1
Pipe Material	= CONC
Pipe Length	= 12.01 ft
Plan Length	= 12.01 ft
Pipe Type	= Circular
Pipe Dimensions	= 24.00 in
Pipe Manning's "n"	= 0.013
Pipe Capacity at Invert Slope	= 41.27 cfs
Invert Elevation Downstream	= 435.73 ft
Invert Elevation Upstream	= 436.13 ft
Invert Slope	= 3.33%
Invert Slope (Plan Length)	= 3.33%
Rim Elevation Downstream	= 448.90 ft
Rim Elevation Upstream	= 448.90 ft
Natural Ground Slope	= 0.00%
Crown Elevation Downstream	= 437.73 ft
Crown Elevation Upstream	= 438.13 ft

—FLOW INFORMATION—

Catchment Area	= 0.00 ac
Runoff Coefficient	= 0.500
Inlet Time	= 0.00 min
Inlet Intensity	= 0.00 in/hr
Inlet Rational Flow	= 0.00 cfs
Inlet Input Flow	= 0.00 cfs
Total Area	= 0.00 ac
Weighted Coefficient	= 0.500
Total Time of Concentration	= 0.24 min
Total Intensity	= 12.93 in/hr
Total Rational Flow	= 0.00 cfs
Total Flow	= 17.87 cfs
Uniform Capacity	= 41.27 cfs
Skipped flow	= 0.00 cfs
Infiltration	= 0.00 gpd

—HYDRAULIC INFORMATION—

HGL Elevation Downstream	= 444.57 ft
HGL Elevation Upstream	= 444.65 ft
HGL Slope	= 0.62 %

Storm Drain Line "H1"

EGL Elevation Downstream	= 445.08 ft
EGL Elevation Upstream	= 445.15 ft
EGL Slope	= 0.62 %
Critical Depth	= 18.28 in
Depth Downstream	= 24.00 in
Depth Upstream	= 24.00 in
Velocity Downstream	= 5.69 ft/s
Velocity Upstream	= 5.69 ft/s
Uniform Velocity Downstream	= NA
Uniform Velocity Upstream	= NA
Area Downstream	= 3.14 ft^2
Area Upstream	= 3.14 ft^2
Kj (JLC)	= 0.01
Calculated Junction Loss	= 0.003 ft

---INLET INFORMATION---

Downstream Inlet	= MH 1
Inlet Description	= <None>
Inlet Type	= Undefined
Computation Case	= Sag
Longitudinal Slope	= 0.00 ft/ft
Mannings n-value	= 0.000
Pavement Cross-Slope	= 0.00 ft/ft
Gutter Cross-Slope	= 0.00 ft/ft
Gutter Local Depression	= 0.00 in
Gutter Width	= 0.00 ft
Ponding Width	= 0.00 ft
Intercept Efficiency	= * %
Flow from Catchment	= 0.00 cfs
Carryover from previous inlet	= 0.00 cfs
Total Flow to Current Inlet	= 0.00 cfs
Flow Intercepted by Current Inlet	= 0.00 cfs
Bypassed Flow	= 0.00 cfs
Pavement Flow	= 0.00 cfs
Gutter Flow	= 0.00 cfs
Depth at Curb	= 0.00 in
Depth at Pavement/Gutter Joint	= 0.00 in
Pavement Spread	= 0.00 ft
Total Spread	= 0.00 ft
Gutter Velocity	= 0.00 ft/s
Curb Efficiency	= * %
Grate Efficiency	= * %
Slot Efficiency	= * %
Total Efficiency	= 0.00 %

PIPE DESCRIPTION: Pipe 9

---RAINFALL INFORMATION---

Return Period	= 100 Year
Rainfall File	= Tutorial

---PIPE INFORMATION---

Current Pipe	= Pipe 9
Downstream Pipe	= Pipe 8
Pipe Material	= CONC
Pipe Length	= 12.01 ft
Plan Length	= 12.01 ft
Pipe Type	= Circular
Pipe Dimensions	= 24.00 in
Pipe Manning's "n"	= 0.013
Pipe Capacity at Invert Slope	= 56.13 cfs
Invert Elevation Downstream	= 436.13 ft
Invert Elevation Upstream	= 436.87 ft
Invert Slope	= 5.28%
Invert Slope (Plan Length)	= 6.16%
Rim Elevation Downstream	= 448.90 ft
Rim Elevation Upstream	= 448.35 ft
Natural Ground Slope	= -4.58%
Crown Elevation Downstream	= 438.13 ft
Crown Elevation Upstream	= 438.87 ft

Storm Drain Line "H1"

—FLOW INFORMATION—

Catchment Area	= 0.00 ac
Runoff Coefficient	= 0.500
Inlet Time	= 0.00 min
Inlet Intensity	= 0.00 in/hr
Inlet Rational Flow	= 0.00 cfs
Inlet Input Flow	= 0.00 cfs
Total Area	= 0.00 ac
Weighted Coefficient	= 0.500
Total Time of Concentration	= 0.22 min
Total Intensity	= 12.94 in/hr
Total Rational Flow	= 0.00 cfs
Total Flow	= 17.87 cfs
Uniform Capacity	= 56.13 cfs
Skipped flow	= 0.00 cfs
Infiltration	= 0.00 gpd

—HYDRAULIC INFORMATION—

HGL Elevation Downstream	= 444.65 ft
HGL Elevation Upstream	= 444.73 ft
HGL Slope	= 0.54 %
EGL Elevation Downstream	= 445.15 ft
EGL Elevation Upstream	= 445.23 ft
EGL Slope	= 0.54 %
Critical Depth	= 18.28 in
Depth Downstream	= 24.00 in
Depth Upstream	= 24.00 in
Velocity Downstream	= 5.69 ft/s
Velocity Upstream	= 5.69 ft/s
Uniform Velocity Downstream	= NA
Uniform Velocity Upstream	= NA
Area Downstream	= 3.14 ft^2
Area Upstream	= 3.14 ft^2
Kj (JLC)	= 0.01
Calculated Junction Loss	= 0.003 ft

—INLET INFORMATION—

Downstream Inlet	= MH 8
Inlet Description	= <None>
Inlet Type	= Undefined
Computation Case	= Sag
Longitudinal Slope	= 0.00 ft/ft
Mannings n-value	= 0.000
Pavement Cross-Slope	= 0.00 ft/ft
Gutter Cross-Slope	= 0.00 ft/ft
Gutter Local Depression	= 0.00 in
Gutter Width	= 0.00 ft
Ponding Width	= 0.00 ft
Intercept Efficiency	= * %
Flow from Catchment	= 0.00 cfs
Carryover from previous inlet	= 0.00 cfs
Total Flow to Current Inlet	= 0.00 cfs
Flow Intercepted by Current Inlet	= 0.00 cfs
Bypassed Flow	= 0.00 cfs
Pavement Flow	= 0.00 cfs
Gutter Flow	= 0.00 cfs
Depth at Curb	= 0.00 in
Depth at Pavement/Gutter Joint	= 0.00 in
Pavement Spread	= 0.00 ft
Total Spread	= 0.00 ft
Gutter Velocity	= 0.00 ft/s
Curb Efficiency	= * %
Grate Efficiency	= * %
Slot Efficiency	= * %
Total Efficiency	= 0.00 %

PIPE DESCRIPTION: Pipe 7
—RAINFALL INFORMATION—

Storm Drain Line "H1"

Return Period	= 100 Year
Rainfall File	= Tutorial

—PIPE INFORMATION—

Current Pipe	= Pipe 7
Downstream Pipe	= Pipe 9
Pipe Material	= CONC
Pipe Length	= 18.62 ft
Plan Length	= 18.62 ft
Pipe Type	= Circular
Pipe Dimensions	= 24.00 in
Pipe Manning's "n"	= 0.013
Pipe Capacity at Invert Slope	= 68.33 cfs
Invert Elevation Downstream	= 436.87 ft
Invert Elevation Upstream	= 438.57 ft
Invert Slope	= 14.03%
Invert Slope (Plan Length)	= 9.13%
Rim Elevation Downstream	= 448.35 ft
Rim Elevation Upstream	= 446.90 ft
Natural Ground Slope	= -7.79%
Crown Elevation Downstream	= 438.87 ft
Crown Elevation Upstream	= 440.57 ft

—FLOW INFORMATION—

Catchment Area	= 0.00 ac
Runoff Coefficient	= 0.500
Inlet Time	= 0.00 min
Inlet Intensity	= 0.00 in/hr
Inlet Rational Flow	= 0.00 cfs
Inlet Input Flow	= 8.94 cfs
Total Area	= 0.00 ac
Weighted Coefficient	= 0.500
Total Time of Concentration	= 0.21 min
Total Intensity	= 12.96 in/hr
Total Rational Flow	= 0.00 cfs
Total Flow	= 17.87 cfs
Uniform Capacity	= 68.33 cfs
Skipped flow	= 0.00 cfs
Infiltration	= 0.00 gpd

—HYDRAULIC INFORMATION—

HGL Elevation Downstream	= 444.73 ft
HGL Elevation Upstream	= 444.85 ft
HGL Slope	= 0.96 %
EGL Elevation Downstream	= 445.23 ft
EGL Elevation Upstream	= 445.35 ft
EGL Slope	= 0.96 %
Critical Depth	= 18.28 in
Depth Downstream	= 24.00 in
Depth Upstream	= 24.00 in
Velocity Downstream	= 5.69 ft/s
Velocity Upstream	= 5.69 ft/s
Uniform Velocity Downstream	= NA
Uniform Velocity Upstream	= NA
Area Downstream	= 3.14 ft^2
Area Upstream	= 3.14 ft^2
Kj (JLC)	= 0.50
Calculated Junction Loss	= 0.252 ft

—INLET INFORMATION—

Downstream Inlet	= MH 9
Inlet Description	= Grate 19-3/8x17-3/4
Inlet Type	= Undefined
Computation Case	= Sag
Longitudinal Slope	= 0.00 ft/ft
Mannings n-value	= 0.000
Pavement Cross-Slope	= 0.00 ft/ft
Gutter Cross-Slope	= 0.00 ft/ft
Gutter Local Depression	= 0.00 in

Storm Drain Line "H1"

Gutter Width	= 0.00 ft
Ponding Width	= 0.00 ft
Intercept Efficiency	= * %
Flow from Catchment	= 0.00 cfs
Carryover from previous inlet	= 0.00 cfs
Total Flow to Current Inlet	= 0.00 cfs
Flow Intercepted by Current Inlet	= 0.00 cfs
Bypassed Flow	= 0.00 cfs
Pavement Flow	= 0.00 cfs
Gutter Flow	= 0.00 cfs
Depth at Curb	= 0.00 in
Depth at Pavement/Gutter Joint	= 0.00 in
Pavement Spread	= 0.00 ft
Total Spread	= 0.00 ft
Gutter Velocity	= 0.00 ft/s
Curb Efficiency	= * %
Grate Efficiency	= * %
Slot Efficiency	= * %
Total Efficiency	= 0.00 %

PIPE DESCRIPTION: Pipe 2

----RAINFALL INFORMATION----

Return Period	= 100 Year
Rainfall File	= Tutorial

----PIPE INFORMATION----

Current Pipe	= Pipe 2
Downstream Pipe	= Pipe 7
Pipe Material	= RCP
Pipe Length	= 37.00 ft
Plan Length	= 37.00 ft
Pipe Type	= Circular
Pipe Dimensions	= 18.00 in
Pipe Manning's "n"	= 0.013
Pipe Capacity at Invert Slope	= 30.14 cfs
Invert Elevation Downstream	= 439.43 ft
Invert Elevation Upstream	= 442.47 ft
Invert Slope	= 8.28%
Invert Slope (Plan Length)	= 8.24%
Rim Elevation Downstream	= 446.90 ft
Rim Elevation Upstream	= 446.90 ft
Natural Ground Slope	= 0.00%
Crown Elevation Downstream	= 440.93 ft
Crown Elevation Upstream	= 443.97 ft

