Preliminary Hydrology Report

Mapes & Trumble Industrial Project

APN: 329-020-033, 034, 044 & 046

August 2022

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Contents

Appendices

References

Hydrology Manual. Riverside County Flood Control and Water Conservation District, April 1978.

100.0 Introduction

Kimley-Horn and Associates has been retained to prepare a Preliminary Hydrology Report for the proposed Mapes and Trumble Industrial Project in Perris, California. The purpose of this report is to demonstrate preliminary analysis of the hydrologic and hydraulic conditions associated with the development of the project site. To do so, the following is the scope of this report:

- Discuss the pre-development discharge patterns and points
- Discuss the post-development discharge patterns and points
- Determine the pre-development flow rates for the 2-year, 10-year and 100-year events
- Determine the post-development unmitigated flow rates for the 2-year, 10-year and 100-year events
- Analyze the required post-development onsite mitigation for the 2-year and 100-year event

Even though this report discusses stormwater, this report is not a Stormwater Pollution Prevention Plan (SWPPP), a Groundwater Study, a Geotechnical Report, nor a Water Quality Management Plan (WQMP). Each of these separate reports discusses separate aspects of stormwater. Portions of the Geotechnical Report are utilized and referenced for the purpose of this report. Similarly, the stormwater mitigation requirements of the WQMP are considered for sizing the BMPs and outlet structures used for this project.

100.1 Project Description

The existing vacant lot will be developed into the proposed Mapes and Trumble Industrial Project. The proposed development will include an industrial building with truck loading docks. Site improvements will include landscaping, concrete hardscape and asphalt paving. The associated improvements include, but are not limited to onsite grading, domestic water service, sanitary sewer service, storm drain infrastructure, concrete and asphalt pavement, landscaping and irrigation. The project will also include offsite improvements along Mapes Road, Trumble Road, and Exceed Road. However, this preliminary study will only focus on the onsite analysis, and the Final Hydrology Report will include both onsite and offsite analysis. The project site is approximately 19.0 acres, and the project will not be phased.

100.2 Location

The site is located at the southwest intersection between Mapes Road and Trumble Road in the City of Perris, within Riverside County. The project site is bordered by Interstate 215 to the west, Mapes Road to the north, Trumble Road to the east, and an industrial building to the south. For reference, see the Location Map in Appendix A.

100.3 Methodology

The hydrologic and hydraulic analyses were completed following the methods outlined in the RCFC & WCD Hydrology Manual. The rational method was used to estimate time of concentrations and peak flow rates generated from the existing and proposed 2-year, 10-year and 100-year storm events. The synthetic unit hydrograph method was used to determine the onsite existing and proposed hydrographs for the 24-hour duration of the 2-year and 100-year storm event. To determine the outflow from the proposed BMPs, a basin routing analysis was performed for the 2-year and 100-year storm event. The CivilDesign Engineering Software – 2018 Version 9.0 was used to complete the rational method, synthetic unit hydrograph, and basin routing analyses. The results of the rational method analyses are included in Appendix I, the results of the synthetic unit hydrograph analyses are included in Appendix J, and the basin analysis is included in Appendix K. As mentioned previously, this preliminary study is limited to onsite analyses, and the complete onsite and offsite drainage system analyses will be provided in the Final Hydrology Report.

For the rational method and unit hydrograph analysis, the slope of the intensity duration curve from the Riverside County Flood Control and Water Conservation District Hydrology Manual was used along with rainfall data from NOAA Atlas 14 for the project site. See Appendices D and E for rainfall data along with the slope of the intensity duration curve. For the basin routing analysis, the results of unit hydrograph analysis was used along with the stage-storage parameters of the detention system to obtain the peak outflows from the BMPs for both the 2-year and 100-year storm events.

The type of soil and soil conditions are major factors affecting infiltration/detention and resultant storm water runoff. The Natural Resources Conservation Service (NRCS) has classified soil into one general hydrologic soil group for comparing infiltration and runoff rates. The group is based on properties that influence runoff, such as water infiltration rate, texture, natural discharge, and moisture condition. The runoff potential is based on the amount of runoff at the end of a long duration storm that occurs after wetting and swelling of the soil not protected by vegetation. Using the United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey online tool, it was determined the predominant hydrologic soil group classification onsite is D. Based on Plate C-1.42 of the Hydrology Manual, the site soils is type D as well. Soil type D is defined as soils having poor infiltration rates (high runoff potential). Based on the Geotechnical Investigation and Percolation Testing Report prepared by AES Soils, water did not percolate, and the proposed site is considered to be a poor candidate for onsite infiltration. See Appendix D and F for the soil information.

In addition, antecedent moisture condition (AMC) I, II, and III was used to calculate the peak flows and volumes for the 2-year, 10-year, and 100-year storm events respectively based on the hydrology manual. The land use selected for the proposed drainage subareas is “Commercial”. See Appendix D Plate D-5.6 for the impervious percentages that correspond to each land use.

100.4 Drainage Characteristics

The site is in Zone AE and Zone X per the Federal Emergency Management Administration (FEMA) Flood Insurance Rate Map (FIRM) panel 06065C1445H, dated August 18, 2014. For reference, see FIRM Map in Appendix B.

Flood Zone AE is defined by FEMA as areas with base flood elevations determined. Flood Zone AE is located within a special flood hazard area subject to inundation by the 100-year flood. The base flood elevation on the project site is 1420 ft. Flood Zone X is defined by FEMA as aeras with 0.2% annual chance flood hazard and areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile.

100.4.1 Pre-development Condition

Under the existing conditions, the project site drains towards the northwest. The existing condition of the project site is undeveloped with poor land coverage. Under existing conditions, the project site was subdivided into three drainage areas (A1, A2, and A3). Both A1 and A2 confluence and sheet flow towards the northwest through an existing swale where it will sheet flow into an existing catch basin located along Mapes Road and enter the Perris Flood Control Channel where it will discharge into the overland. Under existing conditions, the project site also accepts offsite runon from the south along Exceed Road. Offsite runon sheet flows through the site and similarly enters the existing catch basin.

Table 1 shows a summary of the Onsite Pre-development Flows. See the Pre-Development Hydrology Exhibit in Appendix H for more information and Appendix I for the Rational Method Calculations.

Table 1: 100-year Onsite Pre-development Flows

Area Description	Area (acres)	Q_2 (cfs)	V_2 (cf)	Q_{10} (cfs)	V_{10} (cf)	Q_{100} (cfs)	V_{100} (cf)
Total	**19.01**	**8.30**	**14,323**	**21.84**	**97,291**	**39.91**	**277,142**

100.4.2 Post-development Condition

Similar to the existing conditions, the post-developed project site will predominantly drain northwest to maintain the existing flow pattern to the maximum extent possible. The project proposes to construct one (1) new industrial building with truck loading docks, landscaping, concrete hardscape, and asphalt paving. See Appendix C for the Construction Plans.

Per the Romoland Master Drainage Plan (MDP), originally prepared in April 1988 and revised in March 2006, the project site is intended to discharge into the overland via the Perris Flood Control Channel.

Under the proposed conditions, stormwater runoff will be collected by nearby catch basins and conveyed to an underground detention system. The detention system will mitigate stormwater runoff and route it into a nearby Modular Wetland System for treatment. When the required treatment volume is stored within the detention system, excess runoff will bypass the Modular Wetland System via orifice openings within the detention system. Since it is infeasible to retain runoff onsite via infiltration, all runoff is proposed to discharge into the existing catch basin located along Mapes Road towards the northwest of the project.

The developed project site includes eleven (11) drainage areas. Runoff within drainage areas A1 through A9 is proposed to be routed towards Detention System #1 and MWS #1 located towards the west of the project site, and runoff within drainage areas B1 and B2 is proposed to be routed towards Detention System #2 and MWS #2 located towards the northeast of the project site. The modular wetland system is intended to treat the required runoff prior to discharging offsite, and the detention system is intended to detain and control the flow rate of excess runoff leaving the site through the orifice openings.

To handle the offsite runon along Exceed Road, a new catch basin and storm drain system is proposed to route the offsite runon directly into the existing catch basin without treatment.

Table 2 shows a summary of the Onsite Post-development Flows (unmitigated). For more information, refer to the Post Development Hydrology Exhibit in Appendix H and the Rational Method Calculations in Appendix I.

Table 2: Onsite Post-development Flows (unmitigated)

Area Description	Area (acres)	Q_2 (cfs)	V_2 (cf)	Q_{10} (cfs)	V_{10} (cf)	Q_{100} (cfs)	V_{100} (cf)
A	18.09	19.96	103,019	37.48	174,985	62.05	305,203
B	0.92	1.00	4,726	1.94	8,098	3.28	14,780
Total	**19.01**	**20.96**	**107,746**	**39.42**	**183,083**	**65.34**	**319,983**

100.5 Stormwater Mitigation

Since infiltration is infeasible, the proposed development will be required to treat the design capture volume prior to discharging runoff offsite. In addition, since the project is within an HCOC Applicable Area, the project will be restricted to discharging up to 110% of the pre-development peak flow for a 2-year storm event. For the 100-year storm event, this project proposes to restrict the peak flow to be no greater 90% of the pre-development peak flow.

Table 3: Mitigation Requirements

Area Description	Area (acres)	DCV (CF)	Allowable Q_2 (cfs)	Allowable Q_{100} (cfs)
A	18.09	26,297	-	-
B	0.92	1,106	-	-
Total	**19.01**	**27,403**	**9.13**	**35.92**

To mitigate and treat the required runoff generated onsite, the project proposes a combination of an underground detention system and modular wetland system. To ensure that the required volume is treated by the modular wetland system, the orifices used to control the peak flow rate are placed at an elevation above the DCV elevation. For Detention System #1, the bottom of the orifice is placed at 8’ above the bottom of the detention system and for Detention System #2, the bottom of the orifice is placed at 4.5’ above the bottom of the detention system.

Table 4 below shows a summary of the basins and Appendices J and K contain the basin analysis calculations.

Table 4: Basin Routing Analysis

Area Description	Volume Treated (CF)	2-Year Peak Runoff (cfs)	100-Year Peak Runoff (cfs)
A	26,993	3.55	12.56
B	1,257	0.18	0.63
Total	**28,249**	**3.73**	**13.19**

100.6 Hydraulic Analysis

The calculated peak flows form the analyses discussed above will be used to size the onsite drainage devices such as the storm drain pipes and catch basin sizing. Sizing calculations will be performed and included in the Final Hydrology Report.

100.7 Conclusion

In conclusion, the following was covered in this report:

- The pre-development discharge patterns and points were analyzed
- The post-development discharge patterns and points were analyzed
- The pre-development flow rates for the 2-year, 10-year, and 100-year events were determined
- The post-development unmitigated flows for the 2-year, 10-year, and 100-year events were determined
- The required stormwater mitigation for the 2-year and 100-year events was determined

As discussed in the contents of this report, the development is not expected to cause a significant impact to downstream systems for storms up to the 100-year condition.

Appendix A

Location Map

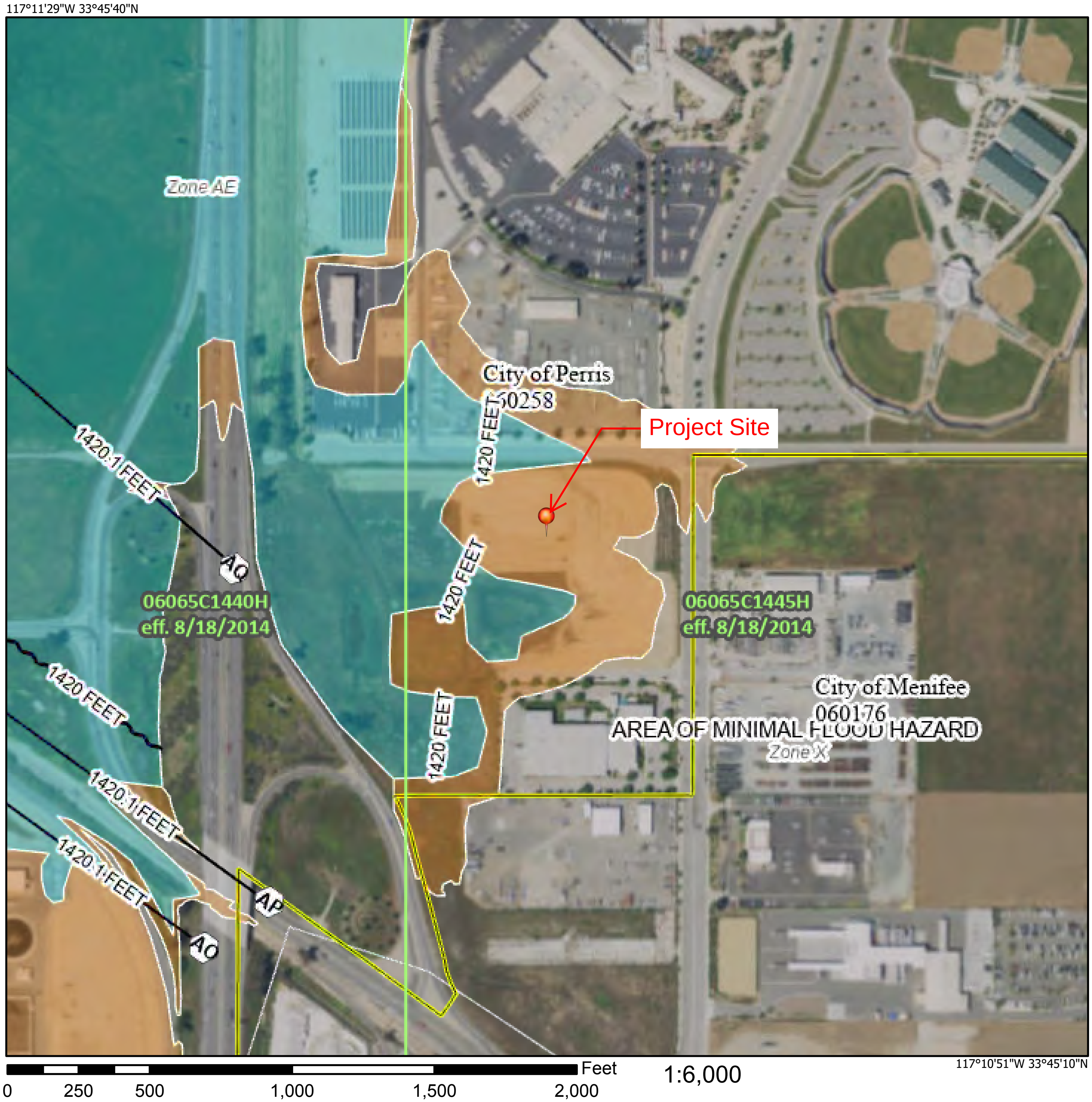
Location Map

Appendix B

FIRM Map

National Flood Hazard Layer FIRMette

FEMA



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Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	🟦	Without Base Flood Elevation (BFE) *Zone A, V, A99* With BFE or Depth *Zone AE, AO, AH, VE, AR*
	▨	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	🟧	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	▨	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	▨	Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
	▨	Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN	Area of Minimal Flood Hazard *Zone X*
	☐	Effective LOMRs
	🟧	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	– — –	Channel, Culvert, or Storm Sewer
	ııııııı	Levee, Dike, or Floodwall
OTHER FEATURES	Ⓑ 20.2 / 17.5	Cross Sections with 1% Annual Chance Water Surface Elevation
	8 — — —	Coastal Transect
	~~513~~~	Base Flood Elevation Line (BFE)
	—	Limit of Study
	—	Jurisdiction Boundary
	--- ---	Coastal Transect Baseline
	- —	Profile Baseline
	—	Hydrographic Feature
MAP PANELS	☐	Digital Data Available
	☐	No Digital Data Available
	☒	Unmapped
	●	The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

N

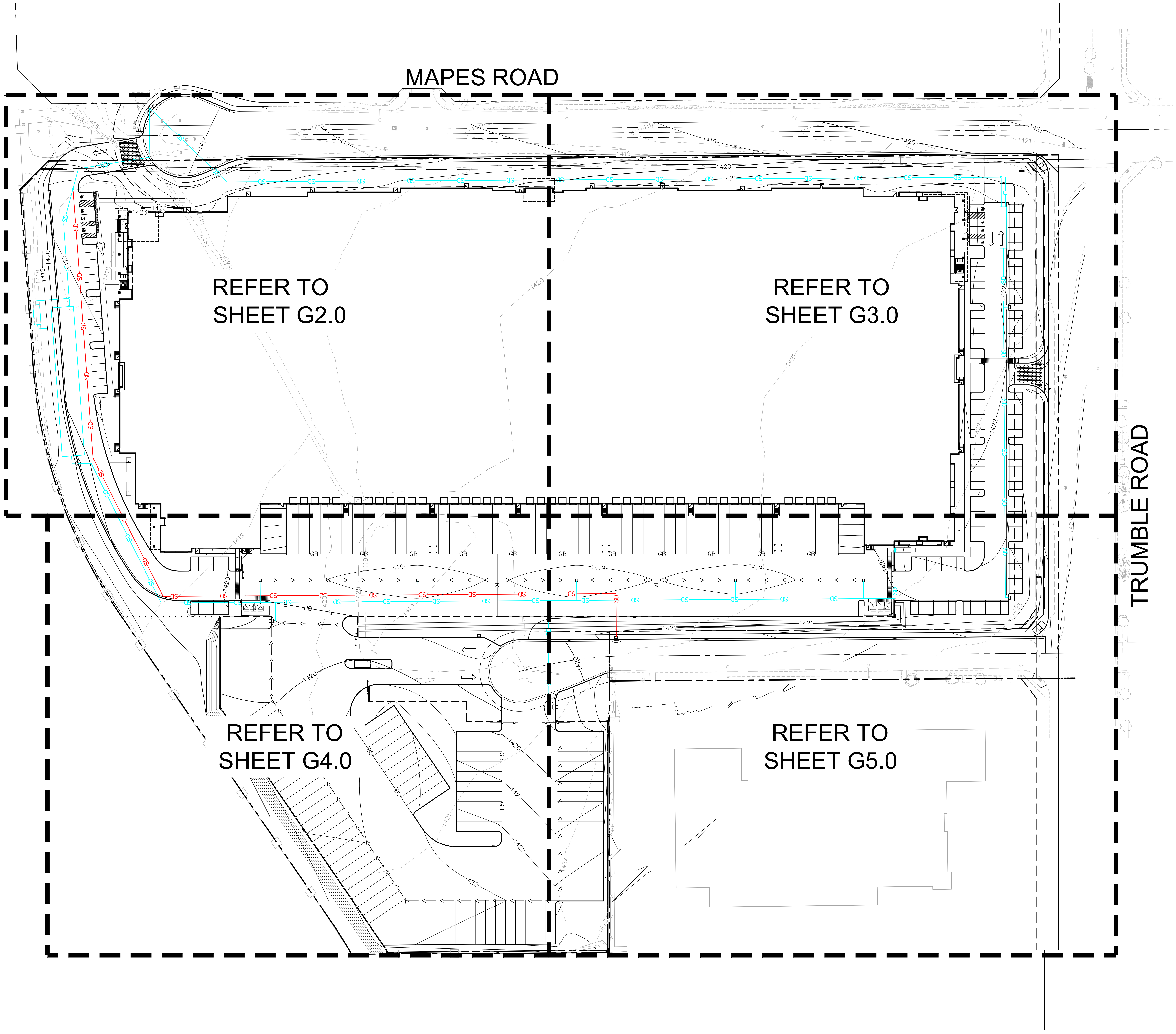
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/1/2022 at 2:42 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix C

Construction Plans



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NORTH

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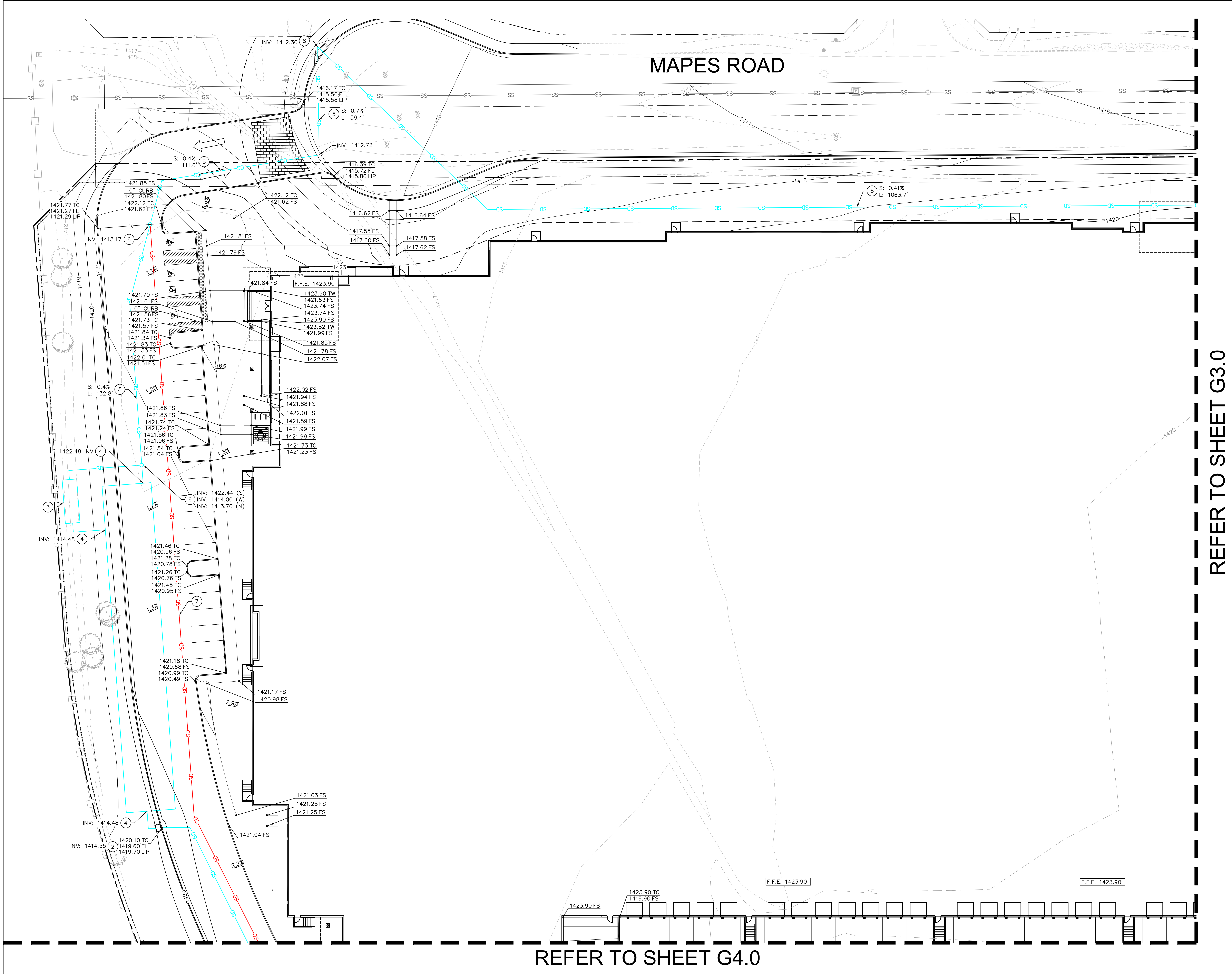

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DATUM NOTES

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DRAINAGE STATEMENT

STORMWATER RUNOFF GENERATED ONSITE WILL BE CAPTURED BY THE PROPOSED GRATE INLETS AND CATCH BASINS. FROM THERE, WATER WILL BE ROUTED VIA PROPOSED STORM DRAIN PIPE INTO THE PROPOSED UNDERGROUND WATER TREATMENT/STORAGE TANKS. WATER AFTER LEAVING THE TANKS WILL DRAIN VIA PROPOSED STORM DRAIN PIPE INTO AN EXISTING OFFSITE CATCH BASIN THAT DRAINS OUT INTO AN EXISTING NATURALLY VEGETATED CHANNEL. THE FLOW TO THE EXISTING CATCH BASIN SHALL NOT EXCEED THE EXISTING HYDROLOGY CONDITIONS.

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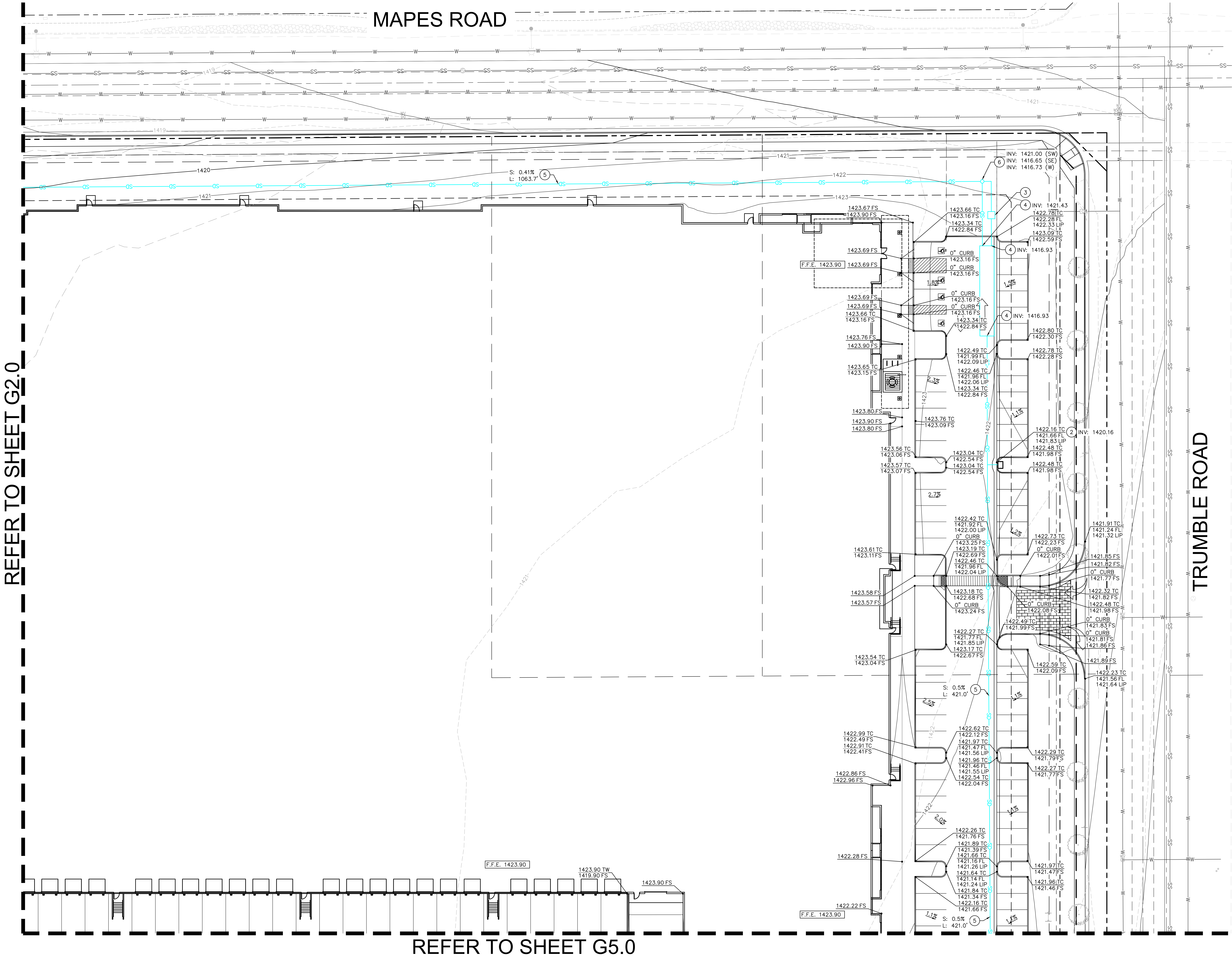

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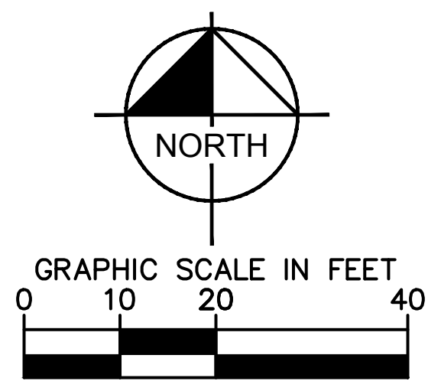

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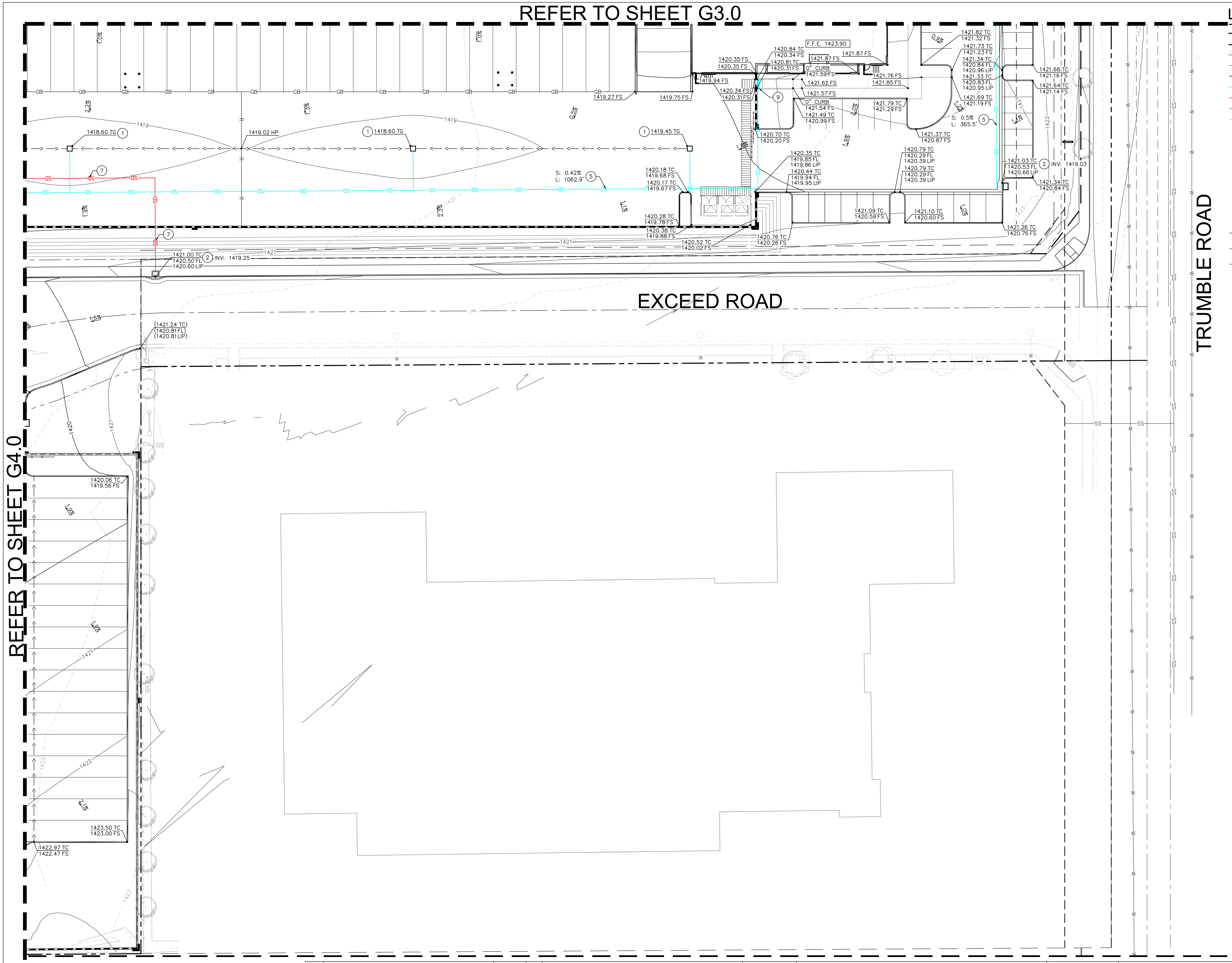

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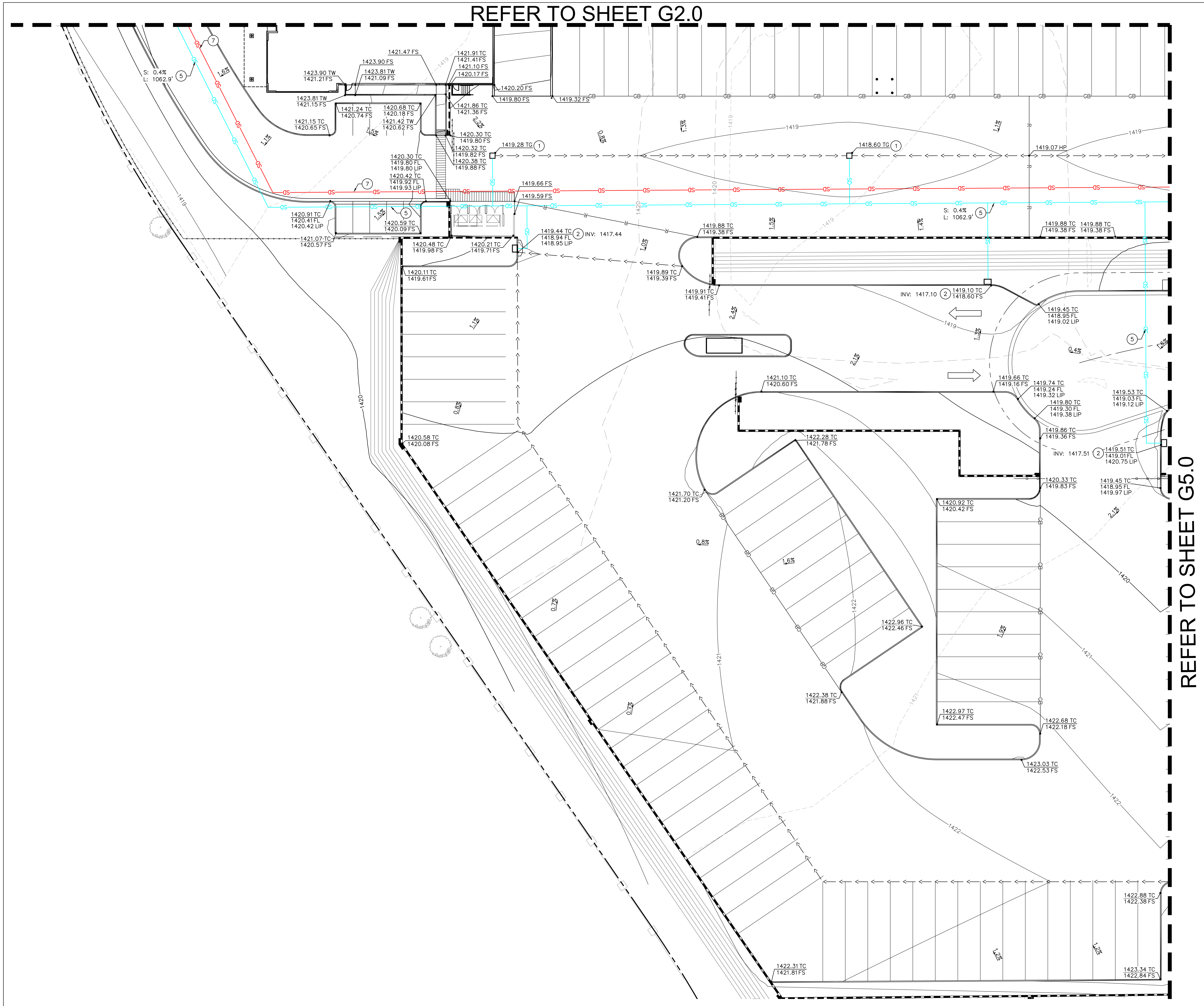

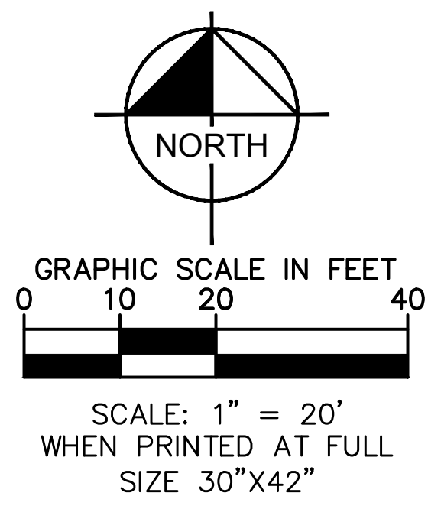

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BS	BOTTOM OF STAIRS
(1419.50 TC) (1419.00 FS)	EXISTING GRADE
1419.50 TC 1419.00 FS	PROPOSED GRADE
—> —> —> —> —	FLOW LINE
——GB——	GRADE BREAK LINE
——R——	RIDGE LINE

DATUM NOTES

DATUM HAS BEEN ADJUSTED BY ORIGINAL SURVEYOR TO OPUS NAVD88 DATUM. DATUM HAS BEEN ESTIMATED TO BE ACCURATE TO THE 0.18' OF THE COUNTRY BENCHMARK.

DRAINAGE STATEMENT

STORMWATER RUNOFF GENERATED ONSITE WILL BE CAPTURED BY THE PROPOSED GRATE INLETS AND CATCH BASINS. FROM THERE, WATER WILL BE ROUTED VIA PROPOSED STORM DRAIN PIPE INTO THE PROPOSED UNDERGROUND WATER TREATMENT/STORAGE TANKS. WATER AFTER LEAVING THE TANKS WILL DRAIN VIA PROPOSED STORM DRAIN PIPE INTO AN EXISTING OFFSITE CATCH BASIN THAT DRAINS OUT INTO AN EXISTING NATURALLY VEGETATED CHANNEL. THE FLOW TO THE EXISTING CATCH BASIN SHALL NOT EXCEED THE EXISTING HYDROLOGY CONDITIONS.

DRAINAGE NOTES

① PROPOSED STORM DRAIN INLET.
② PROPOSED CURB OPENING CATCH BASIN.
③ PROPOSED MODULAR WETLAND SYSTEM.
④ PROPOSED WATER STORAGE TANK.
⑤ PROPOSED STORM DRAIN LINE.
⑥ PROPOSED STORM DRAIN MANHOLE.
⑦ PROPOSED OFFSITE STORM DRAIN LINE.
⑧ PROPOSED CONNECTION TO EXISTING CATCH BASIN.
⑨ PROPOSED TRAFFIC RATED TRENCH DRAIN.

No.	REVISIONS	DATE	BY

Kimley»Horn

1100 W TOWN AND COUNTRY ROAD,SUITE 700,
ORANGE, CA 92868
PHONE: 714-939-1030 FAX: 714-938-9488
WWW.KIMLEY-HORN.COM

KHA PROJECT	
DATE	
SCALE	AS SHOWN
DESIGNED BY	JR
DRAWN BY	JR
CHECKED BY	JG

MAPES & TRUMBLE INDUSTRIAL FACILITY

PREPARED FOR
BLUE ARCH INVESTMENTS

PERIS
CA

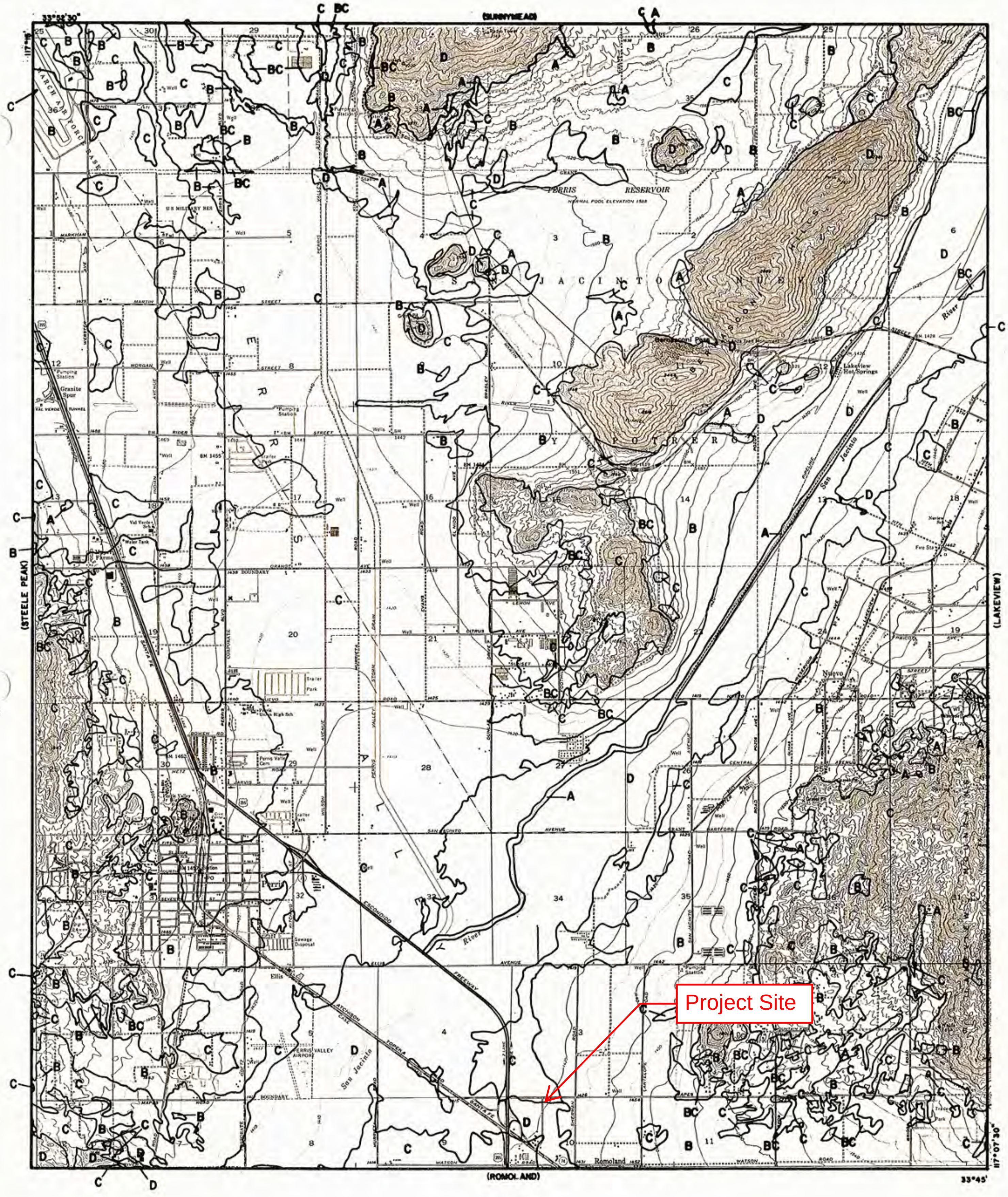
LICENSED PROFESSIONAL

PRELIMINARY GRADING PLAN 3

SHEET NUMBER
G4.0

Appendix D

Hydrology Manual and Other Reference Material



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC & WCD

HYDROLOGY MANUAL

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR PERRIS

PLATE C-1.30

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

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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.

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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.

IMPERVIOUS COVER FOR DEVELOPED AREAS

RUNOFF COEFFICIENT CURVE DATA

The data in the following tables may be used to develop runoff coefficient (C) curves for any combination of runoff index (RI) number and antecedent mositure condition (AMC). For an RI number with an AMC of II (from Plate D-5.5) enter the tables on the following pages and plot the "C" curve data directly on Plate D-5.8. "C" curve data is given for even RI numbers only, but values may easily be interpolated for odd RI numbers.

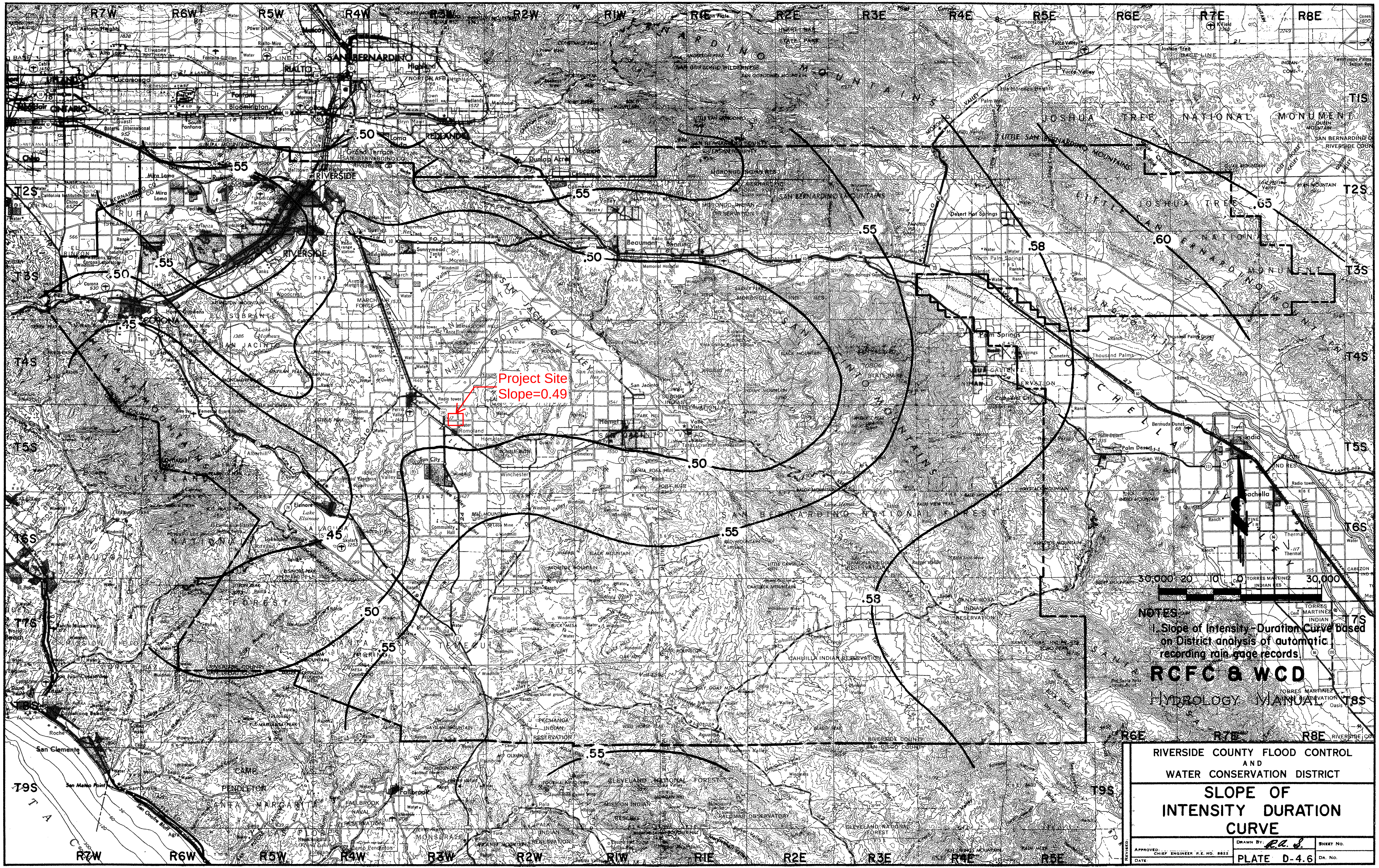
For an AMC of I or III enter the tabulation on this page with the RI for AMC II, and read the appropriate RI for AMC I or III. Use this revised RI to enter the tables on the following pages to determine "C". For example if RI = 40 for AMC II, then RI = 22 for AMC I and RI = 60 for AMC III.