----FLOW INFORMATION----

Catchment Area	= 0.00 ac
Runoff Coefficient	= 0.500
Inlet Time	= 0.00 min
Inlet Intensity	= 0.00 in/hr
Inlet Rational Flow	= 0.00 cfs
Inlet Input Flow	= 8.94 cfs
Total Area	= 0.00 ac
Weighted Coefficient	= 0.500
Total Time of Concentration	= 0.00 min
Total Intensity	= 13.11 in/hr
Total Rational Flow	= 0.00 cfs
Total Flow	= 8.94 cfs
Uniform Capacity	= 30.14 cfs
Skipped flow	= 0.00 cfs
Infiltration	= 0.00 gpd

----HYDRAULIC INFORMATION----

HGL Elevation Downstream	= 445.10 ft
HGL Elevation Upstream	= 445.56 ft
HGL Slope	= 1.27 %
EGL Elevation Downstream	= 445.49 ft
EGL Elevation Upstream	= 445.96 ft
EGL Slope	= 1.27 %

Storm Drain Line "H1"

Critical Depth	= 13.88 in
Depth Downstream	= 18.00 in
Depth Upstream	= 18.00 in
Velocity Downstream	= 5.06 ft/s
Velocity Upstream	= 5.06 ft/s
Uniform Velocity Downstream	= NA
Uniform Velocity Upstream	= NA
Area Downstream	= 1.77 ft^2
Area Upstream	= 1.77 ft^2
Kj (JLC)	= 0.50
Calculated Junction Loss	= NA

—INLET INFORMATION—

Downstream Inlet	= MH 7
Inlet Description	= Grate 19-3/8x17-3/4
Inlet Type	= Undefined
Computation Case	= Sag
Longitudinal Slope	= 0.00 ft/ft
Mannings n-value	= 0.000
Pavement Cross-Slope	= 0.00 ft/ft
Gutter Cross-Slope	= 0.00 ft/ft
Gutter Local Depression	= 0.00 in
Gutter Width	= 0.00 ft
Ponding Width	= 0.00 ft
Intercept Efficiency	= * %
Flow from Catchment	= 0.00 cfs
Carryover from previous inlet	= 0.00 cfs
Total Flow to Current Inlet	= 0.00 cfs
Flow Intercepted by Current Inlet	= 0.00 cfs
Bypassed Flow	= 0.00 cfs
Pavement Flow	= 0.00 cfs
Gutter Flow	= 0.00 cfs
Depth at Curb	= 0.00 in
Depth at Pavement/Gutter Joint	= 0.00 in
Pavement Spread	= 0.00 ft
Total Spread	= 0.00 ft
Gutter Velocity	= 0.00 ft/s
Curb Efficiency	= * %
Grate Efficiency	= * %
Slot Efficiency	= * %
Total Efficiency	= 0.00 %

Catch Basin Calculations

TRACT 28639-1 RIO VISTA VILLAGE

CATCH BASIN CAPACITY CHARTS

ON-GRADE CONDITION: $W = \left[Q / 2.92\, D^{1.5} \right]^{1.17647}$

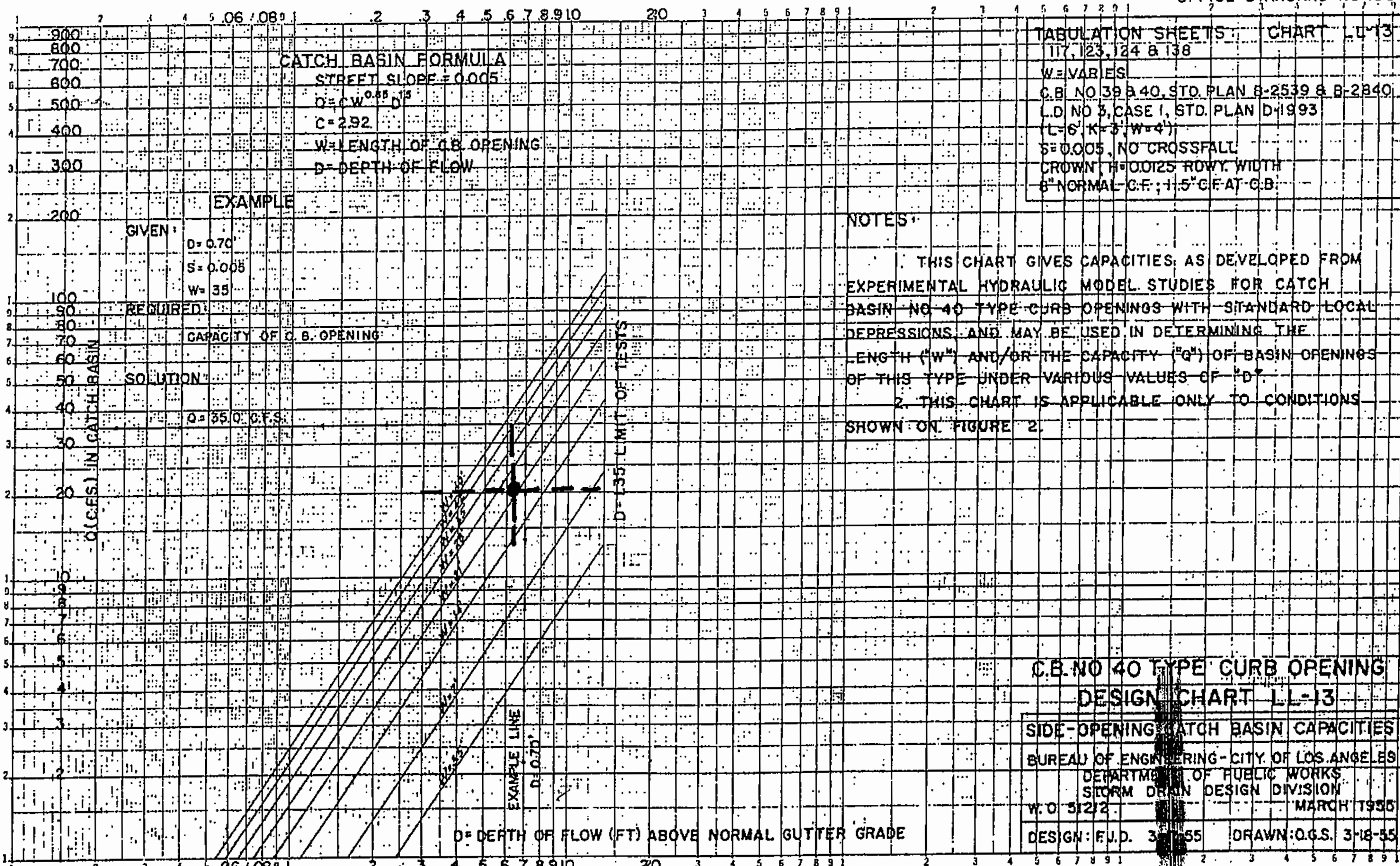
STA: 23+53.50 (E) RIO GUADALUPE

D = 0.63 W = 22.71

Q = 20.76 USE: W = 24

LINE: B-1, MH 2

OFFICE STANDARD NO 108



TRACT 28639-1 RIO VISTA VILLA

CATCH BASIN CAPACITY CHARTS

ON-GRADE CONDITION: $W = \left[\frac{Q}{2.92\, D^{1.5}} \right]^{1.17647}$

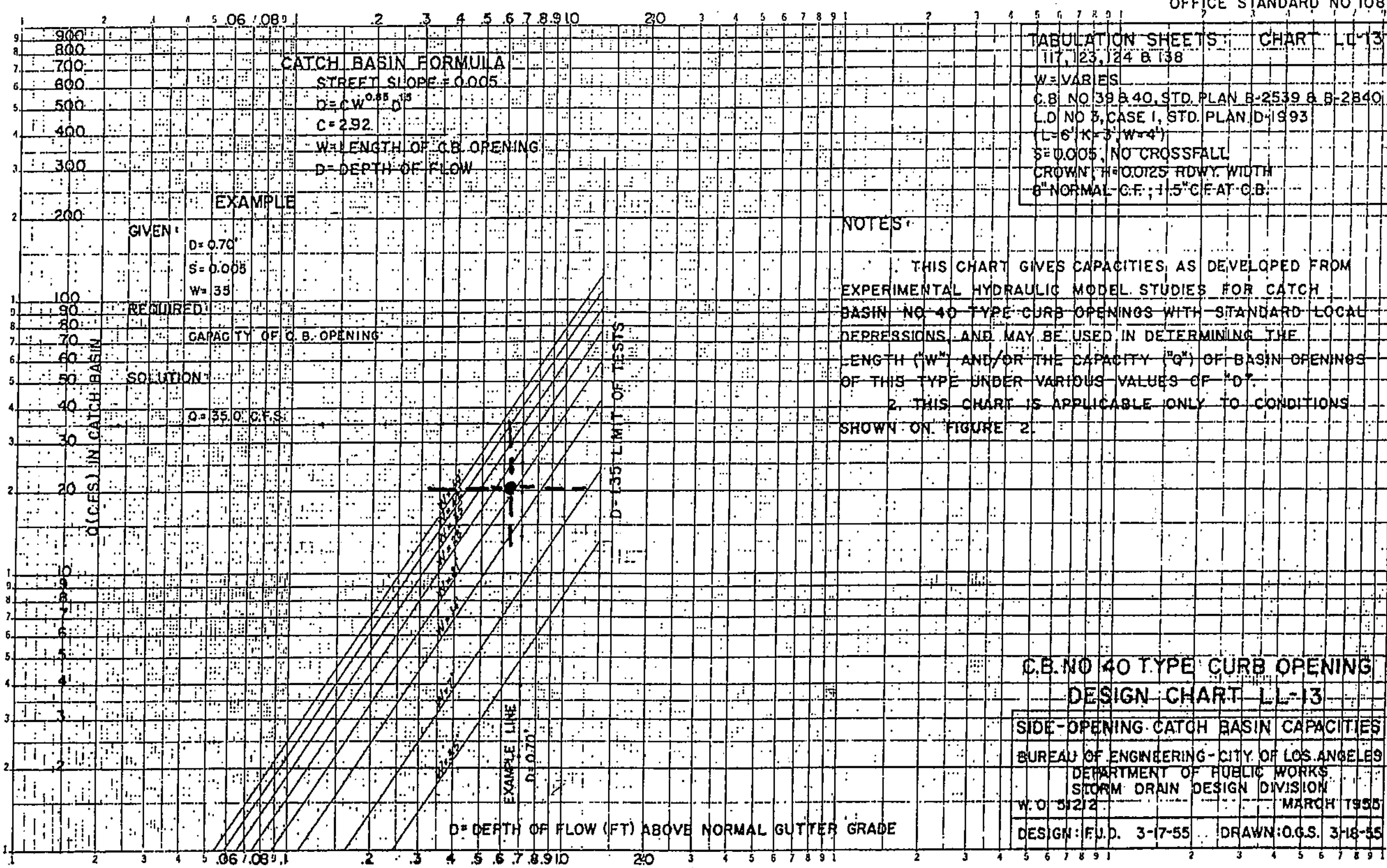
STA: 23+53.50 (W) RIO GUADALUPE

D = 0.63' W = 22.71

Q = 20.76 USE: W = 24'