AMC ADJUSTMENT RELATIONSHIPS

RI FOR AMC II	RI FOR OTHER AMC CONDITIONS:		RI FOR AMC II	RI FOR OTHER AMC CONDITIONS:	
	AMC I	AMC III		AMC I	AMC III
10	--	22	55	35	74
11	--	24	56	36	75
12	--	25	57	37	75
13	--	27	58	38	76
14	--	28	59	39	77
15	--	30	60	40	78
16	--	31	61	41	78
17	--	33	62	42	79
18	--	34	63	43	80
19	--	36	64	44	81
20	--	37	65	45	82
21	10	38	66	46	82
22	10	39	67	47	83
23	11	41	68	48	84
24	11	42	69	50	84
25	12	43	70	51	85
26	12	44	71	52	86
27	13	46	72	53	86
28	14	47	73	54	87
29	14	49	74	55	88
30	15	50	75	57	88
31	16	51	76	58	89
32	16	52	77	59	89
33	17	53	78	60	90
34	18	54	79	62	91
35	18	55	80	63	91
36	19	56	81	64	92
37	20	57	82	66	92
38	21	58	83	67	93
39	21	59	84	68	93
40	22	60	85	70	94
41	23	61	86	72	94
42	24	62	87	73	95
43	25	63	88	75	95
44	25	64	89	76	96
45	26	65	90	78	96
46	27	66	91	80	97
47	28	67	92	81	97
48	29	68	93	83	98
49	30	69	94	85	98
50	31	70	95	87	98
51	31	70	96	89	99
52	32	71	97	91	99
53	33	72	98	94	99
54	34	73	99	97	--

RCFC & WCD
HYDROLOGY MANUAL

RUNOFF COEFFICIENT
CURVE DATA



NOTES:

1. Slope of Intensity-Duration Curve based on District analysis of automatic recording rain gage records.

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RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

SLOPE OF
INTENSITY DURATION
CURVE

DRAWN BY: R.A.S.

PLATE D-4.6

Appendix E

NOAA Rainfall Data

NOAA Atlas 14, Volume 6, Version 2
Location name: Perris, California, USA*
Latitude: 33.7576°, Longitude: -117.1847°
Elevation: 1421.99 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.086** (0.072-0.104)	**0.123** (0.103-0.148)	**0.173** (0.144-0.210)	**0.216** (0.179-0.265)	**0.279** (0.222-0.353)	**0.329** (0.257-0.426)	**0.384** (0.292-0.509)	**0.442** (0.327-0.605)	**0.527** (0.373-0.753)	**0.597** (0.407-0.883)
10-min	**0.124** (0.104-0.149)	**0.176** (0.147-0.213)	**0.248** (0.207-0.301)	**0.310** (0.256-0.379)	**0.399** (0.319-0.506)	**0.472** (0.368-0.611)	**0.550** (0.418-0.730)	**0.634** (0.468-0.867)	**0.755** (0.534-1.08)	**0.855** (0.583-1.27)
15-min	**0.150** (0.125-0.181)	**0.213** (0.178-0.257)	**0.300** (0.250-0.364)	**0.375** (0.310-0.459)	**0.483** (0.385-0.612)	**0.571** (0.446-0.739)	**0.665** (0.506-0.883)	**0.767** (0.566-1.05)	**0.913** (0.646-1.30)	**1.03** (0.705-1.53)
30-min	**0.242** (0.203-0.292)	**0.344** (0.288-0.416)	**0.486** (0.405-0.589)	**0.607** (0.501-0.742)	**0.782** (0.624-0.990)	**0.924** (0.721-1.20)	**1.08** (0.818-1.43)	**1.24** (0.916-1.70)	**1.48** (1.05-2.11)	**1.67** (1.14-2.48)
60-min	**0.343** (0.287-0.413)	**0.487** (0.407-0.589)	**0.687** (0.572-0.833)	**0.858** (0.709-1.05)	**1.11** (0.882-1.40)	**1.31** (1.02-1.69)	**1.52** (1.16-2.02)	**1.75** (1.30-2.40)	**2.09** (1.48-2.99)	**2.37** (1.61-3.50)
2-hr	**0.511** (0.428-0.617)	**0.691** (0.578-0.835)	**0.934** (0.779-1.13)	**1.14** (0.941-1.39)	**1.43** (1.14-1.81)	**1.65** (1.29-2.14)	**1.89** (1.44-2.51)	**2.14** (1.58-2.93)	**2.50** (1.77-3.57)	**2.78** (1.90-4.12)
3-hr	**0.628** (0.526-0.758)	**0.834** (0.697-1.01)	**1.11** (0.926-1.35)	**1.34** (1.11-1.64)	**1.66** (1.32-2.10)	**1.91** (1.49-2.47)	**2.17** (1.65-2.89)	**2.45** (1.81-3.35)	**2.83** (2.00-4.04)	**3.13** (2.13-4.63)
6-hr	**0.890** (0.745-1.08)	**1.17** (0.974-1.41)	**1.53** (1.27-1.85)	**1.83** (1.51-2.24)	**2.24** (1.79-2.84)	**2.56** (2.00-3.31)	**2.89** (2.20-3.84)	**3.23** (2.39-4.42)	**3.70** (2.62-5.29)	**4.07** (2.78-6.03)
12-hr	**1.18** (0.990-1.43)	**1.55** (1.30-1.88)	**2.04** (1.70-2.47)	**2.44** (2.02-2.98)	**2.99** (2.38-3.79)	**3.42** (2.67-4.42)	**3.85** (2.93-5.12)	**4.31** (3.18-5.89)	**4.93** (3.49-7.05)	**5.42** (3.70-8.03)
24-hr	**1.55** (1.37-1.79)	**2.06** (1.82-2.38)	**2.74** (2.41-3.17)	**3.30** (2.89-3.85)	**4.08** (3.45-4.91)	**4.68** (3.89-5.76)	**5.31** (4.30-6.69)	**5.96** (4.70-7.71)	**6.86** (5.20-9.24)	**7.58** (5.55-10.6)
2-day	**1.81** (1.60-2.09)	**2.45** (2.17-2.83)	**3.32** (2.93-3.85)	**4.05** (3.54-4.72)	**5.06** (4.28-6.10)	**5.86** (4.86-7.21)	**6.69** (5.42-8.43)	**7.57** (5.97-9.80)	**8.80** (6.66-11.9)	**9.78** (7.16-13.6)
3-day	**1.92** (1.70-2.22)	**2.64** (2.33-3.05)	**3.62** (3.19-4.19)	**4.45** (3.89-5.19)	**5.61** (4.75-6.76)	**6.53** (5.42-8.04)	**7.51** (6.08-9.45)	**8.54** (6.73-11.0)	**9.99** (7.57-13.5)	**11.2** (8.18-15.6)
4-day	**2.06** (1.82-2.37)	**2.86** (2.52-3.30)	**3.95** (3.48-4.57)	**4.87** (4.26-5.68)	**6.18** (5.23-7.45)	**7.23** (5.99-8.89)	**8.33** (6.75-10.5)	**9.51** (7.50-12.3)	**11.2** (8.47-15.1)	**12.5** (9.18-17.5)
7-day	**2.29** (2.03-2.64)	**3.23** (2.86-3.74)	**4.53** (3.99-5.25)	**5.64** (4.93-6.58)	**7.22** (6.11-8.70)	**8.49** (7.05-10.4)	**9.85** (7.98-12.4)	**11.3** (8.91-14.6)	**13.4** (10.1-18.0)	**15.1** (11.0-21.0)
10-day	**2.41** (2.13-2.78)	**3.43** (3.03-3.96)	**4.85** (4.27-5.61)	**6.06** (5.30-7.07)	**7.80** (6.61-9.41)	**9.22** (7.65-11.3)	**10.7** (8.69-13.5)	**12.4** (9.74-16.0)	**14.7** (11.1-19.8)	**16.6** (12.2-23.1)
20-day	**2.82** (2.50-3.26)	**4.08** (3.61-4.72)	**5.86** (5.16-6.78)	**7.40** (6.47-8.64)	**9.65** (8.17-11.6)	**11.5** (9.55-14.2)	**13.5** (10.9-17.0)	**15.7** (12.4-20.3)	**18.9** (14.3-25.5)	**21.6** (15.8-30.0)
30-day	**3.32** (2.93-3.83)	**4.80** (4.24-5.54)	**6.90** (6.08-8.00)	**8.76** (7.66-10.2)	**11.5** (9.73-13.9)	**13.8** (11.4-17.0)	**16.3** (13.2-20.5)	**19.0** (15.0-24.6)	**23.1** (17.5-31.1)	**26.5** (19.4-37.0)
45-day	**3.87** (3.42-4.46)	**5.54** (4.89-6.39)	**7.95** (7.00-9.21)	**10.1** (8.83-11.8)	**13.3** (11.3-16.1)	**16.1** (13.3-19.8)	**19.1** (15.5-24.0)	**22.5** (17.7-29.1)	**27.5** (20.8-37.1)	**31.8** (23.3-44.4)
60-day	**4.46** (3.95-5.15)	**6.30** (5.56-7.27)	**8.97** (7.91-10.4)	**11.4** (9.95-13.3)	**15.0** (12.7-18.1)	**18.2** (15.1-22.4)	**21.7** (17.6-27.3)	**25.7** (20.2-33.2)	**31.7** (24.0-42.7)	**36.9** (27.0-51.4)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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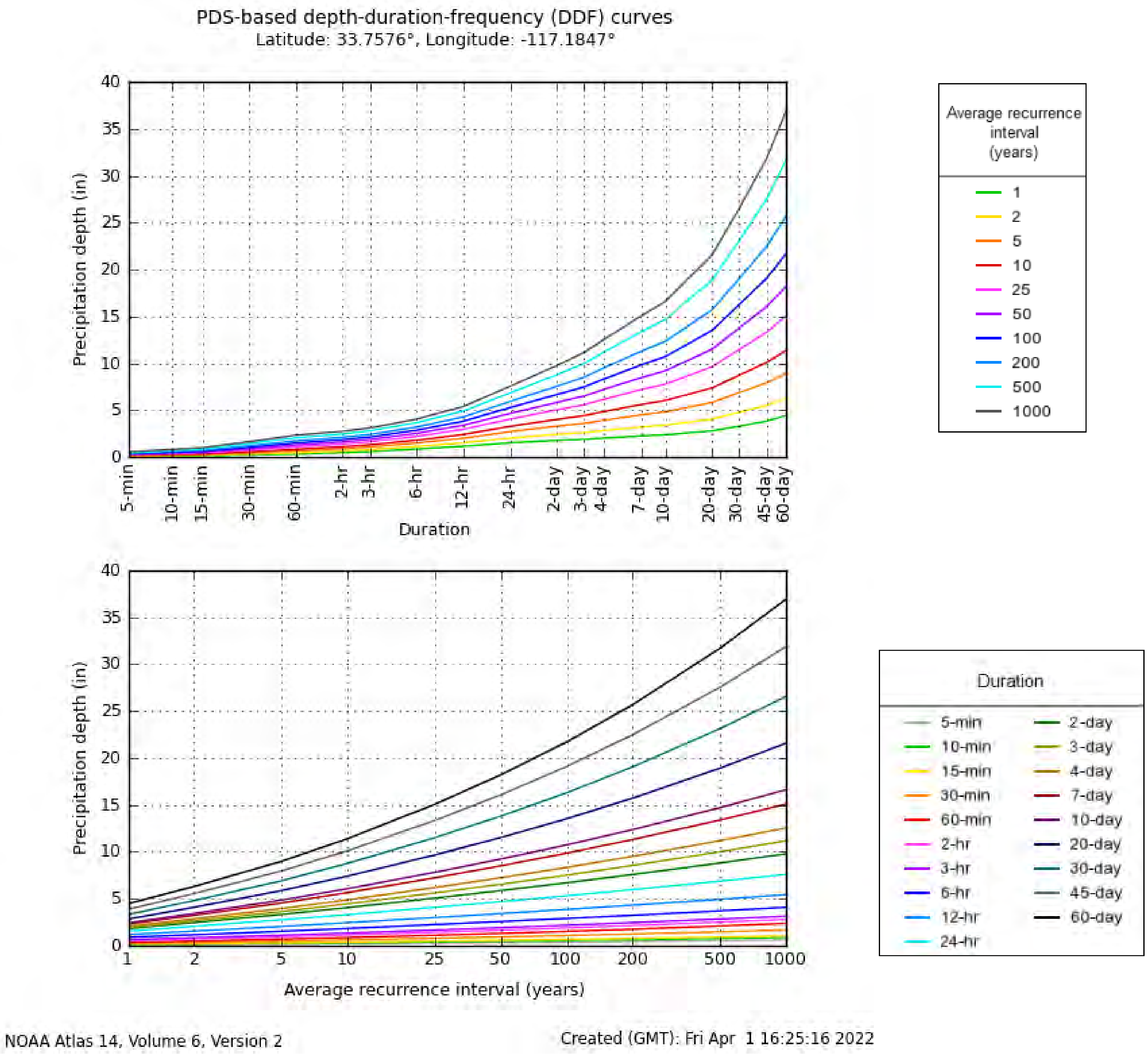
PF graphical



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Maps & aerials

Small scale terrain

Large scale terrain

Large scale map

Large scale aerial

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Appendix F

Soils Reports

Hydrologic Soil Group—Western Riverside Area, California

Map Scale: 1:2,790 if printed on A landscape (11" x 8.5") sheet.

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

MAP LEGEND

Area of Interest (AOI)

▭ Area of Interest (AOI)

Soils

Soil Rating Polygons

🟪 A

🟩 A/D

🟦 B

🟫 B/D

🟦 C

🟨 C/D

🟥 D

⬜ Not rated or not available

Soil Rating Lines

〰 A

〰 A/D

〰 B

〰 B/D

〰 C

〰 C/D

〰 D

〰 Not rated or not available

Soil Rating Points

🟪 A

🟩 A/D

🟦 B

🟫 B/D

🟦 C

🟫 C/D

🟥 D

⬜ Not rated or not available

Water Features

〰 Streams and Canals

Transportation

┼┼┼ Rails

〰 Interstate Highways

〰 US Routes

〰 Major Roads

〰 Local Roads

Background

▨ Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

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

Date(s) aerial images were photographed: May 25, 2019—Jun 25, 2019

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
EnA	Exeter sandy loam, 0 to 2 percent slopes	C	0.0	0.0%
EwB	Exeter very fine sandy loam, 0 to 5 percent slopes	C	0.0	0.1%
MaA	Madera fine sandy loam, 0 to 2 percent slopes	D	37.9	99.9%
Totals for Area of Interest			**37.9**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

REPORT OF

GEOTECHNICAL INVESTIGATION AND PERCOLATION TESTING

PROPOSED COMMERCIAL/WAREHOUSE BUILDING PROJECT

APN: 329-020-033, 034, 044, 046

SOUTHWEST CORNER OF TRUMBLE ROAD AND MAPES ROAD

PERRIS, CALIFORNIA 92571

FOR

BLUE MARQUISE INVESTMENTS, LLC

PROJECT NO. 21-673-02

DECEMBER 10, 2021

AES
C. M. APPLIED EARTH SCIENCES
a division of Applied Soil Technology, Inc.
GEOTECHNICAL & ENVIRONMENTAL ENGINEERING CONSULTANTS

December 10, 2021 21-673-02

Blue Marquise Investments, LLC
6300 Wilshire Blvd, Suite 1420
Los Angeles, California 90048

Attention: Mr. Kamran Benji

Subject: Geotechnical Investigation
Proposed New Commercial/Warehouse Building Project
APN: 329-020-033, 034, 044, 046
Southwest Corner of Trumble Road and Mapes Road
Perris, California 92571

Gentlemen:

INTRODUCTION

This report presents the results of a geotechnical investigation and percolation testing for the subject project. During the course of this investigation, the engineering properties of the subsurface materials were evaluated in order to provide recommendations for design and construction of foundations and grading. The investigation included subsurface exploration, soil sampling, laboratory testing, engineering evaluation and analysis, consultation, and preparation of this report.

During the course of this investigation, the provided conceptual site plan was used as reference. The plan was prepared by the offices of HPA Architecture.

The enclosed Drawing No. 1, entitled Site Plan, shows the approximate locations of the exploratory borings in relation to the site boundaries and the proposed new building. This drawing also shows approximate location of test pits where percolation testing was performed.

Figure No. 1 shows the Site Vicinity Map. Figure No. 2 shows the Regional Topographic Map. Figure No. 3 shows the Regional Geologic Maps.

The attached Appendix I, describes the method of field exploration. Figure Nos. I-1 and I-10 present summaries of the soils encountered at the location of our exploratory borings. Figure No. I-11 presents a key to the log of exploratory borings.

Appendix II describes the laboratory testing procedures. Figure Nos. II-1 and II-2 present the results of direct shear and consolidation tests performed on selected undisturbed samples.

PROJECT CONSIDERATIONS

It is our understanding that the proposed project will consist of construction of a new commercial warehouse building at the subject site. The proposed development will consist of offices and warehouse totaling 427,320 square feet.

The proposed building is expected to be a one-story steel frame structure. The flooring system will be in a form of concrete grade slabs established at or near the present grade. No basement is planned.

Parking for the proposed facility will be provided in a form of open parking lot. Some 400 parking spaces will be provided. The setback from Mapes and Trumble roads is expected to be 10 feet. The approximate location of the proposed building and parking with respect to the site boundaries is shown on the enclosed Site Plan; Drawing No. 1.

Structural loading data was not available during the course of preparation of this report. For the purpose of this report, however, it is assumed that the magnitude of the collected load would be on the order of 100 kips, combined dead, plus frequently applied live loads. Wall loads are expected to be on the order of 10 kips per lineal foot.

ANTICIPATED SITE GRADING WORK

Site grading for the proposed project will involve removal and recompaction of the existing fill. As part of the site grading work, some utility trenches will be backfilled.

In the building area, the zone of removal should be extended beyond the exterior walls of the proposed building a horizontal distance equal to the thickness of removal. The recompacted fill will be used for support of structural foundations and grade slabs. Debris and rocks larger than 4 inches in diameter should be excluded from the areas of new compacted fill.

The removal and recompaction of the fill in parking lot areas can be limited to 12 inches. The remaining 12 inches of the fill should be scarified and compacted in-place.

The excavated materials from the site may be reused in the areas of compacted fill. Note that some 10 percent shrinkage should be assumed when reusing the existing fill in the areas of new compacted fill. Therefore, import soils will be required to accomplish the site grading work. All imported soils should be non-expansive and granular in nature.

The existing fill were found to be fine grained in nature and potentially expansive. Such soils, where reused in the areas of new fill, should be placed back at some 3 percent higher than the optimum moisture content. The grade slabs also should be designed for expansive soil conditions.

SITE CONDITIONS

SITE SURFACE CONDITIONS

The site of the proposed development is located on Southwest corner of Trumble Road and Mapes Road in Perris, California. The site is irregular in shape and covers a plan area of 20.7 acres (902,107 square feet). See the enclosed Site Plan; Drawing No. 1 for the site location.

At the time of our investigation, the site was vacant. The site is slightly sloped down in the northwest direction. No slope occurs in the close vicinity of the subject site.

SUBSURFACE CONDITIONS

Correlation of the subsoil between the test borings was considered to be good. Generally, the site, to the depths explored, was found to be covered with surficial fill consisting of silty sand underlain by predominantly sandy soils with little to no fines and variable amounts of gravel. Thickness of the surficial fill was found to be on the order of 2 to 3 feet in our borings. Deeper fill, however, may be present beneath the existing structures and in old utility lines.

The existing fill should not be used for support of new fill, structural foundations, and grade slabs at their present state. Such soils, however, can be excavated and reused in the areas of new compacted fill, provided that any debris and rocks larger than 4 inches in diameter are removed.

The underlying native soils were found to be medium dense to dense in-place and adequate to receive new fill for support of grade slabs and structural foundations. The results of our laboratory testing indicated that the site native soils within the zone of influence of foundation pressure were of relatively high strength and low compression.

The existing fill were found to be fine grained in nature and potentially expansive. The expansion index of the existing fill was found to be 42.

During the course of our field investigation, no water was found in our borings drilled to a maximum depth of 21 feet. The State Maps for Perris Quadrangle are not available to show the historically highest groundwater level in the vicinity of the subject site. It is estimated that it can be greater than 100 feet below ground surface.

Due to the method of drilling (use of continuous auger) caving was not detected during the course of our field exploration. Because the site upper soils have appreciable amounts of fines, forming is expected not to be necessary during foundation construction.

SEISMIC DESIGN CONSIDERATIONS

In accordance with the ASCE7-16, corresponding to California Building Code (CBC 2019), the project site can be classified as site “D”. The mapped spectral accelerations of S_S= 1.434 (short period) and S_1 =0.533 (1-second period) can be used for this project. These parameters correspond to site Coefficients values of F_a =1.0 and F_V = null (see the Note below), respectively.

The seismic design parameters would be as follows:

S_{MS}= F_a (S_S) = 1.0 (1.434) = 1.434	**S_{M1}**=F_v (S_1) = null (see Note below)
S_{DS}=2/3 (S_{MS}) = 2/3 (1.434) = 0.956	**S_{D1}**=2/3 (S_{M1}) = null (see Note below)

Note: Since the seismic factor S_1 is greater than 0.2 site-specific ground motion hazard analyses may be required. The project structural engineer shall determine if an exemption can be applied in accordance with ASCE7-16 Section 11.4.8. If an exemption applies, a long period coefficient (F_v) of 1.7 may be utilized for calculation of the seismic parameters **S_{M1}** and **S_{D1}** in the above Table.

DISCUSSION OF LIQUEFACTION POTENTIAL

During the course of our investigation, no groundwater was found in our borings to the maximum depth of 21 feet explored. The State Maps for Perris Quadrangle are not available to show the historically highest groundwater level in the vicinity of the subject site. It is estimated that it can be greater than 100 feet below ground surface. Additionally, Perris area is not a designated liquefaction zone. On this basis, it is our opinion that soil liquefaction will not occur at the subject site.

STATEMENT 111

For the purpose of the subject project, it is our opinion that when the proposed grading and construction is made as planned, following the recommendations of this report, the site will be safe against the hazards of landsliding, settlement or slippage. The proposed construction and grading will not have adverse effect on the geologic stability of the existing properties outside the boundaries of the subject site.

SOIL CHEMICAL IMPURITIES AND CORROSION CONSIDERATIONS

After the proposed finished grades are established, samples of the subgrade materials in contact with foundations and utility lines should be tested for chemical impurity (soil corrosivity). For the purpose of this report, however, it should be assumed that the site soils are corrosive. Subject to the results of chemical testing during construction, the design may be changed.

EVALUATION AND RECOMMENDATIONS

GENERAL

Based on the geotechnical engineering data derived from this investigation, the site can be developed as planned. The existing fill soils are considered to be inadequate for support of new fill, structural foundations, grade slabs at their present state. Such fill soils, however, can be excavated and reused in the areas of new fill. The zone of removal should be extended beyond the exterior walls of the proposed building a horizontal distance equal to the thickness of removal. The new fill will be used for support of grade slabs and foundations.

The existing fill were found to be fine grained in nature and potentially expansive. Such soils, where reused in the areas of new fill, should be placed back at some 3 percent higher than the optimum moisture content. The grade slabs also should be designed for expansive soil conditions.

After proper site grading, conventional spread footing foundation system can be used for support of the proposed building. The foundation bearing materials should consist of medium dense to dense native and/or properly compacted fill soils.

Grade slabs can be supported on the finished grades which would be properly compacted granular fill soils. Due to potentially expansive character of the site upper soils, it is recommended that the concrete grade slabs for this project to have a minimum section of 5 inches and be reinforced with #4 bars placed at every 16 inches on center, each way. In the areas of pedestrian concrete walkways, the above recommendation can be changed to a minimum section of 4 inches.

The following sections present our specific recommendations for grading, site surface drainage, foundations, lateral design, grade slabs, temporary excavation, pavement design, and observations during construction.

GRADING RECOMMENDATIONS

Site grading for the proposed project will involve removal and recompaction of the existing fill and utility trench backfilling. In the building area, the zone of removal should be extended beyond the exterior walls of the proposed building a horizontal distance equal to the thickness of removal. The recompacted fill will be used for support of structural foundations and grade slabs. Debris and rocks larger than 4 inches in diameter should be excluded from the areas of new compacted fill.

The removal and recompaction of the fill in the parking lot areas can be limited to 12 inches. The remaining 12 inches of the fill should be scarified and compacted in-place.

For utility trench backfill, place clean sand around and above the utility lines using jetting. The sand should be brought up to 12 inches above utility lines. Above the sand, normal soils from the site can be used. All utility backfills should be placed at a minimum relative compaction of 90% at optimum moisture content.

The excavated materials from the site may be reused in the areas of compacted fill. Note that some 10 percent shrinkage should be assumed when reusing the existing fill in the areas of new compacted fill. Therefore, import soils will be required to accomplish the site grading work. All imported soils should be non-expansive and granular in nature.

The existing fill were found to be fine grained in nature and potentially expansive. Such soils, where reused in the areas of new fill, should be placed back at some 3 percent higher than the optimum moisture content. The grade slabs also should be designed for expansive soil conditions.

Prior to placement of any fill on the site, the Soil Engineer should observe the excavation bottoms. The areas to receive compacted fill should be scarified to a depth of about 8 inches and compacted to at least 90 percent of the maximum dry density as determined by the ASTM Designation D 1557 Compaction Method. The moisture content of the fine grained soils should be brought up to at least 3 percent higher than the optimum moisture content.

All import soils should be free of organic matter and rocks larger than 4 inches in diameter. Before import soils are brought to the site, a 40-pound sample of the proposed import soils should be submitted to the Soil Engineer (at least 48 hours in advance) so that the maximum density and expansion character of the import materials can be determined.

General guidelines regarding site grading are presented below in an itemized form which may be included in the earthwork specification. It is recommended that all fill be placed under engineering observation and in accordance with the following guidelines:

1. All vegetation and debris should be collected and hauled off-site. In the areas of new fill, the existing fill should be excavated until native soils are exposed.

2. The excavated areas should be observed and approved by the Soil Engineer prior to placing any fill.

3. The excavated sandy materials from the site are considered to be satisfactory for reuse in the compacted fill areas.

4. Fill material, approved by the Soil Engineer, should be placed in controlled layers. Each layer should be compacted to at least 90 percent of the maximum unit weight as determined by ASTM designation D 1557 for the material used.

5. The fill material shall be placed in layers which, when compacted, shall not exceed 8 inches per layer. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to insure uniformity of material in each layer.
6. When moisture content of the fill material is too low to obtain adequate compaction, water shall be added and thoroughly dispersed until the moisture content is near optimum.
7. When the moisture content of the fill material is too high to obtain adequate compaction, the fill material shall be aerated by blading or other satisfactory methods until near optimum moisture condition is achieved.
8. Inspection and field density tests should be conducted by the Soil Engineer during grading work to assure that adequate compaction is attained. Where compaction of less than 90 percent is indicated, additional compactive effort should be made with adjustment of the moisture content or layer thickness, as necessary, until at least 90 percent compaction is obtained.

SURFACE DRAINAGE

Adequate site drainage should be provided to divert roof and surface waters away from the proposed building and from the property through non-erodible drainage devices. In no case should the surface waters be allowed to pond adjacent to the buildings or anywhere on the building pads. A minimum surface slope of one and two percent are recommended for paved and unpaved areas, respectively.

The site drainage recommendations should also include the following:

1. Having positive slope away from the buildings, as recommended above.
2. Installation of roof drains, area drains and catch basins with appropriate connecting lines.
3. Managing landscape watering.
4. Regular maintenance of the drainage devices.
5. Installing waterproofing or damp proofing, whichever appropriate, beneath concrete grade slabs.
6. The owners should be familiar with the general maintenance guidelines of the city requirements.

FOUNDATIONS

Conventional spread footings can be used for support of the proposed building. The foundation bearing materials will be native and/or properly compacted fill soils.

New footings should be at least 18 inches wide and be placed at a minimum depth of 24 inches below the lowest adjacent final grades. Properly designed and constructed spread footings may be based on an allowable maximum bearing pressure of 2,200 pounds per square foot. This value can be increased at a rate of 100 and 200 pounds per square for each additional foot of footing width and depth, to a maximum value of 2,700 pounds per square foot.

The above given values are for the total of dead and frequently applied live loads. For short duration transient loading, such as wind or seismic forces, these values may be increased by one-third.

Under the allowable maximum soil pressure, footings with assumed collected loads of 100 kips is expected to settle about 5/8 of one inch. Wall footings, with loads of about 10 kips per lineal foot are expected to settle on the order of 1/2 of one inch. Maximum differential settlements are expected to be on the order of 1/4 of an inch. The major portions of the settlements are expected to occur during construction.

LATERAL DESIGN

Lateral resistance at the base of footings in contact with native soils may be assumed to be the product of the dead load forces and a coefficient of friction of 0.35. Passive pressure on the face of footings may also be used to resist lateral forces. A passive pressure of zero at the finished grades and increasing at a rate of 250 pounds per square foot per foot of depth to a maximum value of 1,500 pounds per square foot may be used for footings poured against properly compacted fill soils.

GRADE SLABS

New concrete grade slabs can be supported on the finished grades which would be properly compacted fill soils. Due to potentially expansive character of the site upper soils, it is recommended that new grade slabs for this project be at least 5 inches thick and be reinforced with # 4 bars placed at every 16 inches on center, each way.

For pedestrian concrete walkways, the above recommendation can be changed to a minimum section of 4 inches.

In the areas where moisture sensitive floor covering is used and slab dampness cannot be tolerated, a vapor-barrier should be used beneath the slabs. This normally consists of a 10-mil polyethylene film covered with 2 inches of clean sand.

TEMPORARY EXCAVATION

Unshored Excavations: As part of the installation of underground utilities, temporary shoring will be made. Such cuts are expected to reach several feet. Based upon the engineering characteristics of the site upper soils, it is our opinion, as a minimum, that temporary excavation slopes in accordance with the following table should be used:

Maximum Depth of Cut (Ft)	Maximum Slope Ratio (Horizontal:Vertical)
0-3	Vertical
>3	1:1

Water should not be allowed to flow over the top of the excavation in an uncontrolled manner. No surcharge should be allowed within a 45-degree line drawn from the bottom of the excavation. Excavation surfaces should be kept moist but not saturated to retard raveling and sloughing during construction.

It would be advantageous, particularly during wet season construction, to place polyethylene plastic sheeting over the slopes. This will reduce the chances of moisture changes within the soil banks and material wash into the excavation.

Shoring: In lieu of shaving (1:1) the upper portion of the cuts exceeding 3 feet, cross bracing system can be used as shoring (underground utility trenches, etc.).

PAVEMENT DESIGN

Using an assumed “R” value of 50, the minimum pavement section alternatives for Traffic Index (TI) values ranging from 4 to 7 were calculated. The results are shown on the enclosed Calculation Sheet.

The lower TI value of 4 is normally used for passenger cars, including pickup trucks. The higher TI value of 7 is normally used for heavier traffic (trucks, including garbage trucks).

The presumed R-value used for this project was for the upper soils which are sandy silt and silty sand. At the time of grading, a representative sample of soils should be tested to determine the actual “R” value and the recommended designed pavement section be modified as necessary.

Before pavement sections are placed, the surficial fill to a maximum depth of 12 inches should be removed and recompacted. The remaining 12 inches of the fill should be scarified and compacted in-place. The new fill should be placed under engineering observation and testing, as presented in the preceding sections of this report.

This office should be notified if increased traffic loading condition is expected so that modification to the above given recommendations can be made. A Traffic Engineer should be consulted for design and use of proper pavement sections in the alley and roadway leading to parking entrances.

The base course should be compacted to a relative compaction of 95 percent per relative compaction. The soil engineer should verify the compaction degree of the pavement section subgrade and base course.

ON-SITE PERCOLATION TESTING

Horizontal Drain System “Trench”

The procedure for trench system design included performing the following tasks per the Administrative Manual County of Los Angeles Department of Public Works Geotechnical and Materials Engineering Division: Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration (GS200.2), at the subject site:

1. Excavate two test pits (TP-1 and TP-2) to a depth of about 4.5 feet.
2. Extending a one cubic foot (1’ X 1 ’X 1’) hole at the bases of the test pits.
3. Pre-saturating the one cubic foot hole prior to the percolation testing.
4. Determining time interval for recording water drop between readings by conducting standard water drop test over 10 minutes.

5. Once interval is determined, add water to 12 inches about bottom (starting water level must be this initial water depth);
6. Conduct percolation test by taking readings of water drop from initial water level per determined time interval.
7. Fill excavation back to initial water depth and record the time of filling.
8. Repeat percolation tests a minimum of eight times or until a stabilized rate of drop is obtained, whichever occurs first. (Stabilized rate in the highest and lowest readings within 10% of each other for three consecutive tests.);
9. Making engineering evaluation/analysis/calculations and report preparation.

Field percolation tests were conducted on November 18, 2021 using Excavation Percolation Test Procedure outlined on page 4 of the Administrative Manual, Guidelines for Design, Investigation and Reporting, Low Impact Development Stormwater Infiltration. The enclosed Site Plan; Drawing No. 1, shows the approximate location of the test pits within which the percolation test was conducted.

One cubic foot hole (1’ X1’ X 1’) was excavated at the bottom of each test pit. The one cubic foot hole was then presoaked and standard test interval rate conducted prior to the actual in-situ percolation testing. The one cubic foot hole at the base of the test pit was completely filled, to the rim, with water. However, our test results indicated that a horizontal drain system is not feasible, and water did not percolate. The materials within the percolation zone consisted of very dense silty sand soils and appreciable amount of fines.

Based on the above, the subject site is considered to be a poor candidate for on-site infiltration. Therefore, the stormwater should be diverted to areas of planters and any excess water should be carried to the curb side, after going through the required on-site filtration process.

OBSERVATION DURING CONSTRUCTION

The presented recommendations in this report assume that all foundations will be established in native soils. All footing excavations should be observed and accepted by a representative of this office before reinforcing is placed.

Site grading work should be conducted under observation and testing by a representative of this firm. For proper scheduling, please notify this office at least 24 hours before any observation work is required.

CLOSURE

The findings and recommendations presented in this report were based on the results of our field and laboratory investigations combined with professional engineering experience and judgment. The report was prepared in accordance with generally accepted engineering principles and practice. We make no other warranty, either express or implied.

It is noted that the conclusions and recommendations presented are based on exploration "window" borings and excavations which is in conformance with accepted engineering practice. Some variations of subsurface conditions are common between "windows" and major variations are possible.

-oOo-

The following Figures and Appendices are attached and complete this report:

˝ avement Design Calculation Sheet
° rawing No. 1 - Site Plan
Figure No. 1 - Site Vicinity Map
Figure No. 2 - Regional Topographic Map
Figure No. 3 - Regional Geologic Map
    Appendix I-Method of Field Exploration
        Log of Borings Figure Nos. I-1 through I-10
        Un f ed I ˜ lass f ˇ a ˇ n $s ˇ e ˆ F gure ! . I-11
    Appendix II- Methods of Laboratory Testing
        F gure ! s" ++1 ˇhrough II-2.2

Respectfully Submitted,

APPLIED EARTH SCIENCES

Reviewed by:

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Fereidoun “Fred” Jahani
Project Engineer
RE62875

REGISTERED PROFESSIONAL ENGINEER
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2 ____

Caro 5. %inas, President
) eotechnical Engineer
GE 601

REGISTERED PROFESSIONAL ENGINEER
CARO J. MINAS
NO. 601
GEOTECHNICAL
STATE OF CALIFORNIA

FJ/CJM/ln/la

Distribution: (4) Addressee

R-Value (Assumed)

50

Traffic Index (TI)	Gravel Equivelence Factor (Gf)	Gravel Equivelence (GE)
4	2.50	0.256
5	2.50	0.320
6	2.32	0.414
7	2.14	0.523

Pavement Section Thickness (inches)				
Traffic Index (TI)	Full Tac*		Alternative No. 1	
	Tac*(in)	Tbc** (in)	Tac*(in)	Tbc** (in)
4	4	0	3	3
5	5	0	4	3
6	6	0	5	4
7	7	0	6	4

* Tac=Thickness of Asphalt Concrete (2.5" Minimum)

**Tbc= Thickness of Base Course (Class III) with R-Value of 78 or Better (4" Minimum)

Flexible Pavement Design Data

FOR: Proposed Commercial Warehouse | **DATE**: 12/10/21 | **PROJECT NO.:** 21-673-02

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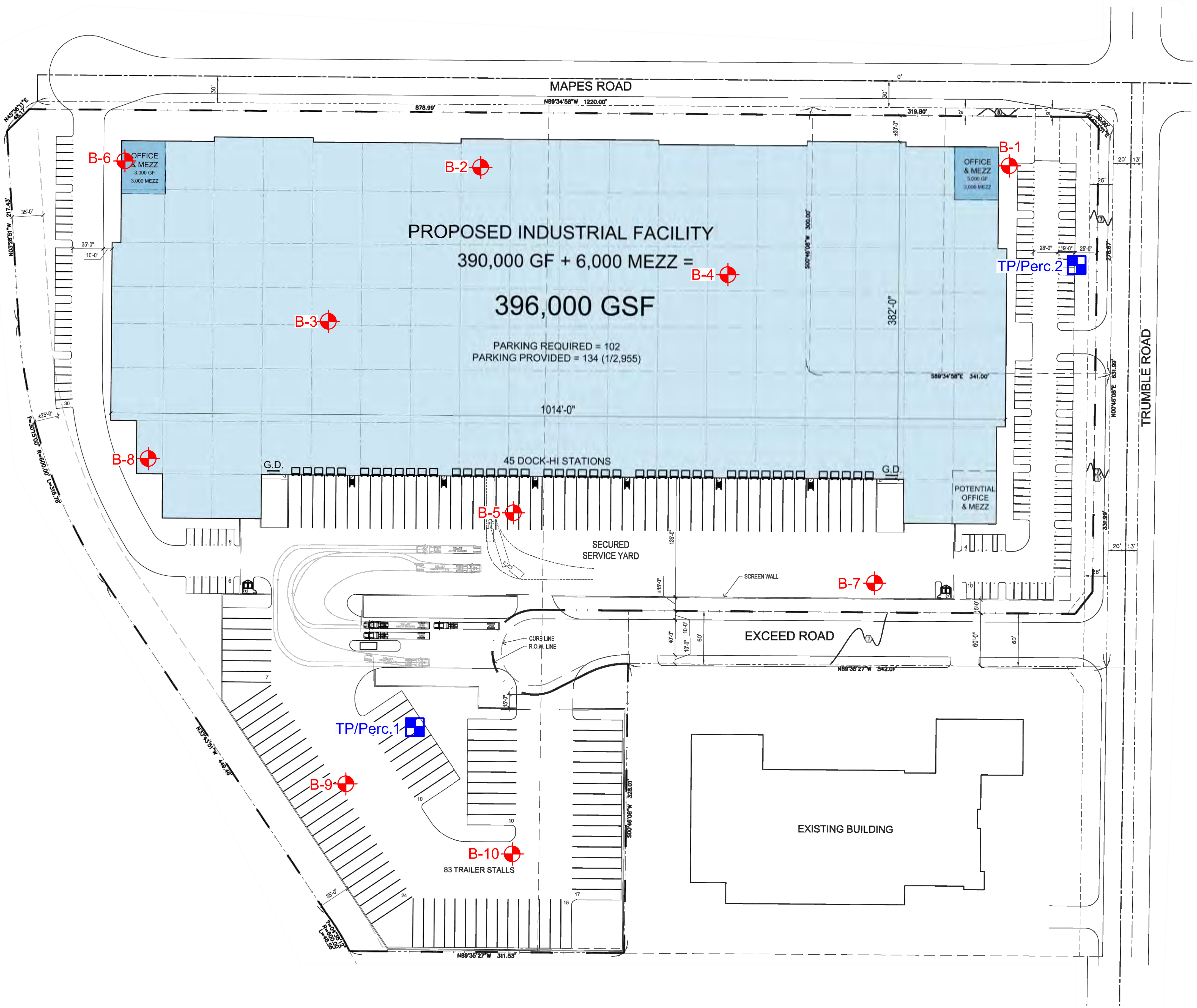
CALC SHEET No. 1



N

Scale: 1" = 120'

LEGEND:

B-10 ⊕ = Location & Number of Boring

TP/Perc.2 ▣ = Percolation Test, Shallow Trench System

Note:

Site plan prepared by using plan provided by:
-Architecture Design Relationships

SITE PLAN

PROJECT No: 21-673-02

DATE: 11 / 18 / 2021

DRAWN BY: TG

CHECKED BY: CM

DRAWING No: 1

DESCRIPTION: Proposed Commercial/ Warehouse Building Project

FOR: Blue Marquise Investments, LLC

ADDRESS: SW Corner of Trumble Road & Mapes Road, Perris, CA 92571

Applied Earth Sciences
GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL
ENGINEERING CONSULTANTS
www.aessoil.com
(818) 552-6000

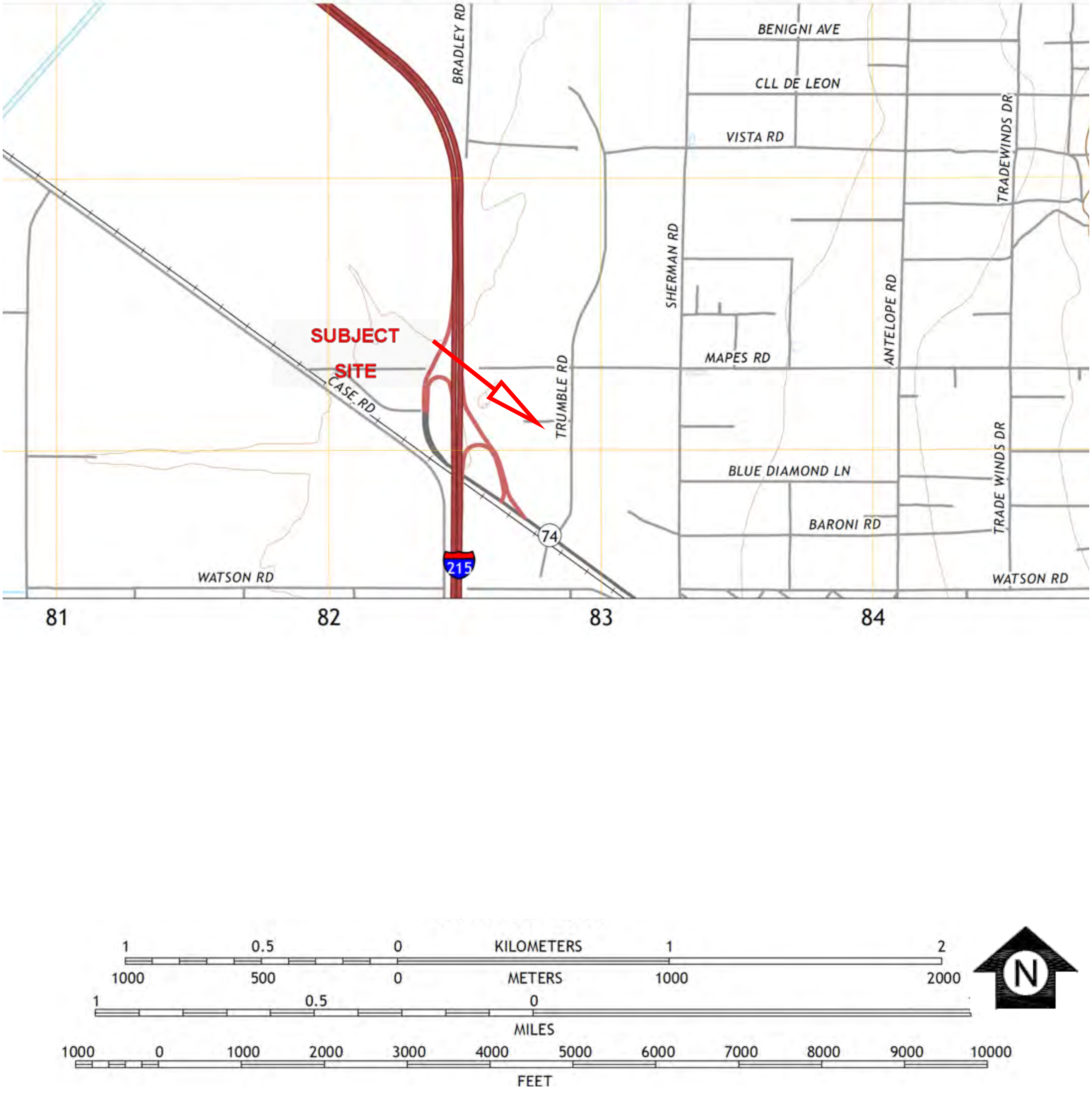
Reference: Portion of Google Maps

SITE VICINITY MAP

Proposed Commercia/l Warehouse Building Project

SW Corner of Trumble Road & Mapes Road, Perris, CA 92571

FOR Blue Marquise Investments, LLC	DATE 11 / 18 / 2021	PROJECT No. 21-673-02
APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS		FIGURE No. 1



Reference: USGC Topo Map

REGIONAL TOPOGRAPHIC MAP

Proposed Commercia/l Warehouse
Building Project

SW Corner of Trumble Road & Mapes Road, Perris, CA 92571

FOR
Blue Marquise Investments, LLC

DATE
11 / 18 / 2021

PROJECT No.
21-673-02

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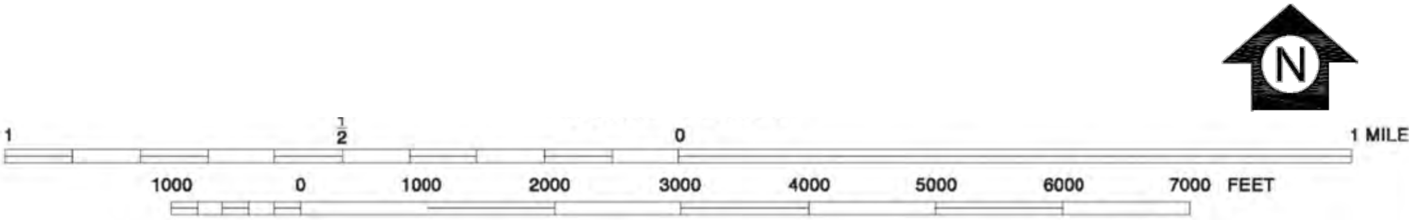
FIGURE No.
2

Alluvial sediments, unconsolidated, undissected

Qa *Alluvial sand and clay of valley areas, covered by gray soil*



Reference: Dibblee Geologic Map of the Perris Quadrangle

REGIONAL GEOLOGIC MAP

Proposed Commercia/l Warehouse
Building Project

SW Corner of Trumble Road & Mapes Road, Perris, CA 92571

FOR
Blue Marquise Investments, LLC

DATE
11 / 18 / 2021

PROJECT No.
21-673-02

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FIGURE No.
3

APPENDIX I

METHOD OF FIELD EXPLORATION

In order to define subsurface conditions, ten borings were drilled on the site using hollow stem auger equipment to a maximum depth of 21 feet. The approximate locations of the exploratory borings are shown on the enclosed Site Plan.

Logs of the subsurface materials, as encountered in the borings, were recorded in the field and are presented Figure Nos. I-1 through I-10. These figures also show the number and approximate depths of each of the recovered soil samples.

Relatively undisturbed samples of the subsoils were obtained by driving a steel sampler with successive drops of a 140-pound standard sampling hammer free-falling a vertical distance of about 30 inches. The number of blows required for one foot of sampler penetration was recorded at the time of drilling and are shown on the log of exploratory borings. The relatively undisturbed soil samples were retained in brass liner rings 2.5 inches in diameter and 1.0 inch in height.

Field investigation for this project was performed on October 14 through 15, 2021. The material excavated from the borings was placed back and compacted upon completion of the field work. Such material may settle. The owner should periodically inspect these areas and notify this office if the settlement creates a hazard to persons or property.