LINE: B-1, MH 3

OFFICE STANDARD NO 108



TRACT 28639-1 RIO VISTA VILLAGE

CATCH BASIN CAPACITY CHARTS

ON-GRADE CONDITION: $W = \left[Q / 2.92\, D^{1.5} \right]^{1.17647}$

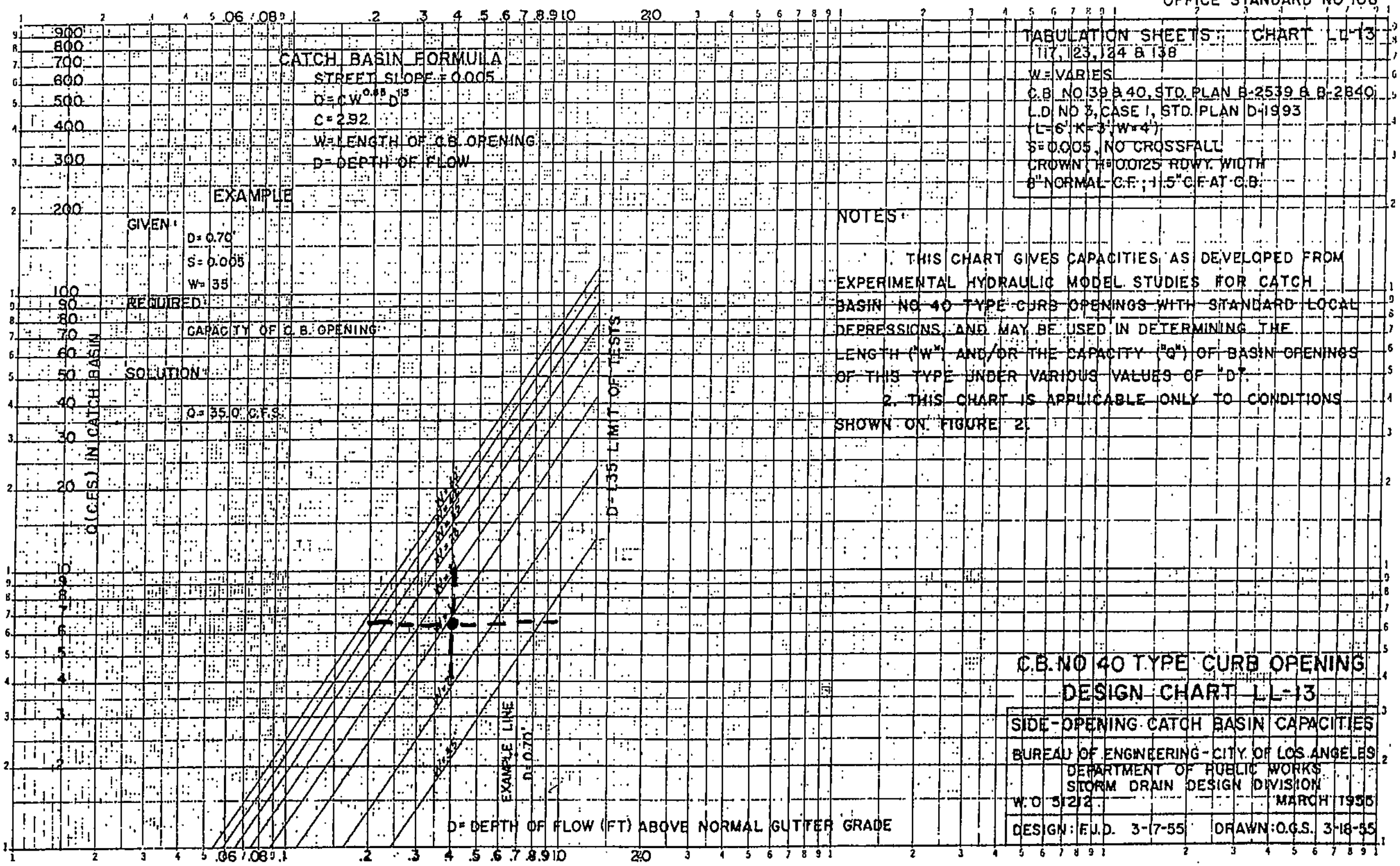
STA: 20+54.60 (W) RIO GUADALUPE

D = 0.41' W = 12.40'

Q = 6.515 USE: W = 13'

LINE: B-2, MH 4

OFFICE STANDARD NO 108



iRACT 28639-1 RIO VISTA VILLAG

CATCH BASIN CAPACITY CHARTS

ON-GRADE CONDITION: $W = \left[Q / 2.92\, D^{1.5} \right]^{1.17647}$

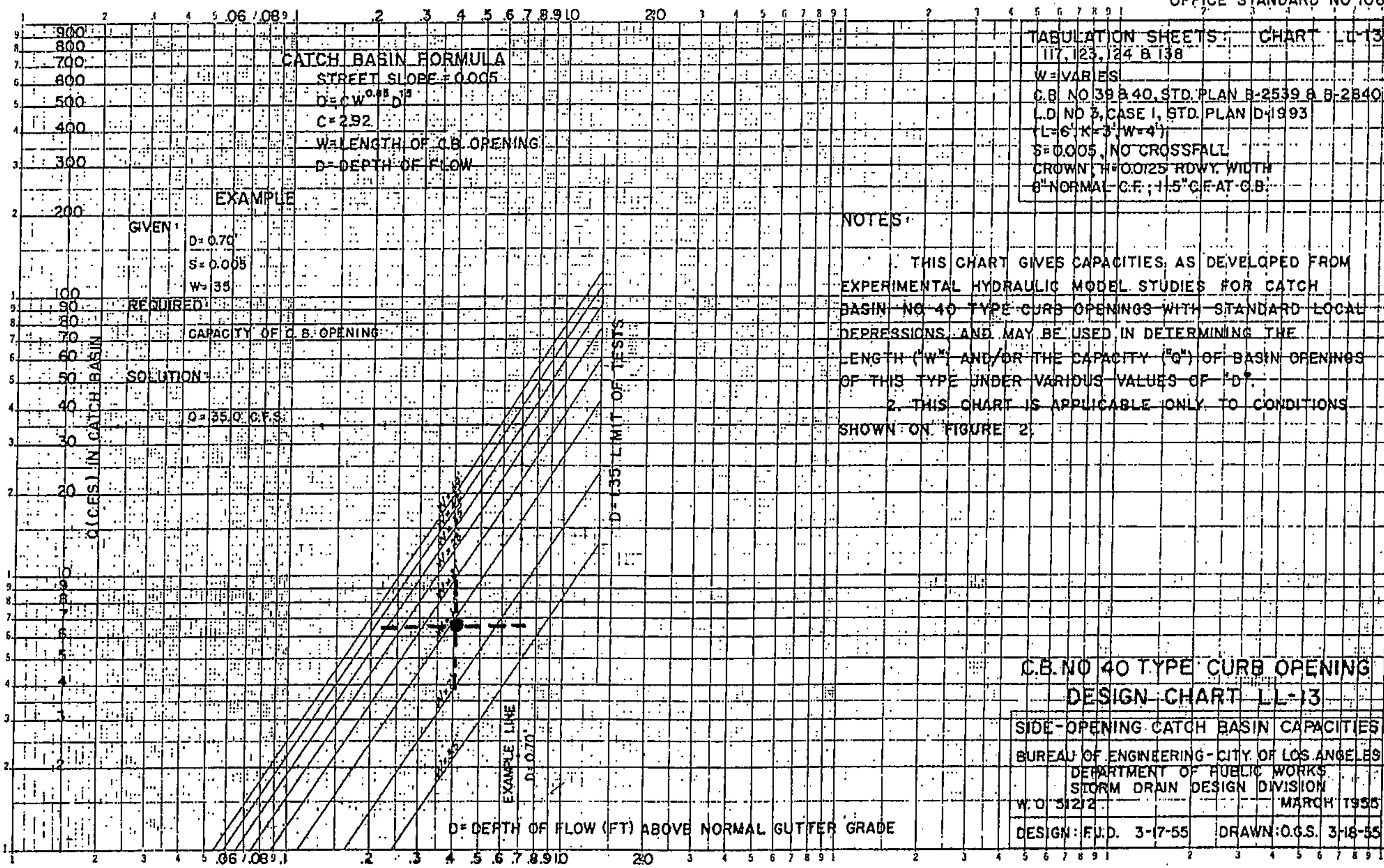
STA: 20+5400(E) RIO GUADALUPE

D= 0.41 W= 12.40

Q= 6.515 USE: W= 13'

LINE: B-3, MH 5

OFFICE STANDARD NO 108



TRACT 28639-1 RIO VISTA VILLA

CATCH BASIN CAPACITY CHARTS

ON-GRADE CONDITION: $W = \left[Q / 2.92\, D^{1.5} \right]^{1.17647}$

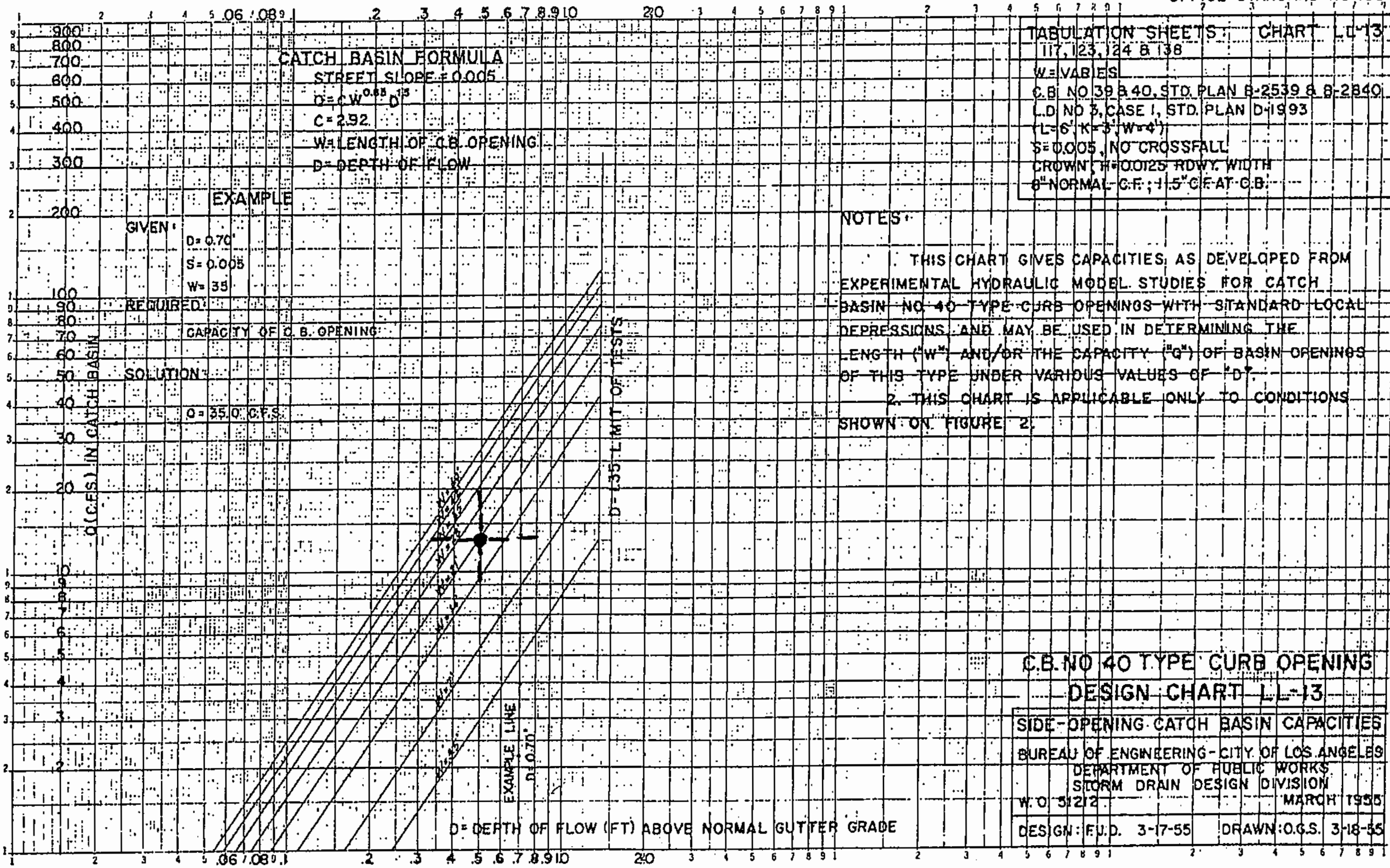
STA: 14+69.00 (W) RIO FELICIA

D = 0.49' W = 20.75'

Q = 13.185 USE: W = 21'

LINE: C, MH 1

OFFICE STANDARD NO 108



TRACT 28639-1 RIO VISTA VILLAGE

CATCH BASIN CAPACITY CHARTS

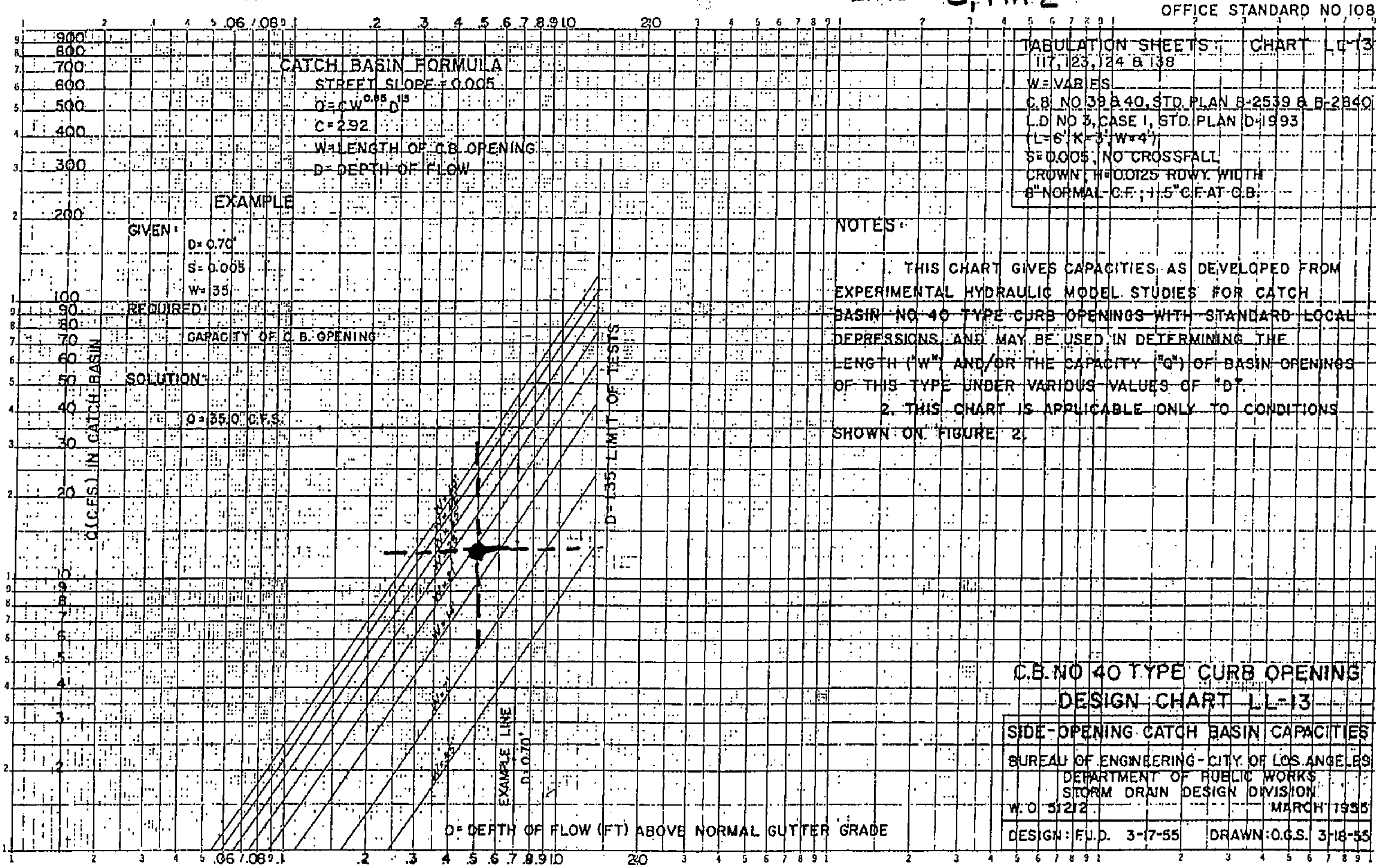
ON-GRADE CONDITION: $W = \left[Q / 2.92 D^{1.5} \right]^{1.17647}$

STA: 14+69.00(E) RIO FELICIA

D = 0.49' W = 20.75

Q = 13.185 USE: W = 21'

LINE: C, MH 2



TRACT 28639-1 RIO VISTA VILLAGE

CATCH BASIN CAPACITY CHARTS

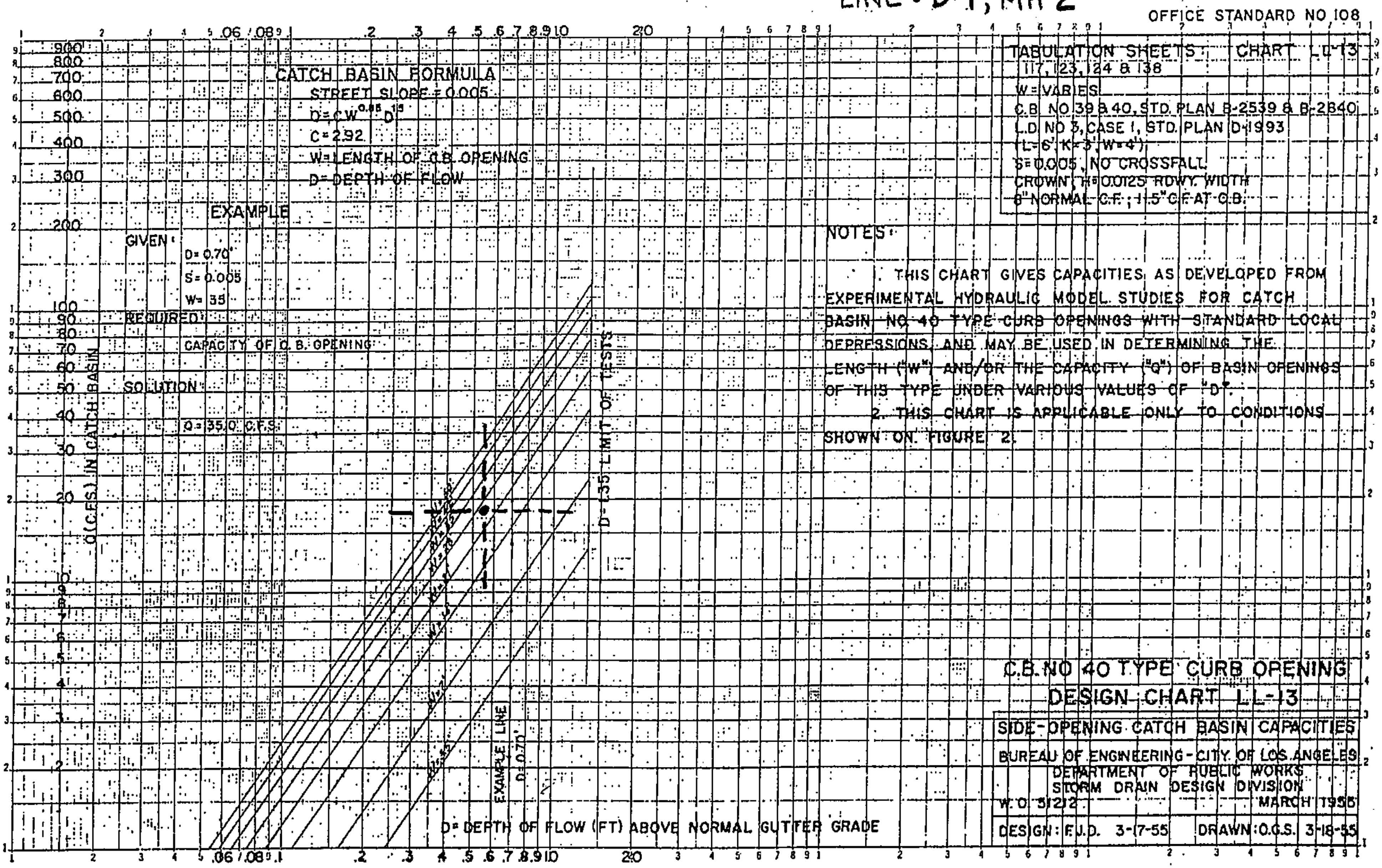
ON-GRADE CONDITION: $W = \left[\frac{Q}{2.92\, D^{1.5}} \right]^{1.17647}$

STA: 26+07.88 (W) AVE. QUINTANA

D = 0.55' W = 24.20

Q = 17.875 USE: W = 25'