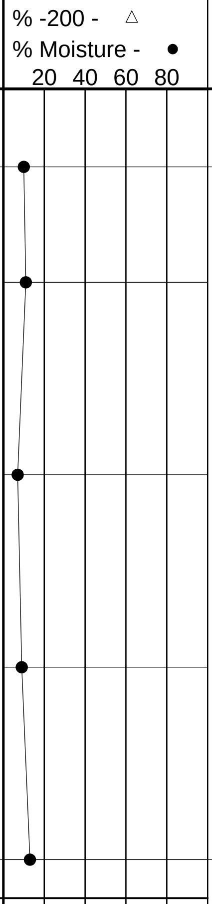
AES

LOG OF BORING NO.1

21-673-02
SW Corner of Trumble Road & Mapes Road, Perris, CA 92571

Type: Hollow Stem Auger, With 140 Lb Hammer Logged by: Daniel
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200
0			(ML) FILL: Silt, moderately compact, slightly moist, medium brown, sandy silt.					
		■	(SM) SAND: Very dense, moist, brown, silty fine to medium grained sand.		50/3"	10	119	
5		■	(SM) Grades to lighter brown, more silty.		50/2"	11	118	
10		■	(SM) Grades to dark brown, slightly silty, fine to coarse grained sand with gravel.		58	7	125	
15		■	(SM) Grades to light yellowish brown, silty fine to medium grained sand, less gravelly.		65	9	123	
20		■	(ML) SILT: Very stiff, moist, yellowish brown, sandy silt.		63	13	113	
25			End of Boring @ 21' No Groundwater Encountered Hole Backfilled.					
30								
35								



COMPLETION DEPTH: 21 DEPTH TO WATER> INITIAL:
DATE: October 20, 2021 FINAL:

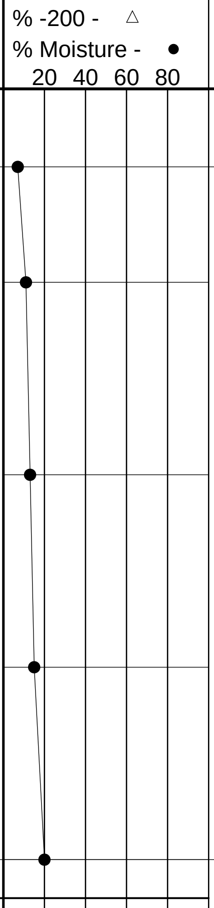
LOG OF BORING NO.2

21-673-02
SW Corner of Trumble Road & Mapes Road, Perris, CA 92571

Type: Hollow Stem Auger, With 140 Lb Hammer Logged by: Daniel
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200
0			(ML) FILL: Silt, moderately compact, slightly moist, light brown, sandy silt.					
		■	(SM) SAND: Very dense, moist, brown, silty fine to medium grained sand with fine gravel.		50/5"	7	131	
5		■	(SM) Grades to slightly more silty.		50/4"	11	127	
10		■	(SM) Grades to yellowish brown, less silty, less gravelly.		61	13	117	
15		■	(SM) Grades to orange brown, more silty.		71	15	114	
20		■	(ML) SILT: Very stiff, moist, pale olive, slightly clayey, sandy silt.		40	20	113	
25								
30								
35								

End of Boring @ 21'
No Groundwater Encountered
Hole Backfilled.



COMPLETION DEPTH: 21
DATE: October 20, 2021

DEPTH TO WATER> INITIAL:
FINAL:

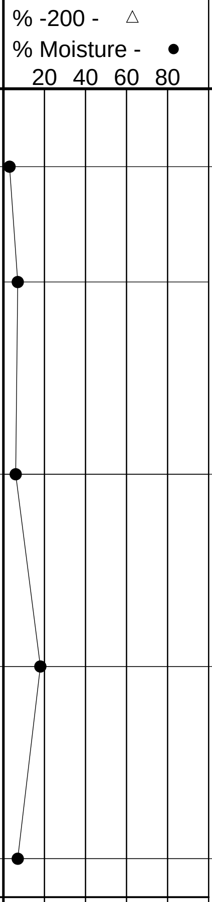
LOG OF BORING NO.3

21-673-02
SW Corner of Trumble Road & Mapes Road, Perris, CA 92571

Type: Hollow Stem Auger, With 140 Lb Hammer Logged by: Daniel
Location: *See Site Plan*

DEPTH, FT	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200
0	(ML) FILL: Silt, moderately compact, slightly moist, medium brown, sandy silt.					
2	(SM) SAND: Very dense, dry to slightly moist, light brown to brown, silty fine to medium grained sand.		50/3"	3	117	
5	(SM) Grades to moist, brown, gravelly.		70	7	134	
10	(SP/SM) Grades to brownish yellow, fine to coarse grained sand, some fines.		80	6	127	
15	(SM-ML) Grades to dense, pale yellow, silt-fine grained sand mixture.		32	18	115	
20	(SP/SM) Grades to very dense, slightly moist to moist, light yellowish brown, fine to medium grained sand, some fines, fine gravel.		52	7	119	

End of Boring @ 21'
No Groundwater Encountered
Hole Backfilled.



COMPLETION DEPTH: 21
DATE: October 20, 2021

DEPTH TO WATER> INITIAL:
FINAL:

LOG OF BORING NO.4

21-673-02
SW Corner of Trumble Road & Mapes Road, Perris, CA 92571

Type: Hollow Stem Auger, With 140 Lb Hammer Logged by: Daniel
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(ML) FILL: Silt, moderately compact, dry to slightly moist, medium brown, sandy silt, few gravel.						
		■	(SM) SAND: Very dense, moist, brown, silty fine to medium grained sand.		50/3"	11	117	●	
5		■	(SM) Grades to lighter brown, more silty, slightly gravelly.		65	9	122	●	
10		■	(SM) Grades to dark brown, slightly silty, fine to coarse grained sand.		68	9	125	●	
15		■	(SM) Grades to orange brown, more silty, more gravelly.		50/3"	9	134	●	
			End of Boring @ 16' No Groundwater Encountered Hole Backfilled.						
20									
25									
30									
35									

COMPLETION DEPTH: 16
DATE: October 20, 2021

DEPTH TO WATER> INITIAL:
FINAL:

LOG OF BORING NO.5

21-673-02
SW Corner of Trumble Road & Mapes Road, Perris, CA 92571

Type: Hollow Stem Auger, With 140 Lb Hammer Logged by: Daniel
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0	▩		(SM) FILL: Sand, moderately compact, slightly moist, brown, silty sand, few gravel.						
	░	■	(SM) SAND: Very dense, moist, brown, silty fine to coarse grained sand with gravel.		50/3"	9	130	●	
5	░	■	(SM) Grades to slightly more silty.		64	10	133	●	
10	░	■	(SM) Grades to less silty, slightly more gravelly.		70	6	132	●	
15	░		(SM) Grades to orange brown to light yellowish brown.		50/3"	11	121	●	
20			End of Boring @ 16' No Groundwater Encountered Hole Backfilled.						
25									
30									
35									

COMPLETION DEPTH: 16
DATE: October 20, 2021

DEPTH TO WATER> INITIAL:
FINAL:

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LOG OF BORING NO.6

21-673-02
SW Corner of Trumble Road & Mapes Road, Perris, CA 92571

Type: Hollow Stem Auger, With 140 Lb Hammer   Logged by: Daniel
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(ML) FILL: Silt, moderately compact, dry to slightly moist, light brown, sandy silt.						
		■	(SM) SAND: Very dense, moist, brown, silty fine to coarse grained sand with gravel.		50/3"	9	129	●	
5		■	(SM) Grades to silty fine to medium grained sand, less gravelly.		49	10	121	●	
10		■	(SM) Grades to brownish yellow, less silty, slightly more gravelly.		71	9	128	●	
15			(SM-ML) Grades to orange brown, silt-fine grained sand mixture.		76	19	109	●	

End of Boring @ 16'
No Groundwater Encountered
Hole Backfilled.

20
25
30
35

COMPLETION DEPTH: 16
DATE: October 20, 2021

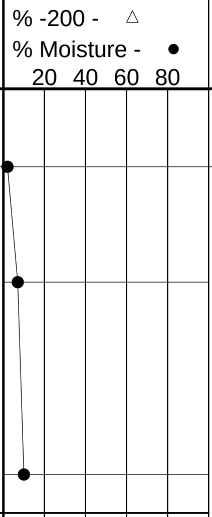
DEPTH TO WATER> INITIAL:
FINAL:

LOG OF BORING NO.7

21-673-02
SW Corner of Trumble Road & Mapes Road, Perris, CA 92571

Type: Hollow Stem Auger, With 140 Lb Hammer Logged by: Daniel
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200
0			(ML) FILL: Silt, moderately compact, slightly moist, medium brown, sandy silt.					
			(SM) SAND: Very dense, dry to slightly moist, light brown, silty fine to medium grained sand with gravel.		82	2	131	
5			(SM) Grades to slightly moist to moist, brownish yellow, less silty, less gravelly.		50/5"	7	123	
10			(SM) Similar as above.		74	10	120	
			End of Boring @ 11' No Groundwater Encountered Hole Backfilled.					
15								
20								
25								
30								
35								



COMPLETION DEPTH: 11
DATE: October 20, 2021

DEPTH TO WATER> INITIAL:
FINAL:

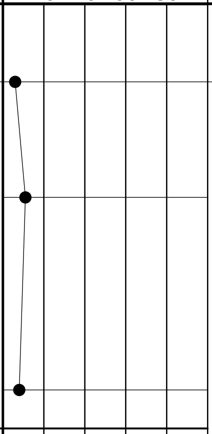
LOG OF BORING NO.8

21-673-02
SW Corner of Trumble Road & Mapes Road, Perris, CA 92571

Type: Hollow Stem Auger, With 140 Lb Hammer Logged by: Daniel
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(ML) FILL: Silt, moderately compact, slightly moist, medium brown, sandy silt with lots of rootlets.						
		■			68	6	127		
			(SM) SAND: Very dense, slightly moist to moist, brown, silty fine to medium grained sand with gravel.						
5		■	(SM) Grades to moist, dark brown, silty fine to coarse grained sand.		75	11	125		
10		■	(SM) Grades to yellowish brown, silty fine to medium grained sand.		50/3"	8	130		
15									
20									
25									
30									
35									

End of Boring @ 11'
No Groundwater Encountered
Hole Backfilled.



COMPLETION DEPTH: 11
DATE: October 20, 2021

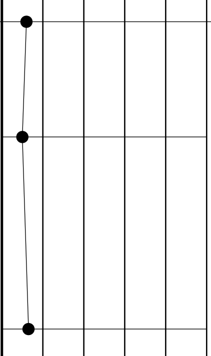
DEPTH TO WATER> INITIAL:
FINAL:

LOG OF BORING NO.9

21-673-02
SW Corner of Trumble Road & Mapes Road, Perris, CA 92571

Type: Hollow Stem Auger, With 140 Lb Hammer Logged by: Daniel
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(ML) FILL: Silt, moderately compact, slightly moist, medium brown, sandy silt.						
		■	(SM) SAND: Very dense, moist, brown, silty fine to medium grained sand with gravel.		50/5"	12	120		
5		■	(SM) Grades to more silty, less gravelly.		50/6"	10	114		
10		■	(SM) Grades to dark brown, more gravelly.		55	13	130		
15									
20									
25									
30									
35									



End of Boring @ 11'
No Groundwater Encountered
Hole Backfilled.

COMPLETION DEPTH: 11
DATE: October 20, 2021

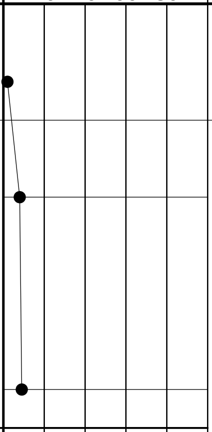
DEPTH TO WATER> INITIAL:
FINAL:

LOG OF BORING NO.10

21-673-02
SW Corner of Trumble Road & Mapes Road, Perris, CA 92571

Type: Hollow Stem Auger, With 140 Lb Hammer Logged by: Daniel
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0	▩		(SM) FILL: Sand, moderately compact, slightly moist, brown, silty sand with gravel, debri.						
	▩	■			32	2	129	●	
	▥		(SM) Grades to compact, dark gray, fragments of asphalt.						
5	▥	■	(SM) SAND: Very dense, moist, dark brown, silt fine to coarse grained sand with gravel.		50/3"	8	121	●	
10	▥	■	(SM) Grades to more silty, more gravelly.		62	9	135	●	
			End of Boring @ 11' No Groundwater Encountered Hole Backfilled.						
15									
20									
25									
30									
35									



COMPLETION DEPTH: 11 DEPTH TO WATER> INITIAL:
DATE: October 20, 2021 FINAL:

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAME
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravels, gravel - sand mixtures, little or no fines.
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amt. of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amt. of fines)	SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)		ML	Organic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Organic clay of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)		MH	Organic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Organic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

PARTICLE SIZE LIMITS

SILT OR CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

NO. 200 NO. 40 NO. 10 NO. 4 $\frac{3}{4}$ in. 3 in. (12 in.)

U. S. STANDARD SIEVE SIZE

UNIFIED SOIL CLASSIFICATION SYSTEM

JOB NAME : Proposed New Commercial Warehouse Building
South West Corner of Trumble Road & Mapes Road,
Perris, CA 92571

JOB No. 21-673-02

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FIGURE No. I-11

APPENDIX II

LABORATORY TESTING PROCEDURES

Moisture Density

The moisture-density information provides a summary of soil consistency for each stratum and can also provide a correlation between soils found on this site and other nearby sites. The tests were performed using ASTM D 2216-04 Laboratory Determination of water content Test Method. The dry unit weight and field moisture content were determined for each undisturbed sample, and the results are shown on log of exploratory borings.

Shear Tests

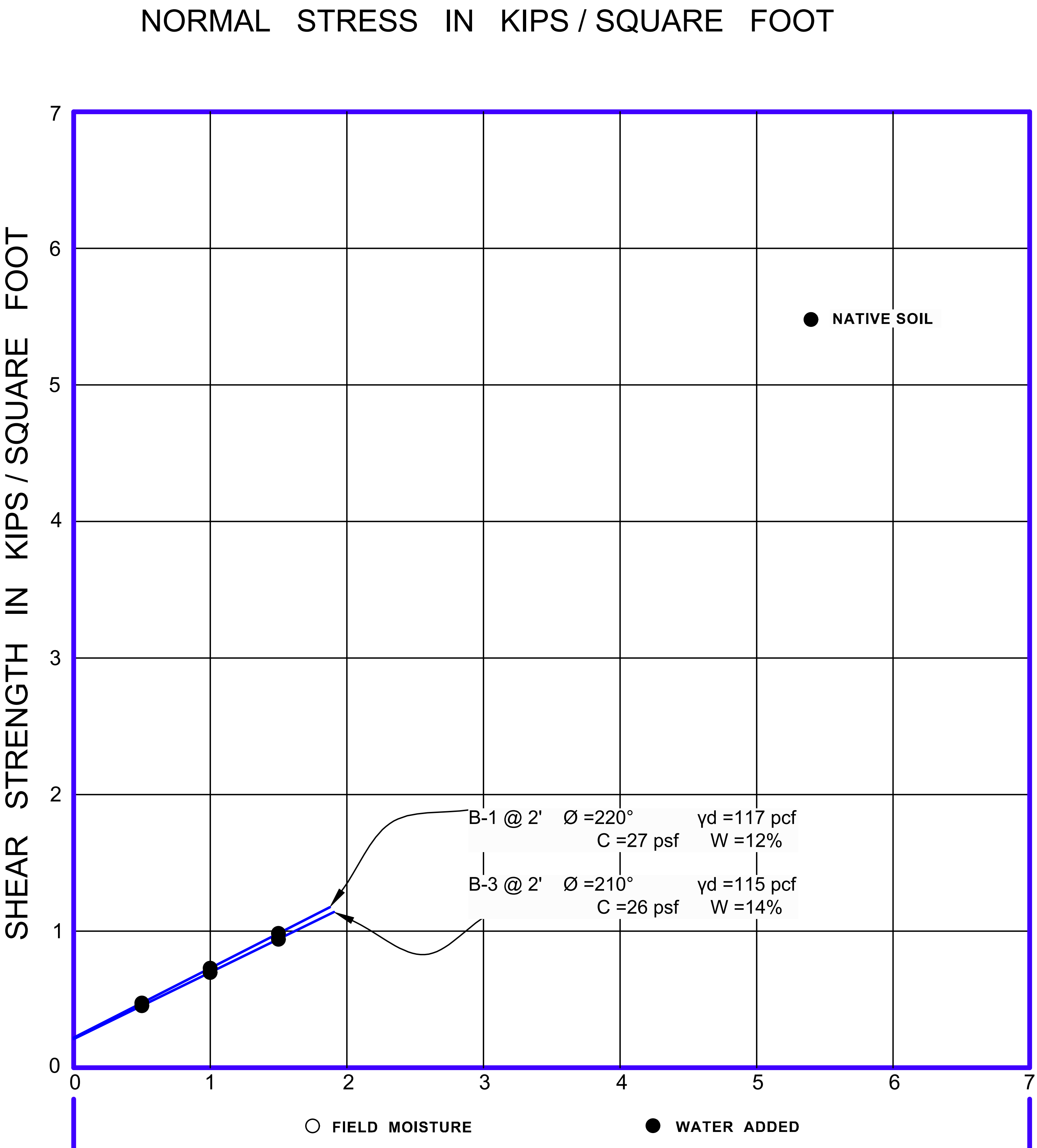
Shear tests were made with a direct shear machine at a constant rate of strain. The machine is designed to test the materials without completely removing the samples from the brass rings. The rate of shear was determined through determination of the rate of consolidation of the foundation bearing materials.

A range of normal stresses was applied vertically, and the shear strength was progressively determined at each load in order to determine the internal angle of friction and the cohesion. The tests were performed using ASTM D 3080-04 Laboratory Direct Shear Test Method. The Ultimate shear strength results of direct shear tests are presented on Figure No. II-1 within this Appendix.

Consolidation

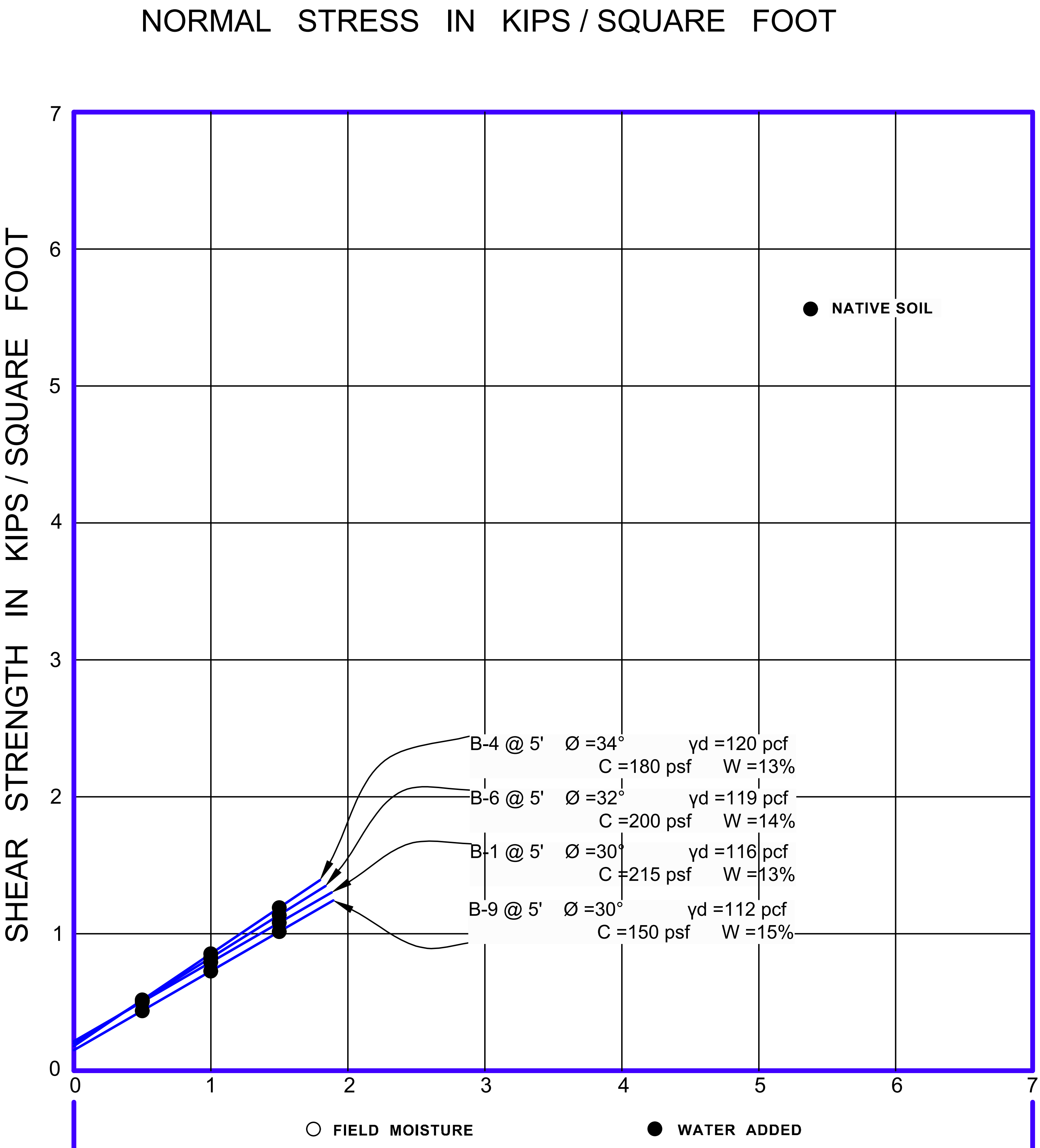
The apparatus used for the consolidation tests is designed to receive the undisturbed brass ring of soil as it comes from the field. Loads were applied to the test specimen in several increments, and the resulting deformations were recorded at time intervals. Porous stones were placed in contact with the top and bottom of the specimen to permit the ready addition or release of water. ASTM D 2435-04 Laboratory Consolidation Test Method.

Undisturbed specimens were tested at the field and added water conditions. The test results are shown on Figure No. II-2 within this Appendix.



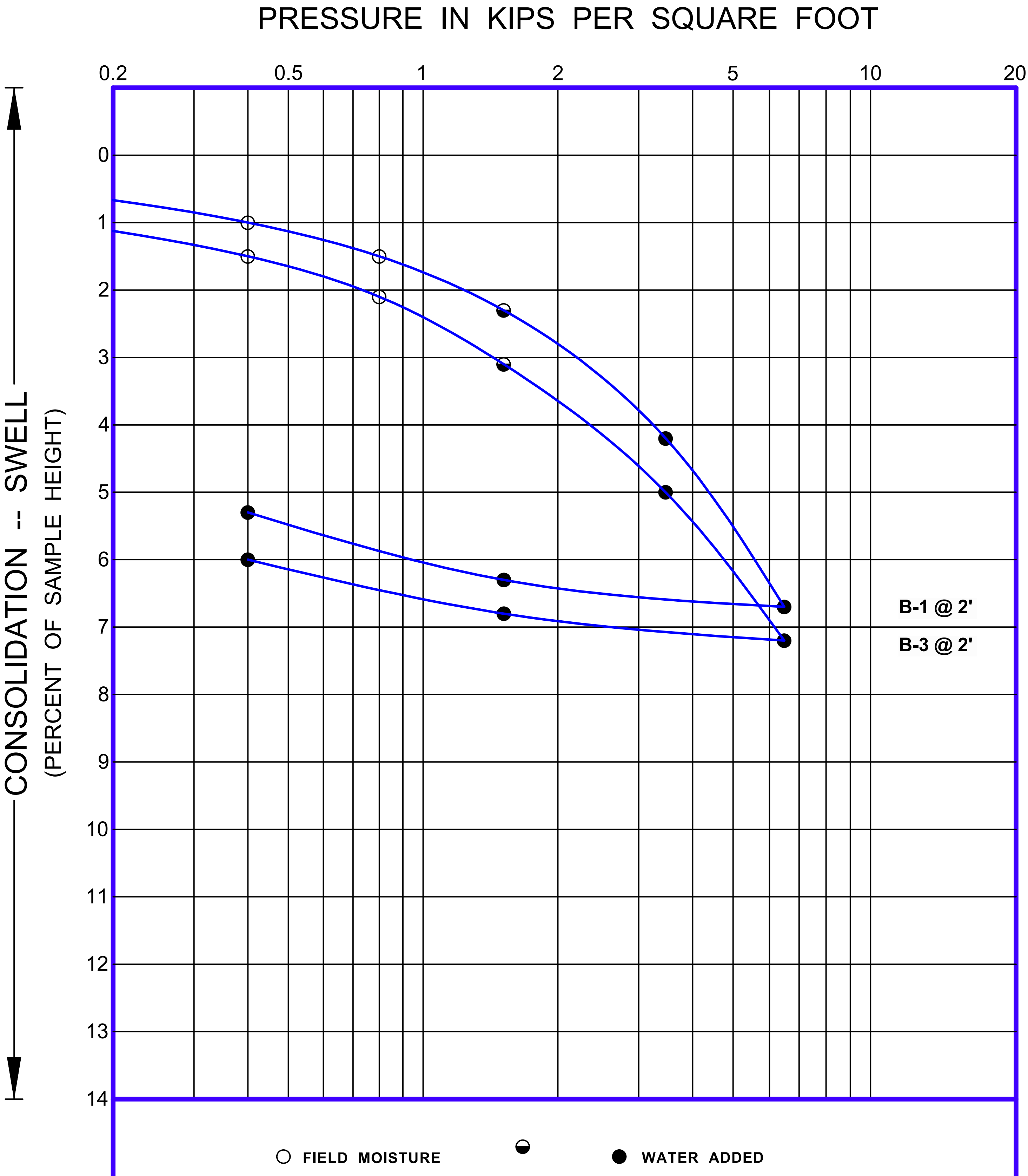
DIRECT SHEAR TESTS

JOB NAME :	Proposed New Commercial Warehouse Building South West Corner of Trumble Road & Mapes Road, Perris, CA 92571	JOB No. 21-673-02
Applied Earth Sciences	GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS www.aessoil.com (818) 552-6000	FIGURE No. II - 1.1



DIRECT SHEAR TESTS

JOB NAME : Proposed New Commercial Warehouse Building South West Corner of Trumble Road & Mapes Road, Perris, CA 92571	JOB No. 21-673-02
Applied Earth Sciences GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS www.aessoil.com (818) 552-6000	FIGURE No. II - 1.2



SWELL - CONSOLIDATION TESTS

JOB NAME : Proposed New Commercial Warehouse Building
South West Corner of Trumble Road & Mapes Road,
Perris, CA 92571

JOB No. 21-673-02

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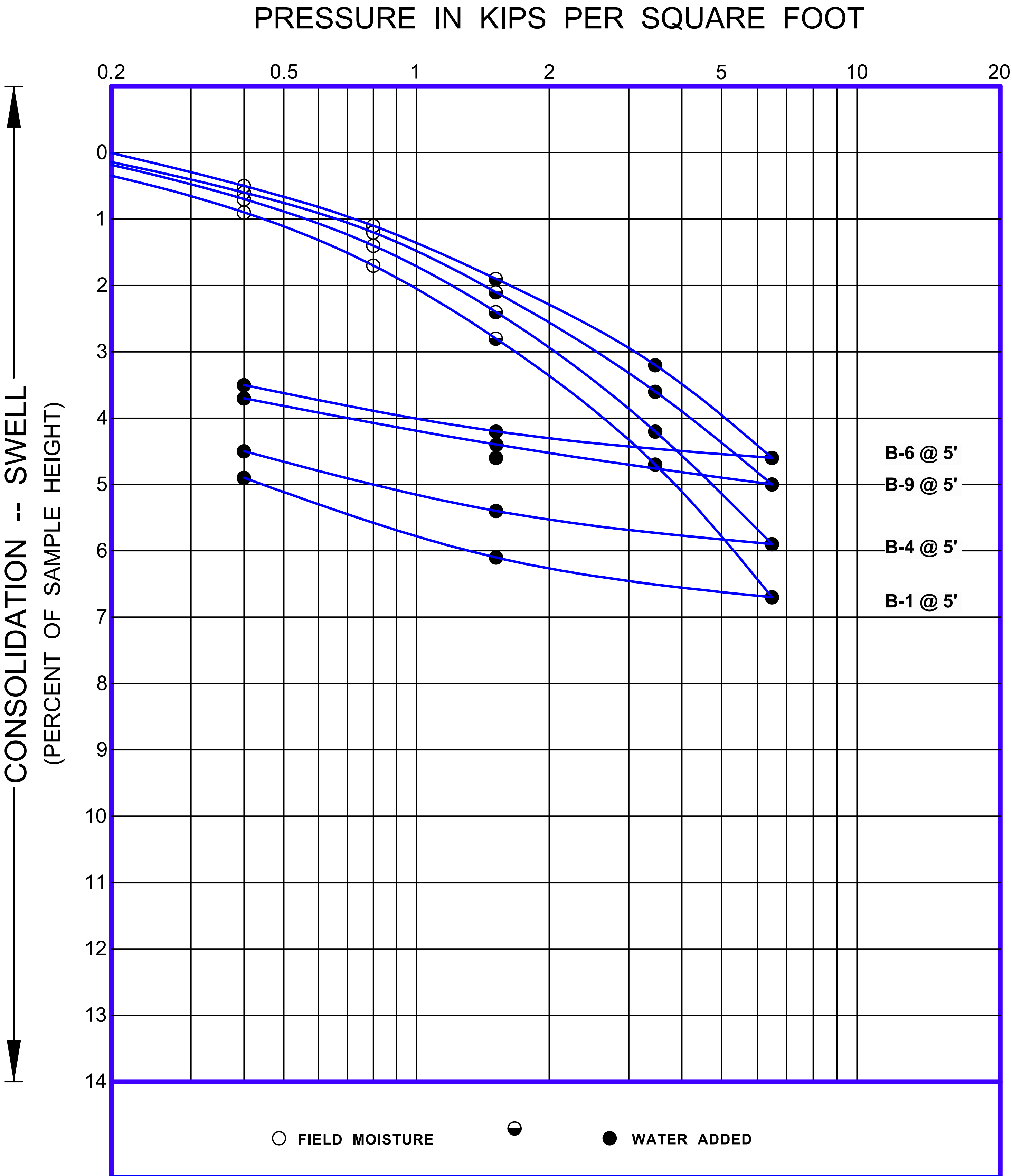
FIGURE No. II - 2.1



SWELL - CONSOLIDATION TESTS

JOB NAME : Proposed New Commercial Warehouse Building
South West Corner of Trumble Road & Mapes Road,
Perris, CA 92571

JOB No. 21-673-02

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FIGURE No. II - 2.2

Appendix G

Romoland Master Drainage Plan

RIVERSIDE COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT
RIVERSIDE, CALIFORNIA

ROMOLAND

MASTER DRAINAGE PLAN

Zone 4

Original Plan - April 1988
Revision No.1 – March 2006

Warren D. Williams
General Manager – Chief Engineer

UNDERGROUND STORM DRAINS

The proposed underground storm drains generally consist of reinforced concrete pipe ranging in size from 27 inches to 96 inches in diameter. Reinforced concrete boxes are usually placed under dedicated road crossings or where the flow rates or hydraulic necessities exceed the capacity of standard pipe sizes. The underground storm drains proposed within this revision consist of pre-cast reinforced concrete pipe or reinforced concrete box.

DETENTION BASINS

The purpose of the detention basin proposed in this plan is, by the use of temporary storage, to reduce fairly high inflow rates to substantially lesser outflow rates. This peak reduction allows the use of smaller and thus less costly downstream facilities. It should be pointed out that the detention basin proposed in this plan is designed for ultimate 100-year frequency storms. Flows exceeding the design capacity of the basin would pass through the emergency spillway in flow patterns approximating present condition.

MAJOR REVISIONS

This section describes some of the major revisions to the previously adopted Romoland Master Drainage Plan. Revisions may include alignment changes, facility types and sizes and or flow-rate adjustments. Minor changes (such as the downstream extension of Line A-2, elimination of downstream portions of Line A-4, the deletion of Line A-14b and A-6) were the result of mainline realignments described below. **FIGURE 3** depicts the realignment, and modifications made by this master plan revision.

Line A

This facility has been completely realigned and redesigned to account for basin additions in the Homeland area that have decreased the flow rate anticipated from that area. Line A will be proposed as an earthen open channel west of the freeway, where the alignment closely resembles the District's 1990 preliminary drawings titled "Romoland Channel Line A Stage 1" (project number: 4-0-310, drawing number: 4-552). The portion of Line A upstream of the 215 freeway is a combination of concrete-lined open channel, reinforced concrete box, and reinforced concrete pipe.

The existing topography on the east side of the Interstate 215 is steeper than the west side. As a result, the average slope is greater. The velocities on the east side of Interstate 215 range from 12 feet per second to over 20 feet per second. An earthen channel with that range of velocities would tend to scour and create deposition in the San Jacinto River. This deposition would constitute a hydrologic condition of concern for the San Jacinto River. In addition, this sediment could lead to further impairment of Lake Elsinore (which is listed on the federal Clean Water Act 303(d) list as impaired for sedimentation/siltation). In order to minimize scour potential and significantly reduce the right-of-way required, Line A is proposed as a concrete-lined channel between of Interstate 215 and Palomar Road.

Line A-3

This facility consists of a concrete-lined open channel along Varela Lane and reinforced concrete box on Palomar Road. The alignment was altered to combine both Line A-3 and Line A-3e. This eliminates a portion of the north-south alignment of Line A-3 and will simplify construction.

Line A-8 & A-12
The upstream portion of Line A-8 located on Murrieta road was extended northerly and incorporated as a part of Line A-12. Consequently, portions of Line A-8 from Murrieta to Hull Street have been deleted. Facility sizes and flow rates were revised accordingly.

Line A-15
This facility was revised to an underground storm drain and realigned downstream of Ethanac Road to travel north along Goetz Road to the San Jacinto River.

Line A-16, Line A-17, Line A-18
Lines A-16, A-17, and A-18 are new facilities that connect to the revised Line A alignment near the intersections of Sherman Road, Dawson Road and Antelope Road respectively. These lines are underground storm drains that extend south from Line A approximately 300 ft.

SECTION VI – ALTERNATIVES

Several alternatives were developed and studied during the generation of this revision to the Romoland Master Drainage Plan. These alternatives considered different alignment schemes for the major storm drains and open channels; sizing of the proposed detention basins; and various hydraulic considerations. As the study progressed, alternatives considered for the main facilities proposed in this Plan were presented to the District management and staff. General concurrence with the Plan selected was obtained based on cost differentials, accessibility to collector drains, right-of-way restrictions and ease of construction.

SECTION VII – ESTIMATED COST

A cost summary for the MDP facilities is shown in **TABLE 1 "Cost Summary"**. Cost were based on the 2005 Planning Unit Cost sheets and include construction, right of way and 34% for engineering, environmental mitigation, administration and contingencies.

The cost of the drains shown in **TABLE 1** includes manholes and catch basins in addition to the cost of the pipe installed. Manholes are located as necessary with a maximum spacing of 500 feet. Catch basins are not specifically located but the total number of lineal feet is computed and costed.

SECTION VIII – CONCLUSIONS

Based on the studies and investigations made for this report it is concluded that:

1. The Romoland area has experienced serious flooding problems in the past. As this area continues to urbanize these damages are expected to increase. A more orderly growth pattern can safely occur with the construction of these proposed facilities.

2. A drainage system is required to safely convey storm runoff through the area with the least interruption to public services. The Master Drainage Plan presented in this report is such a system and is the most feasible of the alternatives studied.

3. The proposed Plan lends itself to stage construction as funds become available.

4. The total cost of the recommended improvements, including construction, rights of way, engineering, administration and contingencies, is estimated to be **$64,221,206.00**.

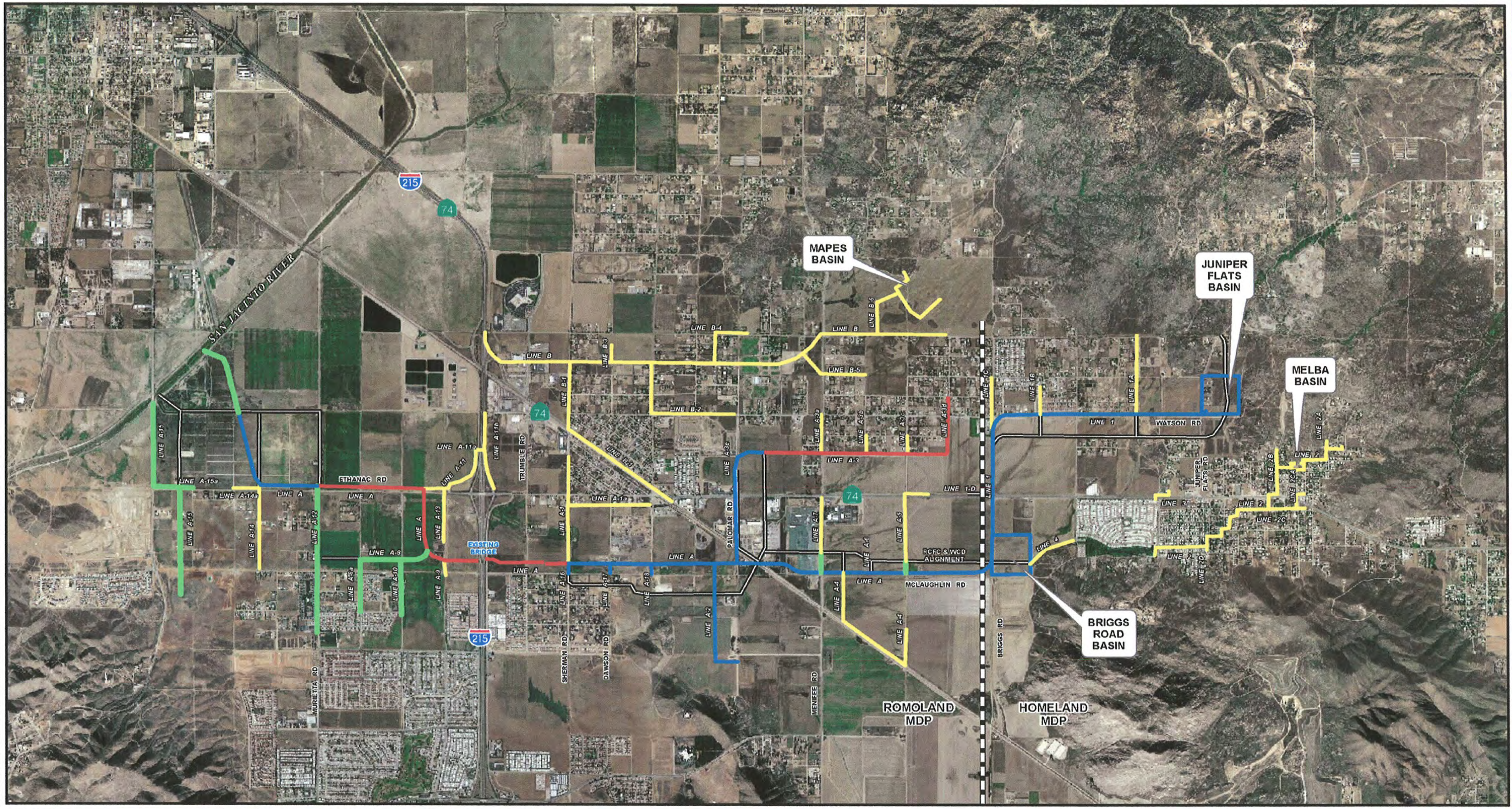
SECTION IX – RECOMMENDATIONS

It is recommended that:

1. The Master Drainage Plan, as set forth herein, be adopted by the Riverside County Flood Control and Water Conservation District's Board of Supervisors as part of the overall master plan for the County of Riverside.

2. The Master Drainage Plan, as set forth herein, be used as a guide for all future developments in the study area and that such developments be required to conform to the Plan insofar as possible.

3. The rights of way required for the Plan be protected from encroachment.



Source: AirPhoto USA
February 2004

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ALBERT A.
WEBB
ASSOCIATES
ENGINEERING CONSULTANTS

0 3,000 6,000
Feet

LEGEND

- PHASE I - PROPOSED REVISIONS
- PHASE I - PREVIOUSLY ADOPTED
- FUTURE FACILITIES - PROPOSED REVISIONS
- FUTURE FACILITIES - PREVIOUSLY ADOPTED
- PREVIOUSLY ADOPTED, TO BE ELIMINATED

Figure 3

MDP's - Adopted and Revised

Romoland / Homeland MDP/ADP

G:\2003\03-0141\Gis\drainageEIR_fig_I-2-D.mxd; Map revised Aug. 10, 2005

LEGEND

▬ ⸾ ▬	MASTER PLAN BOUNDARY
▬ ▬ ▬	PROPOSED STORM DRAIN
◇	PROPOSED BASIN
▬ · ▬ ·	PROPOSED OPEN CHANNEL (CONCRETE SIDESLOPE=1.5:1 UNLESS OTHERWISE NOTED)
▬▬▬	EXISTING FACILITY
Q=45	10-YEAR FLOWRATE (CFS)
Q_{100} = 350	100-YEAR FLOWRATE (CFS)

SATELLITE IMAGERY CREATED IN 2013

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

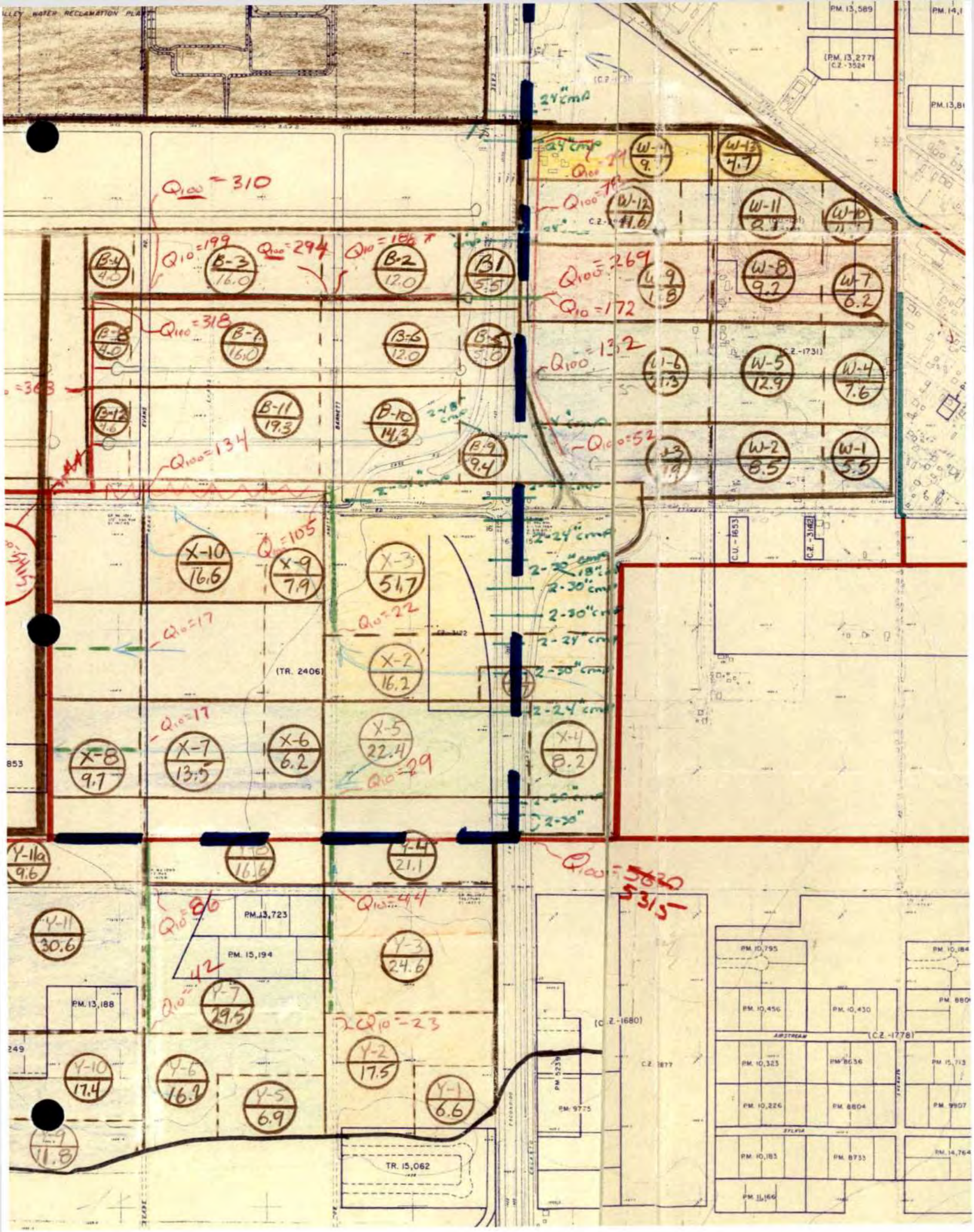
ROMOLAND

MASTER DRAINAGE PLAN

REVISION NO. 1
MARCH 2006

ORIGINAL ADOPTION DATE
APRIL 1988

Hydrology


VALLEY WATER RECLAMATION PLANT
PM. 13,589
PM. 14,1
(PM. 13,277)
C.Z.-3524
PM. 13,8
24" cmp
Q100 = 310
Q10 = 199
Q100 = 294
Q10 = 186
Q100 = 792
Q100 = 269
Q10 = 172
Q100 = 318
Q100 = 132
(C.Z.-1731)
= 363
Q100 = 134
Q100 = 52
24" cmp
W-14
9.
W-13
4.7
W-12
11.6
W-11
8.
W-10
11.
W-9
1.8
W-8
9.2
W-7
6.2
W-6
21.3
W-5
12.9
W-4
7.6
W-3
7.9
W-2
8.5
W-1
5.5
B-4
4.0
B-3
16.0
B-2
12.0
B1
5.5
B-8
4.0
B-7
16.0
B-6
12.0
B-5
5.6
B-12
4.6
B-11
19.3
B-10
14.3
B-9
9.4
EVANS
BARNETT
2-24" cmp
2-24" cmp
2-30" cmp
18"
2-30" cmp
2-30" cmp
2-24" cmp
2-30" cmp
2-24" cmp
2-30" cmp
2-30"
C.U.-1653
C.Z.-3142
Q100 = 105
X-10
16.6
X-9
7.9
X-3
51.7
Q10 = 17
Q10 = 22
X-2
16.2
(TR. 2406)
Q10 = 17
X-8
9.7
X-7
13.5
X-6
6.2
X-5
22.4
X-4
8.2
Q10 = 29
853
Y-11a
9.6
Y-12
16.6
Y-4
21.1
Q100 = ~~5620~~ 5315
Q10 = 86
Q10 = 44
PM. 13,723
PM. 15,194
42
Q10
Y-11
30.6
Y-3
24.6
Y-7
29.5
PM. 13,188
Q10 = 23
Y-2
17.5
249
Y-10
17.4
Y-6
16.2
Y-5
6.9
Y-1
6.6
Y-9
11.8
TR. 15,062
(C.Z.-1680)
C.Z. 1877
PM 5239
PM. 9775
PM. 10,795
PM. 10,184
PM. 10,456
PM. 10,430
PM. 8804
AIRSTREAM
(C.Z.-1778)
PM. 10,323
PM. 8636
PM. 15,713
PM. 10,226
PM. 8804
PM. 9907
SYLVIA
PM. 10,183
PM. 8733
PM. 14,764
PM. 11,166

RCFC & WCD HYDROLOGY MANUAL
RATIONAL METHOD CALCULATION FORM

Sheet No. 3 of __ Sheets

PROJECT Romoland - West of 395

FREQUENCY 100 yr.

Calculated by Dusty 4-25-83 DATE

Checked by ________ DATE

DRAINAGE AREA	Soil & Development	A Acres	I In/hr.	C	ΔQ CFS	Σ Q CFS	SLOPE	SECTION	V FPS	L FT.	T MIN.	Σ T	REMARKS
W-1	1) D-Comm	5.5	2.85	.892	14.0				H=2	600	12.1	12.1	
W-2	"	8.5	2.34	.890	17.7	14.0	.004	66' St.	2.3	800	5.8	17.9	
W-3	"	11.9	1.92	.888	20.3	32	.003	66' St.	2.4	1250	8.7	26.6	
			1.89			52	.003	TR. CHAN.	6	350	1.0	27.6	Ⓐ
									H=2	550	11.5		
W-4	1) D-Comm	7.6	2.92	.892	19.8	19.8	.004	66' St.	2.3	800	5.8	11.5	
W-5	"	12.9	2.38	.890	27	47	.003	66' St.	2.8	1250	7.4	17.3	
W-6	"	21.3	2.00	.890	38	85						24.7	Ⓑ
		$Q_p = 85 + 52\left(\frac{24.7}{27.6}\right) = 132$							$T_c = 24.7$				
									H=2	500	10.9		
W-7	1) D-Comm	6.2	3.00	.893	16.6	16.6	.005	66' St.	2.6	750	4.8	10.9	
W-8	"	9.2	2.50	.89	20.5	37	.003	66' St.	2.5	1250	8.3	15.7	
W-9	"	15.8	2.02	.889	28	65						24.0	Ⓑ
						132	.003	TR. CHAN.	6	550	1.5	24.7	
			1.94									26.2	Ⓐ
			$Q_p = 132 + 65\left(\frac{1.94}{2.02}\right) = 194$						$T_c = 26.2$				Ⓑ

RCFC & WCD HYDROLOGY MANUAL

RATIONAL METHOD CALCULATION FORM

Sheet No. 4 of __ Sheets

PROJECT ROMOLAND - WEST OF 395

FREQUENCY 100 yr.