LINE: D-1, MH 2



TRACT 28639-1 RIO VISTA VILLAG_

CATCH BASIN CAPACITY CHARTS

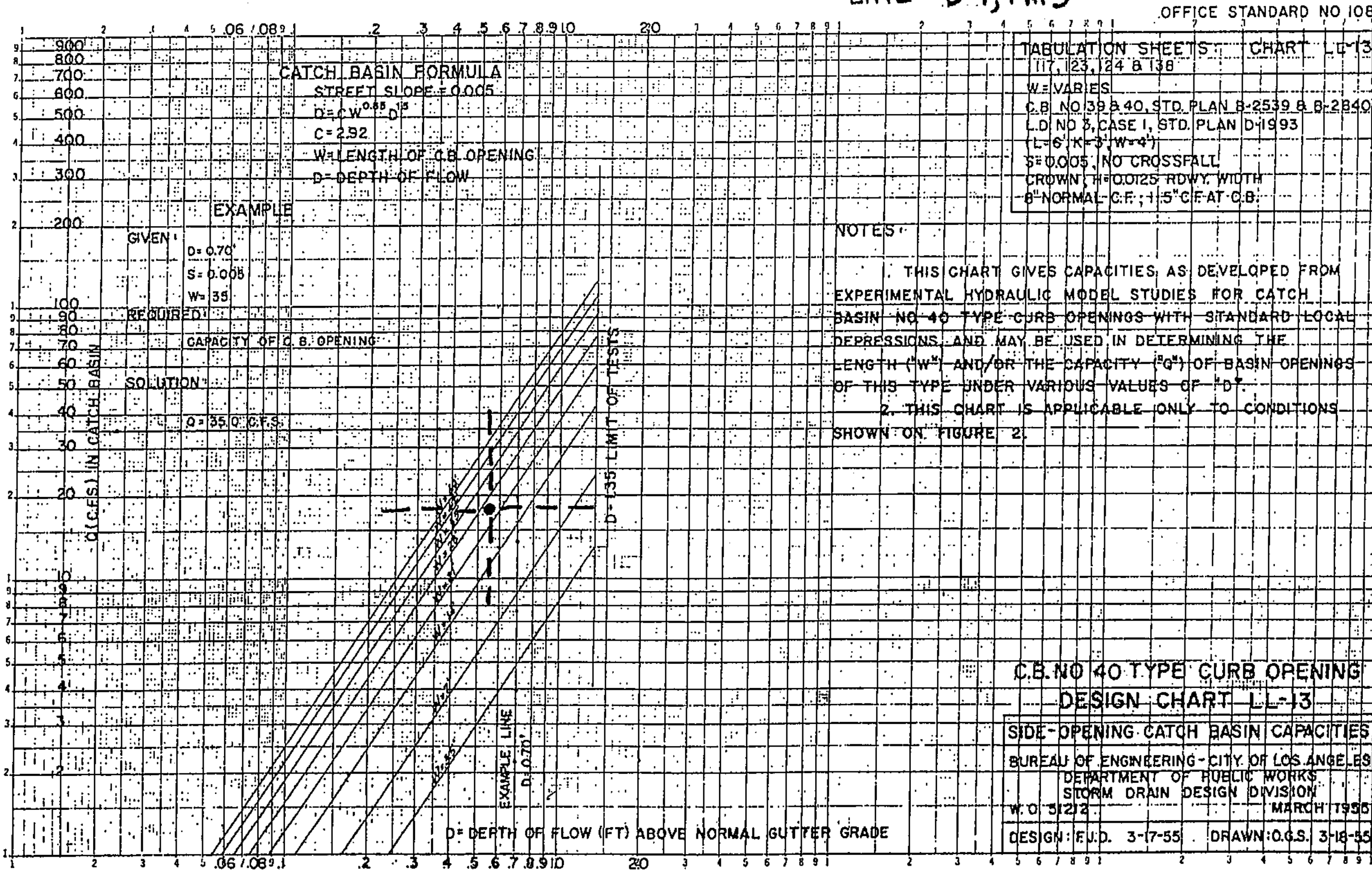
ON-GRADE CONDITION: $W = \left[Q / 2.92\, D^{1.5} \right]^{1.17647}$

STA: 26+07.88 (E) AVE. QUINTANA

D = 0.55' W = 24.20

Q = 17.875 USE: W = 25'

LINE: D-1, MH 3



TRACT 28639-1 RIO VISTA VILLA

CATCH BASIN CAPACITY CHARTS

SUMP CONDITION : $W = \left[Q/1.62\right]^{0.88496}$

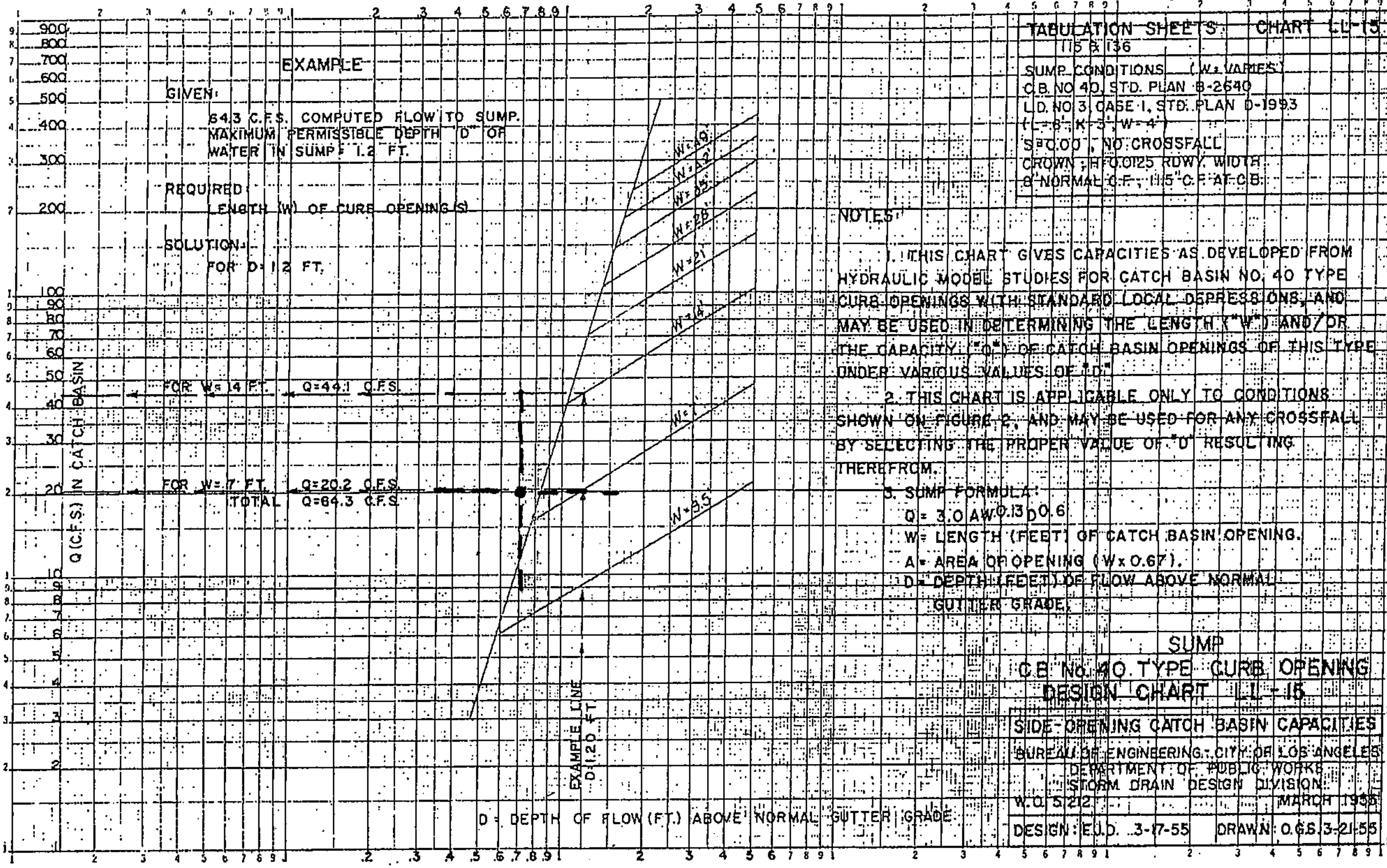
STA : 15+25.00(N) RIO 050

D = 0.7' W = 9.16

Q = 19.79 USE : W = 10'

LINE : D-2, MH 5

OFFICE STANDARD NO. 108



TRACT 28639-1 RIO VISTA VILLA~~GE~~

CATCH BASIN CAPACITY CHARTS

SUMP CONDITION : $W = \left[Q/1.62 \right]^{0.88496}$

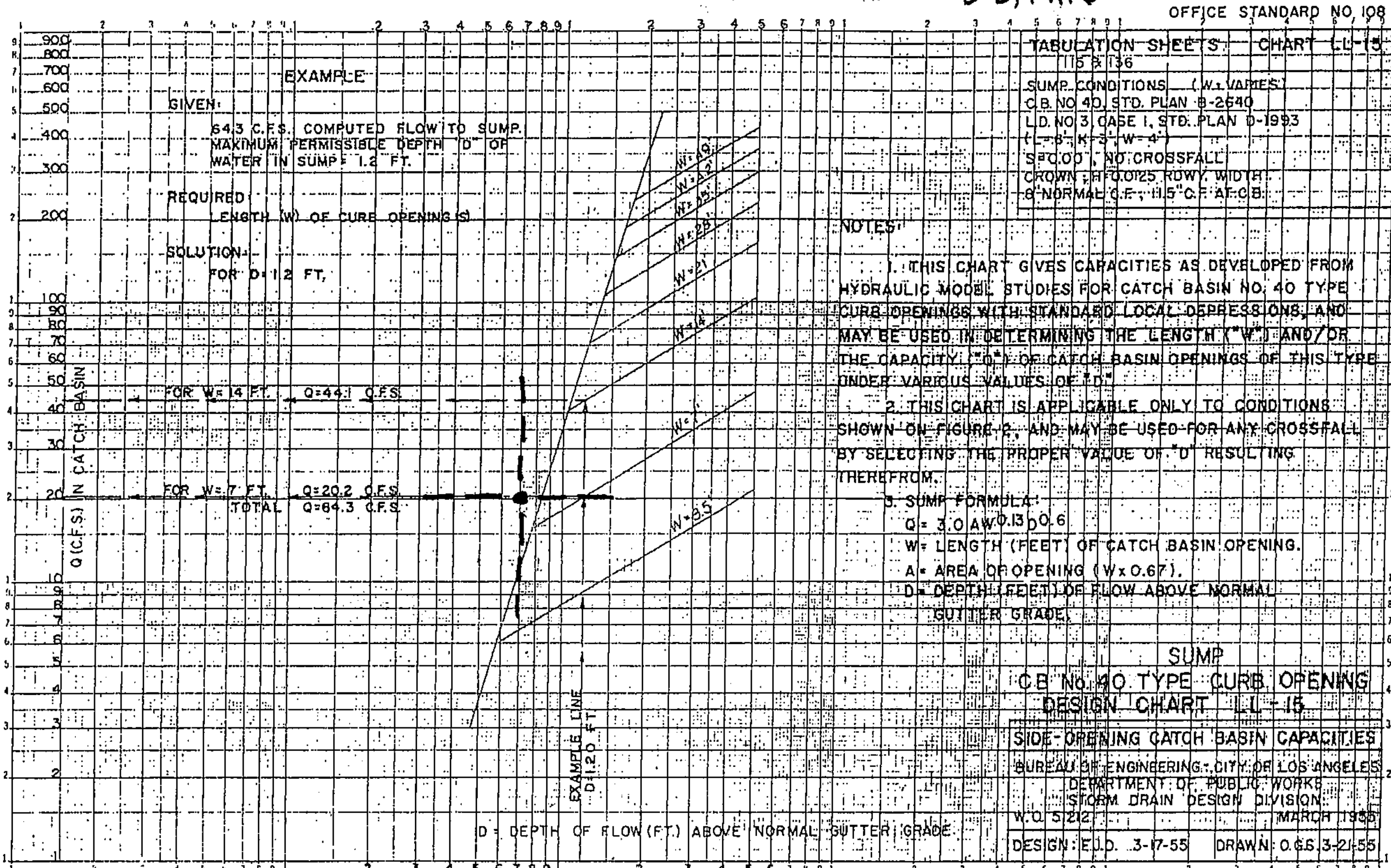
STA : 11+52.00(W) RIO OSO

D = 0.7' W = 9.2

Q = 19.89 USE : W = 10'

LINE : D-3, MH6

OFFICE STANDARD NO. 108



TRACT 28639-1 RIO VISTA VILLA

CATCH BASIN CAPACITY CHARTS

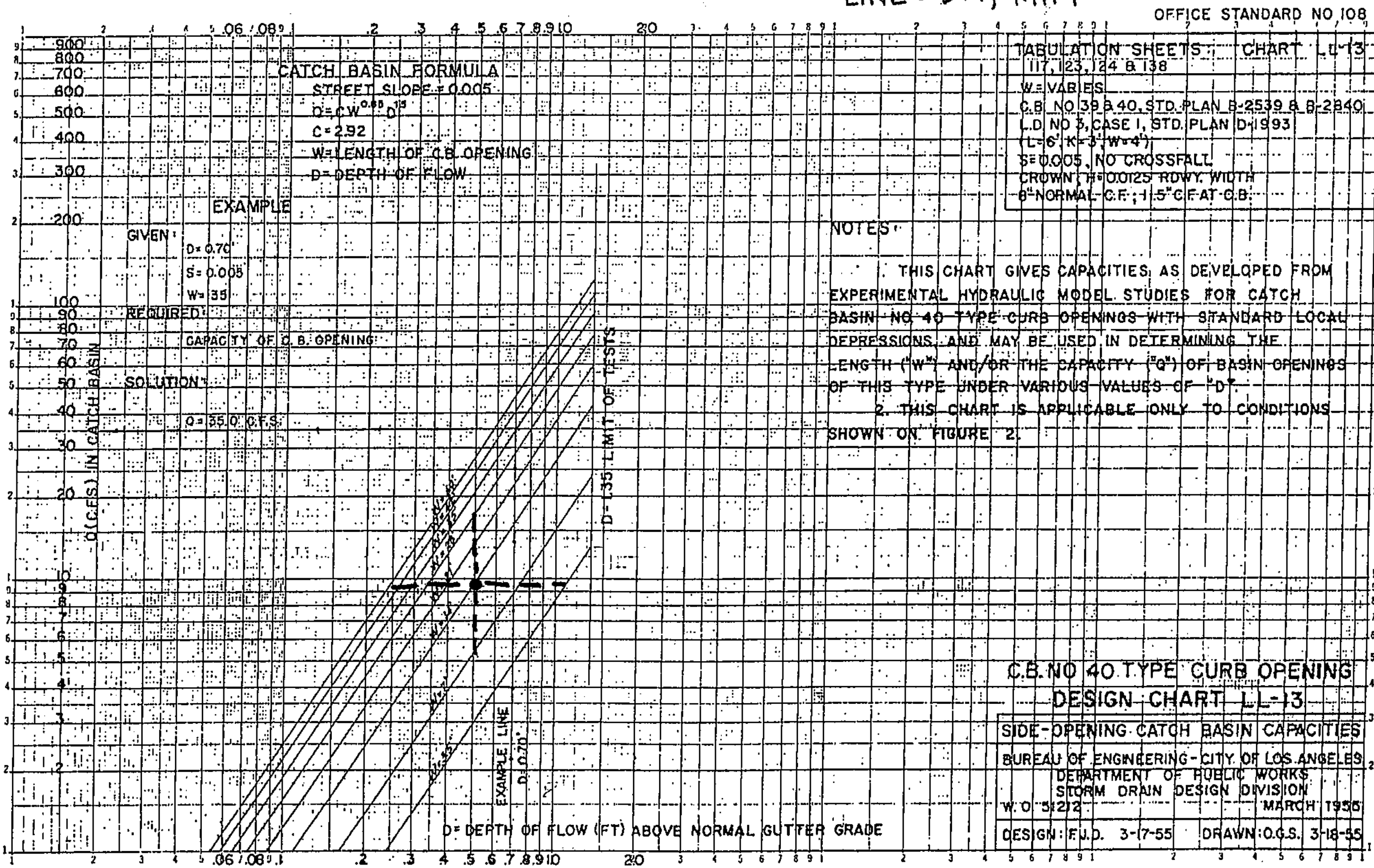
ON-GRADE CONDITION: $W = \left[Q / 2.92\, D^{1.5} \right]^{1.17647}$

STA: 66+21.30(S) RIO VISTA DR.

D = 0.51' W = 13.179

Q = 9.52 USE: W = 14'

LINE: D-4, MH 1



TRACT 28639-1 RIO VISTA VILLAGE

CATCH BASIN CAPACITY CHARTS

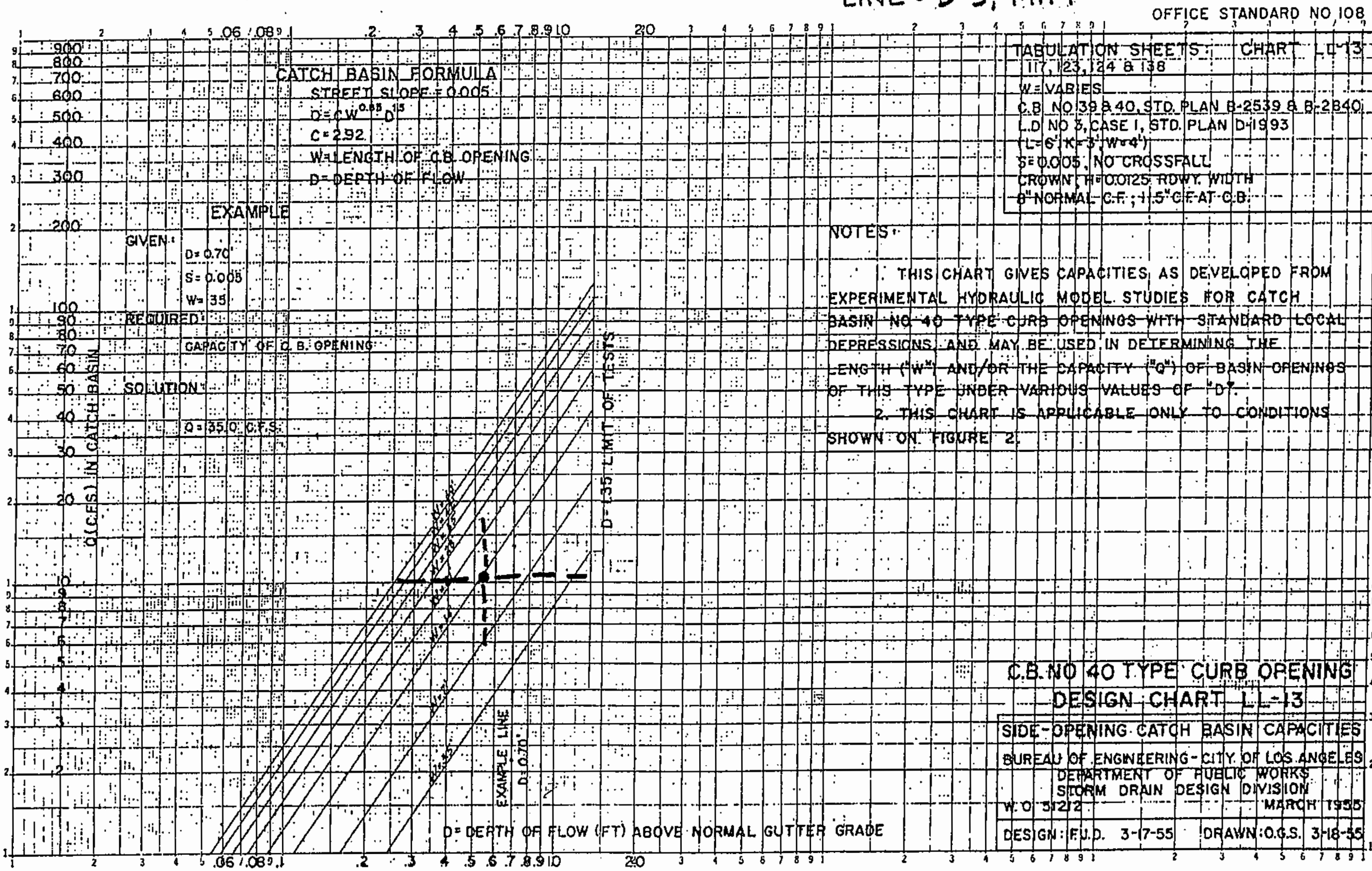
ON-GRADE CONDITION: $W = \left[Q / 2.92\, D^{1.5} \right]^{1.17647}$

STA: 66+21.30 (N) RIO VISTA DR.

D= 0.55' W= 13.17'

Q= 10.66 USE: W=14'