Calculated by West 4-26-83 DATE

Checked by ---------- DATE

DRAINAGE AREA	Soil & Development	A Acres	I In/hr.	C	ΔQ CFS	Σ Q CFS	SLOPE	SECTION	V FPS	L FT.	T MIN.	Σ T	REMARKS
W-13	D-Comm	4.7	2.70	.891	11.3				H=4	900	13.5	13.5	
W-14	C-Comm	9.7	2.05	.886	17.6	11.3	.003	66' St.	2.0	1200	10.0	23.5	
			1.98			29	.003	TR. CHAN.	5	500	1.7	25.2	(B)
W-10	D-Comm	4.1	3.22	.894	11.8				H=4	500	9.5	9.5	
W-11	"	8.1	2.35	.89	16.9	11.8	.003	66' St	2	1000	8.3	17.8	
W-12	"	11.6	1.97	.888	20.	29	.003	66' St.	2.2	1000	7.6	25.4	(A)
						49							

$Q_P = 49 + 29\left(\frac{197}{198}\right) = 78$

						78	.003	TR. CHAN.	5	600	2.0	25.4	
			1.89									27.4	(A)

$Q_P = 194 + 78\left(\frac{262}{274}\right) = 269$ $T_c = 26.2$

TRAVEL TO d/s B-4

						269	.002	84"∅	7.5	3100	6.9	26.2	
			1.72									33.1	(B)

RCFC & WCD HYDROLOGY MANUAL
RATIONAL METHOD CALCULATION FORM

Sheet No. 1 of ___ Sheets

PROJECT ROMOLAND - WEST OF 395

LINE A-11

FREQUENCY 10 yr. ←

Calculated by Wust DATE 4-25-83

Checked by ________ DATE ________

DRAINAGE AREA	Soil & Development	A Acres	I In/hr	C	ΔQ CFS	Σ Q CFS	SLOPE	SECTION	V FPS	L FT.	T MIN.	Σ T	REMARKS
W-1 ✓	D-Comm	5.5	1.83	.885	8.9				H=2	600	12.1	12.1	
W-2 ✓	D-Comm	8.5	1.50	.88	11.2	8.9	.004	66' st.	2.3	800	5.8	17.9	
W-3 ✓	D-Comm	11.9	1.21	.878	12.6	20	.003	66' st.	2.1	1250	9.9	27.8	
						33	.003	TR. CHAN	5.3	350	1.1	28.9	Ⓐ
W-4 ✓	D-Comm	7.6	1.87	.887	12.6				H=2	550	11.5	11.5	
W-5 ✓	"	12.9	1.53	.881	17.4	12.6	.004	66' st.	2.3	800	5.8	17.3	
W-6 ✓	"	21.3	1.24	.877	23	30	.003	66' st.	2.3	1250	9.1	26.4	Ⓑ
						53							
			$Q_P = 53 + 33\left(\frac{26.4}{28.9}\right) = 83$						Tc = 26.4				
												26.4 ✓	
			1.21			83	.003	TR. CHAN	6.8	550	1.3	27.7	Ⓐ
W-7 ✓	D-Comm	6.2	1.92	.888	10.6				H=2	500	10.9	10.9	
W-8 ✓	"	9.2	1.59	.883	12.9	10.6	.005	66' st.	2.5	750	5.0	15.9	
W-9 ✓	"	15.8	1.25	.878	17.3	23.5	.003	66' st.	2.1	1250	9.9	25.8	Ⓑ
						41							
			$Q_P = 83 + 41\left(\frac{1.21}{1.25}\right) = 123$						Tc = 27.7				

RCFC & WCD HYDROLOGY MANUAL
RATIONAL METHOD CALCULATION FORM

Sheet No. 3 of __ Sheets

PROJECT ____________________

FREQUENCY 10 yr.

Calculated by ______ 4-28-83 DATE

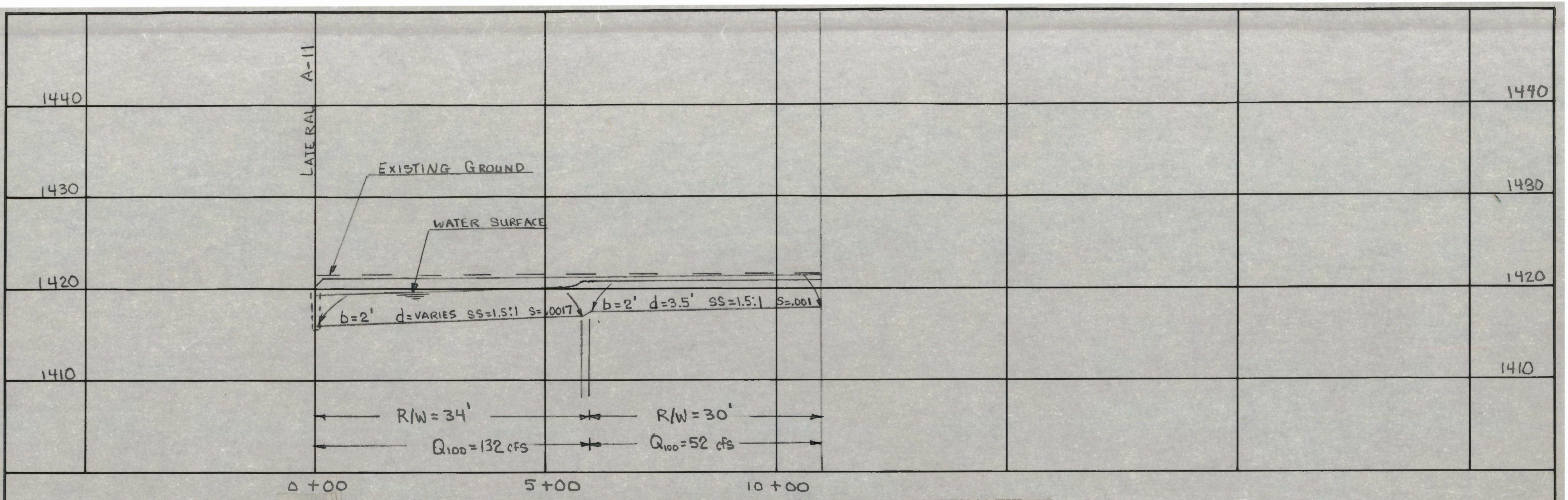
Checked by EO DATE

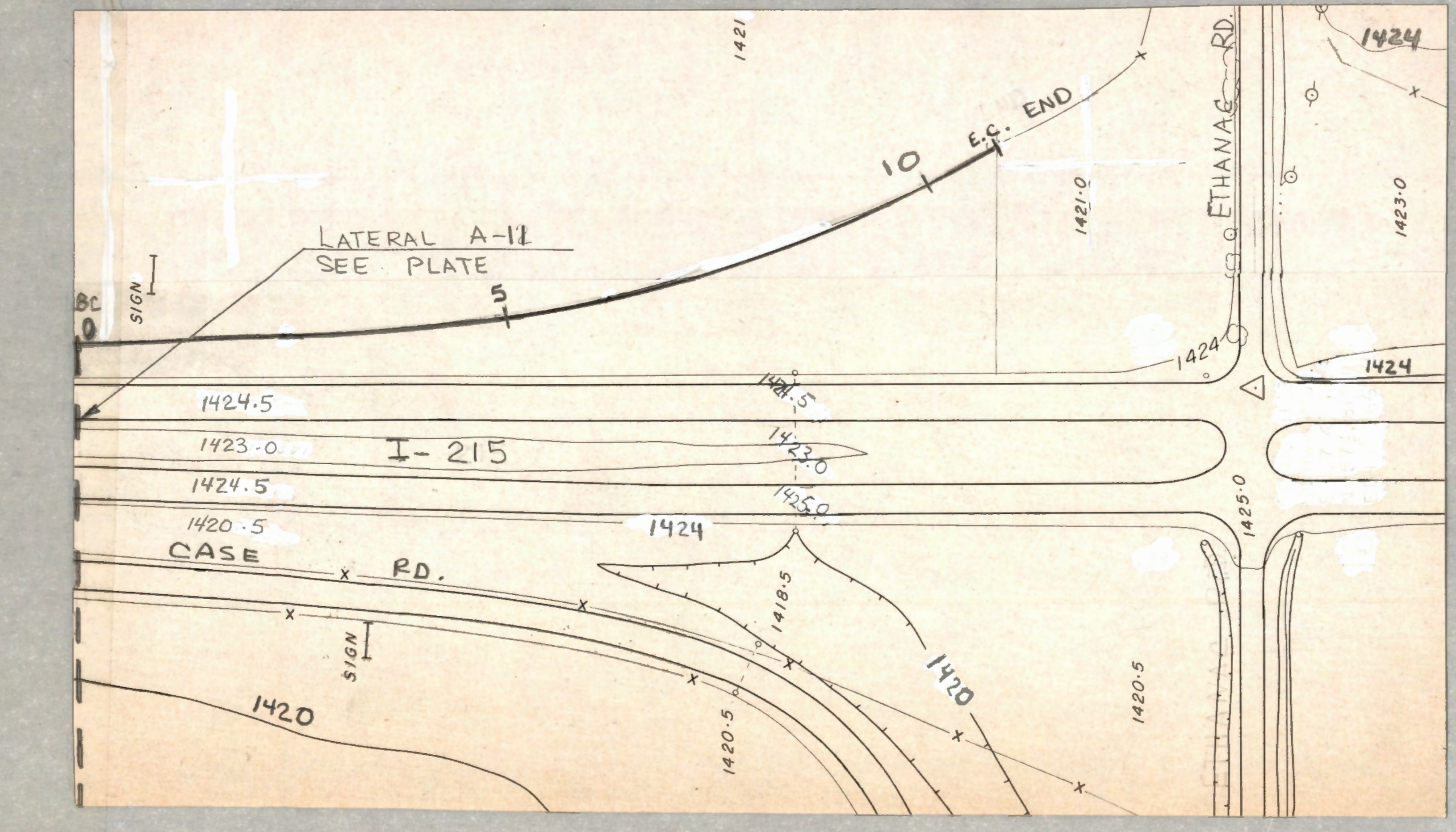
DRAINAGE AREA	Soil & Development	A Acres	I In/hr	C	ΔQ CFS	Σ Q CFS	SLOPE	SECTION	V FPS	L FT.	T MIN.	Σ T	REMARKS
W-13 /	D-Com	4.7	1.73	.885	7.2				H=4	900	13.5	13.5	
W-14 /	C-Com	9.7	1.30	.875	11.1	7.2	.003	66' st.	1.95	1200	10.3	23.8	
			1.26			18.3	.003	TR. CH.	4.7	500	1.7	25.5	Ⓑ
									H=4	500	9.5	9.5	
W-10 /	D-Comm	4.1	2.06	.888	7.5	7.5	.003	66' st.	1.95	1000	8.5	18.0	
W-11 /	"	8.1	1.50	.881	10.7	18.2	.003	66' st.	2.1	1000	7.9	25.9	Ⓐ
W-12 /	"	11.6	1.25	.878	12.7	31							
		$Q_p =$	31 +	18		$\left(\frac{1.25}{1.26}\right)$	= 49		T_c = 25.9				
			1.21			49	.003	TR. CH.	5.5	600	1.8	25.9 27.7	
$T_A = T_B$:		$Q_p =$		123+		49	= 172		T_c = 27.7				
TRAVEL TO d/s B-2													
			1.10			172	.002	84" ⌀	4.5	1500	5.6	27.7 33.3	

Hydraulics

```
DUSTY.PLAN,ROMOLAND         FC102.PGMET    WED, JUN  1, 1983,  2:17 PM  PAGE  1

PROJECT 4-6-954-00 000-0  RUN:      LINE   A - 12a

WATER SURFACE PROFILE INPUT  DIRECTION = UP  (SUBCRITICAL)  STARTING DEPTH =   3.39

   STATION    INVERT          Q     N     DIST  BOTTOM  SIDE   RADIUS
               ELEV                        INC   WIDTH  SLOPE  (M+P)
    0+00.00 1416.00         132  .015   100    2.00  1.500       -1
    5+80.00 1417.00          52  .015   100    2.00  1.500       -1
    6+00.00 1417.50          52  .015   100    2.00  1.500       -1
   11+00.00 1418.00          52  .015   100    2.00  1.500       -1
```

```
DUSTY.PL N,ROMOLAND         FC102.PGMET    WED, JUN  1, 1983,  2:17 PM  PAGE  1

PROJECT 4-6-954-00 000-0  RUN:       LINE   A - 12a

          WATER SURFACE PROFILE FOR SUBCRITICAL FLOW

     STATION    WATER  WATER   INVERT  VELO    VH     CD  SUPER    Q     N    BOTTOM  SIDE
                 ELEV  DEPTH    ELEV                       M+P                WIDTH  SLOPE

     0+00.00  1419.39   3.39  1416.00   5.5    .47    2.8     54   132  .015    2.00 1.500
     1+00.00  1419.53   3.36  1416.17   5.6    .48    2.8     53
     2+00.00  1419.68   3.34  1416.34   5.6    .49    2.8     53
     3+00.00  1419.84   3.33  1416.52   5.7    .50    2.8     53
     4+00.00  1420.00   3.31  1416.69   5.7    .51    2.8     53
     5+00.00  1420.17   3.31  1416.86   5.7    .51    2.8     53
     5+80.00  1420.75   3.75  1417.00   1.8    .05    1.8     43    52  .015    2.00 1.500
     6+00.00  1420.73   3.23  1417.50   2.4    .09    1.8     31    52  .015    2.00 1.500
     7+00.00  1420.75   3.15  1417.60   2.5    .09    1.8     30
     8+00.00  1420.78   3.08  1417.70   2.6    .10    1.8     28
     9+00.00  1420.81   3.01  1417.80   2.7    .11    1.8     27
    10+00.00  1420.84   2.94  1417.90   2.8    .12    1.8     26
    11+00.00  1420.88   2.88  1418.00   2.9    .13    1.8     25    52  .015    2.00 1.500
```





HORIZ. 1"=200'
VERT. 1"=10'

NOTE: Ground line in profile was taken from orthophoto map dated Aug. 8, 1977. Plan view is from topographic map dated FEB. 25, 1959.

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

M.D.P. - ROMOLAND AREA
LATERAL A-11 A

REVISED:
APPROVED: CHIEF ENGINEER
DATE:
DRAWN BY: D.B.
CHECKED BY:
DATE DRAWN: 7/12/83
42

Appendix H

Drainage Maps

CITY OF PERRIS

PRE DEVELOPMENT HYDROLOGY EXHIBIT

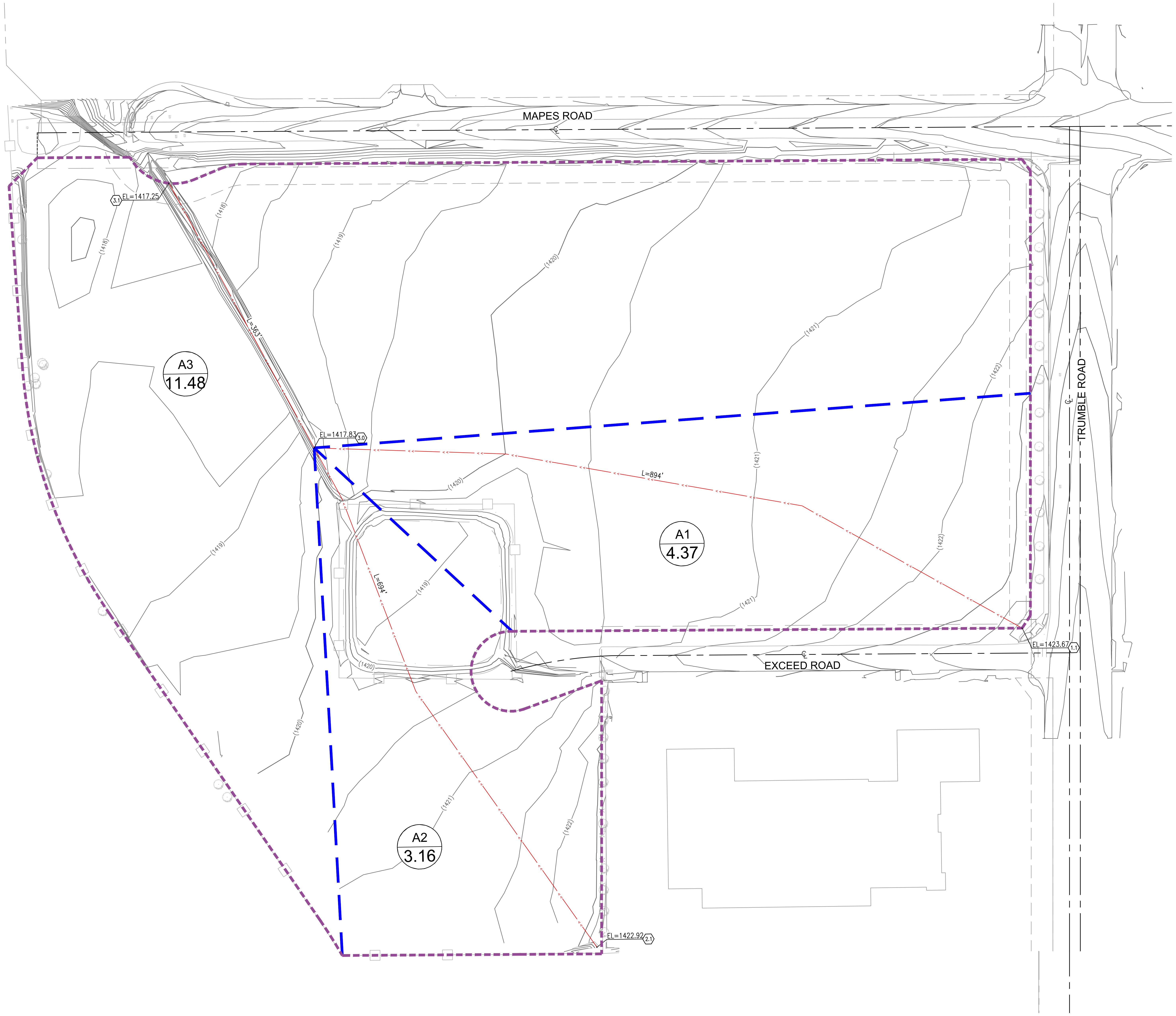
FOR
MAPES INDUSTRIAL FACILITY

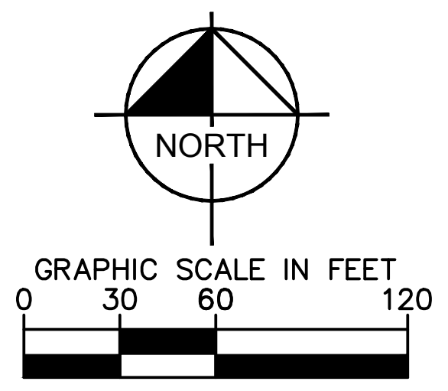
HYDROLOGY INFORMATION

SITE AREA:	19.01 ACRES	
SOIL TYPE:	D	(NRCS WEB SOIL SURVEY)
IMPERVIOUS:	0%	(PER CALCULATIONS)
ISOHYETALS:	0.487 INCH	(2 YEAR, 1 HOUR)
	1.52 INCH	(100 YEAR, 1 HOUR)
RUNOFF INDEX	89	(SOIL GROUP D)
FREQUENCY:	2–YEAR	(FOR STORMWATER QUALITY)
	100–YEAR	(FOR STORM DRAIN DESIGN)
METHOD:	RIVERSIDE COUNTY HYDROLOGY MANUAL	

LEGEND:

▬ ▬ ▬ ▬	DRAINAGE AREA BOUNDARY
— — — —	SUB–DRAINAGE AREA BOUNDARY
——>>——>>——	FLOW PATH
➡	PROPOSED FLOW DIRECTION ARROW
X	DRAINAGE AREA DESIGNATION
XXX	AREA (AC)
1 →	STREAM #
1.1	NODE





SCALE: 1" = 60'
WHEN PRINTED AT FULL
SIZE 30"X42"

HYDROLOGY SUMMARY							
DRAINAGE AREA NO.	TRIBUTARY AREA (SF)	TRIBUTARY AREA (AC)	IMPERVIOUS RATIO	Q_2 (CFS)	V_2 (CF)	Q_{100} (CFS)	V_{100} (CF)
A	828,248	19.01	0.00	8.30	14,323	39.91	277,142

Kimley»Horn

1100 W TOWN AND COUNTRY ROAD,SUITE 700,
ORANGE, CA 92868
PHONE: 714–939–1030 FAX: 714–938–9488
WWW.KIMLEY–HORN.COM

MAPES INDUSTRIAL FACILITY
PRE DEVELOPMENT HYDROLOGY EXHIBIT
MAPES AND TRUMBLE

CITY OF PERRIS

DATE: JUN 2022
SHEET
1
OF 1

06/01/2022

CITY OF PERRIS

POST DEVELOPMENT HYDROLOGY EXHIBIT

FOR
MAPES INDUSTRIAL FACILITY

HYDROLOGY INFORMATION

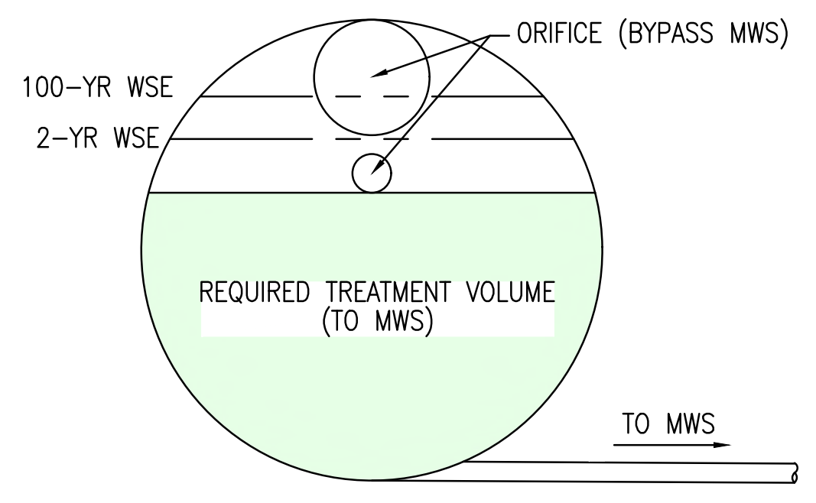
SITE AREA:	19.01 ACRES	
SOIL TYPE:	D	(NRCS WEB SOIL SURVEY)
IMPERVIOUS:	82%	(PER CALCULATIONS)
ISOHYETALS:	0.487 INCH	(2 YEAR, 1 HOUR)
	1.52 INCH	(100 YEAR, 1 HOUR)
RUNOFF INDEX	75	(SOIL GROUP D)
FREQUENCY:	2-YEAR	(FOR STORMWATER QUALITY)
	100-YEAR	(FOR STORM DRAIN DESIGN)
METHOD:	RIVERSIDE COUNTY HYDROLOGY MANUAL	

LEGEND:

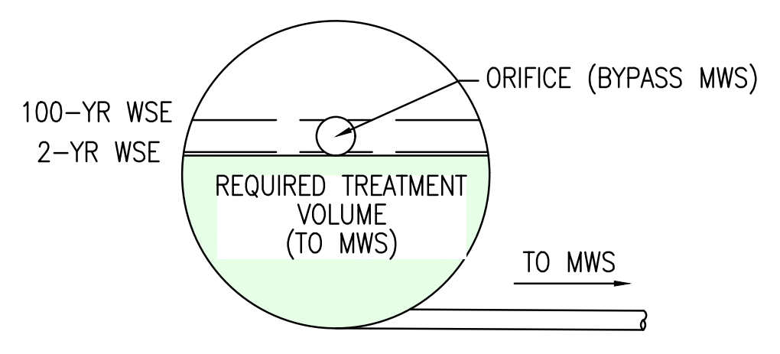
━ ━ ━ ━	DRAINAGE AREA BOUNDARY
━ ━ ━ ━	SUB-DRAINAGE AREA BOUNDARY
——>>——>>——	FLOW PATH
——SD——	STORM DRAIN (ONSITE FLOWS)
——SD——	STORM DRAIN (OFFSITE FLOWS)
➔	PROPOSED FLOW DIRECTION ARROW
X	DRAINAGE AREA DESIGNATION
XXX	AREA (AC)
1 →	STREAM #
1.1	NODE

DRAINAGE NOTES:

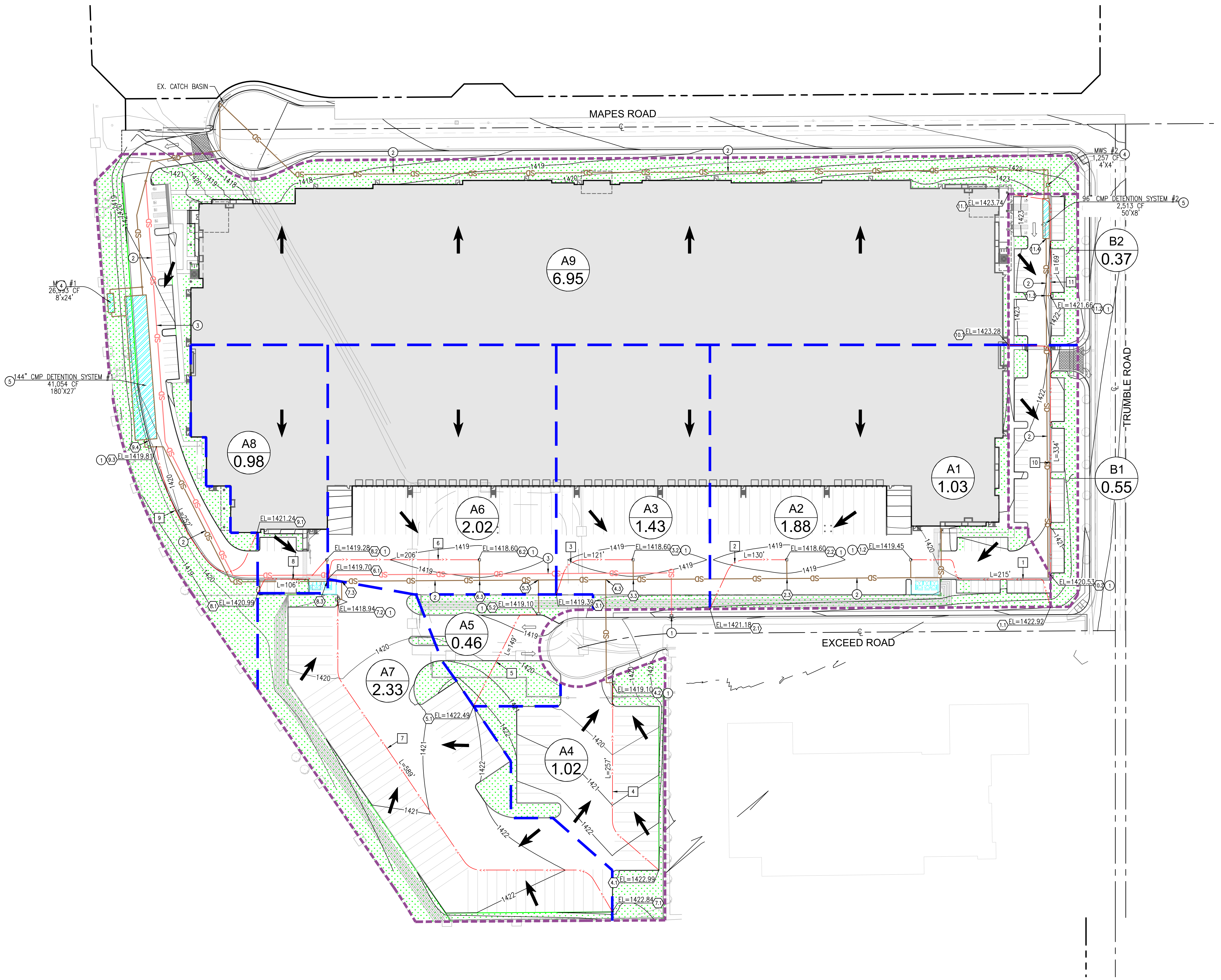
① PROPOSED CATCH BASIN
② PROPOSED STORM DRAIN PIPE (ONSITE FLOWS)
③ PROPOSED STORM DRAIN PIPE (OFFSITE FLOWS)
④ PROPOSED BMP – MODULAR WETLAND SYSTEM
⑤ PROPOSED BMP – UNDERGROUND DETENTION BASIN



DETENTION SYSTEM #1 SECTION
NTS



DETENTION SYSTEM #2 SECTION
NTS



GRAPHIC SCALE IN FEET
0 30 60 120
SCALE: 1" = 60'
WHEN PRINTED AT FULL
SIZE 30"X42"

HYDROLOGY SUMMARY

DRAINAGE AREA NO.	TRIBUTARY AREA (SF)	TRIBUTARY AREA (AC)	IMPERVIOUS RATIO	Q_2 (CFS)	V_2 (CF)	Q_{100} (CFS)	V_{100} (CF)	STORAGE PROVIDED (CF)
A	787,989	18.09	0.83	19.96	103,019	37.48	305,203	41,054 (UNDERGROUND DETENTION SYSTEM #1)
B	40,260	0.92	0.73	1.00	4,726	1.94	14,780	2,513 (UNDERGROUND DETENTION SYSTEM #2)
TOTAL	828,248	19.01	0.82	20.96	107,746	39.42	319,983	43,568

Kimley»Horn

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WWW.KIMLEY-HORN.COM

MAPES INDUSTRIAL FACILITY
POST DEVELOPMENT HYDROLOGY EXHIBIT
MAPES AND TRUMBLE

CITY OF PERRIS

DATE: AUG 2022
SHEET
1
OF 1

K:\ORA_LDEV\BLUE MARQUISE INVESTMENTS, LLC\TRUMBLE AND MAPES PERRIS, CA\REPORTS\H&H\EXHIBITS\POST HYDROLOGY EXHIBIT.DWG (08-16-22 10:28:48AM) Plotted by: Ivan.Thieu
08/16/2022

Appendix I

Rational Method Analysis

Appendix I.1

Rational Method Analysis
Pre-Development Conditions
2-Year Storm

```
                        Riverside County Rational Hydrology Program

        CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
                Rational Hydrology Study       Date: 05/26/22
File:MapesPre2Rat.out
        ------------------------------------------------------------------------
        MAPES AND TRUMBLE INDUSTRIAL FACILITY
        RATIONAL METHOD
        PRE-DEVELOPMENT CONDITIONS
        2-YEAR STORM, DA A
        ------------------------------------------------------------------------
         *********   Hydrology Study Control Information **********

         English (in-lb) Units used in input data file

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


        Program License Serial Number 6443

        ------------------------------------------------------------------------
        Rational Method Hydrology Program based on
        Riverside County Flood Control & Water Conservation District
        1978 hydrology manual

        Storm event (year) =    2.00 Antecedent Moisture Condition = 1

        2 year, 1 hour precipitation =  0.487(In.)
        100 year, 1 hour precipitation =  1.520(In.)

        Storm event year =   2.0
        Calculated rainfall intensity data:
        1 hour intensity =  0.487(In/Hr)
        Slope of intensity duration curve = 0.4900





        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station       1.100 to Point/Station       3.000
        **** INITIAL AREA EVALUATION ****
        ______________________________________________________________________
        Initial area flow distance =   893.980(Ft.)
        Top (of initial area) elevation =  1423.670(Ft.)
        Bottom (of initial area) elevation =  1417.830(Ft.)
        Difference in elevation =     5.840(Ft.)
        Slope =    0.00653  s(percent)=       0.65
        TC = k(0.530)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   21.968 min.
Rainfall intensity =      0.797(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.593
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.066(CFS)
Total initial stream area =        4.370(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        3.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      4.370(Ac.)
Runoff from this stream =      2.066(CFS)
Time of concentration =   21.97 min.
Rainfall intensity =     0.797(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.100 to Point/Station        3.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   693.750(Ft.)
Top (of initial area) elevation =  1422.920(Ft.)
Bottom (of initial area) elevation =  1417.830(Ft.)
Difference in elevation =     5.090(Ft.)
Slope =    0.00734  s(percent)=       0.73
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.393 min.
Rainfall intensity =      0.847(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.606
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.621(CFS)
Total initial stream area =        3.160(Ac.)
Pervious area fraction = 1.000
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station       3.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.160(Ac.)
Runoff from this stream =      1.621(CFS)
Time of concentration =   19.39 min.
Rainfall intensity =     0.847(In/Hr)
Summary of stream data:

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


1        2.066     21.97                 0.797
2        1.621     19.39                 0.847
Largest stream flow has longer time of concentration
Qp =      2.066 + sum of
          Qb         Ia/Ib
           1.621 *    0.941 =      1.525
Qp =      3.591

Total of 2 streams to confluence:
Flow rates before confluence point:
       2.066       1.621
Area of streams before confluence:
        4.370       3.160
Results of confluence:
Total flow rate =      3.591(CFS)
Time of concentration =    21.968 min.
Effective stream area after confluence =      7.530(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station       3.100
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      5.993(CFS)
Depth of flow =   0.614(Ft.), Average velocity =   1.148(Ft/s)
        ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00             0.77
        2              4.23             0.00
        3              9.79             0.02
        4             14.96             1.12
Manning's 'N' friction factor =   0.030
```

```
----------------------------------------------------------------
Sub-Channel flow  =      5.993(CFS)
  '     '        flow top width =     11.724(Ft.)
  '     '    velocity=    1.148(Ft/s)
  '     '        area =      5.222(Sq.Ft)
  '     '        Froude number =     0.303

Upstream point elevation =  1417.830(Ft.)
Downstream point elevation =  1417.250(Ft.)
Flow length =   362.580(Ft.)
Travel time  =    5.27 min.
Time of concentration =   27.23 min.
Depth of flow =   0.614(Ft.)
Average velocity =   1.148(Ft/s)
Total irregular channel flow =     5.993(CFS)
Irregular channel normal depth above invert elev. =   0.614(Ft.)
Average velocity of channel(s) =   1.148(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.572
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.717(In/Hr) for a     2.0 year storm
Subarea runoff =      4.707(CFS) for     11.480(Ac.)
Total runoff =      8.297(CFS)  Total area =      19.010(Ac.)
Depth of flow =   0.725(Ft.), Average velocity =   1.259(Ft/s)
End of computations, total study area =          19.01 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  89.0
```

Appendix I.1I

Rational Method Analysis
Pre-Development Conditions
10-Year Storm

```
                        Riverside County Rational Hydrology Program

        CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
                Rational Hydrology Study        Date: 05/26/22
File:MapesPre10Rat.out
        ------------------------------------------------------------------------
        MAPES AND TRUMBLE INDUSTRIAL FACILITY
        RATIONAL METHOD
        PRE-DEVELOPMENT CONDITIONS
        10-YEAR STORM, DA A
        ------------------------------------------------------------------------
         *********   Hydrology Study Control Information **********

         English (in-lb) Units used in input data file

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


        Program License Serial Number 6443

        ------------------------------------------------------------------------
        Rational Method Hydrology Program based on
        Riverside County Flood Control & Water Conservation District
        1978 hydrology manual

        Storm event (year) =   10.00 Antecedent Moisture Condition = 2

        2 year, 1 hour precipitation =  0.487(In.)
        100 year, 1 hour precipitation =  1.520(In.)

        Storm event year =  10.0
        Calculated rainfall intensity data:
        1 hour intensity =  0.912(In/Hr)
        Slope of intensity duration curve = 0.4900




        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station        1.100 to Point/Station     3.000
        **** INITIAL AREA EVALUATION ****
        ______________________________________________________________________
        Initial area flow distance =   893.980(Ft.)
        Top (of initial area) elevation =  1423.670(Ft.)
        Bottom (of initial area) elevation =  1417.830(Ft.)
        Difference in elevation =     5.840(Ft.)
        Slope =    0.00653  s(percent)=       0.65
        TC = k(0.530)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   21.968 min.
Rainfall intensity =      1.492(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.810
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      5.285(CFS)
Total initial stream area =       4.370(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       3.000 to Point/Station       3.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      4.370(Ac.)
Runoff from this stream =      5.285(CFS)
Time of concentration =   21.97 min.
Rainfall intensity =     1.492(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       2.100 to Point/Station       3.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   693.750(Ft.)
Top (of initial area) elevation =  1422.920(Ft.)
Bottom (of initial area) elevation =  1417.830(Ft.)
Difference in elevation =     5.090(Ft.)
Slope =    0.00734  s(percent)=       0.73
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.393 min.
Rainfall intensity =      1.586(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.815
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.086(CFS)
Total initial stream area =       3.160(Ac.)
Pervious area fraction = 1.000
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       3.000 to Point/Station       3.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.160(Ac.)
Runoff from this stream =      4.086(CFS)
Time of concentration =   19.39 min.
Rainfall intensity =     1.586(In/Hr)
Summary of stream data:

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


1        5.285     21.97                 1.492
2        4.086     19.39                 1.586
Largest stream flow has longer time of concentration
Qp =      5.285 + sum of
          Qb         Ia/Ib
           4.086 *    0.941 =      3.844
Qp =      9.129

Total of 2 streams to confluence:
Flow rates before confluence point:
       5.285       4.086
Area of streams before confluence:
        4.370       3.160
Results of confluence:
Total flow rate =      9.129(CFS)
Time of concentration =    21.968 min.
Effective stream area after confluence =      7.530(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       3.000 to Point/Station       3.100
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =     15.523(CFS)
Depth of flow =   0.975(Ft.), Average velocity =   1.551(Ft/s)
!!Warning: Water is above left or right bank elevations
        ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              0.77
        2              4.23              0.00
        3              9.79              0.02
        4             14.96              1.12
```

```
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =     15.523(CFS)
  '     '        flow top width =     14.280(Ft.)
  '     '    velocity=    1.551(Ft/s)
  '     '        area =     10.009(Sq.Ft)
  '     '        Froude number =     0.326

Upstream point elevation =  1417.830(Ft.)
Downstream point elevation =  1417.250(Ft.)
Flow length =   362.580(Ft.)
Travel time  =    3.90 min.
Time of concentration =   25.86 min.
Depth of flow =   0.975(Ft.)
Average velocity =   1.551(Ft/s)
Total irregular channel flow =    15.523(CFS)
Irregular channel normal depth above invert elev. =   0.975(Ft.)
Average velocity of channel(s) =   1.551(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.804
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.377(In/Hr) for a    10.0 year storm
Subarea runoff =     12.711(CFS) for     11.480(Ac.)
Total runoff =     21.840(CFS)  Total area =      19.010(Ac.)
Depth of flow =   1.146(Ft.), Average velocity =   1.745(Ft/s)
!!Warning: Water is above left or right bank elevations
End of computations, total study area =          19.01 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  89.0
```

Appendix I.1II

Rational Method Analysis
Pre-Development Conditions
100-Year Storm

```
                        Riverside County Rational Hydrology Program

        CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
                Rational Hydrology Study        Date: 05/26/22
File:MapesPre100Rat.out
        ------------------------------------------------------------------------
        MAPES AND TRUMBLE INDUSTRIAL FACILITY
        RATIONAL METHOD
        PRE-DEVELOPMENT CONDITIONS
        100-YEAR STORM, DA A
        ------------------------------------------------------------------------
         *********   Hydrology Study Control Information **********

         English (in-lb) Units used in input data file

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


        Program License Serial Number 6443

        ------------------------------------------------------------------------
        Rational Method Hydrology Program based on
        Riverside County Flood Control & Water Conservation District
        1978 hydrology manual

        Storm event (year) =  100.00 Antecedent Moisture Condition = 3

        2 year, 1 hour precipitation =  0.487(In.)
        100 year, 1 hour precipitation =  1.520(In.)

        Storm event year = 100.0
        Calculated rainfall intensity data:
        1 hour intensity =  1.520(In/Hr)
        Slope of intensity duration curve = 0.4900




        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station        1.100 to Point/Station        3.000
        **** INITIAL AREA EVALUATION ****
        ______________________________________________________________________
        Initial area flow distance =   893.980(Ft.)
        Top (of initial area) elevation =  1423.670(Ft.)
        Bottom (of initial area) elevation =  1417.830(Ft.)
        Difference in elevation =     5.840(Ft.)
        Slope =    0.00653  s(percent)=       0.65
        TC = k(0.530)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   21.968 min.
Rainfall intensity =      2.487(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.878
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      9.545(CFS)
Total initial stream area =       4.370(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       3.000 to Point/Station       3.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      4.370(Ac.)
Runoff from this stream =      9.545(CFS)
Time of concentration =   21.97 min.
Rainfall intensity =     2.487(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       2.100 to Point/Station       3.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   693.750(Ft.)
Top (of initial area) elevation =  1422.920(Ft.)
Bottom (of initial area) elevation =  1417.830(Ft.)
Difference in elevation =     5.090(Ft.)
Slope =    0.00734  s(percent)=       0.73
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.393 min.
Rainfall intensity =      2.644(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      7.348(CFS)
Total initial stream area =       3.160(Ac.)
Pervious area fraction = 1.000
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        3.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.160(Ac.)
Runoff from this stream =      7.348(CFS)
Time of concentration =   19.39 min.
Rainfall intensity =     2.644(In/Hr)
Summary of stream data:

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


1        9.545     21.97                 2.487
2        7.348     19.39                 2.644
Largest stream flow has longer time of concentration
Qp =      9.545 + sum of
          Qb         Ia/Ib
           7.348 *    0.941 =      6.912
Qp =     16.458

Total of 2 streams to confluence:
Flow rates before confluence point:
       9.545       7.348
Area of streams before confluence:
        4.370        3.160
Results of confluence:
Total flow rate =     16.458(CFS)
Time of concentration =    21.968 min.
Effective stream area after confluence =      7.530(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        3.100
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =     28.212(CFS)
Depth of flow =   1.285(Ft.), Average velocity =   1.933(Ft/s)
!!Warning: Water is above left or right bank elevations
        ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              0.77
        2              4.23              0.00
        3              9.79              0.02
        4             14.96              1.12
```

```
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =     28.212(CFS)
  '     '        flow top width =     14.960(Ft.)
  '     '    velocity=    1.933(Ft/s)
  '     '        area =     14.596(Sq.Ft)
  '     '        Froude number =     0.345

Upstream point elevation =  1417.830(Ft.)
Downstream point elevation =  1417.250(Ft.)
Flow length =   362.580(Ft.)
Travel time  =    3.13 min.
Time of concentration =   25.09 min.
Depth of flow =   1.285(Ft.)
Average velocity =   1.933(Ft/s)
Total irregular channel flow =    28.212(CFS)
Irregular channel normal depth above invert elev. =   1.285(Ft.)
Average velocity of channel(s) =   1.933(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.877
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.330(In/Hr) for a   100.0 year storm
Subarea runoff =     23.455(CFS) for     11.480(Ac.)
Total runoff =     39.913(CFS)  Total area =      19.010(Ac.)
Depth of flow =   1.511(Ft.), Average velocity =   2.221(Ft/s)
!!Warning: Water is above left or right bank elevations
End of computations, total study area =          19.01 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  89.0
```

Appendix I.IV

Rational Method Analysis
Post-Development Conditions
2-Year Storm

```
                     Riverside County Rational Hydrology Program

        CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
                Rational Hydrology Study        Date: 05/27/22
File:MapesPost2ARat.out
        ------------------------------------------------------------------------
        MAPES AND TRUMBLE INDUSTRIAL FACILITY
        RATIONAL METHOD
        POST-DEVELOPMENT CONDITIONS
        2-YEAR STORM, DA A
        ------------------------------------------------------------------------
         *********   Hydrology Study Control Information **********

         English (in-lb) Units used in input data file

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


        Program License Serial Number 6443

        ------------------------------------------------------------------------
        Rational Method Hydrology Program based on
        Riverside County Flood Control & Water Conservation District
        1978 hydrology manual

        Storm event (year) =    2.00 Antecedent Moisture Condition = 1

        2 year, 1 hour precipitation =  0.487(In.)
        100 year, 1 hour precipitation =  1.520(In.)

        Storm event year =   2.0
        Calculated rainfall intensity data:
        1 hour intensity =  0.487(In/Hr)
        Slope of intensity duration curve = 0.4900





        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station       1.100 to Point/Station       1.200
        **** INITIAL AREA EVALUATION ****
        ______________________________________________________________________
        Initial area flow distance =   214.760(Ft.)
        Top (of initial area) elevation =  1422.920(Ft.)
        Bottom (of initial area) elevation =  1419.450(Ft.)
        Difference in elevation =     3.470(Ft.)
        Slope =    0.01616  s(percent)=       1.62
        TC = k(0.300)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =    5.864 min.
Rainfall intensity =      1.522(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.864
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.355(CFS)
Total initial stream area =        1.030(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.200 to Point/Station        2.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1415.450(Ft.)
Downstream point/station elevation =  1414.490(Ft.)
Pipe length  =   175.42(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.355(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.355(CFS)
Normal flow depth in pipe =    6.10(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =    5.91(In.)
Pipe flow velocity =      3.38(Ft/s)
Travel time through pipe =    0.87 min.
Time of concentration (TC) =     6.73 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.300 to Point/Station        2.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.030(Ac.)
Runoff from this stream =      1.355(CFS)
Time of concentration =    6.73 min.
Rainfall intensity =     1.423(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.100 to Point/Station        2.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   130.430(Ft.)
Top (of initial area) elevation =  1421.180(Ft.)
```

```
Bottom (of initial area) elevation =  1418.600(Ft.)
Difference in elevation =     2.580(Ft.)
Slope =    0.01978  s(percent)=      1.98
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      1.646(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.866
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.679(CFS)
Total initial stream area =        1.880(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.200 to Point/Station        2.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1414.600(Ft.)
Downstream point/station elevation =  1414.490(Ft.)
Pipe length  =    21.80(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.679(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.679(CFS)
Normal flow depth in pipe =    8.23(In.)
Flow top width inside pipe =   14.93(In.)
Critical Depth =    7.88(In.)
Pipe flow velocity =      3.88(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =     5.09 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.300 to Point/Station        2.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.880(Ac.)
Runoff from this stream =      2.679(CFS)
Time of concentration =    5.09 min.
Rainfall intensity =     1.631(In/Hr)
Summary of stream data:
```

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


1        1.355      6.73                 1.423
2        2.679      5.09                 1.631
Largest stream flow has longer or shorter time of concentration
Qp =      2.679 + sum of
          Qa          Tb/Ta
           1.355 *    0.757 =      1.025
Qp =      3.704

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.355       2.679
Area of streams before confluence:
        1.030       1.880
Results of confluence:
Total flow rate =      3.704(CFS)
Time of concentration =     5.094 min.
Effective stream area after confluence =      2.910(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.300 to Point/Station        3.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1414.490(Ft.)
Downstream point/station elevation =  1413.530(Ft.)
Pipe length  =   191.80(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.704(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.704(CFS)
Normal flow depth in pipe =   10.24(In.)
Flow top width inside pipe =   13.96(In.)
Critical Depth =    9.33(In.)
Pipe flow velocity =      4.15(Ft/s)
Travel time through pipe =    0.77 min.
Time of concentration (TC) =     5.86 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.300 to Point/Station        3.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      2.910(Ac.)
Runoff from this stream =      3.704(CFS)
Time of concentration =    5.86 min.
Rainfall intensity =     1.522(In/Hr)
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Process from Point/Station       3.100 to Point/Station       3.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   120.880(Ft.)
Top (of initial area) elevation =  1419.390(Ft.)
Bottom (of initial area) elevation =  1418.600(Ft.)
Difference in elevation =     0.790(Ft.)
Slope =    0.00654  s(percent)=       0.65
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.585 min.
Rainfall intensity =      1.559(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.865
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.927(CFS)
Total initial stream area =       1.430(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       3.200 to Point/Station       3.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1414.600(Ft.)
Downstream point/station elevation =  1413.530(Ft.)
Pipe length  =    22.97(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.927(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.927(CFS)
Normal flow depth in pipe =    4.71(In.)
Flow top width inside pipe =    8.99(In.)
Critical Depth =    7.59(In.)
Pipe flow velocity =      8.24(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =     5.63 min.