LINE: D-5, MH 1



TRACT 28639-1 RIO VISTA VILLAGE

STA: 11+34.81 (W) AVE. QUINTANA

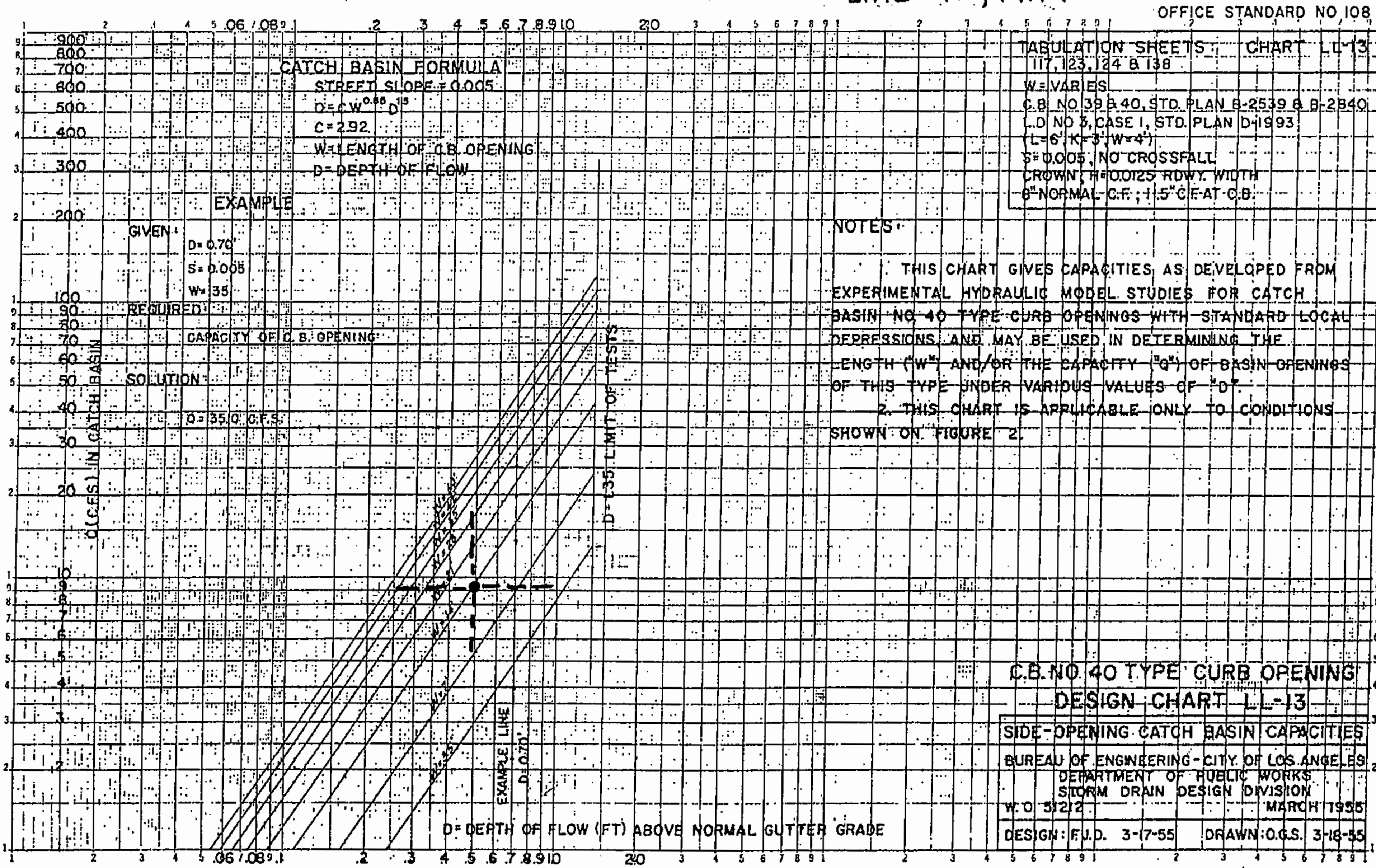
CATCH BASIN CAPACITY CHARTS

ON-GRADE CONDITION: $W = \left[\frac{Q}{2.92\, D^{1.5}} \right]^{1.17647}$

$D = 0.51'$ $W = 12.23'$

$Q = 8.935$ USE: $W = 14'$

LINE: H1, MH 7



TRACT 28639-1 RIO VISTA VILLA(

CATCH BASIN CAPACITY CHARTS

ON-GRADE CONDITION: $W = \left[\frac{Q}{2.92\, D^{1.5}} \right]^{1.17647}$

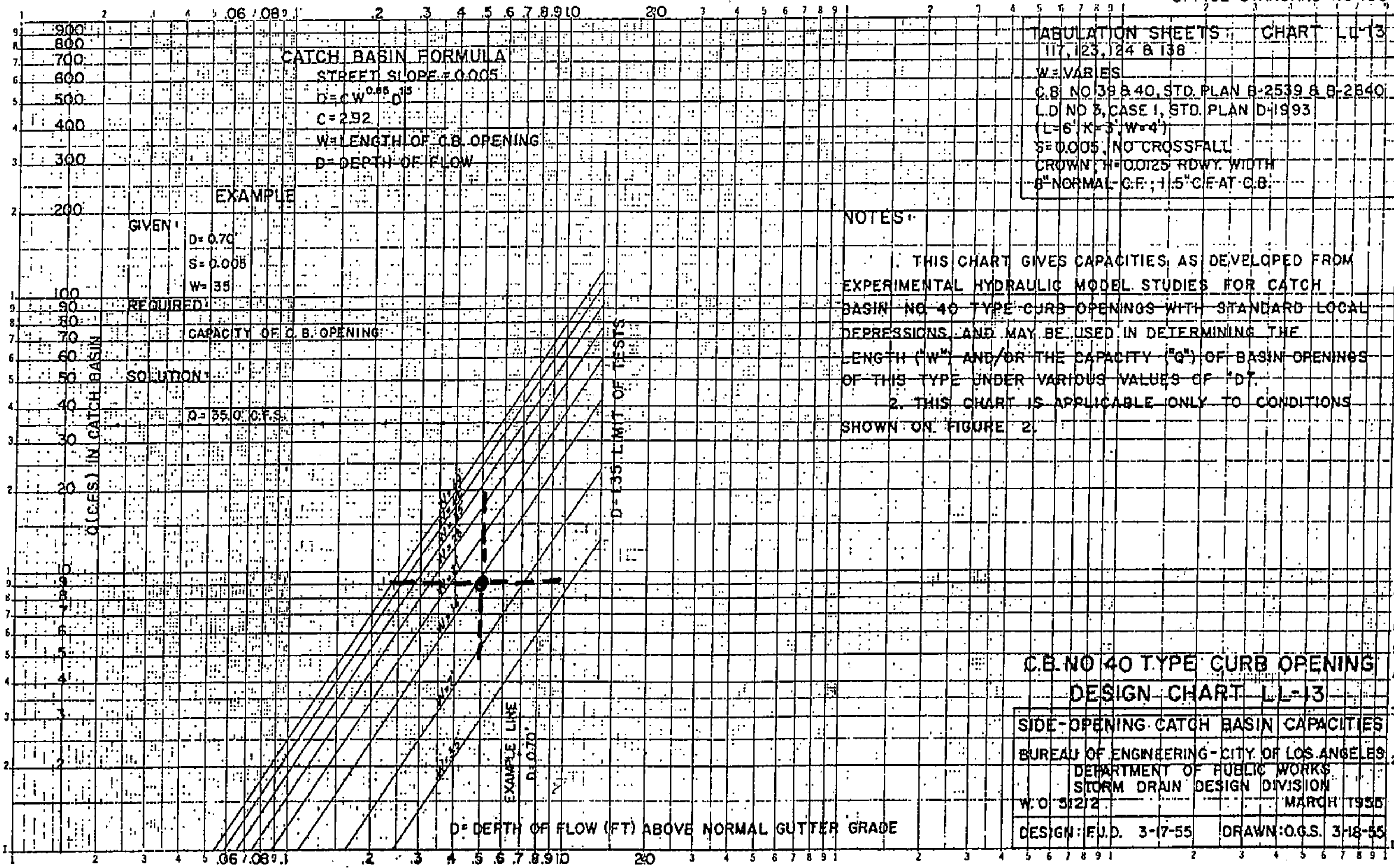
STA: 11+34.81 (E) AVE. QUINTANA

D = 0.51' W = 12.23'

Q = 8.935 USE: W = 14'

LINE: H1, MH 2

OFFICE STANDARD NO 108



FILE 0.U

RIO VISTA VILLAGE

MASTER PLAN OF DRAINAGE ALTERNATIVE

Prepared by:

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MARCH 2000

CITY OF CATHEDRAL CITY
ENGINEERING DIVISION
CHECK PRINT
DATE 4-5-00
BY

TABLE OF CONTENTS

SECTION 1: PURPOSE AND SCOPE

Unlike the previous Rio Vista Village Master Plan of Drainage (MPD), this Rio Vista Village Master Plan of Drainage Alternative (MPD-ALT) was prepared based upon the assumption that the 100-year storm flows are allowed to be conveyed within the limits of the public utility easement (PUE). With the exception of Landau Boulevard, the PUE limit extends 9 feet from the right-of-way limit of the proposed streets (see Figure 2).

The extent of the studies establishing this MPD-ALT includes the following:

1. Determination of the flow capacity of the proposed streets at the PUE limit.
2. Preparation of facility map (Exhibit B-1) showing location and sizes of underground facilities and storage capacity of the retention basins.
3. Preparation of the MPD-ALT report, figures, and facility map.

SECTION 2: HYDROLOGY

The hydrology calculations contained in the previous MPD were used in this study.

SECTION 3: CRITERIA

Storm drain facilities are implemented when the 100-year storm flow exceeds the PUE limit. The proposed underground facilities convey storm flows through the site, discharging them into the proposed retention basins. The underground facilities that are proposed in this MPD are located in the proposed right-of-way as shown in the facilities map (Exhibit B-1). Figure 1 shows the street capacity curves based upon varying slopes.

In keeping with the City's requirement of not allowing the 100-year onsite storm flows to leave the project site, retention basins are proposed in this MPD to store storm flows generated onsite.

SECTION 4: PROPOSED FACILITIES

The improvements proposed in the MPD-ALT are shown in the proposed facilities map (see Exhibit B-1). The facility designation corresponds to the stream designation from which the onsite hydrologic data can be obtained. The proposed improvements include underground storm drain facilities and retention basins. For example, the hydrologic data for Facility A1 can be obtained from "Subarea A Hydrology". Similarly, for Basin A, the unit hydrograph volume calculations can be obtained from "Subarea A Hydrograph Calculations". The map shows proposed general alignment and pertinent preliminary size information, as well as the 100-year design flow rates based upon ultimate development condition.

All of the necessary backup hydrological and hydraulics calculations in support of this MPD-ALT was obtained from the previous MPD report entitled, "RIO VISTA VILLAGE MASTER PLAN OF DRAINAGE, February 2000".

The following is a brief description of the proposed MPD-ALT facilities:

- Facility A system, consisting of Lines A-1, A-2, and Basin "A", is proposed to intercept, convey, and retain 100-year storm flows generated by onsite Subarea A. The tributary storm flows are proposed to be discharged into Basin "A". Line A-1 is identified as a 21-inch reinforced concrete pipe (RCP) while Line A-2 is proposed to be a 27-inch RCP. The design flows used to size the proposed underground system are 23 and 33 ft^3/sec (CFS) for Lines A-1 and A-2, respectively. The computed flood volume tributary to Basin "A" is 1.44 Acre-feet (AF). The proposed storage capacity of the retention basin is approximately 2.38 AF. Therefore, no overflow is anticipated from Basin "A".
- Facility B system consists of a continuous underground facility and Basin "B". The underground facility (Line B-1) consists of 36-inch RCP. It is designed to intercept and convey the 100-year tributary storm flow generated by onsite Subarea B of 56 CFS. The computed flood volume tributary to Basin "B" is 1.93 AF. The proposed storage capacity of the retention basin is approximately 3.66 AF. Therefore, no overflow is anticipated from Basin "B".
- Facility C system consists of a continuous underground facility and Basin "C". The underground facility (Lines C-1 and C-2) consists of 33-inch RCP. It is designed to intercept and convey the 100-year tributary storm flow generated by onsite Subarea C of 43 CFS. The computed flood volume tributary to Basin "C" is 1.41 AF. The proposed storage capacity of the retention basin is approximately 1.33 AF. A flood volume of approximately 0.08 AF is proposed to discharge into Basin "D".
- Facility D system consists of Lines D1-1 and D1-2 and Basin "D". The underground facility ranges in size from 36 to 48-inch RCP. It is designed to intercept and convey the 100-year tributary storm flows generated by onsite Subareas D1 and D2, ranging from 43 to 66 CFS. The computed flood volume tributary to Basin "D" is 1.96 AF. By considering the overflow flood volume from Basin "C" of 0.08 AF, the total flood volume discharging into Basin "D" is 2.04 AF. The proposed storage capacity of the retention basin is approximately 2.42 AF. Therefore, no overflow is anticipated from Basin "D".

- Facility E system consists of Lines E1, E2-1, and E2-2 and Basin "E". The underground facility ranges in size from 21 to 33-inch RCP. It is designed to intercept and convey the 100-year tributary storm flows generated by onsite Subareas E1 and E2, ranging from 25 to 54 CFS. The computed flood volume tributary to Basin "E" is 2.09 AF. The proposed storage capacity of the retention basin is approximately 1.80 AF. A flood volume of approximately 0.29 AF is proposed to discharge into Basin "F".
- Facility F system consists of Lines F-1 and Basin "F". The underground facility is proposed to be a 30-inch RCP. It is designed to intercept and convey the 100-year tributary storm flow generated by onsite Subarea F of 38 CFS. The computed flood volume tributary to Basin "F" is 1.51 AF. By considering the overflow flood volume from Basin "E" of 0.29 AF, the total flood volume discharging into Basin "D" is 1.80 AF. The proposed storage capacity of the retention basin is approximately 1.17 AF. A flood volume of approximately 0.63 AF is proposed to discharge into Basin "G".
- Facility G system consists of Lines G-1 and Basin "G". The underground facility is proposed to be a 33-inch RCP. It is designed to intercept and convey the 100-year tributary storm flow of 33 CFS generated by onsite Subarea G. The computed flood volume tributary to Basin "G" is 1.31 AF. By considering the overflow flood volume from Basin "F" of 0.63 AF, the total flood volume discharging into Basin "D" is 1.94 AF. The proposed storage capacity of the retention basin is approximately 3.07 AF. Therefore, no overflow is anticipated from Basin "G".
- Facility H system consists of Lines H1-1, H3, and Basin "H". The underground facility ranges in size from 21 to 30-inch RCP. It is designed to intercept and convey the 100-year tributary storm flows generated by onsite Subareas H1, H2 and H3, ranging from 12 to 57 CFS. The computed flood volume tributary to Basin "H" is 4.21 AF. Basin "H" will be implemented in conjunction with the future development phase associated with Subareas H1, H2, and H3.
- Facility I system, consisting of Lines I-1, I-2, and Basin "I", is proposed to intercept, convey, and retain 100-year storm flows generated by onsite Subarea I. The tributary storm flows are proposed to be discharged into Basin "I". Lines I-1 and I-2 consist of 18-inch RCP. The design flow used to size the proposed underground system is 10 CFS. The computed flood volume tributary to Basin "I" is 0.47 AF. Like Basin "H", Basin "I" will be implemented in conjunction with the future development phase associated with Subarea I.
- Facility J system, consisting of Line J1 and Basins "J1" and "J2", is proposed to intercept, convey, and retain 100-year storm flows generated by onsite Subarea I. Line J1 is proposed to be a 30-inch RCP. It is sized to convey 24 CFS. The computed flood volume tributary to Basins "J1" and "J2" are 3.85 and 1.54 AF, respectively. The proposed basins will be implemented in conjunction with the future development phase associated with Subareas J1 and J2.
- Basins "K1" and "K2" are proposed to retain the 100-year storm flows generated by the onsite Subareas K1 and K2. The computed flood volume tributary to Basins "K1" and "K2" are 0.55 and 0.69 AF, respectively. The proposed basins will be implemented in conjunction with the future development phase associated with Subareas K1 and K2.