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Process from Point/Station       3.300 to Point/Station       3.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
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```
Stream flow area =      1.430(Ac.)
Runoff from this stream =      1.927(CFS)
Time of concentration =    5.63 min.
Rainfall intensity =     1.552(In/Hr)
Summary of stream data:

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



1        3.704      5.86                 1.522
2        1.927      5.63                 1.552
Largest stream flow has longer time of concentration
Qp =      3.704 + sum of
          Qb         Ia/Ib
           1.927 *    0.980 =      1.890
Qp =      5.594

Total of 2 streams to confluence:
Flow rates before confluence point:
       3.704       1.927
Area of streams before confluence:
        2.910        1.430
Results of confluence:
Total flow rate =      5.594(CFS)
Time of concentration =     5.864 min.
Effective stream area after confluence =      4.340(Ac.)


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Process from Point/Station       3.300 to Point/Station        4.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1413.530(Ft.)
Downstream point/station elevation =  1413.360(Ft.)
Pipe length  =    34.32(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.594(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.594(CFS)
Normal flow depth in pipe =   11.70(In.)
Flow top width inside pipe =   17.17(In.)
Critical Depth =   10.95(In.)
Pipe flow velocity =      4.60(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =     5.99 min.


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Process from Point/Station       4.300 to Point/Station        4.300
**** CONFLUENCE OF MINOR STREAMS ****
```

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______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      4.340(Ac.)
Runoff from this stream =      5.594(CFS)
Time of concentration =    5.99 min.
Rainfall intensity =     1.506(In/Hr)


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Process from Point/Station       4.100 to Point/Station       4.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   256.970(Ft.)
Top (of initial area) elevation =  1422.990(Ft.)
Bottom (of initial area) elevation =  1419.100(Ft.)
Difference in elevation =     3.890(Ft.)
Slope =    0.01514  s(percent)=       1.51
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.384 min.
Rainfall intensity =      1.460(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.863
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.286(CFS)
Total initial stream area =        1.020(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       4.200 to Point/Station       4.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1415.100(Ft.)
Downstream point/station elevation =  1413.360(Ft.)
Pipe length  =   136.57(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.286(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.286(CFS)
Normal flow depth in pipe =    5.48(In.)
Flow top width inside pipe =    8.78(In.)
Critical Depth =    6.26(In.)
Pipe flow velocity =      4.56(Ft/s)
Travel time through pipe =    0.50 min.
Time of concentration (TC) =     6.88 min.
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Process from Point/Station       4.300 to Point/Station       4.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.020(Ac.)
Runoff from this stream =      1.286(CFS)
Time of concentration =    6.88 min.
Rainfall intensity =     1.407(In/Hr)
Summary of stream data:

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


1        5.594      5.99                 1.506
2        1.286      6.88                 1.407
Largest stream flow has longer or shorter time of concentration
Qp =      5.594 + sum of
          Qa          Tb/Ta
           1.286 *    0.870 =      1.119
Qp =      6.712

Total of 2 streams to confluence:
Flow rates before confluence point:
       5.594       1.286
Area of streams before confluence:
        4.340        1.020
Results of confluence:
Total flow rate =      6.712(CFS)
Time of concentration =     5.989 min.
Effective stream area after confluence =      5.360(Ac.)


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Process from Point/Station       4.300 to Point/Station       5.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1413.360(Ft.)
Downstream point/station elevation =  1412.940(Ft.)
Pipe length  =    83.92(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.712(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     6.712(CFS)
Normal flow depth in pipe =   13.38(In.)
Flow top width inside pipe =   15.72(In.)
Critical Depth =   12.02(In.)
Pipe flow velocity =      4.76(Ft/s)
Travel time through pipe =    0.29 min.
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Time of concentration (TC) =     6.28 min.


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Process from Point/Station       5.300 to Point/Station       5.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      5.360(Ac.)
Runoff from this stream =      6.712(CFS)
Time of concentration =    6.28 min.
Rainfall intensity =     1.471(In/Hr)


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Process from Point/Station       5.100 to Point/Station       5.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   148.520(Ft.)
Top (of initial area) elevation =  1422.490(Ft.)
Bottom (of initial area) elevation =  1419.100(Ft.)
Difference in elevation =     3.390(Ft.)
Slope =    0.02283  s(percent)=       2.28
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      1.646(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.866
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      0.655(CFS)
Total initial stream area =       0.460(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       5.200 to Point/Station       5.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1415.100(Ft.)
Downstream point/station elevation =  1412.940(Ft.)
Pipe length  =    40.62(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.655(CFS)
Nearest computed pipe diameter  =      6.00(In.)
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Calculated individual pipe flow  =     0.655(CFS)
Normal flow depth in pipe =    3.02(In.)
Flow top width inside pipe =    6.00(In.)
Critical Depth =    4.92(In.)
Pipe flow velocity =      6.61(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =     5.10 min.


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Process from Point/Station        5.300 to Point/Station        5.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.460(Ac.)
Runoff from this stream =      0.655(CFS)
Time of concentration =    5.10 min.
Rainfall intensity =     1.629(In/Hr)
Summary of stream data:

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


1        6.712      6.28                 1.471
2        0.655      5.10                 1.629
Largest stream flow has longer time of concentration
Qp =      6.712 + sum of
          Qb         Ia/Ib
           0.655 *    0.903 =      0.592
Qp =      7.304

Total of 2 streams to confluence:
Flow rates before confluence point:
       6.712       0.655
Area of streams before confluence:
        5.360       0.460
Results of confluence:
Total flow rate =      7.304(CFS)
Time of concentration =     6.283 min.
Effective stream area after confluence =      5.820(Ac.)


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Process from Point/Station        5.300 to Point/Station        6.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1412.940(Ft.)
Downstream point/station elevation =  1412.570(Ft.)
Pipe length  =    73.56(Ft.)   Manning's N = 0.013
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No. of pipes = 1  Required pipe flow  =     7.304(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     7.304(CFS)
Normal flow depth in pipe =   14.44(In.)
Flow top width inside pipe =   14.34(In.)
Critical Depth =   12.56(In.)
Pipe flow velocity =      4.81(Ft/s)
Travel time through pipe =    0.26 min.
Time of concentration (TC) =     6.54 min.


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Process from Point/Station       6.300 to Point/Station       6.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      5.820(Ac.)
Runoff from this stream =      7.304(CFS)
Time of concentration =    6.54 min.
Rainfall intensity =     1.443(In/Hr)


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Process from Point/Station       6.100 to Point/Station       6.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   206.100(Ft.)
Top (of initial area) elevation =  1419.690(Ft.)
Bottom (of initial area) elevation =  1418.600(Ft.)
Difference in elevation =     1.090(Ft.)
Slope =    0.00529  s(percent)=       0.53
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.212 min.
Rainfall intensity =      1.375(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.862
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.394(CFS)
Total initial stream area =       2.020(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       6.200 to Point/Station       6.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
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______________________________________________________________________
Upstream point/station elevation =  1414.600(Ft.)
Downstream point/station elevation =  1412.570(Ft.)
Pipe length  =    24.15(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.394(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.394(CFS)
Normal flow depth in pipe =    4.49(In.)
Flow top width inside pipe =    9.00(In.)
Critical Depth =    8.21(In.)
Pipe flow velocity =     10.85(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     7.25 min.


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Process from Point/Station        6.300 to Point/Station        6.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.020(Ac.)
Runoff from this stream =      2.394(CFS)
Time of concentration =    7.25 min.
Rainfall intensity =     1.372(In/Hr)
Summary of stream data:

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



1        7.304      6.54                 1.443
2        2.394      7.25                 1.372
Largest stream flow has longer or shorter time of concentration
Qp =      7.304 + sum of
          Qa          Tb/Ta
           2.394 *    0.902 =      2.159
Qp =      9.463

Total of 2 streams to confluence:
Flow rates before confluence point:
       7.304       2.394
Area of streams before confluence:
        5.820       2.020
Results of confluence:
Total flow rate =      9.463(CFS)
Time of concentration =     6.538 min.
Effective stream area after confluence =      7.840(Ac.)


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Process from Point/Station       6.300 to Point/Station       7.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1412.570(Ft.)
Downstream point/station elevation =  1411.710(Ft.)
Pipe length  =   172.10(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.463(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     9.463(CFS)
Normal flow depth in pipe =   14.81(In.)
Flow top width inside pipe =   19.15(In.)
Critical Depth =   13.73(In.)
Pipe flow velocity =      5.22(Ft/s)
Travel time through pipe =    0.55 min.
Time of concentration (TC) =     7.09 min.


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Process from Point/Station       7.300 to Point/Station       7.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      7.840(Ac.)
Runoff from this stream =      9.463(CFS)
Time of concentration =    7.09 min.
Rainfall intensity =     1.387(In/Hr)


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Process from Point/Station       7.100 to Point/Station       7.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   588.890(Ft.)
Top (of initial area) elevation =  1422.840(Ft.)
Bottom (of initial area) elevation =  1418.940(Ft.)
Difference in elevation =     3.900(Ft.)
Slope =    0.00662  s(percent)=      0.66
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.494 min.
Rainfall intensity =      1.144(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.858
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.287(CFS)
Total initial stream area =        2.330(Ac.)
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Pervious area fraction = 0.100


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Process from Point/Station        7.200 to Point/Station        7.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1414.940(Ft.)
Downstream point/station elevation =  1411.710(Ft.)
Pipe length  =    27.78(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.287(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.287(CFS)
Normal flow depth in pipe =    3.99(In.)
Flow top width inside pipe =    8.94(In.)
Critical Depth =    8.09(In.)
Pipe flow velocity =     12.10(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    10.53 min.


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Process from Point/Station        7.300 to Point/Station        7.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.330(Ac.)
Runoff from this stream =      2.287(CFS)
Time of concentration =   10.53 min.
Rainfall intensity =     1.142(In/Hr)
Summary of stream data:

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


1        9.463      7.09                 1.387
2        2.287     10.53                 1.142
Largest stream flow has longer or shorter time of concentration
Qp =      9.463 + sum of
          Qa          Tb/Ta
           2.287 *    0.673 =      1.539
Qp =     11.003

Total of 2 streams to confluence:
Flow rates before confluence point:
       9.463       2.287
Area of streams before confluence:
        7.840        2.330
Results of confluence:
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Total flow rate =     11.003(CFS)
Time of concentration =     7.087 min.
Effective stream area after confluence =     10.170(Ac.)


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Process from Point/Station       7.300 to Point/Station       8.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1411.710(Ft.)
Downstream point/station elevation =  1411.620(Ft.)
Pipe length  =    18.21(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.003(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    11.003(CFS)
Normal flow depth in pipe =   16.97(In.)
Flow top width inside pipe =   16.54(In.)
Critical Depth =   14.83(In.)
Pipe flow velocity =      5.28(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =     7.14 min.


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Process from Point/Station       8.300 to Point/Station       8.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     10.170(Ac.)
Runoff from this stream =     11.003(CFS)
Time of concentration =    7.14 min.
Rainfall intensity =     1.382(In/Hr)


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Process from Point/Station       8.100 to Point/Station       8.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   106.130(Ft.)
Top (of initial area) elevation =  1420.890(Ft.)
Bottom (of initial area) elevation =  1419.280(Ft.)
Difference in elevation =     1.610(Ft.)
Slope =    0.01517  s(percent)=      1.52
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      1.646(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.866
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```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.396(CFS)
Total initial stream area =       0.980(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       8.200 to Point/Station       8.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1415.280(Ft.)
Downstream point/station elevation =  1411.620(Ft.)
Pipe length  =    25.32(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.396(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     1.396(CFS)
Normal flow depth in pipe =    3.54(In.)
Flow top width inside pipe =    5.90(In.)
Critical depth could not be calculated.
Pipe flow velocity =     11.58(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     5.04 min.


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Process from Point/Station       8.300 to Point/Station       8.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.980(Ac.)
Runoff from this stream =      1.396(CFS)
Time of concentration =    5.04 min.
Rainfall intensity =     1.640(In/Hr)
Summary of stream data:

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


1       11.003      7.14                 1.382
2        1.396      5.04                 1.640
Largest stream flow has longer time of concentration
Qp =     11.003 + sum of
          Qb          Ia/Ib
           1.396 *    0.843 =      1.177
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```
Qp =     12.179

Total of 2 streams to confluence:
Flow rates before confluence point:
      11.003       1.396
Area of streams before confluence:
       10.170       0.980
Results of confluence:
Total flow rate =     12.179(CFS)
Time of concentration =     7.144 min.
Effective stream area after confluence =     11.150(Ac.)


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Process from Point/Station       8.300 to Point/Station       9.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1411.620(Ft.)
Downstream point/station elevation =  1410.040(Ft.)
Pipe length  =   317.20(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.179(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    12.179(CFS)
Normal flow depth in pipe =   15.70(In.)
Flow top width inside pipe =   22.83(In.)
Critical Depth =   15.06(In.)
Pipe flow velocity =      5.60(Ft/s)
Travel time through pipe =    0.94 min.
Time of concentration (TC) =     8.09 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       9.300 to Point/Station       9.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     11.150(Ac.)
Runoff from this stream =     12.179(CFS)
Time of concentration =    8.09 min.
Rainfall intensity =     1.300(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       9.100 to Point/Station       9.300
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   252.240(Ft.)
Top (of initial area) elevation =  1421.240(Ft.)
Bottom (of initial area) elevation =  1420.100(Ft.)
Difference in elevation =     1.140(Ft.)
```

```
Slope =    0.00452  s(percent)=       0.45
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.069 min.
Rainfall intensity =      1.302(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.861
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      7.787(CFS)
Total initial stream area =        6.950(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        9.300 to Point/Station        9.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      6.950(Ac.)
Runoff from this stream =      7.787(CFS)
Time of concentration =    8.07 min.
Rainfall intensity =     1.302(In/Hr)
Summary of stream data:

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


1       12.179      8.09                 1.300
2        7.787      8.07                 1.302
Largest stream flow has longer time of concentration
Qp =     12.179 + sum of
          Qb         Ia/Ib
           7.787 *    0.999 =      7.777
Qp =     19.956

Total of 2 streams to confluence:
Flow rates before confluence point:
      12.179       7.787
Area of streams before confluence:
       11.150        6.950
Results of confluence:
Total flow rate =     19.956(CFS)
Time of concentration =     8.089 min.
Effective stream area after confluence =     18.100(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       9.300 to Point/Station       9.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1410.040(Ft.)
Downstream point/station elevation =  1409.990(Ft.)
Pipe length  =     9.57(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.956(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    19.956(CFS)
Normal flow depth in pipe =   19.88(In.)
Flow top width inside pipe =   23.80(In.)
Critical Depth =   18.75(In.)
Pipe flow velocity =      6.36(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =     8.11 min.
End of computations, total study area =           18.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  75.0
```

```
                    Riverside County Rational Hydrology Program

        CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
                Rational Hydrology Study       Date: 05/27/22
File:MapesPost2BRat.out
        ------------------------------------------------------------------------
        MAPES AND TRUMBLE INDUSTRIAL FACILITY
        RATIONAL METHOD
        POST-DEVELOPMENT CONDITIONS
        2-YEAR STORM, DA B
        ------------------------------------------------------------------------
         *********   Hydrology Study Control Information **********

         English (in-lb) Units used in input data file

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


        Program License Serial Number 6443

        ------------------------------------------------------------------------
        Rational Method Hydrology Program based on
        Riverside County Flood Control & Water Conservation District
        1978 hydrology manual

        Storm event (year) =    2.00 Antecedent Moisture Condition = 1

        2 year, 1 hour precipitation =  0.487(In.)
        100 year, 1 hour precipitation =  1.520(In.)

        Storm event year =   2.0
        Calculated rainfall intensity data:
        1 hour intensity =  0.487(In/Hr)
        Slope of intensity duration curve = 0.4900




        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station      10.100 to Point/Station      10.200
        **** INITIAL AREA EVALUATION ****
        ______________________________________________________________________
        Initial area flow distance =   333.910(Ft.)
        Top (of initial area) elevation =  1423.670(Ft.)
        Bottom (of initial area) elevation =  1420.530(Ft.)
        Difference in elevation =     3.140(Ft.)
        Slope =    0.00940  s(percent)=      0.94
        TC = k(0.300)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =    7.797 min.
Rainfall intensity =      1.324(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.861
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      0.627(CFS)
Total initial stream area =        0.550(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.200 to Point/Station       11.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1416.530(Ft.)
Downstream point/station elevation =  1414.760(Ft.)
Pipe length  =   354.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.627(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     0.627(CFS)
Normal flow depth in pipe =    4.69(In.)
Flow top width inside pipe =    8.99(In.)
Critical Depth =    4.31(In.)
Pipe flow velocity =      2.69(Ft/s)
Travel time through pipe =    2.19 min.
Time of concentration (TC) =     9.99 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.300 to Point/Station       11.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.550(Ac.)
Runoff from this stream =      0.627(CFS)
Time of concentration =    9.99 min.
Rainfall intensity =     1.172(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.100 to Point/Station       11.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   169.180(Ft.)
Top (of initial area) elevation =  1423.740(Ft.)
```

```
Bottom (of initial area) elevation =  1421.670(Ft.)
Difference in elevation =     2.070(Ft.)
Slope =    0.01224  s(percent)=      1.22
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.636 min.
Rainfall intensity =      1.552(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.865
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      0.496(CFS)
Total initial stream area =       0.370(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.200 to Point/Station       11.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1417.670(Ft.)
Downstream point/station elevation =  1414.760(Ft.)
Pipe length  =     5.72(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.496(CFS)
Nearest computed pipe diameter  =      3.00(In.)
Calculated individual pipe flow  =     0.496(CFS)
Normal flow depth in pipe =    2.01(In.)
Flow top width inside pipe =    2.82(In.)
Critical depth could not be calculated.
Pipe flow velocity =     14.23(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =     5.64 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.300 to Point/Station       11.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.370(Ac.)
Runoff from this stream =      0.496(CFS)
Time of concentration =    5.64 min.
Rainfall intensity =     1.551(In/Hr)
Summary of stream data:

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

```
1        0.627      9.99                 1.172
2        0.496      5.64                 1.551
Largest stream flow has longer time of concentration
Qp =      0.627 + sum of
          Qb         Ia/Ib
           0.496 *    0.756 =      0.375
Qp =      1.002

Total of 2 streams to confluence:
Flow rates before confluence point:
       0.627       0.496
Area of streams before confluence:
        0.550        0.370
Results of confluence:
Total flow rate =      1.002(CFS)
Time of concentration =     9.990 min.
Effective stream area after confluence =      0.920(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.300 to Point/Station       11.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1414.760(Ft.)
Downstream point/station elevation =  1414.030(Ft.)
Pipe length  =   146.40(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.002(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.002(CFS)
Normal flow depth in pipe =    6.42(In.)
Flow top width inside pipe =    8.14(In.)
Critical Depth =    5.51(In.)
Pipe flow velocity =      2.97(Ft/s)
Travel time through pipe =    0.82 min.
Time of concentration (TC) =    10.81 min.
End of computations, total study area =            0.92 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  75.0
```

Appendix I.V

Rational Method Analysis
Post-Development Conditions
10-Year Storm

```
                    Riverside County Rational Hydrology Program

        CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
                Rational Hydrology Study        Date: 05/27/22
File:MapesPost10ARat.out
        ------------------------------------------------------------------------
        MAPES AND TRUMBLE INDUSTRIAL FACILITY
        RATIONAL METHOD
        POST-DEVELOPMENT CONDITIONS
        10-YEAR STORM, DA A
        ------------------------------------------------------------------------
         *********   Hydrology Study Control Information **********

         English (in-lb) Units used in input data file

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


        Program License Serial Number 6443

        ------------------------------------------------------------------------
        Rational Method Hydrology Program based on
        Riverside County Flood Control & Water Conservation District
        1978 hydrology manual

        Storm event (year) =   10.00 Antecedent Moisture Condition = 2

        2 year, 1 hour precipitation =  0.487(In.)
        100 year, 1 hour precipitation =  1.520(In.)

        Storm event year =  10.0
        Calculated rainfall intensity data:
        1 hour intensity =  0.912(In/Hr)
        Slope of intensity duration curve = 0.4900





        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station       1.100 to Point/Station       1.200
        **** INITIAL AREA EVALUATION ****
        ______________________________________________________________________
        Initial area flow distance =   214.760(Ft.)
        Top (of initial area) elevation =  1422.920(Ft.)
        Bottom (of initial area) elevation =  1419.450(Ft.)
        Difference in elevation =     3.470(Ft.)
        Slope =    0.01616  s(percent)=      1.62
        TC = k(0.300)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =    5.864 min.
Rainfall intensity =      2.850(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.606(CFS)
Total initial stream area =       1.030(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       1.200 to Point/Station       2.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1415.450(Ft.)
Downstream point/station elevation =  1414.490(Ft.)
Pipe length  =   175.42(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.606(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.606(CFS)
Normal flow depth in pipe =    9.73(In.)
Flow top width inside pipe =    9.40(In.)
Critical Depth =    8.30(In.)
Pipe flow velocity =      3.83(Ft/s)
Travel time through pipe =    0.76 min.
Time of concentration (TC) =     6.63 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       2.300 to Point/Station       2.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.030(Ac.)
Runoff from this stream =      2.606(CFS)
Time of concentration =    6.63 min.
Rainfall intensity =     2.684(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       2.100 to Point/Station       2.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   130.430(Ft.)
Top (of initial area) elevation =  1421.180(Ft.)
```

```
Bottom (of initial area) elevation =  1418.600(Ft.)
Difference in elevation =     2.580(Ft.)
Slope =    0.01978  s(percent)=      1.98
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      3.082(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      5.148(CFS)
Total initial stream area =       1.880(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       2.200 to Point/Station       2.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1414.600(Ft.)
Downstream point/station elevation =  1414.490(Ft.)
Pipe length  =    21.80(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.148(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.148(CFS)
Normal flow depth in pipe =   10.99(In.)
Flow top width inside pipe =   17.55(In.)
Critical Depth =   10.48(In.)
Pipe flow velocity =      4.55(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =     5.08 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       2.300 to Point/Station       2.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.880(Ac.)
Runoff from this stream =      5.148(CFS)
Time of concentration =    5.08 min.
Rainfall intensity =     3.058(In/Hr)
Summary of stream data:
```

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


1        2.606      6.63                 2.684
2        5.148      5.08                 3.058
Largest stream flow has longer or shorter time of concentration
Qp =      5.148 + sum of
          Qa          Tb/Ta
           2.606 *    0.766 =      1.997
Qp =      7.146

Total of 2 streams to confluence:
Flow rates before confluence point:
       2.606       5.148
Area of streams before confluence:
        1.030       1.880
Results of confluence:
Total flow rate =      7.146(CFS)
Time of concentration =     5.080 min.
Effective stream area after confluence =      2.910(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.300 to Point/Station        3.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1414.490(Ft.)
Downstream point/station elevation =  1413.530(Ft.)
Pipe length  =   191.80(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.146(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     7.146(CFS)
Normal flow depth in pipe =   14.16(In.)
Flow top width inside pipe =   14.75(In.)
Critical Depth =   12.42(In.)
Pipe flow velocity =      4.79(Ft/s)
Travel time through pipe =    0.67 min.
Time of concentration (TC) =     5.75 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.300 to Point/Station        3.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      2.910(Ac.)
Runoff from this stream =      7.146(CFS)
Time of concentration =    5.75 min.
Rainfall intensity =     2.878(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       3.100 to Point/Station       3.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   120.880(Ft.)
Top (of initial area) elevation =  1419.390(Ft.)
Bottom (of initial area) elevation =  1418.600(Ft.)
Difference in elevation =     0.790(Ft.)
Slope =    0.00654  s(percent)=      0.65
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.585 min.
Rainfall intensity =      2.919(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      3.707(CFS)
Total initial stream area =       1.430(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       3.200 to Point/Station       3.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1414.600(Ft.)
Downstream point/station elevation =  1413.530(Ft.)
Pipe length  =    22.97(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.707(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.707(CFS)
Normal flow depth in pipe =    5.87(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =    9.84(In.)
Pipe flow velocity =      9.70(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     5.62 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       3.300 to Point/Station       3.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
```

```
Stream flow area =      1.430(Ac.)
Runoff from this stream =      3.707(CFS)
Time of concentration =    5.62 min.
Rainfall intensity =     2.909(In/Hr)
Summary of stream data:

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


1        7.146      5.75                 2.878
2        3.707      5.62                 2.909
Largest stream flow has longer time of concentration
Qp =      7.146 + sum of
          Qb         Ia/Ib
           3.707 *    0.989 =      3.668
Qp =     10.814

Total of 2 streams to confluence:
Flow rates before confluence point:
       7.146       3.707
Area of streams before confluence:
        2.910       1.430
Results of confluence:
Total flow rate =     10.814(CFS)
Time of concentration =     5.747 min.
Effective stream area after confluence =      4.340(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.300 to Point/Station        4.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1413.530(Ft.)
Downstream point/station elevation =  1413.360(Ft.)
Pipe length  =    34.32(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.814(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    10.814(CFS)
Normal flow depth in pipe =   16.66(In.)
Flow top width inside pipe =   17.00(In.)
Critical Depth =   14.72(In.)
Pipe flow velocity =      5.28(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =     5.86 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.300 to Point/Station        4.300
**** CONFLUENCE OF MINOR STREAMS ****
```

```
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      4.340(Ac.)
Runoff from this stream =     10.814(CFS)
Time of concentration =    5.86 min.
Rainfall intensity =     2.852(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       4.100 to Point/Station       4.200
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   256.970(Ft.)
Top (of initial area) elevation =  1422.990(Ft.)
Bottom (of initial area) elevation =  1419.100(Ft.)
Difference in elevation =     3.890(Ft.)
Slope =    0.01514  s(percent)=      1.51
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.384 min.
Rainfall intensity =      2.734(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.887
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.475(CFS)
Total initial stream area =       1.020(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       4.200 to Point/Station       4.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1415.100(Ft.)
Downstream point/station elevation =  1413.360(Ft.)
Pipe length  =   136.57(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.475(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.475(CFS)
Normal flow depth in pipe =    6.81(In.)
Flow top width inside pipe =   11.89(In.)
Critical Depth =    8.09(In.)
Pipe flow velocity =      5.38(Ft/s)
Travel time through pipe =    0.42 min.
Time of concentration (TC) =     6.81 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       4.300 to Point/Station       4.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.020(Ac.)
Runoff from this stream =      2.475(CFS)
Time of concentration =    6.81 min.
Rainfall intensity =     2.649(In/Hr)
Summary of stream data:

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


1       10.814      5.86                2.852
2        2.475      6.81                2.649
Largest stream flow has longer or shorter time of concentration
Qp =     10.814 + sum of
          Qa          Tb/Ta
           2.475 *    0.860 =      2.129
Qp =     12.943

Total of 2 streams to confluence:
Flow rates before confluence point:
      10.814       2.475
Area of streams before confluence:
        4.340        1.020
Results of confluence:
Total flow rate =     12.943(CFS)
Time of concentration =     5.856 min.
Effective stream area after confluence =      5.360(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       4.300 to Point/Station       5.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1413.360(Ft.)
Downstream point/station elevation =  1412.940(Ft.)
Pipe length  =    83.92(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.943(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    12.943(CFS)
Normal flow depth in pipe =   16.36(In.)
Flow top width inside pipe =   22.36(In.)
Critical Depth =   15.54(In.)
Pipe flow velocity =      5.67(Ft/s)
Travel time through pipe =    0.25 min.
```

```
Time of concentration (TC) =     6.10 min.


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Process from Point/Station       5.300 to Point/Station       5.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      5.360(Ac.)
Runoff from this stream =     12.943(CFS)
Time of concentration =    6.10 min.
Rainfall intensity =     2.795(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       5.100 to Point/Station       5.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   148.520(Ft.)
Top (of initial area) elevation =  1422.490(Ft.)
Bottom (of initial area) elevation =  1419.100(Ft.)
Difference in elevation =     3.390(Ft.)
Slope =    0.02283  s(percent)=       2.28
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      3.082(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.260(CFS)
Total initial stream area =       0.460(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       5.200 to Point/Station       5.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1415.100(Ft.)
Downstream point/station elevation =  1412.940(Ft.)
Pipe length  =    40.62(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.260(CFS)
Nearest computed pipe diameter  =      6.00(In.)
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```
Calculated individual pipe flow  =     1.260(CFS)
Normal flow depth in pipe =    4.78(In.)
Flow top width inside pipe =    4.83(In.)
Critical depth could not be calculated.
Pipe flow velocity =      7.51(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =     5.09 min.


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Process from Point/Station       5.300 to Point/Station       5.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.460(Ac.)
Runoff from this stream =      1.260(CFS)
Time of concentration =    5.09 min.
Rainfall intensity =     3.055(In/Hr)
Summary of stream data:

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


1       12.943      6.10                 2.795
2        1.260      5.09                 3.055
Largest stream flow has longer time of concentration
Qp =     12.943 + sum of
          Qb         Ia/Ib
           1.260 *    0.915 =      1.153
Qp =     14.096

Total of 2 streams to confluence:
Flow rates before confluence point:
      12.943       1.260
Area of streams before confluence:
        5.360       0.460
Results of confluence:
Total flow rate =     14.096(CFS)
Time of concentration =     6.102 min.
Effective stream area after confluence =      5.820(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       5.300 to Point/Station       6.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1412.940(Ft.)
Downstream point/station elevation =  1412.570(Ft.)
Pipe length  =    73.56(Ft.)   Manning's N = 0.013
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```
No. of pipes = 1  Required pipe flow  =    14.096(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    14.096(CFS)
Normal flow depth in pipe =   17.44(In.)
Flow top width inside pipe =   21.39(In.)
Critical Depth =   16.22(In.)
Pipe flow velocity =      5.76(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =     6.32 min.


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Process from Point/Station       6.300 to Point/Station       6.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      5.820(Ac.)
Runoff from this stream =     14.096(CFS)
Time of concentration =    6.32 min.
Rainfall intensity =     2.749(In/Hr)


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Process from Point/Station       6.100 to Point/Station       6.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   206.100(Ft.)
Top (of initial area) elevation =  1419.690(Ft.)
Bottom (of initial area) elevation =  1418.600(Ft.)
Difference in elevation =     1.090(Ft.)
Slope =    0.00529  s(percent)=       0.53
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.212 min.
Rainfall intensity =      2.575(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.887
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      4.613(CFS)
Total initial stream area =        2.020(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       6.200 to Point/Station       6.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
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______________________________________________________________________
Upstream point/station elevation =  1414.600(Ft.)
Downstream point/station elevation =  1412.570(Ft.)
Pipe length  =    24.15(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.613(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     4.613(CFS)
Normal flow depth in pipe =    7.09(In.)
Flow top width inside pipe =    7.36(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.37(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =     7.24 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       6.300 to Point/Station        6.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.020(Ac.)
Runoff from this stream =      4.613(CFS)
Time of concentration =    7.24 min.
Rainfall intensity =     2.570(In/Hr)
Summary of stream data:

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



1       14.096      6.32                 2.749
2        4.613      7.24                 2.570
Largest stream flow has longer or shorter time of concentration
Qp =     14.096 + sum of
          Qa          Tb/Ta
           4.613 *    0.872 =      4.021
Qp =     18.116

Total of 2 streams to confluence:
Flow rates before confluence point:
      14.096       4.613
Area of streams before confluence:
        5.820        2.020
Results of confluence:
Total flow rate =     18.116(CFS)
Time of concentration =     6.315 min.
Effective stream area after confluence =      7.840(Ac.)


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Process from Point/Station       6.300 to Point/Station       7.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1412.570(Ft.)
Downstream point/station elevation =  1411.710(Ft.)
Pipe length  =   172.10(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.116(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    18.116(CFS)
Normal flow depth in pipe =   18.73(In.)
Flow top width inside pipe =   24.89(In.)
Critical Depth =   17.87(In.)
Pipe flow velocity =      6.15(Ft/s)
Travel time through pipe =    0.47 min.
Time of concentration (TC) =     6.78 min.


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Process from Point/Station       7.300 to Point/Station       7.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      7.840(Ac.)
Runoff from this stream =     18.116(CFS)
Time of concentration =    6.78 min.
Rainfall intensity =     2.654(In/Hr)


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Process from Point/Station       7.100 to Point/Station       7.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   588.890(Ft.)
Top (of initial area) elevation =  1422.840(Ft.)
Bottom (of initial area) elevation =  1418.940(Ft.)
Difference in elevation =     3.900(Ft.)
Slope =    0.00662  s(percent)=      0.66
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.494 min.
Rainfall intensity =      2.143(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      4.417(CFS)
Total initial stream area =        2.330(Ac.)
```

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Pervious area fraction = 0.100


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Process from Point/Station       7.200 to Point/Station       7.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1414.940(Ft.)
Downstream point/station elevation =  1411.710(Ft.)
Pipe length  =    27.78(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.417(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     4.417(CFS)
Normal flow depth in pipe =    5.99(In.)
Flow top width inside pipe =    8.49(In.)
Critical depth could not be calculated.
Pipe flow velocity =     14.13(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    10.53 min.


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Process from Point/Station       7.300 to Point/Station       7.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.330(Ac.)
Runoff from this stream =      4.417(CFS)
Time of concentration =   10.53 min.
Rainfall intensity =     2.140(In/Hr)
Summary of stream data:

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


1       18.116      6.78                 2.654
2        4.417     10.53                 2.140
Largest stream flow has longer or shorter time of concentration
Qp =     18.116 + sum of
          Qa          Tb/Ta
           4.417 *    0.644 =      2.845
Qp =     20.962

Total of 2 streams to confluence:
Flow rates before confluence point:
      18.116       4.417
Area of streams before confluence:
        7.840        2.330
Results of confluence:
```

```
Total flow rate =     20.962(CFS)
Time of concentration =     6.781 min.
Effective stream area after confluence =     10.170(Ac.)


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Process from Point/Station       7.300 to Point/Station       8.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1411.710(Ft.)
Downstream point/station elevation =  1411.620(Ft.)
Pipe length  =    18.21(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    20.962(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    20.962(CFS)
Normal flow depth in pipe =   21.28(In.)
Flow top width inside pipe =   22.06(In.)
Critical Depth =   19.22(In.)
Pipe flow velocity =      6.24(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =     6.83 min.


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Process from Point/Station       8.300 to Point/Station       8.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     10.170(Ac.)
Runoff from this stream =     20.962(CFS)
Time of concentration =    6.83 min.
Rainfall intensity =     2.645(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       8.100 to Point/Station       8.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   106.130(Ft.)
Top (of initial area) elevation =  1420.890(Ft.)
Bottom (of initial area) elevation =  1419.280(Ft.)
Difference in elevation =     1.610(Ft.)
Slope =    0.01517  s(percent)=      1.52
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      3.082(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.889
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.684(CFS)
Total initial stream area =        0.980(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station        8.200 to Point/Station        8.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1415.280(Ft.)
Downstream point/station elevation =  1411.620(Ft.)
Pipe length  =    25.32(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.684(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.684(CFS)
Normal flow depth in pipe =    4.11(In.)
Flow top width inside pipe =    8.97(In.)
Critical Depth =    8.46(In.)
Pipe flow velocity =     13.68(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =     5.03 min.


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Process from Point/Station        8.300 to Point/Station        8.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.980(Ac.)
Runoff from this stream =      2.684(CFS)
Time of concentration =    5.03 min.
Rainfall intensity =     3.072(In/Hr)
Summary of stream data:

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


1       20.962      6.83                 2.645
2        2.684      5.03                 3.072
Largest stream flow has longer time of concentration
Qp =     20.962 + sum of
          Qb         Ia/Ib
           2.684 *    0.861 =      2.310
```

```
Qp =     23.272

Total of 2 streams to confluence:
Flow rates before confluence point:
      20.962       2.684
Area of streams before confluence:
       10.170        0.980
Results of confluence:
Total flow rate =     23.272(CFS)
Time of concentration =     6.830 min.
Effective stream area after confluence =     11.150(Ac.)


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Process from Point/Station        8.300 to Point/Station        9.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1411.620(Ft.)
Downstream point/station elevation =  1410.040(Ft.)
Pipe length  =   317.20(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    23.272(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    23.272(CFS)
Normal flow depth in pipe =   20.37(In.)
Flow top width inside pipe =   28.01(In.)
Critical Depth =   19.71(In.)
Pipe flow velocity =      6.56(Ft/s)
Travel time through pipe =    0.81 min.
Time of concentration (TC) =     7.64 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        9.300 to Point/Station        9.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     11.150(Ac.)
Runoff from this stream =     23.272(CFS)
Time of concentration =    7.64 min.
Rainfall intensity =     2.504(In/Hr)


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Process from Point/Station        9.100 to Point/Station        9.300
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   252.240(Ft.)
Top (of initial area) elevation =  1421.240(Ft.)
Bottom (of initial area) elevation =  1420.100(Ft.)
Difference in elevation =     1.140(Ft.)
```

```
Slope =    0.00452  s(percent)=       0.45
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.069 min.
Rainfall intensity =      2.437(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     15.011(CFS)
Total initial stream area =       6.950(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       9.300 to Point/Station        9.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      6.950(Ac.)
Runoff from this stream =     15.011(CFS)
Time of concentration =    8.07 min.
Rainfall intensity =     2.437(In/Hr)
Summary of stream data:

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



1       23.272      7.64                 2.504
2       15.011      8.07                 2.437
Largest stream flow has longer or shorter time of concentration
Qp =     23.272 + sum of
          Qa          Tb/Ta
          15.011 *    0.946 =     14.205
Qp =     37.477

Total of 2 streams to confluence:
Flow rates before confluence point:
      23.272      15.011
Area of streams before confluence:
       11.150        6.950
Results of confluence:
Total flow rate =     37.477(CFS)
Time of concentration =     7.636 min.
Effective stream area after confluence =     18.100(Ac.)
```

```
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Process from Point/Station       9.300 to Point/Station       9.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1410.040(Ft.)
Downstream point/station elevation =  1409.990(Ft.)
Pipe length  =     9.57(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    37.477(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    37.477(CFS)
Normal flow depth in pipe =   26.48(In.)
Flow top width inside pipe =   26.27(In.)
Critical Depth =   24.47(In.)
Pipe flow velocity =      7.34(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     7.66 min.
End of computations, total study area =          18.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  75.0
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                        Riverside County Rational Hydrology Program

        CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
                Rational Hydrology Study        Date: 05/27/22
File:MapesPost10BRat.out
        ------------------------------------------------------------------------
        MAPES AND TRUMBLE INDUSTRIAL FACILITY
        RATIONAL METHOD
        POST-DEVELOPMENT CONDITIONS
        10-YEAR STORM, DA B
        ------------------------------------------------------------------------
         *********   Hydrology Study Control Information **********

         English (in-lb) Units used in input data file

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


        Program License Serial Number 6443

        ------------------------------------------------------------------------
        Rational Method Hydrology Program based on
        Riverside County Flood Control & Water Conservation District
        1978 hydrology manual

        Storm event (year) =   10.00 Antecedent Moisture Condition = 2

        2 year, 1 hour precipitation =  0.487(In.)
        100 year, 1 hour precipitation =  1.520(In.)

        Storm event year =  10.0
        Calculated rainfall intensity data:
        1 hour intensity =  0.912(In/Hr)
        Slope of intensity duration curve = 0.4900




        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station       10.100 to Point/Station       10.200
        **** INITIAL AREA EVALUATION ****
        ______________________________________________________________________
        Initial area flow distance =   333.910(Ft.)
        Top (of initial area) elevation =  1423.670(Ft.)
        Bottom (of initial area) elevation =  1420.530(Ft.)
        Difference in elevation =     3.140(Ft.)
        Slope =    0.00940  s(percent)=       0.94
        TC = k(0.300)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =    7.797 min.
Rainfall intensity =      2.479(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.208(CFS)
Total initial stream area =        0.550(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       10.200 to Point/Station       11.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1416.530(Ft.)
Downstream point/station elevation =  1414.760(Ft.)
Pipe length  =   354.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.208(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.208(CFS)
Normal flow depth in pipe =    5.86(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =    5.56(In.)
Pipe flow velocity =      3.17(Ft/s)
Travel time through pipe =    1.86 min.
Time of concentration (TC) =     9.66 min.


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Process from Point/Station       11.300 to Point/Station       11.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.550(Ac.)
Runoff from this stream =      1.208(CFS)
Time of concentration =    9.66 min.
Rainfall intensity =     2.232(In/Hr)


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Process from Point/Station       11.100 to Point/Station       11.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   169.180(Ft.)
Top (of initial area) elevation =  1423.740(Ft.)
```

```
Bottom (of initial area) elevation =  1421.670(Ft.)
Difference in elevation =     2.070(Ft.)
Slope =    0.01224  s(percent)=      1.22
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.636 min.
Rainfall intensity =      2.906(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      0.955(CFS)
Total initial stream area =       0.370(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.200 to Point/Station       11.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1417.670(Ft.)
Downstream point/station elevation =  1414.760(Ft.)
Pipe length  =     5.72(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.955(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     0.955(CFS)
Normal flow depth in pipe =    1.99(In.)
Flow top width inside pipe =    5.65(In.)
Critical Depth =    5.61(In.)
Pipe flow velocity =     16.72(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =     5.64 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.300 to Point/Station       11.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.370(Ac.)
Runoff from this stream =      0.955(CFS)
Time of concentration =    5.64 min.
Rainfall intensity =     2.905(In/Hr)
Summary of stream data:

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

```
1        1.208      9.66                 2.232
2        0.955      5.64                 2.905
Largest stream flow has longer time of concentration
Qp =      1.208 + sum of
          Qb         Ia/Ib
           0.955 *    0.768 =      0.734
Qp =      1.942

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.208       0.955
Area of streams before confluence:
        0.550        0.370
Results of confluence:
Total flow rate =      1.942(CFS)
Time of concentration =     9.657 min.
Effective stream area after confluence =      0.920(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.300 to Point/Station       11.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1414.760(Ft.)
Downstream point/station elevation =  1414.030(Ft.)
Pipe length  =   146.40(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.942(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.942(CFS)
Normal flow depth in pipe =    7.91(In.)
Flow top width inside pipe =   11.38(In.)
Critical Depth =    7.13(In.)
Pipe flow velocity =      3.53(Ft/s)
Travel time through pipe =    0.69 min.
Time of concentration (TC) =    10.35 min.
End of computations, total study area =            0.92 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  75.0
```

Appendix I.VI

Rational Method Analysis
Post-Development Conditions
100-Year Storm

```
                    Riverside County Rational Hydrology Program

        CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
                Rational Hydrology Study        Date: 05/27/22
File:MapesPost100ARat.out
        ------------------------------------------------------------------------
        MAPES AND TRUMBLE INDUSTRIAL FACILITY
        RATIONAL METHOD
        POST-DEVELOPMENT CONDITIONS
        100-YEAR STORM, DA A
        ------------------------------------------------------------------------
         *********   Hydrology Study Control Information **********

         English (in-lb) Units used in input data file

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


        Program License Serial Number 6443

        ------------------------------------------------------------------------
        Rational Method Hydrology Program based on
        Riverside County Flood Control & Water Conservation District
        1978 hydrology manual

        Storm event (year) =  100.00 Antecedent Moisture Condition = 3

        2 year, 1 hour precipitation =  0.487(In.)
        100 year, 1 hour precipitation =  1.520(In.)

        Storm event year = 100.0
        Calculated rainfall intensity data:
        1 hour intensity =  1.520(In/Hr)
        Slope of intensity duration curve = 0.4900




        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station       1.100 to Point/Station       1.200
        **** INITIAL AREA EVALUATION ****
        ______________________________________________________________________
        Initial area flow distance =   214.760(Ft.)
        Top (of initial area) elevation =  1422.920(Ft.)
        Bottom (of initial area) elevation =  1419.450(Ft.)
        Difference in elevation =     3.470(Ft.)
        Slope =    0.01616  s(percent)=      1.62
        TC = k(0.300)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =    5.864 min.
Rainfall intensity =      4.750(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.897
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      4.387(CFS)
Total initial stream area =        1.030(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.200 to Point/Station        2.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1415.450(Ft.)
Downstream point/station elevation =  1414.490(Ft.)
Pipe length  =   175.42(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.387(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.387(CFS)
Normal flow depth in pipe =   11.32(In.)
Flow top width inside pipe =   12.91(In.)
Critical Depth =   10.18(In.)
Pipe flow velocity =      4.42(Ft/s)
Travel time through pipe =    0.66 min.
Time of concentration (TC) =     6.53 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.300 to Point/Station        2.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.030(Ac.)
Runoff from this stream =      4.387(CFS)
Time of concentration =    6.53 min.
Rainfall intensity =     4.508(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.100 to Point/Station        2.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   130.430(Ft.)
Top (of initial area) elevation =  1421.180(Ft.)
```

```
Bottom (of initial area) elevation =  1418.600(Ft.)
Difference in elevation =     2.580(Ft.)
Slope =    0.01978  s(percent)=       1.98
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      5.136(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.897
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      8.661(CFS)
Total initial stream area =        1.880(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.200 to Point/Station        2.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1414.600(Ft.)
Downstream point/station elevation =  1414.490(Ft.)
Pipe length  =    21.80(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.661(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     8.661(CFS)
Normal flow depth in pipe =   13.82(In.)
Flow top width inside pipe =   19.93(In.)
Critical Depth =   13.11(In.)
Pipe flow velocity =      5.16(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =     5.07 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.300 to Point/Station        2.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.880(Ac.)
Runoff from this stream =      8.661(CFS)
Time of concentration =    5.07 min.
Rainfall intensity =     5.101(In/Hr)
Summary of stream data:
```

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


1        4.387      6.53                 4.508
2        8.661      5.07                 5.101
Largest stream flow has longer or shorter time of concentration
Qp =      8.661 + sum of
          Qa          Tb/Ta
           4.387 *    0.777 =      3.408
Qp =     12.069

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.387       8.661
Area of streams before confluence:
        1.030       1.880
Results of confluence:
Total flow rate =     12.069(CFS)
Time of concentration =     5.070 min.
Effective stream area after confluence =      2.910(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.300 to Point/Station        3.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1414.490(Ft.)
Downstream point/station elevation =  1413.530(Ft.)
Pipe length  =   191.80(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.069(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    12.069(CFS)
Normal flow depth in pipe =   15.56(In.)
Flow top width inside pipe =   22.92(In.)
Critical Depth =   14.98(In.)
Pipe flow velocity =      5.60(Ft/s)
Travel time through pipe =    0.57 min.
Time of concentration (TC) =     5.64 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.300 to Point/Station        3.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      2.910(Ac.)
Runoff from this stream =     12.069(CFS)
Time of concentration =    5.64 min.
Rainfall intensity =     4.841(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       3.100 to Point/Station       3.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   120.880(Ft.)
Top (of initial area) elevation =  1419.390(Ft.)
Bottom (of initial area) elevation =  1418.600(Ft.)
Difference in elevation =     0.790(Ft.)
Slope =    0.00654  s(percent)=       0.65
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.585 min.
Rainfall intensity =      4.865(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.897
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      6.239(CFS)
Total initial stream area =       1.430(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       3.200 to Point/Station       3.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1414.600(Ft.)
Downstream point/station elevation =  1413.530(Ft.)
Pipe length  =    22.97(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.239(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     6.239(CFS)
Normal flow depth in pipe =    8.20(In.)
Flow top width inside pipe =   11.16(In.)
Critical depth could not be calculated.
Pipe flow velocity =     10.90(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     5.62 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       3.300 to Point/Station       3.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
```

```
Stream flow area =      1.430(Ac.)
Runoff from this stream =      6.239(CFS)
Time of concentration =    5.62 min.
Rainfall intensity =     4.850(In/Hr)
Summary of stream data:

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


1       12.069      5.64                 4.841
2        6.239      5.62                 4.850
Largest stream flow has longer time of concentration
Qp =     12.069 + sum of
          Qb         Ia/Ib
           6.239 *    0.998 =      6.227
Qp =     18.296

Total of 2 streams to confluence:
Flow rates before confluence point:
      12.069       6.239
Area of streams before confluence:
        2.910        1.430
Results of confluence:
Total flow rate =     18.296(CFS)
Time of concentration =     5.642 min.
Effective stream area after confluence =      4.340(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.300 to Point/Station        4.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1413.530(Ft.)
Downstream point/station elevation =  1413.360(Ft.)
Pipe length  =    34.32(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.296(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    18.296(CFS)
Normal flow depth in pipe =   18.94(In.)
Flow top width inside pipe =   24.71(In.)
Critical Depth =   17.95(In.)
Pipe flow velocity =      6.14(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =     5.73 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.300 to Point/Station        4.300
**** CONFLUENCE OF MINOR STREAMS ****
```

```
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      4.340(Ac.)
Runoff from this stream =     18.296(CFS)
Time of concentration =    5.73 min.
Rainfall intensity =     4.802(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       4.100 to Point/Station       4.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   256.970(Ft.)
Top (of initial area) elevation =  1422.990(Ft.)
Bottom (of initial area) elevation =  1419.100(Ft.)
Difference in elevation =     3.890(Ft.)
Slope =    0.01514  s(percent)=      1.51
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.384 min.
Rainfall intensity =      4.557(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.897
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      4.167(CFS)
Total initial stream area =        1.020(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       4.200 to Point/Station       4.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1415.100(Ft.)
Downstream point/station elevation =  1413.360(Ft.)
Pipe length  =   136.57(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.167(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.167(CFS)
Normal flow depth in pipe =    8.13(In.)
Flow top width inside pipe =   14.95(In.)
Critical Depth =    9.93(In.)
Pipe flow velocity =      6.14(Ft/s)
Travel time through pipe =    0.37 min.
Time of concentration (TC) =     6.75 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       4.300 to Point/Station       4.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.020(Ac.)
Runoff from this stream =      4.167(CFS)
Time of concentration =    6.75 min.
Rainfall intensity =     4.432(In/Hr)
Summary of stream data:

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



1       18.296      5.73                 4.802
2        4.167      6.75                 4.432
Largest stream flow has longer or shorter time of concentration
Qp =     18.296 + sum of
          Qa          Tb/Ta
           4.167 *    0.849 =      3.538
Qp =     21.834

Total of 2 streams to confluence:
Flow rates before confluence point:
      18.296       4.167
Area of streams before confluence:
        4.340        1.020
Results of confluence:
Total flow rate =     21.834(CFS)
Time of concentration =     5.735 min.
Effective stream area after confluence =      5.360(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       4.300 to Point/Station       5.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1413.360(Ft.)
Downstream point/station elevation =  1412.940(Ft.)
Pipe length  =    83.92(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    21.834(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    21.834(CFS)
Normal flow depth in pipe =   22.03(In.)
Flow top width inside pipe =   20.93(In.)
Critical Depth =   19.64(In.)
Pipe flow velocity =      6.28(Ft/s)
Travel time through pipe =    0.22 min.
```

```
Time of concentration (TC) =     5.96 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       5.300 to Point/Station       5.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      5.360(Ac.)
Runoff from this stream =     21.834(CFS)
Time of concentration =    5.96 min.
Rainfall intensity =     4.714(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       5.100 to Point/Station       5.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   148.520(Ft.)
Top (of initial area) elevation =  1422.490(Ft.)
Bottom (of initial area) elevation =  1419.100(Ft.)
Difference in elevation =     3.390(Ft.)
Slope =    0.02283  s(percent)=       2.28
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      5.136(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.897
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.119(CFS)
Total initial stream area =       0.460(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       5.200 to Point/Station       5.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1415.100(Ft.)
Downstream point/station elevation =  1412.940(Ft.)
Pipe length  =    40.62(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.119(CFS)
Nearest computed pipe diameter  =      9.00(In.)
```

```
Calculated individual pipe flow  =     2.119(CFS)
Normal flow depth in pipe =    4.79(In.)
Flow top width inside pipe =    8.98(In.)
Critical Depth =    7.88(In.)
Pipe flow velocity =      8.86(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =     5.08 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.300 to Point/Station        5.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.460(Ac.)
Runoff from this stream =      2.119(CFS)
Time of concentration =    5.08 min.
Rainfall intensity =     5.098(In/Hr)
Summary of stream data:

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


1       21.834      5.96                 4.714
2        2.119      5.08                 5.098
Largest stream flow has longer time of concentration
Qp =     21.834 + sum of
          Qb         Ia/Ib
           2.119 *    0.925 =      1.959
Qp =     23.794

Total of 2 streams to confluence:
Flow rates before confluence point:
      21.834       2.119
Area of streams before confluence:
        5.360        0.460
Results of confluence:
Total flow rate =     23.794(CFS)
Time of concentration =     5.957 min.
Effective stream area after confluence =      5.820(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.300 to Point/Station        6.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1412.940(Ft.)
Downstream point/station elevation =  1412.570(Ft.)
Pipe length  =    73.56(Ft.)   Manning's N = 0.013
```

```
No. of pipes = 1  Required pipe flow  =    23.794(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    23.794(CFS)
Normal flow depth in pipe =   20.63(In.)
Flow top width inside pipe =   27.81(In.)
Critical Depth =   19.95(In.)
Pipe flow velocity =      6.61(Ft/s)
Travel time through pipe =    0.19 min.
Time of concentration (TC) =     6.14 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       6.300 to Point/Station       6.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      5.820(Ac.)
Runoff from this stream =     23.794(CFS)
Time of concentration =    6.14 min.
Rainfall intensity =     4.643(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       6.100 to Point/Station       6.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   206.100(Ft.)
Top (of initial area) elevation =  1419.690(Ft.)
Bottom (of initial area) elevation =  1418.600(Ft.)
Difference in elevation =     1.090(Ft.)
Slope =    0.00529  s(percent)=       0.53
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.212 min.
Rainfall intensity =      4.292(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      7.771(CFS)
Total initial stream area =        2.020(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       6.200 to Point/Station       6.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
______________________________________________________________________
Upstream point/station elevation =  1414.600(Ft.)
Downstream point/station elevation =  1412.570(Ft.)
Pipe length  =    24.15(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.771(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     7.771(CFS)
Normal flow depth in pipe =    7.77(In.)
Flow top width inside pipe =   11.47(In.)
Critical depth could not be calculated.
Pipe flow velocity =     14.44(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =     7.24 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       6.300 to Point/Station       6.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.020(Ac.)
Runoff from this stream =      7.771(CFS)
Time of concentration =    7.24 min.
Rainfall intensity =     4.284(In/Hr)
Summary of stream data:

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


1       23.794      6.14                 4.643
2        7.771      7.24                 4.284
Largest stream flow has longer or shorter time of concentration
Qp =     23.794 + sum of
          Qa          Tb/Ta
           7.771 *    0.848 =      6.593
Qp =     30.387

Total of 2 streams to confluence:
Flow rates before confluence point:
      23.794       7.771
Area of streams before confluence:
        5.820       2.020
Results of confluence:
Total flow rate =     30.387(CFS)
Time of concentration =     6.143 min.
Effective stream area after confluence =      7.840(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

```
Process from Point/Station       6.300 to Point/Station       7.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1412.570(Ft.)
Downstream point/station elevation =  1411.710(Ft.)
Pipe length  =   172.10(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    30.387(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    30.387(CFS)
Normal flow depth in pipe =   26.16(In.)
Flow top width inside pipe =   20.05(In.)
Critical Depth =   22.55(In.)
Pipe flow velocity =      6.69(Ft/s)
Travel time through pipe =    0.43 min.
Time of concentration (TC) =     6.57 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       7.300 to Point/Station       7.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      7.840(Ac.)
Runoff from this stream =     30.387(CFS)
Time of concentration =    6.57 min.
Rainfall intensity =     4.492(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       7.100 to Point/Station       7.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   588.890(Ft.)
Top (of initial area) elevation =  1422.840(Ft.)
Bottom (of initial area) elevation =  1418.940(Ft.)
Difference in elevation =     3.900(Ft.)
Slope =    0.00662  s(percent)=      0.66
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.494 min.
Rainfall intensity =      3.572(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      7.454(CFS)
Total initial stream area =        2.330(Ac.)
```

```
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       7.200 to Point/Station       7.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1414.940(Ft.)
Downstream point/station elevation =  1411.710(Ft.)
Pipe length  =    27.78(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.454(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     7.454(CFS)
Normal flow depth in pipe =    6.80(In.)
Flow top width inside pipe =   11.89(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.25(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    10.52 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       7.300 to Point/Station       7.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.330(Ac.)
Runoff from this stream =      7.454(CFS)
Time of concentration =   10.52 min.
Rainfall intensity =     3.567(In/Hr)
Summary of stream data:

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


1       30.387      6.57                 4.492
2        7.454     10.52                 3.567
Largest stream flow has longer or shorter time of concentration
Qp =     30.387 + sum of
          Qa           Tb/Ta
           7.454 *    0.625 =      4.655
Qp =     35.042

Total of 2 streams to confluence:
Flow rates before confluence point:
      30.387       7.454
Area of streams before confluence:
        7.840        2.330
Results of confluence:
```

```
Total flow rate =     35.042(CFS)
Time of concentration =     6.571 min.
Effective stream area after confluence =     10.170(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        7.300 to Point/Station        8.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1411.710(Ft.)
Downstream point/station elevation =  1411.620(Ft.)
Pipe length  =    18.21(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    35.042(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    35.042(CFS)
Normal flow depth in pipe =   25.50(In.)
Flow top width inside pipe =   27.66(In.)
Critical Depth =   23.64(In.)
Pipe flow velocity =      7.12(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     6.61 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        8.300 to Point/Station        8.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     10.170(Ac.)
Runoff from this stream =     35.042(CFS)
Time of concentration =    6.61 min.
Rainfall intensity =     4.478(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        8.100 to Point/Station        8.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   106.130(Ft.)
Top (of initial area) elevation =  1420.890(Ft.)
Bottom (of initial area) elevation =  1419.280(Ft.)
Difference in elevation =     1.610(Ft.)
Slope =    0.01517  s(percent)=       1.52
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      5.136(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.897
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      4.515(CFS)
Total initial stream area =        0.980(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        8.200 to Point/Station        8.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1415.280(Ft.)
Downstream point/station elevation =  1411.620(Ft.)
Pipe length  =    25.32(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.515(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     4.515(CFS)
Normal flow depth in pipe =    5.64(In.)
Flow top width inside pipe =    8.71(In.)
Critical depth could not be calculated.
Pipe flow velocity =     15.49(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =     5.03 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        8.300 to Point/Station        8.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.980(Ac.)
Runoff from this stream =      4.515(CFS)
Time of concentration =    5.03 min.
Rainfall intensity =     5.123(In/Hr)
Summary of stream data:

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


1       35.042      6.61                 4.478
2        4.515      5.03                 5.123
Largest stream flow has longer time of concentration
Qp =     35.042 + sum of
          Qb         Ia/Ib
           4.515 *    0.874 =      3.947
```

```
Qp =     38.989

Total of 2 streams to confluence:
Flow rates before confluence point:
      35.042       4.515
Area of streams before confluence:
       10.170        0.980
Results of confluence:
Total flow rate =     38.989(CFS)
Time of concentration =     6.614 min.
Effective stream area after confluence =     11.150(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       8.300 to Point/Station       9.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1411.620(Ft.)
Downstream point/station elevation =  1410.040(Ft.)
Pipe length  =   317.20(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    38.989(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    38.989(CFS)
Normal flow depth in pipe =   28.59(In.)
Flow top width inside pipe =   22.45(In.)
Critical Depth =   24.93(In.)
Pipe flow velocity =      7.13(Ft/s)
Travel time through pipe =    0.74 min.
Time of concentration (TC) =     7.36 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       9.300 to Point/Station       9.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     11.150(Ac.)
Runoff from this stream =     38.989(CFS)
Time of concentration =    7.36 min.
Rainfall intensity =     4.251(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       9.100 to Point/Station       9.300
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   252.240(Ft.)
Top (of initial area) elevation =  1421.240(Ft.)
Bottom (of initial area) elevation =  1420.100(Ft.)
Difference in elevation =     1.140(Ft.)
```

```
Slope =    0.00452  s(percent)=       0.45
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.069 min.
Rainfall intensity =      4.062(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     25.302(CFS)
Total initial stream area =        6.950(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       9.300 to Point/Station        9.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      6.950(Ac.)
Runoff from this stream =     25.302(CFS)
Time of concentration =    8.07 min.
Rainfall intensity =     4.062(In/Hr)
Summary of stream data:

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


1       38.989      7.36                 4.251
2       25.302      8.07                 4.062
Largest stream flow has longer or shorter time of concentration
Qp =     38.989 + sum of
          Qa          Tb/Ta
          25.302 *    0.912 =     23.064
Qp =     62.054

Total of 2 streams to confluence:
Flow rates before confluence point:
      38.989      25.302
Area of streams before confluence:
       11.150        6.950
Results of confluence:
Total flow rate =     62.054(CFS)
Time of concentration =     7.356 min.
Effective stream area after confluence =     18.100(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       9.300 to Point/Station       9.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1410.040(Ft.)
Downstream point/station elevation =  1409.990(Ft.)
Pipe length  =     9.57(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    62.054(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    62.054(CFS)
Normal flow depth in pipe =   33.56(In.)
Flow top width inside pipe =   27.02(In.)
Critical Depth =   30.13(In.)
Pipe flow velocity =      8.17(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     7.38 min.
End of computations, total study area =          18.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  75.0
```

```
                    Riverside County Rational Hydrology Program

        CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
                Rational Hydrology Study       Date: 05/27/22
File:MapesPost100BRat.out
        ------------------------------------------------------------------------
        MAPES AND TRUMBLE INDUSTRIAL FACILITY
        RATIONAL METHOD
        POST-DEVELOPMENT CONDITIONS
        100-YEAR STORM, DA B
        ------------------------------------------------------------------------
         *********   Hydrology Study Control Information **********

         English (in-lb) Units used in input data file

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


        Program License Serial Number 6443

        ------------------------------------------------------------------------
        Rational Method Hydrology Program based on
        Riverside County Flood Control & Water Conservation District
        1978 hydrology manual

        Storm event (year) =  100.00 Antecedent Moisture Condition = 3

        2 year, 1 hour precipitation =  0.487(In.)
        100 year, 1 hour precipitation =  1.520(In.)

        Storm event year = 100.0
        Calculated rainfall intensity data:
        1 hour intensity =  1.520(In/Hr)
        Slope of intensity duration curve = 0.4900




        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station       10.100 to Point/Station       10.200
        **** INITIAL AREA EVALUATION ****
        ______________________________________________________________________
        Initial area flow distance =   333.910(Ft.)
        Top (of initial area) elevation =  1423.670(Ft.)
        Bottom (of initial area) elevation =  1420.530(Ft.)
        Difference in elevation =     3.140(Ft.)
        Slope =    0.00940  s(percent)=       0.94
        TC = k(0.300)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =    7.797 min.
Rainfall intensity =      4.131(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.036(CFS)
Total initial stream area =       0.550(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.200 to Point/Station       11.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1416.530(Ft.)
Downstream point/station elevation =  1414.760(Ft.)
Pipe length  =   354.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.036(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.036(CFS)
Normal flow depth in pipe =    8.18(In.)
Flow top width inside pipe =   11.18(In.)
Critical Depth =    7.30(In.)
Pipe flow velocity =      3.57(Ft/s)
Travel time through pipe =    1.65 min.
Time of concentration (TC) =     9.45 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.300 to Point/Station       11.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.550(Ac.)
Runoff from this stream =      2.036(CFS)
Time of concentration =    9.45 min.
Rainfall intensity =     3.760(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.100 to Point/Station       11.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   169.180(Ft.)
Top (of initial area) elevation =  1423.740(Ft.)
```

```
Bottom (of initial area) elevation =  1421.670(Ft.)
Difference in elevation =     2.070(Ft.)
Slope =    0.01224  s(percent)=       1.22
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.636 min.
Rainfall intensity =      4.844(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.897
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.607(CFS)
Total initial stream area =        0.370(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.200 to Point/Station       11.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1417.670(Ft.)
Downstream point/station elevation =  1414.760(Ft.)
Pipe length  =     5.72(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.607(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     1.607(CFS)
Normal flow depth in pipe =    2.64(In.)
Flow top width inside pipe =    5.96(In.)
Critical depth could not be calculated.
Pipe flow velocity =     19.27(Ft/s)
Travel time through pipe =    0.00 min.
Time of concentration (TC) =     5.64 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.300 to Point/Station       11.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.370(Ac.)
Runoff from this stream =      1.607(CFS)
Time of concentration =    5.64 min.
Rainfall intensity =     4.842(In/Hr)
Summary of stream data:

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

```
1        2.036      9.45                 3.760
2        1.607      5.64                 4.842
Largest stream flow has longer time of concentration
Qp =      2.036 + sum of
          Qb         Ia/Ib
           1.607 *    0.777 =      1.248
Qp =      3.284

Total of 2 streams to confluence:
Flow rates before confluence point:
       2.036       1.607
Area of streams before confluence:
        0.550        0.370
Results of confluence:
Total flow rate =      3.284(CFS)
Time of concentration =     9.451 min.
Effective stream area after confluence =      0.920(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.300 to Point/Station       11.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1414.760(Ft.)
Downstream point/station elevation =  1414.030(Ft.)
Pipe length  =   146.40(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.284(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.284(CFS)
Normal flow depth in pipe =    9.42(In.)
Flow top width inside pipe =   14.50(In.)
Critical Depth =    8.77(In.)
Pipe flow velocity =      4.05(Ft/s)
Travel time through pipe =    0.60 min.
Time of concentration (TC) =    10.05 min.
End of computations, total study area =            0.92 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  75.0
```

Appendix J

Synthetic Unit Hydrograph Method Analysis

Appendix J.1

Synthetic Unit Hydrograph Method Analysis
Pre-Development Conditions
2-Year Storm

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
                Study date  05/26/22 File: MapesPre2UH242.out


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

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6443

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format




---------------------------------------------------------------------
MAPES AND TRUMBLE INDUSTRIAL FACILITY
UNIT HYDROGRAPH
PRE-DEVELOPMENT CONDITIONS
2-YEAR, 24HR STORM, DA A
--------------------------------------------------------------------
Drainage Area =      19.01(Ac.)  =      0.030 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      19.01(Ac.)  =
0.030 Sq. Mi.
Length along longest watercourse =    1256.56(Ft.)
Length along longest watercourse measured to centroid =     586.75(Ft.)
Length along longest watercourse =      0.238 Mi.
Length along longest watercourse measured to centroid =      0.111 Mi.
Difference in elevation =       6.42(Ft.)
Slope along watercourse =     26.9765 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.097 Hr.
Lag time =     5.81 Min.
25% of lag time =     1.45 Min.
40% of lag time =     2.32 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:
```

```
Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       19.01           2.06                 39.16

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       19.01           5.31                100.94

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    2.060(In)
Area Averaged 100-Year Rainfall =    5.310(In)

Point rain (area averaged) =    2.060(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    2.060(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    19.010           89.00         0.000
 Total Area Entered =     19.01(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
89.0  76.4      0.286     0.000       0.286       1.000      0.286
                                                  Sum (F) =   0.286
Area averaged mean soil loss (F) (In/Hr) =  0.286
Minimum soil loss rate ((In/Hr)) =  0.143
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.900
---------------------------------------------------------------------

                U n i t  H y d r o g r a p h
                        VALLEY S-Curve
--------------------------------------------------------------------
                Unit Hydrograph Data
---------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                           Graph %          (CFS)
---------------------------------------------------------------------
    1   0.083          86.074          15.028               2.879
    2   0.167         172.149          46.219               8.855
    3   0.250         258.223          18.315               3.509
    4   0.333         344.297           7.866               1.507
    5   0.417         430.372           4.648               0.890
    6   0.500         516.446           2.910               0.557
    7   0.583         602.520           2.059               0.395
    8   0.667         688.594           1.359               0.260
```

```
            9   0.750        774.669           0.913              0.175
           10   0.833        860.743           0.684              0.131
                                       Sum = 100.000   Sum=      19.159
------------------------------------------------------------------------


 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain      Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)          Max   |   Low        (In/Hr)
   1   0.08     0.07      0.016        (  0.508)       0.015        0.002
   2   0.17     0.07      0.016        (  0.506)       0.015        0.002
   3   0.25     0.07      0.016        (  0.504)       0.015        0.002
   4   0.33     0.10      0.025        (  0.502)       0.022        0.002
   5   0.42     0.10      0.025        (  0.500)       0.022        0.002
   6   0.50     0.10      0.025        (  0.498)       0.022        0.002
   7   0.58     0.10      0.025        (  0.496)       0.022        0.002
   8   0.67     0.10      0.025        (  0.494)       0.022        0.002
   9   0.75     0.10      0.025        (  0.492)       0.022        0.002
  10   0.83     0.13      0.033        (  0.490)       0.030        0.003
  11   0.92     0.13      0.033        (  0.488)       0.030        0.003
  12   1.00     0.13      0.033        (  0.486)       0.030        0.003
  13   1.08     0.10      0.025        (  0.485)       0.022        0.002
  14   1.17     0.10      0.025        (  0.483)       0.022        0.002
  15   1.25     0.10      0.025        (  0.481)       0.022        0.002
  16   1.33     0.10      0.025        (  0.479)       0.022        0.002
  17   1.42     0.10      0.025        (  0.477)       0.022        0.002
  18   1.50     0.10      0.025        (  0.475)       0.022        0.002
  19   1.58     0.10      0.025        (  0.473)       0.022        0.002
  20   1.67     0.10      0.025        (  0.471)       0.022        0.002
  21   1.75     0.10      0.025        (  0.469)       0.022        0.002
  22   1.83     0.13      0.033        (  0.467)       0.030        0.003
  23   1.92     0.13      0.033        (  0.466)       0.030        0.003
  24   2.00     0.13      0.033        (  0.464)       0.030        0.003
  25   2.08     0.13      0.033        (  0.462)       0.030        0.003
  26   2.17     0.13      0.033        (  0.460)       0.030        0.003
  27   2.25     0.13      0.033        (  0.458)       0.030        0.003
  28   2.33     0.13      0.033        (  0.456)       0.030        0.003
  29   2.42     0.13      0.033        (  0.454)       0.030        0.003
  30   2.50     0.13      0.033        (  0.452)       0.030        0.003
  31   2.58     0.17      0.041        (  0.451)       0.037        0.004
  32   2.67     0.17      0.041        (  0.449)       0.037        0.004
  33   2.75     0.17      0.041        (  0.447)       0.037        0.004
  34   2.83     0.17      0.041        (  0.445)       0.037        0.004
  35   2.92     0.17      0.041        (  0.443)       0.037        0.004
  36   3.00     0.17      0.041        (  0.441)       0.037        0.004
  37   3.08     0.17      0.041        (  0.440)       0.037        0.004
  38   3.17     0.17      0.041        (  0.438)       0.037        0.004
  39   3.25     0.17      0.041        (  0.436)       0.037        0.004
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40	3.33	0.17	0.041	(0.434)	0.037	0.004
41	3.42	0.17	0.041	(0.432)	0.037	0.004
42	3.50	0.17	0.041	(0.430)	0.037	0.004
43	3.58	0.17	0.041	(0.429)	0.037	0.004
44	3.67	0.17	0.041	(0.427)	0.037	0.004
45	3.75	0.17	0.041	(0.425)	0.037	0.004
46	3.83	0.20	0.049	(0.423)	0.044	0.005
47	3.92	0.20	0.049	(0.422)	0.044	0.005
48	4.00	0.20	0.049	(0.420)	0.044	0.005
49	4.08	0.20	0.049	(0.418)	0.044	0.005
50	4.17	0.20	0.049	(0.416)	0.044	0.005
51	4.25	0.20	0.049	(0.414)	0.044	0.005
52	4.33	0.23	0.058	(0.413)	0.052	0.006
53	4.42	0.23	0.058	(0.411)	0.052	0.006
54	4.50	0.23	0.058	(0.409)	0.052	0.006
55	4.58	0.23	0.058	(0.407)	0.052	0.006
56	4.67	0.23	0.058	(0.406)	0.052	0.006
57	4.75	0.23	0.058	(0.404)	0.052	0.006
58	4.83	0.27	0.066	(0.402)	0.059	0.007
59	4.92	0.27	0.066	(0.400)	0.059	0.007
60	5.00	0.27	0.066	(0.399)	0.059	0.007
61	5.08	0.20	0.049	(0.397)	0.044	0.005
62	5.17	0.20	0.049	(0.395)	0.044	0.005
63	5.25	0.20	0.049	(0.393)	0.044	0.005
64	5.33	0.23	0.058	(0.392)	0.052	0.006
65	5.42	0.23	0.058	(0.390)	0.052	0.006
66	5.50	0.23	0.058	(0.388)	0.052	0.006
67	5.58	0.27	0.066	(0.387)	0.059	0.007
68	5.67	0.27	0.066	(0.385)	0.059	0.007
69	5.75	0.27	0.066	(0.383)	0.059	0.007
70	5.83	0.27	0.066	(0.382)	0.059	0.007
71	5.92	0.27	0.066	(0.380)	0.059	0.007
72	6.00	0.27	0.066	(0.378)	0.059	0.007
73	6.08	0.30	0.074	(0.376)	0.067	0.007
74	6.17	0.30	0.074	(0.375)	0.067	0.007
75	6.25	0.30	0.074	(0.373)	0.067	0.007
76	6.33	0.30	0.074	(0.371)	0.067	0.007
77	6.42	0.30	0.074	(0.370)	0.067	0.007
78	6.50	0.30	0.074	(0.368)	0.067	0.007
79	6.58	0.33	0.082	(0.366)	0.074	0.008
80	6.67	0.33	0.082	(0.365)	0.074	0.008
81	6.75	0.33	0.082	(0.363)	0.074	0.008
82	6.83	0.33	0.082	(0.362)	0.074	0.008
83	6.92	0.33	0.082	(0.360)	0.074	0.008
84	7.00	0.33	0.082	(0.358)	0.074	0.008
85	7.08	0.33	0.082	(0.357)	0.074	0.008
86	7.17	0.33	0.082	(0.355)	0.074	0.008
87	7.25	0.33	0.082	(0.353)	0.074	0.008
88	7.33	0.37	0.091	(0.352)	0.082	0.009
89	7.42	0.37	0.091	(0.350)	0.082	0.009

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  90   7.50      0.37      0.091       (  0.349)      0.082        0.009
  91   7.58      0.40      0.099       (  0.347)      0.089        0.010
  92   7.67      0.40      0.099       (  0.345)      0.089        0.010
  93   7.75      0.40      0.099       (  0.344)      0.089        0.010
  94   7.83      0.43      0.107       (  0.342)      0.096        0.011
  95   7.92      0.43      0.107       (  0.341)      0.096        0.011
  96   8.00      0.43      0.107       (  0.339)      0.096        0.011
  97   8.08      0.50      0.124       (  0.337)      0.111        0.012
  98   8.17      0.50      0.124       (  0.336)      0.111        0.012
  99   8.25      0.50      0.124       (  0.334)      0.111        0.012
 100   8.33      0.50      0.124       (  0.333)      0.111        0.012
 101   8.42      0.50      0.124       (  0.331)      0.111        0.012
 102   8.50      0.50      0.124       (  0.330)      0.111        0.012
 103   8.58      0.53      0.132       (  0.328)      0.119        0.013
 104   8.67      0.53      0.132       (  0.327)      0.119        0.013
 105   8.75      0.53      0.132       (  0.325)      0.119        0.013
 106   8.83      0.57      0.140       (  0.323)      0.126        0.014
 107   8.92      0.57      0.140       (  0.322)      0.126        0.014
 108   9.00      0.57      0.140       (  0.320)      0.126        0.014
 109   9.08      0.63      0.157       (  0.319)      0.141        0.016
 110   9.17      0.63      0.157       (  0.317)      0.141        0.016
 111   9.25      0.63      0.157       (  0.316)      0.141        0.016
 112   9.33      0.67      0.165       (  0.314)      0.148        0.016
 113   9.42      0.67      0.165       (  0.313)      0.148        0.016
 114   9.50      0.67      0.165       (  0.311)      0.148        0.016
 115   9.58      0.70      0.173       (  0.310)      0.156        0.017
 116   9.67      0.70      0.173       (  0.308)      0.156        0.017
 117   9.75      0.70      0.173       (  0.307)      0.156        0.017
 118   9.83      0.73      0.181       (  0.305)      0.163        0.018
 119   9.92      0.73      0.181       (  0.304)      0.163        0.018
 120  10.00      0.73      0.181       (  0.303)      0.163        0.018
 121  10.08      0.50      0.124       (  0.301)      0.111        0.012
 122  10.17      0.50      0.124       (  0.300)      0.111        0.012
 123  10.25      0.50      0.124       (  0.298)      0.111        0.012
 124  10.33      0.50      0.124       (  0.297)      0.111        0.012
 125  10.42      0.50      0.124       (  0.295)      0.111        0.012
 126  10.50      0.50      0.124       (  0.294)      0.111        0.012
 127  10.58      0.67      0.165       (  0.292)      0.148        0.016
 128  10.67      0.67      0.165       (  0.291)      0.148        0.016
 129  10.75      0.67      0.165       (  0.290)      0.148        0.016
 130  10.83      0.67      0.165       (  0.288)      0.148        0.016
 131  10.92      0.67      0.165       (  0.287)      0.148        0.016
 132  11.00      0.67      0.165       (  0.285)      0.148        0.016
 133  11.08      0.63      0.157       (  0.284)      0.141        0.016
 134  11.17      0.63      0.157       (  0.282)      0.141        0.016
 135  11.25      0.63      0.157       (  0.281)      0.141        0.016
 136  11.33      0.63      0.157       (  0.280)      0.141        0.016
 137  11.42      0.63      0.157       (  0.278)      0.141        0.016
 138  11.50      0.63      0.157       (  0.277)      0.141        0.016
 139  11.58      0.57      0.140       (  0.276)      0.126        0.014
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140	11.67	0.57	0.140	(0.274)	0.126	0.014
141	11.75	0.57	0.140	(0.273)	0.126	0.014
142	11.83	0.60	0.148	(0.271)	0.133	0.015
143	11.92	0.60	0.148	(0.270)	0.133	0.015
144	12.00	0.60	0.148	(0.269)	0.133	0.015
145	12.08	0.83	0.206	(0.267)	0.185	0.021
146	12.17	0.83	0.206	(0.266)	0.185	0.021
147	12.25	0.83	0.206	(0.265)	0.185	0.021
148	12.33	0.87	0.214	(0.263)	0.193	0.021
149	12.42	0.87	0.214	(0.262)	0.193	0.021
150	12.50	0.87	0.214	(0.261)	0.193	0.021
151	12.58	0.93	0.231	(0.259)	0.208	0.023
152	12.67	0.93	0.231	(0.258)	0.208	0.023
153	12.75	0.93	0.231	(0.257)	0.208	0.023
154	12.83	0.97	0.239	(0.256)	0.215	0.024
155	12.92	0.97	0.239	(0.254)	0.215	0.024
156	13.00	0.97	0.239	(0.253)	0.215	0.024
157	13.08	1.13	0.280	0.252	(0.252)	0.028
158	13.17	1.13	0.280	0.250	(0.252)	0.030
159	13.25	1.13	0.280	0.249	(0.252)	0.031
160	13.33	1.13	0.280	0.248	(0.252)	0.032
161	13.42	1.13	0.280	0.247	(0.252)	0.034
162	13.50	1.13	0.280	0.245	(0.252)	0.035
163	13.58	0.77	0.190	(0.244)	0.171	0.019
164	13.67	0.77	0.190	(0.243)	0.171	0.019
165	13.75	0.77	0.190	(0.242)	0.171	0.019
166	13.83	0.77	0.190	(0.240)	0.171	0.019
167	13.92	0.77	0.190	(0.239)	0.171	0.019
168	14.00	0.77	0.190	(0.238)	0.171	0.019
169	14.08	0.90	0.222	(0.237)	0.200	0.022
170	14.17	0.90	0.222	(0.236)	0.200	0.022
171	14.25	0.90	0.222	(0.234)	0.200	0.022
172	14.33	0.87	0.214	(0.233)	0.193	0.021
173	14.42	0.87	0.214	(0.232)	0.193	0.021
174	14.50	0.87	0.214	(0.231)	0.193	0.021
175	14.58	0.87	0.214	(0.230)	0.193	0.021
176	14.67	0.87	0.214	(0.228)	0.193	0.021
177	14.75	0.87	0.214	(0.227)	0.193	0.021
178	14.83	0.83	0.206	(0.226)	0.185	0.021
179	14.92	0.83	0.206	(0.225)	0.185	0.021
180	15.00	0.83	0.206	(0.224)	0.185	0.021
181	15.08	0.80	0.198	(0.223)	0.178	0.020
182	15.17	0.80	0.198	(0.221)	0.178	0.020
183	15.25	0.80	0.198	(0.220)	0.178	0.020
184	15.33	0.77	0.190	(0.219)	0.171	0.019
185	15.42	0.77	0.190	(0.218)	0.171	0.019
186	15.50	0.77	0.190	(0.217)	0.171	0.019
187	15.58	0.63	0.157	(0.216)	0.141	0.016
188	15.67	0.63	0.157	(0.215)	0.141	0.016
189	15.75	0.63	0.157	(0.214)	0.141	0.016

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190  15.83     0.63      0.157        (  0.213)       0.141         0.016
191  15.92     0.63      0.157        (  0.211)       0.141         0.016
192  16.00     0.63      0.157        (  0.210)       0.141         0.016
193  16.08     0.13      0.033        (  0.209)       0.030         0.003
194  16.17     0.13      0.033        (  0.208)       0.030         0.003
195  16.25     0.13      0.033        (  0.207)       0.030         0.003
196  16.33     0.13      0.033        (  0.206)       0.030         0.003
197  16.42     0.13      0.033        (  0.205)       0.030         0.003
198  16.50     0.13      0.033        (  0.204)       0.030         0.003
199  16.58     0.10      0.025        (  0.203)       0.022         0.002
200  16.67     0.10      0.025        (  0.202)       0.022         0.002
201  16.75     0.10      0.025        (  0.201)       0.022         0.002
202  16.83     0.10      0.025        (  0.200)       0.022         0.002
203  16.92     0.10      0.025        (  0.199)       0.022         0.002
204  17.00     0.10      0.025        (  0.198)       0.022         0.002
205  17.08     0.17      0.041        (  0.197)       0.037         0.004
206  17.17     0.17      0.041        (  0.196)       0.037         0.004
207  17.25     0.17      0.041        (  0.195)       0.037         0.004
208  17.33     0.17      0.041        (  0.194)       0.037         0.004
209  17.42     0.17      0.041        (  0.193)       0.037         0.004
210  17.50     0.17      0.041        (  0.192)       0.037         0.004
211  17.58     0.17      0.041        (  0.191)       0.037         0.004
212  17.67     0.17      0.041        (  0.190)       0.037         0.004
213  17.75     0.17      0.041        (  0.189)       0.037         0.004
214  17.83     0.13      0.033        (  0.188)       0.030         0.003
215  17.92     0.13      0.033        (  0.187)       0.030         0.003
216  18.00     0.13      0.033        (  0.186)       0.030         0.003
217  18.08     0.13      0.033        (  0.185)       0.030         0.003
218  18.17     0.13      0.033        (  0.185)       0.030         0.003
219  18.25     0.13      0.033        (  0.184)       0.030         0.003
220  18.33     0.13      0.033        (  0.183)       0.030         0.003
221  18.42     0.13      0.033        (  0.182)       0.030         0.003
222  18.50     0.13      0.033        (  0.181)       0.030         0.003
223  18.58     0.10      0.025        (  0.180)       0.022         0.002
224  18.67     0.10      0.025        (  0.179)       0.022         0.002
225  18.75     0.10      0.025        (  0.178)       0.022         0.002
226  18.83     0.07      0.016        (  0.177)       0.015         0.002
227  18.92     0.07      0.016        (  0.177)       0.015         0.002
228  19.00     0.07      0.016        (  0.176)       0.015         0.002
229  19.08     0.10      0.025        (  0.175)       0.022         0.002
230  19.17     0.10      0.025        (  0.174)       0.022         0.002
231  19.25     0.10      0.025        (  0.173)       0.022         0.002
232  19.33     0.13      0.033        (  0.173)       0.030         0.003
233  19.42     0.13      0.033        (  0.172)       0.030         0.003
234  19.50     0.13      0.033        (  0.171)       0.030         0.003
235  19.58     0.10      0.025        (  0.170)       0.022         0.002
236  19.67     0.10      0.025        (  0.169)       0.022         0.002
237  19.75     0.10      0.025        (  0.169)       0.022         0.002
238  19.83     0.07      0.016        (  0.168)       0.015         0.002
239  19.92     0.07      0.016        (  0.167)       0.015         0.002
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240  20.00      0.07      0.016       (  0.166)       0.015        0.002
241  20.08      0.10      0.025       (  0.166)       0.022        0.002
242  20.17      0.10      0.025       (  0.165)       0.022        0.002
243  20.25      0.10      0.025       (  0.164)       0.022        0.002
244  20.33      0.10      0.025       (  0.163)       0.022        0.002
245  20.42      0.10      0.025       (  0.163)       0.022        0.002
246  20.50      0.10      0.025       (  0.162)       0.022        0.002
247  20.58      0.10      0.025       (  0.161)       0.022        0.002
248  20.67      0.10      0.025       (  0.161)       0.022        0.002
249  20.75      0.10      0.025       (  0.160)       0.022        0.002
250  20.83      0.07      0.016       (  0.159)       0.015        0.002
251  20.92      0.07      0.016       (  0.159)       0.015        0.002
252  21.00      0.07      0.016       (  0.158)       0.015        0.002
253  21.08      0.10      0.025       (  0.157)       0.022        0.002
254  21.17      0.10      0.025       (  0.157)       0.022        0.002
255  21.25      0.10      0.025       (  0.156)       0.022        0.002
256  21.33      0.07      0.016       (  0.156)       0.015        0.002
257  21.42      0.07      0.016       (  0.155)       0.015        0.002
258  21.50      0.07      0.016       (  0.155)       0.015        0.002
259  21.58      0.10      0.025       (  0.154)       0.022        0.002
260  21.67      0.10      0.025       (  0.153)       0.022        0.002
261  21.75      0.10      0.025       (  0.153)       0.022        0.002
262  21.83      0.07      0.016       (  0.152)       0.015        0.002
263  21.92      0.07      0.016       (  0.152)       0.015        0.002
264  22.00      0.07      0.016       (  0.151)       0.015        0.002
265  22.08      0.10      0.025       (  0.151)       0.022        0.002
266  22.17      0.10      0.025       (  0.150)       0.022        0.002
267  22.25      0.10      0.025       (  0.150)       0.022        0.002
268  22.33      0.07      0.016       (  0.149)       0.015        0.002
269  22.42      0.07      0.016       (  0.149)       0.015        0.002
270  22.50      0.07      0.016       (  0.148)       0.015        0.002
271  22.58      0.07      0.016       (  0.148)       0.015        0.002
272  22.67      0.07      0.016       (  0.148)       0.015        0.002
273  22.75      0.07      0.016       (  0.147)       0.015        0.002
274  22.83      0.07      0.016       (  0.147)       0.015        0.002
275  22.92      0.07      0.016       (  0.146)       0.015        0.002
276  23.00      0.07      0.016       (  0.146)       0.015        0.002
277  23.08      0.07      0.016       (  0.146)       0.015        0.002
278  23.17      0.07      0.016       (  0.145)       0.015        0.002
279  23.25      0.07      0.016       (  0.145)       0.015        0.002
280  23.33      0.07      0.016       (  0.145)       0.015        0.002
281  23.42      0.07      0.016       (  0.145)       0.015        0.002
282  23.50      0.07      0.016       (  0.144)       0.015        0.002
283  23.58      0.07      0.016       (  0.144)       0.015        0.002
284  23.67      0.07      0.016       (  0.144)       0.015        0.002
285  23.75      0.07      0.016       (  0.144)       0.015        0.002
286  23.83      0.07      0.016       (  0.143)       0.015        0.002
287  23.92      0.07      0.016       (  0.143)       0.015        0.002
288  24.00      0.07      0.016       (  0.143)       0.015        0.002
                  (Loss Rate Not Used)
```

```
   Sum =     100.0                                  Sum =     2.5
      Flood volume = Effective rainfall      0.21(In)
       times area      19.0(Ac.)/[(In)/(Ft.)] =      0.3(Ac.Ft)
      Total soil loss =      1.85(In)
      Total soil loss =     2.934(Ac.Ft)
      Total rainfall =     2.06(In)
      Flood volume =      14339.1 Cubic Feet
      Total soil loss =      127808.6 Cubic Feet
      --------------------------------------------------------------------
       Peak flow rate of this hydrograph =      0.622(CFS)
      --------------------------------------------------------------------
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         24 - H O U R   S T O R M
                    R u n o f f     H y d r o g r a p h
      --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

      --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5      0.0000      0.00  Q        |         |         |         |
  0+10      0.0002      0.02  Q        |         |         |         |
  0+15      0.0003      0.03  Q        |         |         |         |
  0+20      0.0005      0.03  Q        |         |         |         |
  0+25      0.0008      0.04  Q        |         |         |         |
  0+30      0.0011      0.04  Q        |         |         |         |
  0+35      0.0014      0.04  Q        |         |         |         |
  0+40      0.0017      0.05  Q        |         |         |         |
  0+45      0.0020      0.05  Q        |         |         |         |
  0+50      0.0024      0.05  Q        |         |         |         |
  0+55      0.0028      0.06  Q        |         |         |         |
  1+ 0      0.0032      0.06  Q        |         |         |         |
  1+ 5      0.0036      0.06  Q        |         |         |         |
  1+10      0.0040      0.05  Q        |         |         |         |
  1+15      0.0043      0.05  Q        |         |         |         |
  1+20      0.0046      0.05  Q        |         |         |         |
  1+25      0.0050      0.05  Q        |         |         |         |
  1+30      0.0053      0.05  Q        |         |         |         |
  1+35      0.0056      0.05  Q        |         |         |         |
  1+40      0.0060      0.05  Q        |         |         |         |
  1+45      0.0063      0.05  Q        |         |         |         |
  1+50      0.0066      0.05  Q        |         |         |         |
  1+55      0.0070      0.06  Q        |         |         |         |
  2+ 0      0.0074      0.06  Q        |         |         |         |
  2+ 5      0.0079      0.06  Q        |         |         |         |
  2+10      0.0083      0.06  QV       |         |         |         |
  2+15      0.0087      0.06  QV       |         |         |         |
  2+20      0.0091      0.06  QV       |         |         |         |
  2+25      0.0096      0.06  QV       |         |         |         |
  2+30      0.0100      0.06  QV       |         |         |         |
```

```
2+35       0.0105      0.07  QV         |         |         |         |
2+40       0.0110      0.07  QV         |         |         |         |
2+45       0.0115      0.08  QV         |         |         |         |
2+50       0.0120      0.08  QV         |         |         |         |
2+55       0.0125      0.08  QV         |         |         |         |
3+ 0       0.0131      0.08  QV         |         |         |         |
3+ 5       0.0136      0.08  QV         |         |         |         |
3+10       0.0142      0.08  QV         |         |         |         |
3+15       0.0147      0.08  QV         |         |         |         |
3+20       0.0153      0.08  QV         |         |         |         |
3+25       0.0158      0.08  QV         |         |         |         |
3+30       0.0163      0.08  QV         |         |         |         |
3+35       0.0169      0.08  Q V        |         |         |         |
3+40       0.0174      0.08  Q V        |         |         |         |
3+45       0.0180      0.08  Q V        |         |         |         |
3+50       0.0185      0.08  Q V        |         |         |         |
3+55       0.0191      0.09  Q V        |         |         |         |
4+ 0       0.0198      0.09  Q V        |         |         |         |
4+ 5       0.0204      0.09  Q V        |         |         |         |
4+10       0.0211      0.09  Q V        |         |         |         |
4+15       0.0217      0.09  Q V        |         |         |         |
4+20       0.0224      0.10  Q V        |         |         |         |
4+25       0.0231      0.10  Q V        |         |         |         |
4+30       0.0238      0.11  Q V        |         |         |         |
4+35       0.0246      0.11  Q V        |         |         |         |
4+40       0.0253      0.11  Q  V       |         |         |         |
4+45       0.0261      0.11  Q  V       |         |         |         |
4+50       0.0269      0.11  Q  V       |         |         |         |
4+55       0.0277      0.12  Q  V       |         |         |         |
5+ 0       0.0285      0.12  Q  V       |         |         |         |
5+ 5       0.0294      0.12  Q  V       |         |         |         |
5+10       0.0301      0.11  Q  V       |         |         |         |
5+15       0.0308      0.10  Q  V       |         |         |         |
5+20       0.0315      0.10  Q  V       |         |         |         |
5+25       0.0322      0.11  Q  V       |         |         |         |
5+30       0.0330      0.11  Q   V      |         |         |         |
5+35       0.0337      0.11  Q   V      |         |         |         |
5+40       0.0345      0.12  Q   V      |         |         |         |
5+45       0.0354      0.12  Q   V      |         |         |         |
5+50       0.0362      0.12  Q   V      |         |         |         |
5+55       0.0371      0.12  Q   V      |         |         |         |
6+ 0       0.0380      0.13  Q   V      |         |         |         |
6+ 5       0.0389      0.13  Q   V      |         |         |         |
6+10       0.0398      0.14  Q   V      |         |         |         |
6+15       0.0407      0.14  Q   V      |         |         |         |
6+20       0.0417      0.14  Q    V     |         |         |         |
6+25       0.0427      0.14  Q    V     |         |         |         |
6+30       0.0437      0.14  Q    V     |         |         |         |
6+35       0.0446      0.14  Q    V     |         |         |         |
6+40       0.0457      0.15  Q    V     |         |         |         |
```

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 6+45       0.0468      0.15  Q    V    |         |         |         |
 6+50       0.0478      0.16  Q    V    |         |         |         |
 6+55       0.0489      0.16  Q    V    |         |         |         |
 7+ 0       0.0500      0.16  Q     V   |         |         |         |
 7+ 5       0.0511      0.16  Q     V   |         |         |         |
 7+10       0.0522      0.16  Q     V   |         |         |         |
 7+15       0.0532      0.16  Q     V   |         |         |         |
 7+20       0.0544      0.16  Q     V   |         |         |         |
 7+25       0.0555      0.17  Q     V   |         |         |         |
 7+30       0.0567      0.17  Q     V   |         |         |         |
 7+35       0.0579      0.17  Q      V  |         |         |         |
 7+40       0.0591      0.18  Q      V  |         |         |         |
 7+45       0.0604      0.19  Q      V  |         |         |         |
 7+50       0.0617      0.19  Q      V  |         |         |         |
 7+55       0.0631      0.20  Q      V  |         |         |         |
 8+ 0       0.0645      0.20  Q      V  |         |         |         |
 8+ 5       0.0659      0.21  Q       V |         |         |         |
 8+10       0.0674      0.22  Q       V |         |         |         |
 8+15       0.0690      0.23  Q       V |         |         |         |
 8+20       0.0706      0.23  Q       V |         |         |         |
 8+25       0.0722      0.23  Q       V |         |         |         |
 8+30       0.0738      0.24  Q       V |         |         |         |
 8+35       0.0755      0.24  Q        V|         |         |         |
 8+40       0.0772      0.25  Q        V|         |         |         |
 8+45       0.0789      0.25  Q        V|         |         |         |
 8+50       0.0806      0.25  |Q       V|         |         |         |
 8+55       0.0824      0.26  |Q        V         |         |         |
 9+ 0       0.0843      0.26  |Q        V         |         |         |
 9+ 5       0.0861      0.27  |Q        V         |         |         |
 9+10       0.0881      0.29  |Q        V         |         |         |
 9+15       0.0901      0.29  |Q        V         |         |         |
 9+20       0.0922      0.30  |Q       |V        |         |         |
 9+25       0.0943      0.31  |Q       |V        |         |         |
 9+30       0.0964      0.31  |Q       |V        |         |         |
 9+35       0.0986      0.32  |Q       |V        |         |         |
 9+40       0.1008      0.32  |Q       | V       |         |         |
 9+45       0.1031      0.33  |Q       | V       |         |         |
 9+50       0.1054      0.33  |Q       | V       |         |         |
 9+55       0.1077      0.34  |Q       |  V      |         |         |
10+ 0       0.1101      0.34  |Q       |  V      |         |         |
10+ 5       0.1123      0.33  |Q       |  V      |         |         |
10+10       0.1142      0.28  |Q       |  V      |         |         |
10+15       0.1160      0.26  |Q       |   V     |         |         |
10+20       0.1178      0.25  |Q       |   V     |         |         |
10+25       0.1194      0.25  Q         |   V     |         |         |
10+30       0.1211      0.24  Q         |   V     |         |         |
10+35       0.1228      0.25  |Q       |   V     |         |         |
10+40       0.1248      0.29  |Q       |    V    |         |         |
10+45       0.1269      0.30  |Q       |    V    |         |         |
10+50       0.1290      0.31  |Q       |    V    |         |         |
```