SECTION 5: CONCLUSIONS

Based on the study and investigations made for this report, it is concluded that:

1. By utilizing the public utility easement (PUE) for 100-year flow conveyance, the requirement for onsite underground drainage facilities is less than what was proposed in the previous MPD.
2. Based upon the assumption that the 100-year storm flows will be conveyed within the limits of the PUE, implementation of the proposed drainage facilities as presented in this MPD-ALT will provide the Rio Vista Village project with 100-year flood protection from storm flows generated onsite.
3. The onsite 100-year storm flows will be intercepted and conveyed safely through the proposed drainage facilities. Additionally, these storm flows will be retained within the proposed retention basins, with the exception of some minor storm flows that will be allowed to discharge onto Landau Boulevard.
4. In the interim condition, 100-year offsite storm flows emanating from drainage areas to the north may impact the capacity of the proposed MPD-ALT drainage facilities if these flows are allowed to traverse the project site. Similarly, if the existing Morongo Creek Stormwater Channel lacks the flow capacity or structural integrity to convey the tributary storm flows, then the resulting errant flows may impact the capacity of the proposed MPD-ALT facilities.

SECTION 6: RECOMMENDATIONS

It is recommended that:

1. The Rio Vista Village MPD-ALT, as set forth herein, be used as a planning tool for managing the project (onsite) drainage flows.
2. The potential impact of the offsite storm flows to the flow conveyance and storage capacities of the proposed MPD-ALT facilities be evaluated.

BASIN A
FLOOD VOLUME = 1.44 AF
BASIN CAPACITY = 2.38 AF.

BASIN B
FLOOD VOLUME = 1.93 AF
BASIN CAPACITY = 3.66 AF

BASIN C
FLOOD VOLUME = 1.41 AF
BASIN CAPACITY = 1.33 AF
SPILL TO BASIN D = .08 AF

BASIN D
FLOOD VOLUME = 1.96 AF
SPILL FROM BASIN C = .08 AF
TOTAL FLOOD VOLUME= 2.04 AF
BASIN CAPACITY = 2.42 AF

BASIN E
FLOOD VOLUME = 2.09 AF
BASIN CAPACITY = 1.80 AF
SPILL TO BASIN F = .29 AF

BASIN F
FLOOD VOLUME = 1.51 AF
SPILL FROM BASIN F = .29 AF
TOTAL FLOOD VOLUME= 1.80 AF
BASIN CAPACITY = 1.17 AF
SPILL TO BASIN G = .63 AF

BASIN G
FLOOD VOLUME = 1.31 AF
SPILL FROM BASIN F = .63 AF
TOTAL FLOOD VOLUME = 1.94 AF
BASIN CAPACITY = 3.07 AF

BASIN H
FLOOD VOLUME = 4.21 AF

BASIN I
FLOOD VOLUME = .47 AF

BASIN J1
FLOOD VOLUME = 3.85 AF

BASIN J2
FLOOD VOLUME = 1.54 AF

BASIN K1
FLOOD VOLUME = .55 AF

BASIN K2
FLOOD VOLUME = .69 AF

RIO VISTA VILLAGE MASTER PLAN OF DRAINAGE

PROPOSED FACILITIES MAP (ULTIMATE CONDITION)

EXHIBIT "B-1"

AEI·CASC ENGINEERING
937 SOUTH VIA LATA
SUITE # 500
COLTON, CA. 92324
PH. (909) 783-0101 FAX (909) 783-0108

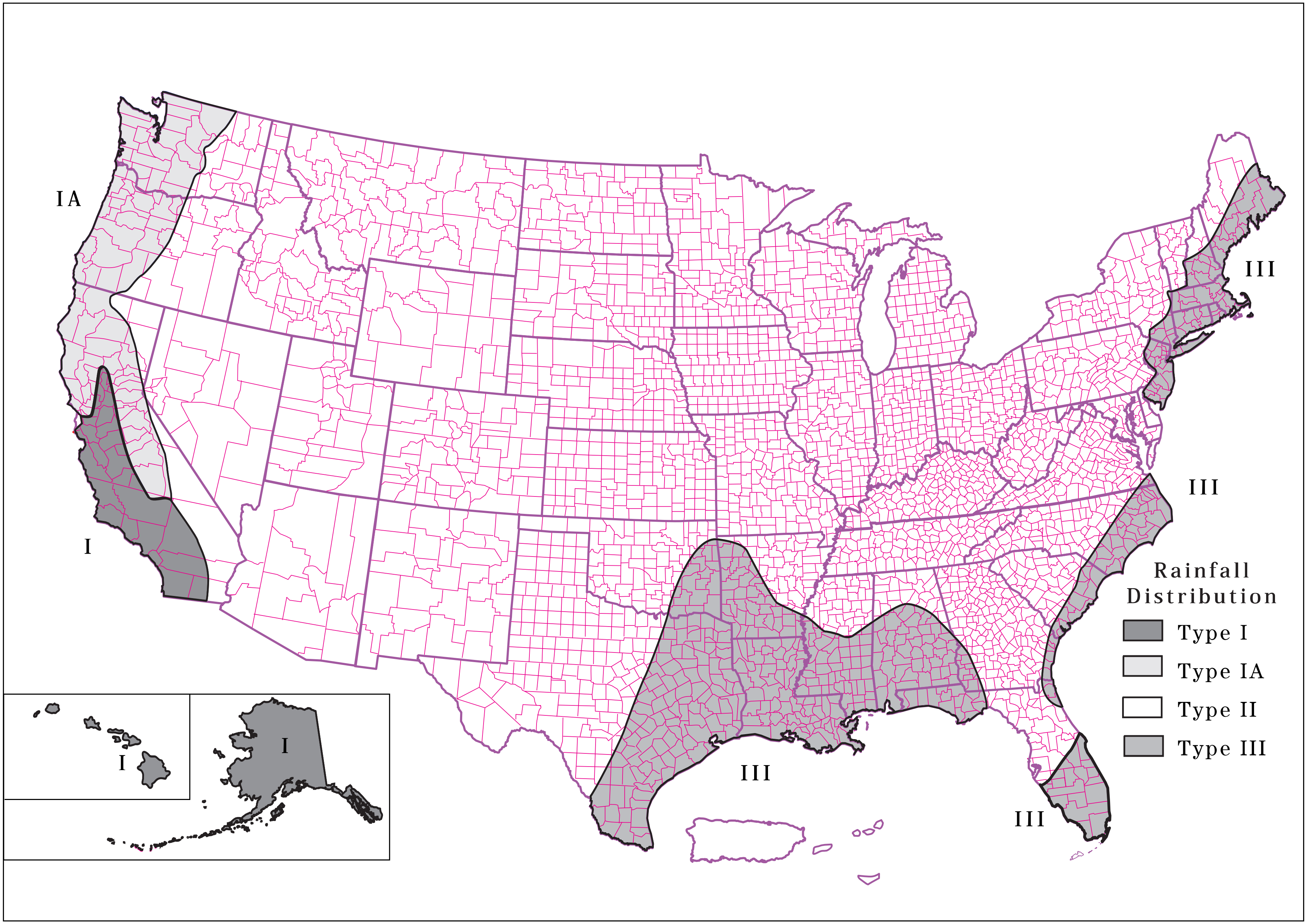
DESIGNED BY:	DRAWN BY:	CHECKED BY:	FILING NO.
JB		CVA	
PLANS PREPARED UNDER THE SUPERVISION OF:			DRAWING NO.
JOHN BURTON R.C.E. 47103		DATE	SHEET 1 OF 1

O:\712_Burnett\ FACILITY_MAP.dwg 02/04/00 14:35

APPENDIX 8

SUPPORTING DOCUMENTS

Figure B-2 Approximate geographic boundaries for NRCS (SCS) rainfall distributions



Runoff Coefficients (C)

Area Description	Coefficient Value	Typical Design
Business:		
Central business	0.70 - 0.95	
District and local	0.50 - 0.70	
Residential:		
Single family	0.35 - 0.45	
Multi-units detached	0.40 - 0.75	
Suburban	0.25 - 0.40	
Apartments	0.50 - 0.70	
Industrial:		
Light	0.50 - 0.80	
Heavy	0.60 - 0.90	
Parks, **cemeteries**	0.10 - 0.25	
Playgrounds	0.20 - 0.35	
Railroad yards	0.20 - 0.40	
Lawns		
Sandy soil	0.05 - 0.20	
Heavy soil	0.18 - 0.35	0.30
Unimproved	0.10 - 0.30	0.20
Asphaltic	0.70 - 0.95	0.90
Concrete	0.80 - 0.95	0.90
Roofs	0.75 - 0.95	0.90

Source: ASCE

The following table shows SCS curve number values, according to the SCS method for runoff calculations. Please scroll down for a description of the soil groups.

SCS Curve Numbers (CN)

Description of Land Use	**Hydrologic Soil Group**			
	A	**B**	**C**	**D**
Paved parking lots, roofs, driveways	98	98	98	98
Streets and Roads				
Paved with curbs and storm sewers	98	98	98	98
Gravel	76	85	89	91
Dirt	72	82	87	89
Cultivated (Agricultural Crop) Land				
Without conservation treatment (no terraces)	72	81	88	91
With conservation treatment (terraces, contours)	62	71	78	81
Pasture or Range Land				
Poor (<50% ground cover or heavily grazed)	68	79	86	89
Good (50-75% ground cover; Not heavily grazed)	39	61	74	80
Meadow (grass, no grazing, mowed for hay)	30	58	71	78
Brush (good, >75% ground cover)	30	48	65	73
Woods and Forests				
Poor (small trees/brush destroyed by over-grazing or burning)	45	66	77	83
Fair (grazing but not burned; some brush)	36	60	73	79
Good (no grazing; brush covers ground)	30	55	70	77
Open Spaces (lawns, parks, golf courses, cemeteries, etc.)				
Fair (grass covers 50 – 75% of area)	49	69	79	84
Good (grass covers >75% of area)	39	61	74	80
Commercial and Business Districts (85% impervious)	89	92	94	95
Industrial Districts (72% impervious)	81	88	91	93
Residential Areas				
1/8 acre lots, about 65% impervious	77	85	90	92
1/4 acre lots, about 38% impervious	61	75	83	87
1/2 acre lots, about 25% impervious	54	70	80	85
1 acre lots, about 20% impervious	51	68	79	84

Group A Soils: High infiltration (low runoff). Sand, loamy sand, or sandy loam. Infiltration rate > 0.3 in/hr when wet.
Group B Soils: Moderate infiltration (moderate runoff). Silt loam or loam. Infiltration rate 0.15 – 0.30 in/hr when wet.
Group C Soils: Low infiltration (moderate to high runoff). Sandy clay loam. Infiltration rate 0.05 – 0.150 in/hr when wet.
Group D Soils: Very low infiltration (high runoff). Clay loam, silty clay loam, sandy clay, silty clay, or clay. Infiltration rate 0 – 0.05 in/hr when wet.