```
10+55       0.1311      0.31  |Q        |    V    |         |         |
11+ 0       0.1333      0.31  |Q        |     V   |         |         |
11+ 5       0.1354      0.31  |Q        |     V   |         |         |
11+10       0.1375      0.30  |Q        |     V   |         |         |
11+15       0.1396      0.30  |Q        |     V   |         |         |
11+20       0.1417      0.30  |Q        |      V  |         |         |
11+25       0.1438      0.30  |Q        |      V  |         |         |
11+30       0.1458      0.30  |Q        |      V  |         |         |
11+35       0.1479      0.30  |Q        |      V  |         |         |
11+40       0.1498      0.28  |Q        |       V |         |         |
11+45       0.1517      0.28  |Q        |       V |         |         |
11+50       0.1536      0.27  |Q        |       V |         |         |
11+55       0.1555      0.28  |Q        |       V |         |         |
12+ 0       0.1575      0.28  |Q        |        V|         |         |
12+ 5       0.1595      0.30  |Q        |        V|         |         |
12+10       0.1620      0.35  |Q        |        V|         |         |
12+15       0.1645      0.37  |Q        |        V|         |         |
12+20       0.1672      0.38  |Q        |         V         |         |
12+25       0.1699      0.40  |Q        |         V         |         |
12+30       0.1726      0.40  |Q        |         V         |         |
12+35       0.1755      0.41  |Q        |         |V        |         |
12+40       0.1784      0.43  |Q        |         |V        |         |
12+45       0.1814      0.43  |Q        |         | V       |         |
12+50       0.1844      0.44  |Q        |         | V       |         |
12+55       0.1875      0.45  |Q        |         | V       |         |
13+ 0       0.1906      0.45  |Q        |         |  V      |         |
13+ 5       0.1939      0.47  |Q        |         |  V      |         |
13+10       0.1974      0.51  | Q       |         |  V      |         |
13+15       0.2012      0.55  | Q       |         |   V     |         |
13+20       0.2051      0.57  | Q       |         |   V     |         |
13+25       0.2092      0.60  | Q       |         |    V    |         |
13+30       0.2135      0.62  | Q       |         |    V    |         |
13+35       0.2176      0.60  | Q       |         |     V   |         |
13+40       0.2208      0.47  |Q        |         |     V   |         |
13+45       0.2237      0.42  |Q        |         |      V  |         |
13+50       0.2264      0.40  |Q        |         |      V  |         |
13+55       0.2291      0.38  |Q        |         |      V  |         |
14+ 0       0.2317      0.38  |Q        |         |       V |         |
14+ 5       0.2343      0.38  |Q        |         |       V |         |
14+10       0.2371      0.41  |Q        |         |       V |         |
14+15       0.2400      0.42  |Q        |         |        V|         |
14+20       0.2429      0.42  |Q        |         |        V|         |
14+25       0.2457      0.41  |Q        |         |        V|         |
14+30       0.2485      0.41  |Q        |         |         V         |
14+35       0.2513      0.41  |Q        |         |         V         |
14+40       0.2542      0.41  |Q        |         |         V         |
14+45       0.2570      0.41  |Q        |         |         |V        |
14+50       0.2598      0.41  |Q        |         |         |V        |
14+55       0.2626      0.40  |Q        |         |         |V        |
15+ 0       0.2653      0.40  |Q        |         |         | V       |
```

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15+ 5       0.2680      0.39  |Q        |         |         | V       |
15+10       0.2707      0.39  |Q        |         |         | V       |
15+15       0.2733      0.38  |Q        |         |         |  V      |
15+20       0.2760      0.38  |Q        |         |         |  V      |
15+25       0.2785      0.37  |Q        |         |         |  V      |
15+30       0.2810      0.37  |Q        |         |         |   V     |
15+35       0.2835      0.36  |Q        |         |         |   V     |
15+40       0.2857      0.33  |Q        |         |         |   V     |
15+45       0.2879      0.31  |Q        |         |         |   V     |
15+50       0.2900      0.31  |Q        |         |         |    V    |
15+55       0.2921      0.31  |Q        |         |         |    V    |
16+ 0       0.2942      0.30  |Q        |         |         |    V    |
16+ 5       0.2961      0.27  |Q        |         |         |    V    |
16+10       0.2971      0.16  Q         |         |         |     V   |
16+15       0.2979      0.11  Q         |         |         |     V   |
16+20       0.2985      0.09  Q         |         |         |     V   |
16+25       0.2991      0.08  Q         |         |         |     V   |
16+30       0.2996      0.08  Q         |         |         |     V   |
16+35       0.3001      0.07  Q         |         |         |     V   |
16+40       0.3005      0.06  Q         |         |         |     V   |
16+45       0.3008      0.05  Q         |         |         |     V   |
16+50       0.3012      0.05  Q         |         |         |     V   |
16+55       0.3015      0.05  Q         |         |         |     V   |
17+ 0       0.3018      0.05  Q         |         |         |     V   |
17+ 5       0.3022      0.05  Q         |         |         |     V   |
17+10       0.3027      0.07  Q         |         |         |     V   |
17+15       0.3032      0.07  Q         |         |         |     V   |
17+20       0.3037      0.07  Q         |         |         |     V   |
17+25       0.3042      0.08  Q         |         |         |     V   |
17+30       0.3047      0.08  Q         |         |         |      V  |
17+35       0.3053      0.08  Q         |         |         |      V  |
17+40       0.3058      0.08  Q         |         |         |      V  |
17+45       0.3064      0.08  Q         |         |         |      V  |
17+50       0.3069      0.08  Q         |         |         |      V  |
17+55       0.3074      0.07  Q         |         |         |      V  |
18+ 0       0.3078      0.07  Q         |         |         |      V  |
18+ 5       0.3083      0.07  Q         |         |         |      V  |
18+10       0.3087      0.06  Q         |         |         |      V  |
18+15       0.3092      0.06  Q         |         |         |      V  |
18+20       0.3096      0.06  Q         |         |         |      V  |
18+25       0.3100      0.06  Q         |         |         |      V  |
18+30       0.3105      0.06  Q         |         |         |      V  |
18+35       0.3109      0.06  Q         |         |         |      V  |
18+40       0.3113      0.05  Q         |         |         |      V  |
18+45       0.3116      0.05  Q         |         |         |      V  |
18+50       0.3119      0.05  Q         |         |         |      V  |
18+55       0.3122      0.04  Q         |         |         |      V  |
19+ 0       0.3124      0.04  Q         |         |         |      V  |
19+ 5       0.3127      0.04  Q         |         |         |      V  |
19+10       0.3130      0.04  Q         |         |         |       V |
```

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19+15       0.3133      0.05  Q         |         |         |       V |
19+20       0.3136      0.05  Q         |         |         |       V |
19+25       0.3140      0.06  Q         |         |         |       V |
19+30       0.3144      0.06  Q         |         |         |       V |
19+35       0.3148      0.06  Q         |         |         |       V |
19+40       0.3152      0.05  Q         |         |         |       V |
19+45       0.3155      0.05  Q         |         |         |       V |
19+50       0.3159      0.05  Q         |         |         |       V |
19+55       0.3161      0.04  Q         |         |         |       V |
20+ 0       0.3164      0.04  Q         |         |         |       V |
20+ 5       0.3166      0.04  Q         |         |         |       V |
20+10       0.3169      0.04  Q         |         |         |       V |
20+15       0.3172      0.05  Q         |         |         |       V |
20+20       0.3175      0.05  Q         |         |         |       V |
20+25       0.3179      0.05  Q         |         |         |       V |
20+30       0.3182      0.05  Q         |         |         |       V |
20+35       0.3185      0.05  Q         |         |         |       V |
20+40       0.3188      0.05  Q         |         |         |       V |
20+45       0.3191      0.05  Q         |         |         |       V |
20+50       0.3195      0.05  Q         |         |         |       V |
20+55       0.3197      0.04  Q         |         |         |       V |
21+ 0       0.3200      0.03  Q         |         |         |       V |
21+ 5       0.3202      0.04  Q         |         |         |       V |
21+10       0.3205      0.04  Q         |         |         |       V |
21+15       0.3208      0.04  Q         |         |         |       V |
21+20       0.3211      0.04  Q         |         |         |        V|
21+25       0.3214      0.04  Q         |         |         |        V|
21+30       0.3216      0.03  Q         |         |         |        V|
21+35       0.3218      0.04  Q         |         |         |        V|
21+40       0.3221      0.04  Q         |         |         |        V|
21+45       0.3224      0.04  Q         |         |         |        V|
21+50       0.3227      0.04  Q         |         |         |        V|
21+55       0.3230      0.04  Q         |         |         |        V|
22+ 0       0.3232      0.03  Q         |         |         |        V|
22+ 5       0.3235      0.04  Q         |         |         |        V|
22+10       0.3238      0.04  Q         |         |         |        V|
22+15       0.3241      0.04  Q         |         |         |        V|
22+20       0.3244      0.04  Q         |         |         |        V|
22+25       0.3246      0.04  Q         |         |         |        V|
22+30       0.3249      0.03  Q         |         |         |        V|
22+35       0.3251      0.03  Q         |         |         |        V|
22+40       0.3253      0.03  Q         |         |         |        V|
22+45       0.3255      0.03  Q         |         |         |        V|
22+50       0.3258      0.03  Q         |         |         |        V|
22+55       0.3260      0.03  Q         |         |         |        V|
23+ 0       0.3262      0.03  Q         |         |         |        V|
23+ 5       0.3264      0.03  Q         |         |         |        V|
23+10       0.3266      0.03  Q         |         |         |        V|
23+15       0.3268      0.03  Q         |         |         |        V|
23+20       0.3271      0.03  Q         |         |         |        V|
```

```
  23+25       0.3273      0.03  Q         |         |         |       V|
  23+30       0.3275      0.03  Q         |         |         |       V|
  23+35       0.3277      0.03  Q         |         |         |       V|
  23+40       0.3279      0.03  Q         |         |         |       V|
  23+45       0.3281      0.03  Q         |         |         |       V|
  23+50       0.3284      0.03  Q         |         |         |       V|
  23+55       0.3286      0.03  Q         |         |         |       V|
  24+ 0       0.3288      0.03  Q         |         |         |       V|
  24+ 5       0.3290      0.03  Q         |         |         |       V|
  24+10       0.3291      0.01  Q         |         |         |       V|
  24+15       0.3291      0.01  Q         |         |         |       V|
  24+20       0.3291      0.00  Q         |         |         |       V|
  24+25       0.3292      0.00  Q         |         |         |       V|
  24+30       0.3292      0.00  Q         |         |         |       V|
  24+35       0.3292      0.00  Q         |         |         |       V|
  24+40       0.3292      0.00  Q         |         |         |       V|
  24+45       0.3292      0.00  Q         |         |         |        V
-----------------------------------------------------------------------
```

Appendix J.I1

Synthetic Unit Hydrograph Method Analysis
Pre-Development Conditions
10-Year Storm

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
                Study date  05/26/22 File: MapesPre10UH2410.out


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

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6443

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



---------------------------------------------------------------------
MAPES AND TRUMBLE INDUSTRIAL FACILITY
UNIT HYDROGRAPH
PRE-DEVELOPMENT CONDITIONS
10-YEAR, 24HR STORM, DA A
--------------------------------------------------------------------
Drainage Area =      19.01(Ac.)  =      0.030 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      19.01(Ac.)  =
0.030 Sq. Mi.
Length along longest watercourse =    1256.56(Ft.)
Length along longest watercourse measured to centroid =     586.75(Ft.)
Length along longest watercourse =      0.238 Mi.
Length along longest watercourse measured to centroid =      0.111 Mi.
Difference in elevation =       6.42(Ft.)
Slope along watercourse =     26.9765 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.097 Hr.
Lag time =     5.81 Min.
25% of lag time =     1.45 Min.
40% of lag time =     2.32 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:
```

```
Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       19.01            2.06                   39.16

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       19.01            5.31                  100.94

STORM EVENT (YEAR) =   10.00
Area Averaged 2-Year Rainfall =    2.060(In)
Area Averaged 100-Year Rainfall =    5.310(In)

Point rain (area averaged) =    3.397(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    3.397(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    19.010           89.00         0.000
 Total Area Entered =     19.01(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
89.0  89.0      0.141     0.000        0.141       1.000      0.141
                                                  Sum (F) =   0.141
Area averaged mean soil loss (F) (In/Hr) =  0.141
Minimum soil loss rate ((In/Hr)) =  0.071
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.900
---------------------------------------------------------------------

                U n i t  H y d r o g r a p h
                        VALLEY S-Curve
--------------------------------------------------------------------
                Unit Hydrograph Data
---------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                           Graph %           (CFS)
---------------------------------------------------------------------
    1   0.083         86.074         15.028             2.879
    2   0.167        172.149         46.219             8.855
    3   0.250        258.223         18.315             3.509
    4   0.333        344.297          7.866             1.507
    5   0.417        430.372          4.648             0.890
    6   0.500        516.446          2.910             0.557
    7   0.583        602.520          2.059             0.395
    8   0.667        688.594          1.359             0.260
```

```
            9   0.750        774.669          0.913              0.175
           10   0.833        860.743          0.684              0.131
                                      Sum = 100.000   Sum=      19.159
-----------------------------------------------------------------------


 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     0.07      0.027        (  0.251)      0.024         0.003
   2   0.17     0.07      0.027        (  0.250)      0.024         0.003
   3   0.25     0.07      0.027        (  0.249)      0.024         0.003
   4   0.33     0.10      0.041        (  0.248)      0.037         0.004
   5   0.42     0.10      0.041        (  0.247)      0.037         0.004
   6   0.50     0.10      0.041        (  0.246)      0.037         0.004
   7   0.58     0.10      0.041        (  0.245)      0.037         0.004
   8   0.67     0.10      0.041        (  0.244)      0.037         0.004
   9   0.75     0.10      0.041        (  0.243)      0.037         0.004
  10   0.83     0.13      0.054        (  0.242)      0.049         0.005
  11   0.92     0.13      0.054        (  0.241)      0.049         0.005
  12   1.00     0.13      0.054        (  0.240)      0.049         0.005
  13   1.08     0.10      0.041        (  0.239)      0.037         0.004
  14   1.17     0.10      0.041        (  0.238)      0.037         0.004
  15   1.25     0.10      0.041        (  0.237)      0.037         0.004
  16   1.33     0.10      0.041        (  0.236)      0.037         0.004
  17   1.42     0.10      0.041        (  0.235)      0.037         0.004
  18   1.50     0.10      0.041        (  0.234)      0.037         0.004
  19   1.58     0.10      0.041        (  0.234)      0.037         0.004
  20   1.67     0.10      0.041        (  0.233)      0.037         0.004
  21   1.75     0.10      0.041        (  0.232)      0.037         0.004
  22   1.83     0.13      0.054        (  0.231)      0.049         0.005
  23   1.92     0.13      0.054        (  0.230)      0.049         0.005
  24   2.00     0.13      0.054        (  0.229)      0.049         0.005
  25   2.08     0.13      0.054        (  0.228)      0.049         0.005
  26   2.17     0.13      0.054        (  0.227)      0.049         0.005
  27   2.25     0.13      0.054        (  0.226)      0.049         0.005
  28   2.33     0.13      0.054        (  0.225)      0.049         0.005
  29   2.42     0.13      0.054        (  0.224)      0.049         0.005
  30   2.50     0.13      0.054        (  0.223)      0.049         0.005
  31   2.58     0.17      0.068        (  0.222)      0.061         0.007
  32   2.67     0.17      0.068        (  0.221)      0.061         0.007
  33   2.75     0.17      0.068        (  0.221)      0.061         0.007
  34   2.83     0.17      0.068        (  0.220)      0.061         0.007
  35   2.92     0.17      0.068        (  0.219)      0.061         0.007
  36   3.00     0.17      0.068        (  0.218)      0.061         0.007
  37   3.08     0.17      0.068        (  0.217)      0.061         0.007
  38   3.17     0.17      0.068        (  0.216)      0.061         0.007
  39   3.25     0.17      0.068        (  0.215)      0.061         0.007
```

40	3.33	0.17	0.068	(0.214)	0.061	0.007
41	3.42	0.17	0.068	(0.213)	0.061	0.007
42	3.50	0.17	0.068	(0.212)	0.061	0.007
43	3.58	0.17	0.068	(0.212)	0.061	0.007
44	3.67	0.17	0.068	(0.211)	0.061	0.007
45	3.75	0.17	0.068	(0.210)	0.061	0.007
46	3.83	0.20	0.082	(0.209)	0.073	0.008
47	3.92	0.20	0.082	(0.208)	0.073	0.008
48	4.00	0.20	0.082	(0.207)	0.073	0.008
49	4.08	0.20	0.082	(0.206)	0.073	0.008
50	4.17	0.20	0.082	(0.205)	0.073	0.008
51	4.25	0.20	0.082	(0.205)	0.073	0.008
52	4.33	0.23	0.095	(0.204)	0.086	0.010
53	4.42	0.23	0.095	(0.203)	0.086	0.010
54	4.50	0.23	0.095	(0.202)	0.086	0.010
55	4.58	0.23	0.095	(0.201)	0.086	0.010
56	4.67	0.23	0.095	(0.200)	0.086	0.010
57	4.75	0.23	0.095	(0.199)	0.086	0.010
58	4.83	0.27	0.109	(0.198)	0.098	0.011
59	4.92	0.27	0.109	(0.198)	0.098	0.011
60	5.00	0.27	0.109	(0.197)	0.098	0.011
61	5.08	0.20	0.082	(0.196)	0.073	0.008
62	5.17	0.20	0.082	(0.195)	0.073	0.008
63	5.25	0.20	0.082	(0.194)	0.073	0.008
64	5.33	0.23	0.095	(0.193)	0.086	0.010
65	5.42	0.23	0.095	(0.193)	0.086	0.010
66	5.50	0.23	0.095	(0.192)	0.086	0.010
67	5.58	0.27	0.109	(0.191)	0.098	0.011
68	5.67	0.27	0.109	(0.190)	0.098	0.011
69	5.75	0.27	0.109	(0.189)	0.098	0.011
70	5.83	0.27	0.109	(0.188)	0.098	0.011
71	5.92	0.27	0.109	(0.187)	0.098	0.011
72	6.00	0.27	0.109	(0.187)	0.098	0.011
73	6.08	0.30	0.122	(0.186)	0.110	0.012
74	6.17	0.30	0.122	(0.185)	0.110	0.012
75	6.25	0.30	0.122	(0.184)	0.110	0.012
76	6.33	0.30	0.122	(0.183)	0.110	0.012
77	6.42	0.30	0.122	(0.183)	0.110	0.012
78	6.50	0.30	0.122	(0.182)	0.110	0.012
79	6.58	0.33	0.136	(0.181)	0.122	0.014
80	6.67	0.33	0.136	(0.180)	0.122	0.014
81	6.75	0.33	0.136	(0.179)	0.122	0.014
82	6.83	0.33	0.136	(0.178)	0.122	0.014
83	6.92	0.33	0.136	(0.178)	0.122	0.014
84	7.00	0.33	0.136	(0.177)	0.122	0.014
85	7.08	0.33	0.136	(0.176)	0.122	0.014
86	7.17	0.33	0.136	(0.175)	0.122	0.014
87	7.25	0.33	0.136	(0.174)	0.122	0.014
88	7.33	0.37	0.149	(0.174)	0.135	0.015
89	7.42	0.37	0.149	(0.173)	0.135	0.015

```
 90   7.50     0.37      0.149       (  0.172)       0.135        0.015
 91   7.58     0.40      0.163       (  0.171)       0.147        0.016
 92   7.67     0.40      0.163       (  0.170)       0.147        0.016
 93   7.75     0.40      0.163       (  0.170)       0.147        0.016
 94   7.83     0.43      0.177       (  0.169)       0.159        0.018
 95   7.92     0.43      0.177       (  0.168)       0.159        0.018
 96   8.00     0.43      0.177       (  0.167)       0.159        0.018
 97   8.08     0.50      0.204          0.167    (  0.183)        0.037
 98   8.17     0.50      0.204          0.166    (  0.183)        0.038
 99   8.25     0.50      0.204          0.165    (  0.183)        0.039
100   8.33     0.50      0.204          0.164    (  0.183)        0.040
101   8.42     0.50      0.204          0.163    (  0.183)        0.040
102   8.50     0.50      0.204          0.163    (  0.183)        0.041
103   8.58     0.53      0.217          0.162    (  0.196)        0.055
104   8.67     0.53      0.217          0.161    (  0.196)        0.056
105   8.75     0.53      0.217          0.160    (  0.196)        0.057
106   8.83     0.57      0.231          0.160    (  0.208)        0.071
107   8.92     0.57      0.231          0.159    (  0.208)        0.072
108   9.00     0.57      0.231          0.158    (  0.208)        0.073
109   9.08     0.63      0.258          0.157    (  0.232)        0.101
110   9.17     0.63      0.258          0.157    (  0.232)        0.102
111   9.25     0.63      0.258          0.156    (  0.232)        0.102
112   9.33     0.67      0.272          0.155    (  0.245)        0.117
113   9.42     0.67      0.272          0.154    (  0.245)        0.117
114   9.50     0.67      0.272          0.154    (  0.245)        0.118
115   9.58     0.70      0.285          0.153    (  0.257)        0.132
116   9.67     0.70      0.285          0.152    (  0.257)        0.133
117   9.75     0.70      0.285          0.151    (  0.257)        0.134
118   9.83     0.73      0.299          0.151    (  0.269)        0.148
119   9.92     0.73      0.299          0.150    (  0.269)        0.149
120  10.00     0.73      0.299          0.149    (  0.269)        0.150
121  10.08     0.50      0.204          0.149    (  0.183)        0.055
122  10.17     0.50      0.204          0.148    (  0.183)        0.056
123  10.25     0.50      0.204          0.147    (  0.183)        0.057
124  10.33     0.50      0.204          0.146    (  0.183)        0.057
125  10.42     0.50      0.204          0.146    (  0.183)        0.058
126  10.50     0.50      0.204          0.145    (  0.183)        0.059
127  10.58     0.67      0.272          0.144    (  0.245)        0.127
128  10.67     0.67      0.272          0.144    (  0.245)        0.128
129  10.75     0.67      0.272          0.143    (  0.245)        0.129
130  10.83     0.67      0.272          0.142    (  0.245)        0.130
131  10.92     0.67      0.272          0.142    (  0.245)        0.130
132  11.00     0.67      0.272          0.141    (  0.245)        0.131
133  11.08     0.63      0.258          0.140    (  0.232)        0.118
134  11.17     0.63      0.258          0.139    (  0.232)        0.119
135  11.25     0.63      0.258          0.139    (  0.232)        0.119
136  11.33     0.63      0.258          0.138    (  0.232)        0.120
137  11.42     0.63      0.258          0.137    (  0.232)        0.121
138  11.50     0.63      0.258          0.137    (  0.232)        0.121
139  11.58     0.57      0.231          0.136    (  0.208)        0.095
```

```
140  11.67     0.57      0.231          0.135    (  0.208)        0.096
141  11.75     0.57      0.231          0.135    (  0.208)        0.096
142  11.83     0.60      0.245          0.134    (  0.220)        0.111
143  11.92     0.60      0.245          0.133    (  0.220)        0.111
144  12.00     0.60      0.245          0.133    (  0.220)        0.112
145  12.08     0.83      0.340          0.132    (  0.306)        0.208
146  12.17     0.83      0.340          0.131    (  0.306)        0.208
147  12.25     0.83      0.340          0.131    (  0.306)        0.209
148  12.33     0.87      0.353          0.130    (  0.318)        0.223
149  12.42     0.87      0.353          0.129    (  0.318)        0.224
150  12.50     0.87      0.353          0.129    (  0.318)        0.225
151  12.58     0.93      0.380          0.128    (  0.342)        0.252
152  12.67     0.93      0.380          0.127    (  0.342)        0.253
153  12.75     0.93      0.380          0.127    (  0.342)        0.254
154  12.83     0.97      0.394          0.126    (  0.355)        0.268
155  12.92     0.97      0.394          0.126    (  0.355)        0.269
156  13.00     0.97      0.394          0.125    (  0.355)        0.269
157  13.08     1.13      0.462          0.124    (  0.416)        0.338
158  13.17     1.13      0.462          0.124    (  0.416)        0.338
159  13.25     1.13      0.462          0.123    (  0.416)        0.339
160  13.33     1.13      0.462          0.122    (  0.416)        0.340
161  13.42     1.13      0.462          0.122    (  0.416)        0.340
162  13.50     1.13      0.462          0.121    (  0.416)        0.341
163  13.58     0.77      0.313          0.120    (  0.281)        0.192
164  13.67     0.77      0.313          0.120    (  0.281)        0.193
165  13.75     0.77      0.313          0.119    (  0.281)        0.193
166  13.83     0.77      0.313          0.119    (  0.281)        0.194
167  13.92     0.77      0.313          0.118    (  0.281)        0.194
168  14.00     0.77      0.313          0.117    (  0.281)        0.195
169  14.08     0.90      0.367          0.117    (  0.330)        0.250
170  14.17     0.90      0.367          0.116    (  0.330)        0.251
171  14.25     0.90      0.367          0.116    (  0.330)        0.251
172  14.33     0.87      0.353          0.115    (  0.318)        0.238
173  14.42     0.87      0.353          0.114    (  0.318)        0.239
174  14.50     0.87      0.353          0.114    (  0.318)        0.239
175  14.58     0.87      0.353          0.113    (  0.318)        0.240
176  14.67     0.87      0.353          0.113    (  0.318)        0.241
177  14.75     0.87      0.353          0.112    (  0.318)        0.241
178  14.83     0.83      0.340          0.112    (  0.306)        0.228
179  14.92     0.83      0.340          0.111    (  0.306)        0.229
180  15.00     0.83      0.340          0.110    (  0.306)        0.229
181  15.08     0.80      0.326          0.110    (  0.293)        0.216
182  15.17     0.80      0.326          0.109    (  0.293)        0.217
183  15.25     0.80      0.326          0.109    (  0.293)        0.217
184  15.33     0.77      0.313          0.108    (  0.281)        0.204
185  15.42     0.77      0.313          0.108    (  0.281)        0.205
186  15.50     0.77      0.313          0.107    (  0.281)        0.205
187  15.58     0.63      0.258          0.107    (  0.232)        0.152
188  15.67     0.63      0.258          0.106    (  0.232)        0.152
189  15.75     0.63      0.258          0.105    (  0.232)        0.153
```

```
190  15.83     0.63      0.258          0.105    (  0.232)        0.153
191  15.92     0.63      0.258          0.104    (  0.232)        0.154
192  16.00     0.63      0.258          0.104    (  0.232)        0.154
193  16.08     0.13      0.054       (  0.103)       0.049        0.005
194  16.17     0.13      0.054       (  0.103)       0.049        0.005
195  16.25     0.13      0.054       (  0.102)       0.049        0.005
196  16.33     0.13      0.054       (  0.102)       0.049        0.005
197  16.42     0.13      0.054       (  0.101)       0.049        0.005
198  16.50     0.13      0.054       (  0.101)       0.049        0.005
199  16.58     0.10      0.041       (  0.100)       0.037        0.004
200  16.67     0.10      0.041       (  0.100)       0.037        0.004
201  16.75     0.10      0.041       (  0.099)       0.037        0.004
202  16.83     0.10      0.041       (  0.099)       0.037        0.004
203  16.92     0.10      0.041       (  0.098)       0.037        0.004
204  17.00     0.10      0.041       (  0.098)       0.037        0.004
205  17.08     0.17      0.068       (  0.097)       0.061        0.007
206  17.17     0.17      0.068       (  0.097)       0.061        0.007
207  17.25     0.17      0.068       (  0.096)       0.061        0.007
208  17.33     0.17      0.068       (  0.096)       0.061        0.007
209  17.42     0.17      0.068       (  0.095)       0.061        0.007
210  17.50     0.17      0.068       (  0.095)       0.061        0.007
211  17.58     0.17      0.068       (  0.094)       0.061        0.007
212  17.67     0.17      0.068       (  0.094)       0.061        0.007
213  17.75     0.17      0.068       (  0.093)       0.061        0.007
214  17.83     0.13      0.054       (  0.093)       0.049        0.005
215  17.92     0.13      0.054       (  0.092)       0.049        0.005
216  18.00     0.13      0.054       (  0.092)       0.049        0.005
217  18.08     0.13      0.054       (  0.092)       0.049        0.005
218  18.17     0.13      0.054       (  0.091)       0.049        0.005
219  18.25     0.13      0.054       (  0.091)       0.049        0.005
220  18.33     0.13      0.054       (  0.090)       0.049        0.005
221  18.42     0.13      0.054       (  0.090)       0.049        0.005
222  18.50     0.13      0.054       (  0.089)       0.049        0.005
223  18.58     0.10      0.041       (  0.089)       0.037        0.004
224  18.67     0.10      0.041       (  0.088)       0.037        0.004
225  18.75     0.10      0.041       (  0.088)       0.037        0.004
226  18.83     0.07      0.027       (  0.088)       0.024        0.003
227  18.92     0.07      0.027       (  0.087)       0.024        0.003
228  19.00     0.07      0.027       (  0.087)       0.024        0.003
229  19.08     0.10      0.041       (  0.086)       0.037        0.004
230  19.17     0.10      0.041       (  0.086)       0.037        0.004
231  19.25     0.10      0.041       (  0.086)       0.037        0.004
232  19.33     0.13      0.054       (  0.085)       0.049        0.005
233  19.42     0.13      0.054       (  0.085)       0.049        0.005
234  19.50     0.13      0.054       (  0.084)       0.049        0.005
235  19.58     0.10      0.041       (  0.084)       0.037        0.004
236  19.67     0.10      0.041       (  0.084)       0.037        0.004
237  19.75     0.10      0.041       (  0.083)       0.037        0.004
238  19.83     0.07      0.027       (  0.083)       0.024        0.003
239  19.92     0.07      0.027       (  0.082)       0.024        0.003
```

```
240  20.00     0.07      0.027       (  0.082)       0.024         0.003
241  20.08     0.10      0.041       (  0.082)       0.037         0.004
242  20.17     0.10      0.041       (  0.081)       0.037         0.004
243  20.25     0.10      0.041       (  0.081)       0.037         0.004
244  20.33     0.10      0.041       (  0.081)       0.037         0.004
245  20.42     0.10      0.041       (  0.080)       0.037         0.004
246  20.50     0.10      0.041       (  0.080)       0.037         0.004
247  20.58     0.10      0.041       (  0.080)       0.037         0.004
248  20.67     0.10      0.041       (  0.079)       0.037         0.004
249  20.75     0.10      0.041       (  0.079)       0.037         0.004
250  20.83     0.07      0.027       (  0.079)       0.024         0.003
251  20.92     0.07      0.027       (  0.078)       0.024         0.003
252  21.00     0.07      0.027       (  0.078)       0.024         0.003
253  21.08     0.10      0.041       (  0.078)       0.037         0.004
254  21.17     0.10      0.041       (  0.077)       0.037         0.004
255  21.25     0.10      0.041       (  0.077)       0.037         0.004
256  21.33     0.07      0.027       (  0.077)       0.024         0.003
257  21.42     0.07      0.027       (  0.077)       0.024         0.003
258  21.50     0.07      0.027       (  0.076)       0.024         0.003
259  21.58     0.10      0.041       (  0.076)       0.037         0.004
260  21.67     0.10      0.041       (  0.076)       0.037         0.004
261  21.75     0.10      0.041       (  0.075)       0.037         0.004
262  21.83     0.07      0.027       (  0.075)       0.024         0.003
263  21.92     0.07      0.027       (  0.075)       0.024         0.003
264  22.00     0.07      0.027       (  0.075)       0.024         0.003
265  22.08     0.10      0.041       (  0.074)       0.037         0.004
266  22.17     0.10      0.041       (  0.074)       0.037         0.004
267  22.25     0.10      0.041       (  0.074)       0.037         0.004
268  22.33     0.07      0.027       (  0.074)       0.024         0.003
269  22.42     0.07      0.027       (  0.073)       0.024         0.003
270  22.50     0.07      0.027       (  0.073)       0.024         0.003
271  22.58     0.07      0.027       (  0.073)       0.024         0.003
272  22.67     0.07      0.027       (  0.073)       0.024         0.003
273  22.75     0.07      0.027       (  0.073)       0.024         0.003
274  22.83     0.07      0.027       (  0.072)       0.024         0.003
275  22.92     0.07      0.027       (  0.072)       0.024         0.003
276  23.00     0.07      0.027       (  0.072)       0.024         0.003
277  23.08     0.07      0.027       (  0.072)       0.024         0.003
278  23.17     0.07      0.027       (  0.072)       0.024         0.003
279  23.25     0.07      0.027       (  0.072)       0.024         0.003
280  23.33     0.07      0.027       (  0.071)       0.024         0.003
281  23.42     0.07      0.027       (  0.071)       0.024         0.003
282  23.50     0.07      0.027       (  0.071)       0.024         0.003
283  23.58     0.07      0.027       (  0.071)       0.024         0.003
284  23.67     0.07      0.027       (  0.071)       0.024         0.003
285  23.75     0.07      0.027       (  0.071)       0.024         0.003
286  23.83     0.07      0.027       (  0.071)       0.024         0.003
287  23.92     0.07      0.027       (  0.071)       0.024         0.003
288  24.00     0.07      0.027       (  0.071)       0.024         0.003
                (Loss Rate Not Used)
```

```
  Sum =     100.0                                  Sum =    16.9
     Flood volume = Effective rainfall      1.41(In)
      times area      19.0(Ac.)/[(In)/(Ft.)] =      2.2(Ac.Ft)
     Total soil loss =      1.99(In)
     Total soil loss =     3.147(Ac.Ft)
     Total rainfall =     3.40(In)
     Flood volume =       97320.0 Cubic Feet
     Total soil loss =      137091.0 Cubic Feet
     --------------------------------------------------------------------
      Peak flow rate of this hydrograph =      6.446(CFS)
     --------------------------------------------------------------------
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         24 - H O U R    S T O R M
                    R u n o f f     H y d r o g r a p h
     --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0001      0.01  Q         |         |         |         |
  0+10       0.0003      0.03  Q         |         |         |         |
  0+15       0.0006      0.04  Q         |         |         |         |
  0+20       0.0009      0.05  Q         |         |         |         |
  0+25       0.0013      0.06  Q         |         |         |         |
  0+30       0.0018      0.07  Q         |         |         |         |
  0+35       0.0023      0.07  Q         |         |         |         |
  0+40       0.0028      0.08  Q         |         |         |         |
  0+45       0.0034      0.08  Q         |         |         |         |
  0+50       0.0039      0.08  Q         |         |         |         |
  0+55       0.0046      0.09  Q         |         |         |         |
  1+ 0       0.0053      0.10  Q         |         |         |         |
  1+ 5       0.0059      0.10  Q         |         |         |         |
  1+10       0.0065      0.09  Q         |         |         |         |
  1+15       0.0071      0.08  Q         |         |         |         |
  1+20       0.0076      0.08  Q         |         |         |         |
  1+25       0.0082      0.08  Q         |         |         |         |
  1+30       0.0087      0.08  Q         |         |         |         |
  1+35       0.0093      0.08  Q         |         |         |         |
  1+40       0.0098      0.08  Q         |         |         |         |
  1+45       0.0104      0.08  Q         |         |         |         |
  1+50       0.0109      0.08  Q         |         |         |         |
  1+55       0.0116      0.09  Q         |         |         |         |
  2+ 0       0.0123      0.10  Q         |         |         |         |
  2+ 5       0.0129      0.10  Q         |         |         |         |
  2+10       0.0137      0.10  Q         |         |         |         |
  2+15       0.0144      0.10  Q         |         |         |         |
  2+20       0.0151      0.10  Q         |         |         |         |
  2+25       0.0158      0.10  Q         |         |         |         |
  2+30       0.0165      0.10  Q         |         |         |         |
```

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2+35       0.0172      0.11  Q         |         |         |         |
2+40       0.0181      0.12  Q         |         |         |         |
2+45       0.0189      0.12  Q         |         |         |         |
2+50       0.0198      0.13  Q         |         |         |         |
2+55       0.0207      0.13  Q         |         |         |         |
3+ 0       0.0216      0.13  Q         |         |         |         |
3+ 5       0.0225      0.13  Q         |         |         |         |
3+10       0.0234      0.13  Q         |         |         |         |
3+15       0.0243      0.13  Q         |         |         |         |
3+20       0.0252      0.13  Q         |         |         |         |
3+25       0.0261      0.13  Q         |         |         |         |
3+30       0.0270      0.13  Q         |         |         |         |
3+35       0.0278      0.13  Q         |         |         |         |
3+40       0.0287      0.13  Q         |         |         |         |
3+45       0.0296      0.13  Q         |         |         |         |
3+50       0.0306      0.13  Q         |         |         |         |
3+55       0.0316      0.15  Q         |         |         |         |
4+ 0       0.0326      0.15  Q         |         |         |         |
4+ 5       0.0337      0.15  Q         |         |         |         |
4+10       0.0347      0.15  Q         |         |         |         |
4+15       0.0358      0.15  Q         |         |         |         |
4+20       0.0369      0.16  Q         |         |         |         |
4+25       0.0381      0.17  Q         |         |         |         |
4+30       0.0393      0.18  Q         |         |         |         |
4+35       0.0405      0.18  Q         |         |         |         |
4+40       0.0418      0.18  Q         |         |         |         |
4+45       0.0430      0.18  Q         |         |         |         |
4+50       0.0443      0.19  Q         |         |         |         |
4+55       0.0457      0.20  Q         |         |         |         |
5+ 0       0.0471      0.20  Q         |         |         |         |
5+ 5       0.0484      0.20  Q         |         |         |         |
5+10       0.0496      0.17  Q         |         |         |         |
5+15       0.0508      0.17  Q         |         |         |         |
5+20       0.0519      0.17  Q         |         |         |         |
5+25       0.0531      0.18  Q         |         |         |         |
5+30       0.0543      0.18  Q         |         |         |         |
5+35       0.0556      0.18  Q         |         |         |         |
5+40       0.0570      0.20  QV        |         |         |         |
5+45       0.0584      0.20  QV        |         |         |         |
5+50       0.0598      0.20  QV        |         |         |         |
5+55       0.0612      0.21  QV        |         |         |         |
6+ 0       0.0626      0.21  QV        |         |         |         |
6+ 5       0.0641      0.21  QV        |         |         |         |
6+10       0.0656      0.22  QV        |         |         |         |
6+15       0.0672      0.23  QV        |         |         |         |
6+20       0.0688      0.23  QV        |         |         |         |
6+25       0.0704      0.23  QV        |         |         |         |
6+30       0.0720      0.23  QV        |         |         |         |
6+35       0.0736      0.24  QV        |         |         |         |
6+40       0.0753      0.25  QV        |         |         |         |
```

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 6+45       0.0771      0.25  |Q        |         |         |         |
 6+50       0.0789      0.26  |Q        |         |         |         |
 6+55       0.0807      0.26  |Q        |         |         |         |
 7+ 0       0.0824      0.26  |Q        |         |         |         |
 7+ 5       0.0842      0.26  |Q        |         |         |         |
 7+10       0.0860      0.26  |Q        |         |         |         |
 7+15       0.0878      0.26  |Q        |         |         |         |
 7+20       0.0896      0.26  |Q        |         |         |         |
 7+25       0.0915      0.28  |Q        |         |         |         |
 7+30       0.0935      0.28  |Q        |         |         |         |
 7+35       0.0954      0.29  |Q        |         |         |         |
 7+40       0.0975      0.30  |Q        |         |         |         |
 7+45       0.0996      0.31  |Q        |         |         |         |
 7+50       0.1018      0.31  |Q        |         |         |         |
 7+55       0.1040      0.33  |Q        |         |         |         |
 8+ 0       0.1063      0.33  |Q        |         |         |         |
 8+ 5       0.1090      0.39  |Q        |         |         |         |
 8+10       0.1129      0.57  | Q       |         |         |         |
 8+15       0.1174      0.65  | Q       |         |         |         |
 8+20       0.1221      0.69  | Q       |         |         |         |
 8+25       0.1271      0.72  | Q       |         |         |         |
 8+30       0.1322      0.74  | Q       |         |         |         |
 8+35       0.1377      0.81  | VQ      |         |         |         |
 8+40       0.1443      0.95  | VQ      |         |         |         |
 8+45       0.1512      1.01  | V Q     |         |         |         |
 8+50       0.1587      1.09  | V Q     |         |         |         |
 8+55       0.1672      1.23  | V Q     |         |         |         |
 9+ 0       0.1762      1.30  |  V Q    |         |         |         |
 9+ 5       0.1860      1.42  |  V Q    |         |         |         |
 9+10       0.1977      1.69  |  V  Q   |         |         |         |
 9+15       0.2102      1.81  |  V   Q  |         |         |         |
 9+20       0.2233      1.92  |  V   Q  |         |         |         |
 9+25       0.2377      2.08  |   V   Q |         |         |         |
 9+30       0.2525      2.16  |   V   Q |         |         |         |
 9+35       0.2680      2.24  |   V   Q |         |         |         |
 9+40       0.2845      2.40  |    V   Q|         |         |         |
 9+45       0.3015      2.47  |    V   Q|         |         |         |
 9+50       0.3191      2.55  |    V    Q         |         |         |
 9+55       0.3377      2.70  |     V   Q         |         |         |
10+ 0       0.3568      2.78  |     V   |Q        |         |         |
10+ 5       0.3743      2.54  |     V   Q         |         |         |
10+10       0.3862      1.73  |     Q   |         |         |         |
10+15       0.3960      1.42  |    Q V  |         |         |         |
10+20       0.4049      1.30  |    Q V  |         |         |         |
10+25       0.4134      1.23  |   Q  V  |         |         |         |
10+30       0.4216      1.19  |   Q  V  |         |         |         |
10+35       0.4310      1.37  |    Q V  |         |         |         |
10+40       0.4445      1.96  |      Q  |         |         |         |
10+45       0.4596      2.19  |       Q |         |         |         |
10+50       0.4754      2.30  |       VQ|         |         |         |
```

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10+55       0.4917      2.37  |       VQ|         |         |         |
11+ 0       0.5084      2.42  |        Q|         |         |         |
11+ 5       0.5251      2.42  |        Q|         |         |         |
11+10       0.5412      2.33  |        Q|         |         |         |
11+15       0.5571      2.31  |        Q|         |         |         |
11+20       0.5730      2.31  |        QV         |         |         |
11+25       0.5889      2.31  |        QV         |         |         |
11+30       0.6049      2.32  |        QV         |         |         |
11+35       0.6204      2.25  |       Q |V        |         |         |
11+40       0.6343      2.02  |       Q |V        |         |         |
11+45       0.6476      1.93  |      Q  |V        |         |         |
11+50       0.6610      1.94  |      Q  |V        |         |         |
11+55       0.6751      2.05  |       Q | V       |         |         |
12+ 0       0.6895      2.10  |       Q | V       |         |         |
12+ 5       0.7060      2.39  |        Q| V       |         |         |
12+10       0.7284      3.25  |         |  Q      |         |         |
12+15       0.7532      3.60  |         |  VQ     |         |         |
12+20       0.7794      3.80  |         |  V Q    |         |         |
12+25       0.8071      4.02  |         |   V Q   |         |         |
12+30       0.8355      4.14  |         |   V Q   |         |         |
12+35       0.8651      4.29  |         |    V Q  |         |         |
12+40       0.8966      4.58  |         |     V Q |         |         |
12+45       0.9290      4.71  |         |     V Q |         |         |
12+50       0.9622      4.82  |         |      V Q|         |         |
12+55       0.9965      4.98  |         |      V Q|         |         |
13+ 0       1.0313      5.06  |         |       V Q         |         |
13+ 5       1.0678      5.30  |         |        V|Q        |         |
13+10       1.1087      5.93  |         |        V|  Q      |         |
13+15       1.1513      6.19  |         |         V   Q     |         |
13+20       1.1948      6.32  |         |         |V   Q    |         |
13+25       1.2389      6.39  |         |         | V  Q    |         |
13+30       1.2833      6.45  |         |         | V  Q    |         |
13+35       1.3250      6.06  |         |         |  VQ     |         |
13+40       1.3578      4.76  |         |        Q|   V     |         |
13+45       1.3871      4.26  |         |      Q  |   V     |         |
13+50       1.4150      4.06  |         |     Q   |    V    |         |
13+55       1.4421      3.93  |         |    Q    |    V    |         |
14+ 0       1.4687      3.86  |         |    Q    |     V   |         |
14+ 5       1.4961      3.97  |         |    Q    |     V   |         |
14+10       1.5266      4.43  |         |      Q  |      V  |         |
14+15       1.5583      4.60  |         |       Q |      V  |         |
14+20       1.5902      4.64  |         |       Q |       V |         |
14+25       1.6217      4.58  |         |       Q |        V|         |
14+30       1.6532      4.57  |         |       Q |        V|         |
14+35       1.6847      4.58  |         |       Q |         V         |
14+40       1.7164      4.60  |         |       Q |         V         |
14+45       1.7481      4.61  |         |       Q |         |V        |
14+50       1.7797      4.58  |         |       Q |         |V        |
14+55       1.8105      4.47  |         |      Q  |         | V       |
15+ 0       1.8410      4.43  |         |      Q  |         | V       |
```

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15+ 5       1.8712      4.38  |         |      Q  |         |  V      |
15+10       1.9005      4.26  |         |      Q  |         |   V     |
15+15       1.9295      4.21  |         |     Q   |         |   V     |
15+20       1.9581      4.16  |         |     Q   |         |    V    |
15+25       1.9859      4.03  |         |     Q   |         |    V    |
15+30       2.0134      3.99  |         |    Q    |         |     V   |
15+35       2.0397      3.81  |         |    Q    |         |     V   |
15+40       2.0626      3.33  |         |  Q      |         |     V   |
15+45       2.0842      3.14  |         | Q       |         |      V  |
15+50       2.1052      3.06  |         | Q       |         |      V  |
15+55       2.1260      3.02  |         | Q       |         |       V |
16+ 0       2.1466      2.99  |         |Q        |         |       V |
16+ 5       2.1642      2.55  |         Q         |         |       V |
16+10       2.1726      1.22  |   Q     |         |         |       V |
16+15       2.1774      0.69  | Q       |         |         |       V |
16+20       2.1806      0.46  |Q        |         |         |        V|
16+25       2.1828      0.33  |Q        |         |         |        V|
16+30       2.1845      0.25  Q         |         |         |        V|
16+35       2.1858      0.18  Q         |         |         |        V|
16+40       2.1867      0.13  Q         |         |         |        V|
16+45       2.1874      0.10  Q         |         |         |        V|
16+50       2.1880      0.08  Q         |         |         |        V|
16+55       2.1885      0.08  Q         |         |         |        V|
17+ 0       2.1891      0.08  Q         |         |         |        V|
17+ 5       2.1897      0.09  Q         |         |         |        V|
17+10       2.1904      0.11  Q         |         |         |        V|
17+15       2.1913      0.12  Q         |         |         |        V|
17+20       2.1921      0.12  Q         |         |         |        V|
17+25       2.1930      0.13  Q         |         |         |        V|
17+30       2.1939      0.13  Q         |         |         |        V|
17+35       2.1948      0.13  Q         |         |         |        V|
17+40       2.1956      0.13  Q         |         |         |        V|
17+45       2.1965      0.13  Q         |         |         |        V|
17+50       2.1974      0.13  Q         |         |         |        V|
17+55       2.1982      0.11  Q         |         |         |        V|
18+ 0       2.1989      0.11  Q         |         |         |        V|
18+ 5       2.1997      0.11  Q         |         |         |        V|
18+10       2.2004      0.11  Q         |         |         |        V|
18+15       2.2011      0.11  Q         |         |         |        V|
18+20       2.2019      0.10  Q         |         |         |        V|
18+25       2.2026      0.10  Q         |         |         |        V|
18+30       2.2033      0.10  Q         |         |         |        V|
18+35       2.2040      0.10  Q         |         |         |        V|
18+40       2.2046      0.09  Q         |         |         |        V|
18+45       2.2052      0.08  Q         |         |         |        V|
18+50       2.2057      0.08  Q         |         |         |        V|
18+55       2.2062      0.06  Q         |         |         |        V|
19+ 0       2.2066      0.06  Q         |         |         |        V|
19+ 5       2.2070      0.06  Q         |         |         |        V|
19+10       2.2075      0.07  Q         |         |         |        V|
```

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19+15       2.2080      0.07  Q         |         |         |        V|
19+20       2.2085      0.08  Q         |         |         |        V|
19+25       2.2092      0.09  Q         |         |         |        V|
19+30       2.2098      0.10  Q         |         |         |        V|
19+35       2.2105      0.10  Q         |         |         |        V|
19+40       2.2111      0.09  Q         |         |         |        V|
19+45       2.2116      0.08  Q         |         |         |        V|
19+50       2.2122      0.08  Q         |         |         |        V|
19+55       2.2126      0.06  Q         |         |         |        V|
20+ 0       2.2130      0.06  Q         |         |         |        V|
20+ 5       2.2134      0.06  Q         |         |         |        V|
20+10       2.2139      0.07  Q         |         |         |        V|
20+15       2.2144      0.07  Q         |         |         |        V|
20+20       2.2150      0.08  Q         |         |         |        V|
20+25       2.2155      0.08  Q         |         |         |        V|
20+30       2.2160      0.08  Q         |         |         |        V|
20+35       2.2165      0.08  Q         |         |         |        V|
20+40       2.2171      0.08  Q         |         |         |        V|
20+45       2.2176      0.08  Q         |         |         |        V|
20+50       2.2181      0.07  Q         |         |         |        V|
20+55       2.2186      0.06  Q         |         |         |        V|
21+ 0       2.2189      0.06  Q         |         |         |        V|
21+ 5       2.2194      0.06  Q         |         |         |        V|
21+10       2.2198      0.07  Q         |         |         |        V|
21+15       2.2203      0.07  Q         |         |         |        V|
21+20       2.2208      0.07  Q         |         |         |        V|
21+25       2.2213      0.06  Q         |         |         |        V|
21+30       2.2216      0.06  Q         |         |         |        V|
21+35       2.2221      0.06  Q         |         |         |        V|
21+40       2.2225      0.07  Q         |         |         |        V|
21+45       2.2230      0.07  Q         |         |         |        V|
21+50       2.2235      0.07  Q         |         |         |        V|
21+55       2.2240      0.06  Q         |         |         |        V|
22+ 0       2.2243      0.06  Q         |         |         |        V|
22+ 5       2.2247      0.06  Q         |         |         |        V|
22+10       2.2252      0.07  Q         |         |         |        V|
22+15       2.2257      0.07  Q         |         |         |        V|
22+20       2.2262      0.07  Q         |         |         |        V|
22+25       2.2266      0.06  Q         |         |         |        V|
22+30       2.2270      0.06  Q         |         |         |        V|
22+35       2.2274      0.05  Q         |         |         |        V|
22+40       2.2278      0.05  Q         |         |         |        V|
22+45       2.2281      0.05  Q         |         |         |        V|
22+50       2.2285      0.05  Q         |         |         |        V|
22+55       2.2289      0.05  Q         |         |         |        V|
23+ 0       2.2292      0.05  Q         |         |         |        V|
23+ 5       2.2296      0.05  Q         |         |         |        V|
23+10       2.2299      0.05  Q         |         |         |        V|
23+15       2.2303      0.05  Q         |         |         |        V|
23+20       2.2307      0.05  Q         |         |         |        V|
```

```
     23+25          2.2310         0.05   Q           |           |           |          V|
     23+30          2.2314         0.05   Q           |           |           |          V|
     23+35          2.2317         0.05   Q           |           |           |          V|
     23+40          2.2321         0.05   Q           |           |           |          V|
     23+45          2.2325         0.05   Q           |           |           |          V|
     23+50          2.2328         0.05   Q           |           |           |          V|
     23+55          2.2332         0.05   Q           |           |           |          V|
     24+ 0          2.2335         0.05   Q           |           |           |          V|
     24+ 5          2.2338         0.04   Q           |           |           |          V|
     24+10          2.2340         0.02   Q           |           |           |          V|
     24+15          2.2340         0.01   Q           |           |           |          V|
     24+20          2.2341         0.01   Q           |           |           |          V|
     24+25          2.2341         0.00   Q           |           |           |          V|
     24+30          2.2341         0.00   Q           |           |           |          V|
     24+35          2.2342         0.00   Q           |           |           |          V|
     24+40          2.2342         0.00   Q           |           |           |          V|
     24+45          2.2342         0.00   Q           |           |           |          V|
-----------------------------------------------------------------------
```

Appendix J.II1

Synthetic Unit Hydrograph Method Analysis
Pre-Development Conditions
100-Year Storm

```
                U n i t   H y d r o g r a p h   A n a l y s i s

                Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
                        Study date  05/26/22 File: MapesPre100UH24100.out


        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        ------------------------------------------------------------------------

        Riverside County Synthetic Unit Hydrology Method
        RCFC & WCD Manual date - April 1978


        Program License Serial Number 6443

        ---------------------------------------------------------------------
         English (in-lb) Input Units Used
         English Rainfall Data (Inches) Input Values Used

         English Units used in output format




        ---------------------------------------------------------------------
        MAPES AND TRUMBLE INDUSTRIAL FACILITY
        UNIT HYDROGRAPH
        PRE-DEVELOPMENT CONDITIONS
        100-YEAR, 24HR STORM, DA A
        --------------------------------------------------------------------
        Drainage Area =      19.01(Ac.)  =      0.030 Sq. Mi.
        Drainage Area for Depth-Area Areal Adjustment =      19.01(Ac.)  =
0.030 Sq. Mi.
        Length along longest watercourse =    1256.56(Ft.)
        Length along longest watercourse measured to centroid =     586.75(Ft.)
        Length along longest watercourse =      0.238 Mi.
        Length along longest watercourse measured to centroid =      0.111 Mi.
        Difference in elevation =       6.42(Ft.)
        Slope along watercourse =     26.9765 Ft./Mi.
        Average Manning's 'N' = 0.030
        Lag time =    0.097 Hr.
        Lag time =     5.81 Min.
        25% of lag time =     1.45 Min.
        40% of lag time =     2.32 Min.
        Unit time =     5.00 Min.
        Duration of storm = 24 Hour(s)
        User Entered Base Flow =     0.00(CFS)

        2 YEAR Area rainfall data:
```

```
Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       19.01            2.06                   39.16

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       19.01            5.31                  100.94

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    2.060(In)
Area Averaged 100-Year Rainfall =    5.310(In)

Point rain (area averaged) =    5.310(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    5.310(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    19.010           89.00         0.000
 Total Area Entered =     19.01(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
89.0  95.6      0.057     0.000        0.057       1.000      0.057
                                                  Sum (F) =   0.057
Area averaged mean soil loss (F) (In/Hr) =  0.057
Minimum soil loss rate ((In/Hr)) =  0.029
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.900
---------------------------------------------------------------------

                U n i t  H y d r o g r a p h
                        VALLEY S-Curve
--------------------------------------------------------------------
                Unit Hydrograph Data
---------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                            Graph %           (CFS)
---------------------------------------------------------------------
    1   0.083         86.074         15.028               2.879
    2   0.167        172.149         46.219               8.855
    3   0.250        258.223         18.315               3.509
    4   0.333        344.297          7.866               1.507
    5   0.417        430.372          4.648               0.890
    6   0.500        516.446          2.910               0.557
    7   0.583        602.520          2.059               0.395
    8   0.667        688.594          1.359               0.260
```

```
            9   0.750        774.669          0.913              0.175
           10   0.833        860.743          0.684              0.131
                                      Sum = 100.000   Sum=      19.159
-----------------------------------------------------------------------


 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     0.07     0.042        (  0.101)       0.038         0.004
   2   0.17     0.07     0.042        (  0.101)       0.038         0.004
   3   0.25     0.07     0.042        (  0.101)       0.038         0.004
   4   0.33     0.10     0.064        (  0.100)       0.057         0.006
   5   0.42     0.10     0.064        (  0.100)       0.057         0.006
   6   0.50     0.10     0.064        (  0.099)       0.057         0.006
   7   0.58     0.10     0.064        (  0.099)       0.057         0.006
   8   0.67     0.10     0.064        (  0.099)       0.057         0.006
   9   0.75     0.10     0.064        (  0.098)       0.057         0.006
  10   0.83     0.13     0.085        (  0.098)       0.076         0.008
  11   0.92     0.13     0.085        (  0.098)       0.076         0.008
  12   1.00     0.13     0.085        (  0.097)       0.076         0.008
  13   1.08     0.10     0.064        (  0.097)       0.057         0.006
  14   1.17     0.10     0.064        (  0.096)       0.057         0.006
  15   1.25     0.10     0.064        (  0.096)       0.057         0.006
  16   1.33     0.10     0.064        (  0.096)       0.057         0.006
  17   1.42     0.10     0.064        (  0.095)       0.057         0.006
  18   1.50     0.10     0.064        (  0.095)       0.057         0.006
  19   1.58     0.10     0.064        (  0.094)       0.057         0.006
  20   1.67     0.10     0.064        (  0.094)       0.057         0.006
  21   1.75     0.10     0.064        (  0.094)       0.057         0.006
  22   1.83     0.13     0.085        (  0.093)       0.076         0.008
  23   1.92     0.13     0.085        (  0.093)       0.076         0.008
  24   2.00     0.13     0.085        (  0.093)       0.076         0.008
  25   2.08     0.13     0.085        (  0.092)       0.076         0.008
  26   2.17     0.13     0.085        (  0.092)       0.076         0.008
  27   2.25     0.13     0.085        (  0.091)       0.076         0.008
  28   2.33     0.13     0.085        (  0.091)       0.076         0.008
  29   2.42     0.13     0.085        (  0.091)       0.076         0.008
  30   2.50     0.13     0.085        (  0.090)       0.076         0.008
  31   2.58     0.17     0.106          0.090    (  0.096)        0.016
  32   2.67     0.17     0.106          0.090    (  0.096)        0.017
  33   2.75     0.17     0.106          0.089    (  0.096)        0.017
  34   2.83     0.17     0.106          0.089    (  0.096)        0.017
  35   2.92     0.17     0.106          0.088    (  0.096)        0.018
  36   3.00     0.17     0.106          0.088    (  0.096)        0.018
  37   3.08     0.17     0.106          0.088    (  0.096)        0.018
  38   3.17     0.17     0.106          0.087    (  0.096)        0.019
  39   3.25     0.17     0.106          0.087    (  0.096)        0.019
```

```
40   3.33      0.17      0.106          0.087    (  0.096)       0.020
41   3.42      0.17      0.106          0.086    (  0.096)       0.020
42   3.50      0.17      0.106          0.086    (  0.096)       0.020
43   3.58      0.17      0.106          0.086    (  0.096)       0.021
44   3.67      0.17      0.106          0.085    (  0.096)       0.021
45   3.75      0.17      0.106          0.085    (  0.096)       0.021
46   3.83      0.20      0.127          0.085    (  0.115)       0.043
47   3.92      0.20      0.127          0.084    (  0.115)       0.043
48   4.00      0.20      0.127          0.084    (  0.115)       0.044
49   4.08      0.20      0.127          0.083    (  0.115)       0.044
50   4.17      0.20      0.127          0.083    (  0.115)       0.044
51   4.25      0.20      0.127          0.083    (  0.115)       0.045
52   4.33      0.23      0.149          0.082    (  0.134)       0.066
53   4.42      0.23      0.149          0.082    (  0.134)       0.067
54   4.50      0.23      0.149          0.082    (  0.134)       0.067
55   4.58      0.23      0.149          0.081    (  0.134)       0.067
56   4.67      0.23      0.149          0.081    (  0.134)       0.068
57   4.75      0.23      0.149          0.081    (  0.134)       0.068
58   4.83      0.27      0.170          0.080    (  0.153)       0.090
59   4.92      0.27      0.170          0.080    (  0.153)       0.090
60   5.00      0.27      0.170          0.080    (  0.153)       0.090
61   5.08      0.20      0.127          0.079    (  0.115)       0.048
62   5.17      0.20      0.127          0.079    (  0.115)       0.049
63   5.25      0.20      0.127          0.079    (  0.115)       0.049
64   5.33      0.23      0.149          0.078    (  0.134)       0.070
65   5.42      0.23      0.149          0.078    (  0.134)       0.071
66   5.50      0.23      0.149          0.078    (  0.134)       0.071
67   5.58      0.27      0.170          0.077    (  0.153)       0.093
68   5.67      0.27      0.170          0.077    (  0.153)       0.093
69   5.75      0.27      0.170          0.077    (  0.153)       0.093
70   5.83      0.27      0.170          0.076    (  0.153)       0.094
71   5.92      0.27      0.170          0.076    (  0.153)       0.094
72   6.00      0.27      0.170          0.076    (  0.153)       0.094
73   6.08      0.30      0.191          0.075    (  0.172)       0.116
74   6.17      0.30      0.191          0.075    (  0.172)       0.116
75   6.25      0.30      0.191          0.074    (  0.172)       0.117
76   6.33      0.30      0.191          0.074    (  0.172)       0.117
77   6.42      0.30      0.191          0.074    (  0.172)       0.117
78   6.50      0.30      0.191          0.074    (  0.172)       0.118
79   6.58      0.33      0.212          0.073    (  0.191)       0.139
80   6.67      0.33      0.212          0.073    (  0.191)       0.140
81   6.75      0.33      0.212          0.073    (  0.191)       0.140
82   6.83      0.33      0.212          0.072    (  0.191)       0.140
83   6.92      0.33      0.212          0.072    (  0.191)       0.141
84   7.00      0.33      0.212          0.072    (  0.191)       0.141
85   7.08      0.33      0.212          0.071    (  0.191)       0.141
86   7.17      0.33      0.212          0.071    (  0.191)       0.142
87   7.25      0.33      0.212          0.071    (  0.191)       0.142
88   7.33      0.37      0.234          0.070    (  0.210)       0.163
89   7.42      0.37      0.234          0.070    (  0.210)       0.164
```

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 90   7.50     0.37      0.234          0.070    (  0.210)        0.164
 91   7.58     0.40      0.255          0.069    (  0.229)        0.186
 92   7.67     0.40      0.255          0.069    (  0.229)        0.186
 93   7.75     0.40      0.255          0.069    (  0.229)        0.186
 94   7.83     0.43      0.276          0.068    (  0.248)        0.208
 95   7.92     0.43      0.276          0.068    (  0.248)        0.208
 96   8.00     0.43      0.276          0.068    (  0.248)        0.208
 97   8.08     0.50      0.319          0.067    (  0.287)        0.251
 98   8.17     0.50      0.319          0.067    (  0.287)        0.252
 99   8.25     0.50      0.319          0.067    (  0.287)        0.252
100   8.33     0.50      0.319          0.066    (  0.287)        0.252
101   8.42     0.50      0.319          0.066    (  0.287)        0.252
102   8.50     0.50      0.319          0.066    (  0.287)        0.253
103   8.58     0.53      0.340          0.066    (  0.306)        0.274
104   8.67     0.53      0.340          0.065    (  0.306)        0.275
105   8.75     0.53      0.340          0.065    (  0.306)        0.275
106   8.83     0.57      0.361          0.065    (  0.325)        0.296
107   8.92     0.57      0.361          0.064    (  0.325)        0.297
108   9.00     0.57      0.361          0.064    (  0.325)        0.297
109   9.08     0.63      0.404          0.064    (  0.363)        0.340
110   9.17     0.63      0.404          0.063    (  0.363)        0.340
111   9.25     0.63      0.404          0.063    (  0.363)        0.340
112   9.33     0.67      0.425          0.063    (  0.382)        0.362
113   9.42     0.67      0.425          0.062    (  0.382)        0.362
114   9.50     0.67      0.425          0.062    (  0.382)        0.363
115   9.58     0.70      0.446          0.062    (  0.401)        0.384
116   9.67     0.70      0.446          0.062    (  0.401)        0.384
117   9.75     0.70      0.446          0.061    (  0.401)        0.385
118   9.83     0.73      0.467          0.061    (  0.421)        0.406
119   9.92     0.73      0.467          0.061    (  0.421)        0.407
120  10.00     0.73      0.467          0.060    (  0.421)        0.407
121  10.08     0.50      0.319          0.060    (  0.287)        0.258
122  10.17     0.50      0.319          0.060    (  0.287)        0.259
123  10.25     0.50      0.319          0.060    (  0.287)        0.259
124  10.33     0.50      0.319          0.059    (  0.287)        0.259
125  10.42     0.50      0.319          0.059    (  0.287)        0.260
126  10.50     0.50      0.319          0.059    (  0.287)        0.260
127  10.58     0.67      0.425          0.058    (  0.382)        0.366
128  10.67     0.67      0.425          0.058    (  0.382)        0.367
129  10.75     0.67      0.425          0.058    (  0.382)        0.367
130  10.83     0.67      0.425          0.058    (  0.382)        0.367
131  10.92     0.67      0.425          0.057    (  0.382)        0.368
132  11.00     0.67      0.425          0.057    (  0.382)        0.368
133  11.08     0.63      0.404          0.057    (  0.363)        0.347
134  11.17     0.63      0.404          0.056    (  0.363)        0.347
135  11.25     0.63      0.404          0.056    (  0.363)        0.347
136  11.33     0.63      0.404          0.056    (  0.363)        0.348
137  11.42     0.63      0.404          0.056    (  0.363)        0.348
138  11.50     0.63      0.404          0.055    (  0.363)        0.348
139  11.58     0.57      0.361          0.055    (  0.325)        0.306
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140  11.67      0.57      0.361           0.055    (  0.325)         0.306
141  11.75      0.57      0.361           0.054    (  0.325)         0.307
142  11.83      0.60      0.382           0.054    (  0.344)         0.328
143  11.92      0.60      0.382           0.054    (  0.344)         0.328
144  12.00      0.60      0.382           0.054    (  0.344)         0.329
145  12.08      0.83      0.531           0.053    (  0.478)         0.478
146  12.17      0.83      0.531           0.053    (  0.478)         0.478
147  12.25      0.83      0.531           0.053    (  0.478)         0.478
148  12.33      0.87      0.552           0.053    (  0.497)         0.500
149  12.42      0.87      0.552           0.052    (  0.497)         0.500
150  12.50      0.87      0.552           0.052    (  0.497)         0.500
151  12.58      0.93      0.595           0.052    (  0.535)         0.543
152  12.67      0.93      0.595           0.052    (  0.535)         0.543
153  12.75      0.93      0.595           0.051    (  0.535)         0.543
154  12.83      0.97      0.616           0.051    (  0.554)         0.565
155  12.92      0.97      0.616           0.051    (  0.554)         0.565
156  13.00      0.97      0.616           0.051    (  0.554)         0.565
157  13.08      1.13      0.722           0.050    (  0.650)         0.672
158  13.17      1.13      0.722           0.050    (  0.650)         0.672
159  13.25      1.13      0.722           0.050    (  0.650)         0.672
160  13.33      1.13      0.722           0.049    (  0.650)         0.673
161  13.42      1.13      0.722           0.049    (  0.650)         0.673
162  13.50      1.13      0.722           0.049    (  0.650)         0.673
163  13.58      0.77      0.489           0.049    (  0.440)         0.440
164  13.67      0.77      0.489           0.048    (  0.440)         0.440
165  13.75      0.77      0.489           0.048    (  0.440)         0.440
166  13.83      0.77      0.489           0.048    (  0.440)         0.440
167  13.92      0.77      0.489           0.048    (  0.440)         0.441
168  14.00      0.77      0.489           0.048    (  0.440)         0.441
169  14.08      0.90      0.573           0.047    (  0.516)         0.526
170  14.17      0.90      0.573           0.047    (  0.516)         0.526
171  14.25      0.90      0.573           0.047    (  0.516)         0.527
172  14.33      0.87      0.552           0.047    (  0.497)         0.506
173  14.42      0.87      0.552           0.046    (  0.497)         0.506
174  14.50      0.87      0.552           0.046    (  0.497)         0.506
175  14.58      0.87      0.552           0.046    (  0.497)         0.506
176  14.67      0.87      0.552           0.046    (  0.497)         0.507
177  14.75      0.87      0.552           0.045    (  0.497)         0.507
178  14.83      0.83      0.531           0.045    (  0.478)         0.486
179  14.92      0.83      0.531           0.045    (  0.478)         0.486
180  15.00      0.83      0.531           0.045    (  0.478)         0.486
181  15.08      0.80      0.510           0.044    (  0.459)         0.465
182  15.17      0.80      0.510           0.044    (  0.459)         0.466
183  15.25      0.80      0.510           0.044    (  0.459)         0.466
184  15.33      0.77      0.489           0.044    (  0.440)         0.445
185  15.42      0.77      0.489           0.044    (  0.440)         0.445
186  15.50      0.77      0.489           0.043    (  0.440)         0.445
187  15.58      0.63      0.404           0.043    (  0.363)         0.360
188  15.67      0.63      0.404           0.043    (  0.363)         0.361
189  15.75      0.63      0.404           0.043    (  0.363)         0.361
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190  15.83     0.63      0.404          0.042     (  0.363)        0.361
191  15.92     0.63      0.404          0.042     (  0.363)        0.361
192  16.00     0.63      0.404          0.042     (  0.363)        0.362
193  16.08     0.13      0.085          0.042     (  0.076)        0.043
194  16.17     0.13      0.085          0.042     (  0.076)        0.043
195  16.25     0.13      0.085          0.041     (  0.076)        0.044
196  16.33     0.13      0.085          0.041     (  0.076)        0.044
197  16.42     0.13      0.085          0.041     (  0.076)        0.044
198  16.50     0.13      0.085          0.041     (  0.076)        0.044
199  16.58     0.10      0.064          0.041     (  0.057)        0.023
200  16.67     0.10      0.064          0.040     (  0.057)        0.023
201  16.75     0.10      0.064          0.040     (  0.057)        0.024
202  16.83     0.10      0.064          0.040     (  0.057)        0.024
203  16.92     0.10      0.064          0.040     (  0.057)        0.024
204  17.00     0.10      0.064          0.040     (  0.057)        0.024
205  17.08     0.17      0.106          0.039     (  0.096)        0.067
206  17.17     0.17      0.106          0.039     (  0.096)        0.067
207  17.25     0.17      0.106          0.039     (  0.096)        0.067
208  17.33     0.17      0.106          0.039     (  0.096)        0.067
209  17.42     0.17      0.106          0.039     (  0.096)        0.068
210  17.50     0.17      0.106          0.038     (  0.096)        0.068
211  17.58     0.17      0.106          0.038     (  0.096)        0.068
212  17.67     0.17      0.106          0.038     (  0.096)        0.068
213  17.75     0.17      0.106          0.038     (  0.096)        0.068
214  17.83     0.13      0.085          0.038     (  0.076)        0.047
215  17.92     0.13      0.085          0.037     (  0.076)        0.048
216  18.00     0.13      0.085          0.037     (  0.076)        0.048
217  18.08     0.13      0.085          0.037     (  0.076)        0.048
218  18.17     0.13      0.085          0.037     (  0.076)        0.048
219  18.25     0.13      0.085          0.037     (  0.076)        0.048
220  18.33     0.13      0.085          0.036     (  0.076)        0.048
221  18.42     0.13      0.085          0.036     (  0.076)        0.049
222  18.50     0.13      0.085          0.036     (  0.076)        0.049
223  18.58     0.10      0.064          0.036     (  0.057)        0.028
224  18.67     0.10      0.064          0.036     (  0.057)        0.028
225  18.75     0.10      0.064          0.036     (  0.057)        0.028
226  18.83     0.07      0.042          0.035     (  0.038)        0.007
227  18.92     0.07      0.042          0.035     (  0.038)        0.007
228  19.00     0.07      0.042          0.035     (  0.038)        0.007
229  19.08     0.10      0.064          0.035     (  0.057)        0.029
230  19.17     0.10      0.064          0.035     (  0.057)        0.029
231  19.25     0.10      0.064          0.035     (  0.057)        0.029
232  19.33     0.13      0.085          0.034     (  0.076)        0.051
233  19.42     0.13      0.085          0.034     (  0.076)        0.051
234  19.50     0.13      0.085          0.034     (  0.076)        0.051
235  19.58     0.10      0.064          0.034     (  0.057)        0.030
236  19.67     0.10      0.064          0.034     (  0.057)        0.030
237  19.75     0.10      0.064          0.034     (  0.057)        0.030
238  19.83     0.07      0.042          0.034     (  0.038)        0.009
239  19.92     0.07      0.042          0.033     (  0.038)        0.009
```

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240  20.00     0.07      0.042          0.033    (  0.038)        0.009
241  20.08     0.10      0.064          0.033    (  0.057)        0.031
242  20.17     0.10      0.064          0.033    (  0.057)        0.031
243  20.25     0.10      0.064          0.033    (  0.057)        0.031
244  20.33     0.10      0.064          0.033    (  0.057)        0.031
245  20.42     0.10      0.064          0.032    (  0.057)        0.031
246  20.50     0.10      0.064          0.032    (  0.057)        0.031
247  20.58     0.10      0.064          0.032    (  0.057)        0.031
248  20.67     0.10      0.064          0.032    (  0.057)        0.032
249  20.75     0.10      0.064          0.032    (  0.057)        0.032
250  20.83     0.07      0.042          0.032    (  0.038)        0.011
251  20.92     0.07      0.042          0.032    (  0.038)        0.011
252  21.00     0.07      0.042          0.032    (  0.038)        0.011
253  21.08     0.10      0.064          0.031    (  0.057)        0.032
254  21.17     0.10      0.064          0.031    (  0.057)        0.032
255  21.25     0.10      0.064          0.031    (  0.057)        0.033
256  21.33     0.07      0.042          0.031    (  0.038)        0.011
257  21.42     0.07      0.042          0.031    (  0.038)        0.012
258  21.50     0.07      0.042          0.031    (  0.038)        0.012
259  21.58     0.10      0.064          0.031    (  0.057)        0.033
260  21.67     0.10      0.064          0.031    (  0.057)        0.033
261  21.75     0.10      0.064          0.031    (  0.057)        0.033
262  21.83     0.07      0.042          0.030    (  0.038)        0.012
263  21.92     0.07      0.042          0.030    (  0.038)        0.012
264  22.00     0.07      0.042          0.030    (  0.038)        0.012
265  22.08     0.10      0.064          0.030    (  0.057)        0.034
266  22.17     0.10      0.064          0.030    (  0.057)        0.034
267  22.25     0.10      0.064          0.030    (  0.057)        0.034
268  22.33     0.07      0.042          0.030    (  0.038)        0.013
269  22.42     0.07      0.042          0.030    (  0.038)        0.013
270  22.50     0.07      0.042          0.030    (  0.038)        0.013
271  22.58     0.07      0.042          0.030    (  0.038)        0.013
272  22.67     0.07      0.042          0.029    (  0.038)        0.013
273  22.75     0.07      0.042          0.029    (  0.038)        0.013
274  22.83     0.07      0.042          0.029    (  0.038)        0.013
275  22.92     0.07      0.042          0.029    (  0.038)        0.013
276  23.00     0.07      0.042          0.029    (  0.038)        0.013
277  23.08     0.07      0.042          0.029    (  0.038)        0.013
278  23.17     0.07      0.042          0.029    (  0.038)        0.013
279  23.25     0.07      0.042          0.029    (  0.038)        0.014
280  23.33     0.07      0.042          0.029    (  0.038)        0.014
281  23.42     0.07      0.042          0.029    (  0.038)        0.014
282  23.50     0.07      0.042          0.029    (  0.038)        0.014
283  23.58     0.07      0.042          0.029    (  0.038)        0.014
284  23.67     0.07      0.042          0.029    (  0.038)        0.014
285  23.75     0.07      0.042          0.029    (  0.038)        0.014
286  23.83     0.07      0.042          0.029    (  0.038)        0.014
287  23.92     0.07      0.042          0.029    (  0.038)        0.014
288  24.00     0.07      0.042          0.029    (  0.038)        0.014
                (Loss Rate Not Used)
```

```
   Sum =     100.0                                  Sum =    48.2
      Flood volume = Effective rainfall      4.02(In)
       times area      19.0(Ac.)/[(In)/(Ft.)] =       6.4(Ac.Ft)
      Total soil loss =      1.29(In)
      Total soil loss =     2.046(Ac.Ft)
      Total rainfall =      5.31(In)
      Flood volume =      277282.7 Cubic Feet
      Total soil loss =       89127.1 Cubic Feet
      --------------------------------------------------------------------
       Peak flow rate of this hydrograph =     12.790(CFS)
      --------------------------------------------------------------------
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          24 - H O U R    S T O R M
                     R u n o f f     H y d r o g r a p h
      --------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
-----------------------------------------------------------------------
  0+ 5       0.0001      0.01  Q        |         |         |         |
  0+10       0.0004      0.05  Q        |         |         |         |
  0+15       0.0009      0.06  Q        |         |         |         |
  0+20       0.0014      0.08  Q        |         |         |         |
  0+25       0.0021      0.10  Q        |         |         |         |
  0+30       0.0029      0.11  Q        |         |         |         |
  0+35       0.0036      0.11  Q        |         |         |         |
  0+40       0.0044      0.12  Q        |         |         |         |
  0+45       0.0053      0.12  Q        |         |         |         |
  0+50       0.0061      0.13  Q        |         |         |         |
  0+55       0.0072      0.15  Q        |         |         |         |
  1+ 0       0.0082      0.15  Q        |         |         |         |
  1+ 5       0.0093      0.15  Q        |         |         |         |
  1+10       0.0102      0.13  Q        |         |         |         |
  1+15       0.0111      0.13  Q        |         |         |         |
  1+20       0.0119      0.13  Q        |         |         |         |
  1+25       0.0128      0.12  Q        |         |         |         |
  1+30       0.0137      0.12  Q        |         |         |         |
  1+35       0.0145      0.12  Q        |         |         |         |
  1+40       0.0154      0.12  Q        |         |         |         |
  1+45       0.0162      0.12  Q        |         |         |         |
  1+50       0.0171      0.13  Q        |         |         |         |
  1+55       0.0181      0.15  Q        |         |         |         |
  2+ 0       0.0192      0.15  Q        |         |         |         |
  2+ 5       0.0202      0.16  Q        |         |         |         |
  2+10       0.0213      0.16  Q        |         |         |         |
  2+15       0.0224      0.16  Q        |         |         |         |
  2+20       0.0236      0.16  Q        |         |         |         |
  2+25       0.0247      0.16  Q        |         |         |         |
  2+30       0.0258      0.16  Q        |         |         |         |
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2+35       0.0271      0.19  Q         |         |         |         |
2+40       0.0288      0.25  Q         |         |         |         |
2+45       0.0308      0.29  Q         |         |         |         |
2+50       0.0329      0.30  Q         |         |         |         |
2+55       0.0351      0.32  Q         |         |         |         |
3+ 0       0.0373      0.33  Q         |         |         |         |
3+ 5       0.0396      0.34  Q         |         |         |         |
3+10       0.0420      0.35  Q         |         |         |         |
3+15       0.0445      0.35  Q         |         |         |         |
3+20       0.0470      0.36  Q         |         |         |         |
3+25       0.0495      0.37  Q         |         |         |         |
3+30       0.0521      0.38  Q         |         |         |         |
3+35       0.0547      0.38  Q         |         |         |         |
3+40       0.0574      0.39  Q         |         |         |         |
3+45       0.0601      0.40  Q         |         |         |         |
3+50       0.0633      0.46  Q         |         |         |         |
3+55       0.0679      0.66  VQ        |         |         |         |
4+ 0       0.0730      0.74  VQ        |         |         |         |
4+ 5       0.0784      0.78  VQ        |         |         |         |
4+10       0.0839      0.81  VQ        |         |         |         |
4+15       0.0896      0.82  VQ        |         |         |         |
4+20       0.0958      0.90  VQ        |         |         |         |
4+25       0.1034      1.10  V Q       |         |         |         |
4+30       0.1115      1.19  V Q       |         |         |         |
4+35       0.1200      1.23  V Q       |         |         |         |
4+40       0.1286      1.25  V Q       |         |         |         |
4+45       0.1374      1.27  V Q       |         |         |         |
4+50       0.1467      1.35  V Q       |         |         |         |
4+55       0.1573      1.55  V  Q      |         |         |         |
5+ 0       0.1686      1.63  |V Q      |         |         |         |
5+ 5       0.1793      1.55  |V Q      |         |         |         |
5+10       0.1876      1.20  |VQ       |         |         |         |
5+15       0.1949      1.07  |VQ       |         |         |         |
5+20       0.2024      1.08  |VQ       |         |         |         |
5+25       0.2110      1.25  |VQ       |         |         |         |
5+30       0.2200      1.31  |VQ       |         |         |         |
5+35       0.2296      1.39  |VQ       |         |         |         |
5+40       0.2406      1.60  |V Q      |         |         |         |
5+45       0.2521      1.68  |V Q      |         |         |         |
5+50       0.2640      1.72  |V Q      |         |         |         |
5+55       0.2761      1.75  |V Q      |         |         |         |
6+ 0       0.2883      1.78  |V Q      |         |         |         |
6+ 5       0.3011      1.85  |V Q      |         |         |         |
6+10       0.3152      2.05  |V  Q     |         |         |         |
6+15       0.3300      2.14  | V Q     |         |         |         |
6+20       0.3450      2.18  | V Q     |         |         |         |
6+25       0.3602      2.21  | V Q     |         |         |         |
6+30       0.3755      2.22  | V Q     |         |         |         |
6+35       0.3913      2.30  | V Q     |         |         |         |
6+40       0.4085      2.50  | V Q     |         |         |         |
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 6+45       0.4263      2.58  | V  Q    |         |         |         |
 6+50       0.4444      2.63  | V  Q    |         |         |         |
 6+55       0.4627      2.65  | V  Q    |         |         |         |
 7+ 0       0.4810      2.67  |  V Q    |         |         |         |
 7+ 5       0.4995      2.68  |  V Q    |         |         |         |
 7+10       0.5181      2.70  |  V Q    |         |         |         |
 7+15       0.5367      2.70  |  V Q    |         |         |         |
 7+20       0.5558      2.78  |  V Q    |         |         |         |
 7+25       0.5763      2.97  |  V Q    |         |         |         |
 7+30       0.5973      3.05  |  V  Q   |         |         |         |
 7+35       0.6190      3.15  |  V  Q   |         |         |         |
 7+40       0.6421      3.36  |   V Q   |         |         |         |
 7+45       0.6659      3.46  |   V Q   |         |         |         |
 7+50       0.6905      3.56  |   V  Q  |         |         |         |
 7+55       0.7165      3.78  |   V  Q  |         |         |         |
 8+ 0       0.7432      3.88  |   V  Q  |         |         |         |
 8+ 5       0.7711      4.05  |   V   Q |         |         |         |
 8+10       0.8018      4.46  |    V  Q |         |         |         |
 8+15       0.8337      4.63  |    V   Q|         |         |         |
 8+20       0.8661      4.71  |    V   Q|         |         |         |
 8+25       0.8989      4.76  |    V   Q|         |         |         |
 8+30       0.9319      4.79  |    V   Q|         |         |         |
 8+35       0.9654      4.88  |     V  Q|         |         |         |
 8+40       1.0005      5.08  |     V   Q         |         |         |
 8+45       1.0361      5.17  |     V   Q         |         |         |
 8+50       1.0724      5.28  |     V   Q         |         |         |
 8+55       1.1102      5.49  |     V   Q         |         |         |
 9+ 0       1.1486      5.58  |      V  |Q        |         |         |
 9+ 5       1.1882      5.75  |      V  |Q        |         |         |
 9+10       1.2306      6.16  |      V  | Q       |         |         |
 9+15       1.2742      6.33  |       V | Q       |         |         |
 9+20       1.3187      6.47  |       V | Q       |         |         |
 9+25       1.3649      6.71  |       V |  Q      |         |         |
 9+30       1.4119      6.81  |       V |  Q      |         |         |
 9+35       1.4596      6.93  |        V|  Q      |         |         |
 9+40       1.5089      7.16  |        V|   Q     |         |         |
 9+45       1.5589      7.26  |        V|   Q     |         |         |
 9+50       1.6096      7.37  |         V   Q     |         |         |
 9+55       1.6619      7.59  |         V    Q    |         |         |
10+ 0       1.7148      7.68  |         V    Q    |         |         |
10+ 5       1.7651      7.30  |         |V  Q     |         |         |
10+10       1.8065      6.02  |         |VQ       |         |         |
10+15       1.8445      5.52  |         |Q        |         |         |
10+20       1.8810      5.31  |         QV        |         |         |
10+25       1.9168      5.19  |         Q V       |         |         |
10+30       1.9520      5.11  |         Q V       |         |         |
10+35       1.9889      5.37  |         Q V       |         |         |
10+40       2.0322      6.28  |         | Q       |         |         |
10+45       2.0778      6.63  |         |  Q      |         |         |
10+50       2.1245      6.77  |         |  Q      |         |         |
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10+55       2.1718      6.87  |         |  Q      |         |         |
11+ 0       2.2196      6.94  |         |  Q      |         |         |
11+ 5       2.2673      6.93  |         |  QV     |         |         |
11+10       2.3139      6.77  |         |  QV     |         |         |
11+15       2.3602      6.72  |         |  QV     |         |         |
11+20       2.4064      6.71  |         |  Q V    |         |         |
11+25       2.4525      6.69  |         |  Q V    |         |         |
11+30       2.4985      6.69  |         |  Q V    |         |         |
11+35       2.5437      6.56  |         |  Q V    |         |         |
11+40       2.5863      6.18  |         | Q   V   |         |         |
11+45       2.6279      6.04  |         | Q   V   |         |         |
11+50       2.6695      6.04  |         | Q   V   |         |         |
11+55       2.7121      6.19  |         | Q    V  |         |         |
12+ 0       2.7551      6.25  |         | Q    V  |         |         |
12+ 5       2.8013      6.70  |         |  Q   V  |         |         |
12+10       2.8565      8.03  |         |     QV  |         |         |
12+15       2.9155      8.56  |         |      QV |         |         |
12+20       2.9764      8.85  |         |      QV |         |         |
12+25       3.0397      9.18  |         |       QV|         |         |
12+30       3.1041      9.35  |         |       QV|         |         |
12+35       3.1700      9.57  |         |        Q|         |         |
12+40       3.2389     10.01  |         |         Q         |         |
12+45       3.3092     10.20  |         |         Q         |         |
12+50       3.3805     10.36  |         |         QV        |         |
12+55       3.4535     10.60  |         |         |Q        |         |
13+ 0       3.5272     10.70  |         |         |QV       |         |
13+ 5       3.6034     11.07  |         |         | Q       |         |
13+10       3.6863     12.04  |         |         |  VQ     |         |
13+15       3.7720     12.44  |         |         |  VQ     |         |
13+20       3.8589     12.62  |         |         |   VQ    |         |
13+25       3.9465     12.72  |         |         |   VQ    |         |
13+30       4.0346     12.79  |         |         |    Q    |         |
13+35       4.1184     12.17  |         |         |   QV    |         |
13+40       4.1881     10.13  |         |         Q     V   |         |
13+45       4.2524      9.33  |         |       Q |     V   |         |
13+50       4.3144      9.00  |         |      Q  |      V  |         |
13+55       4.3750      8.80  |         |      Q  |      V  |         |
14+ 0       4.4347      8.67  |         |      Q  |      V  |         |
14+ 5       4.4955      8.83  |         |      Q  |       V |         |
14+10       4.5610      9.52  |         |        Q|       V |         |
14+15       4.6284      9.79  |         |        Q|        V|         |
14+20       4.6961      9.83  |         |        Q|        V|         |
14+25       4.7630      9.72  |         |        Q|        V|         |
14+30       4.8298      9.70  |         |        Q|         V         |
14+35       4.8966      9.70  |         |        Q|         V         |
14+40       4.9635      9.71  |         |        Q|         |V        |
14+45       5.0304      9.72  |         |        Q|         |V        |
14+50       5.0970      9.66  |         |        Q|         | V       |
14+55       5.1622      9.47  |         |       Q |         | V       |
15+ 0       5.2269      9.40  |         |       Q |         | V       |
```

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15+ 5       5.2911      9.31  |         |       Q |         |  V      |
15+10       5.3538      9.11  |         |       Q |         |  V      |
15+15       5.4159      9.02  |         |       Q |         |   V     |
15+20       5.4774      8.93  |         |      Q  |         |   V     |
15+25       5.5374      8.72  |         |      Q  |         |   V     |
15+30       5.5969      8.63  |         |      Q  |         |    V    |
15+35       5.6544      8.35  |         |     Q   |         |    V    |
15+40       5.7066      7.58  |         |    Q    |         |    V    |
15+45       5.7566      7.27  |         |   Q     |         |     V   |
15+50       5.8057      7.13  |         |   Q     |         |     V   |
15+55       5.8543      7.05  |         |   Q     |         |     V   |
16+ 0       5.9026      7.01  |         |   Q     |         |      V  |
16+ 5       5.9443      6.06  |         | Q       |         |      V  |
16+10       5.9664      3.22  |     Q   |         |         |      V  |
16+15       5.9808      2.09  |   Q     |         |         |      V  |
16+20       5.9918      1.60  |  Q      |         |         |      V  |
16+25       6.0009      1.32  | Q       |         |         |      V  |
16+30       6.0088      1.15  | Q       |         |         |      V  |
16+35       6.0155      0.96  |Q        |         |         |      V  |
16+40       6.0203      0.70  |Q        |         |         |      V  |
16+45       6.0242      0.57  |Q        |         |         |      V  |
16+50       6.0276      0.50  |Q        |         |         |      V  |
16+55       6.0310      0.49  Q         |         |         |      V  |
17+ 0       6.0343      0.48  Q         |         |         |      V  |
17+ 5       6.0384      0.60  |Q        |         |         |      V  |
17+10       6.0450      0.97  |Q        |         |         |      V  |
17+15       6.0528      1.12  | Q       |         |         |       V |
17+20       6.0609      1.18  | Q       |         |         |       V |
17+25       6.0694      1.23  | Q       |         |         |       V |
17+30       6.0780      1.25  | Q       |         |         |       V |
17+35       6.0868      1.27  | Q       |         |         |       V |
17+40       6.0956      1.29  | Q       |         |         |       V |
17+45       6.1046      1.30  | Q       |         |         |       V |
17+50       6.1132      1.25  | Q       |         |         |       V |
17+55       6.1205      1.06  | Q       |         |         |       V |
18+ 0       6.1273      0.99  |Q        |         |         |       V |
18+ 5       6.1340      0.96  |Q        |         |         |       V |
18+10       6.1405      0.95  |Q        |         |         |       V |
18+15       6.1470      0.94  |Q        |         |         |       V |
18+20       6.1534      0.94  |Q        |         |         |       V |
18+25       6.1599      0.93  |Q        |         |         |       V |
18+30       6.1663      0.93  |Q        |         |         |       V |
18+35       6.1723      0.87  |Q        |         |         |       V |
18+40       6.1770      0.69  |Q        |         |         |       V |
18+45       6.1813      0.62  |Q        |         |         |       V |
18+50       6.1849      0.53  |Q        |         |         |       V |
18+55       6.1871      0.32  Q         |         |         |       V |
19+ 0       6.1888      0.24  Q         |         |         |       V |
19+ 5       6.1906      0.26  Q         |         |         |       V |
19+10       6.1935      0.43  Q         |         |         |       V |
```

```
19+15       6.1969      0.49  Q         |         |         |       V |
19+20       6.2009      0.58  |Q        |         |         |       V |
19+25       6.2063      0.78  |Q        |         |         |       V |
19+30       6.2123      0.87  |Q        |         |         |        V|
19+35       6.2181      0.85  |Q        |         |         |        V|
19+40       6.2228      0.69  |Q        |         |         |        V|
19+45       6.2272      0.63  |Q        |         |         |        V|
19+50       6.2310      0.55  |Q        |         |         |        V|
19+55       6.2334      0.35  Q         |         |         |        V|
20+ 0       6.2353      0.27  Q         |         |         |        V|
20+ 5       6.2374      0.30  Q         |         |         |        V|
20+10       6.2406      0.47  Q         |         |         |        V|
20+15       6.2442      0.53  |Q        |         |         |        V|
20+20       6.2480      0.55  |Q        |         |         |        V|
20+25       6.2519      0.57  |Q        |         |         |        V|
20+30       6.2559      0.58  |Q        |         |         |        V|
20+35       6.2600      0.59  |Q        |         |         |        V|
20+40       6.2641      0.60  |Q        |         |         |        V|
20+45       6.2682      0.60  |Q        |         |         |        V|
20+50       6.2720      0.55  |Q        |         |         |        V|
20+55       6.2744      0.36  Q         |         |         |        V|
21+ 0       6.2764      0.29  Q         |         |         |        V|
21+ 5       6.2786      0.32  Q         |         |         |        V|
21+10       6.2820      0.49  Q         |         |         |        V|
21+15       6.2858      0.56  |Q        |         |         |        V|
21+20       6.2894      0.52  |Q        |         |         |        V|
21+25       6.2918      0.35  Q         |         |         |        V|
21+30       6.2938      0.28  Q         |         |         |        V|
21+35       6.2960      0.32  Q         |         |         |        V|
21+40       6.2994      0.50  Q         |         |         |        V|
21+45       6.3033      0.57  |Q        |         |         |        V|
21+50       6.3070      0.53  |Q        |         |         |        V|
21+55       6.3095      0.36  Q         |         |         |        V|
22+ 0       6.3116      0.30  Q         |         |         |        V|
22+ 5       6.3139      0.33  Q         |         |         |        V|
22+10       6.3174      0.51  |Q        |         |         |        V|
22+15       6.3214      0.58  |Q        |         |         |        V|
22+20       6.3251      0.55  |Q        |         |         |        V|
22+25       6.3277      0.37  Q         |         |         |        V|
22+30       6.3298      0.31  Q         |         |         |        V|
22+35       6.3318      0.28  Q         |         |         |        V|
22+40       6.3337      0.27  Q         |         |         |        V|
22+45       6.3355      0.27  Q         |         |         |        V|
22+50       6.3373      0.26  Q         |         |         |        V|
22+55       6.3391      0.26  Q         |         |         |        V|
23+ 0       6.3408      0.26  Q         |         |         |        V|
23+ 5       6.3426      0.25  Q         |         |         |        V|
23+10       6.3443      0.26  Q         |         |         |        V|
23+15       6.3461      0.26  Q         |         |         |        V|
23+20       6.3479      0.26  Q         |         |         |        V|
```

```
  23+25        6.3497      0.26  Q          |          |          |        V|
  23+30        6.3515      0.26  Q          |          |          |        V|
  23+35        6.3533      0.26  Q          |          |          |        V|
  23+40        6.3551      0.26  Q          |          |          |        V|
  23+45        6.3569      0.26  Q          |          |          |        V|
  23+50        6.3587      0.26  Q          |          |          |        V|
  23+55        6.3605      0.26  Q          |          |          |        V|
  24+ 0        6.3623      0.27  Q          |          |          |        V|
  24+ 5        6.3639      0.23  Q          |          |          |        V|
  24+10        6.3646      0.10  Q          |          |          |        V|
  24+15        6.3650      0.05  Q          |          |          |        V|
  24+20        6.3652      0.03  Q          |          |          |        V|
  24+25        6.3653      0.02  Q          |          |          |        V|
  24+30        6.3654      0.01  Q          |          |          |        V|
  24+35        6.3655      0.01  Q          |          |          |        V|
  24+40        6.3655      0.00  Q          |          |          |        V|
  24+45        6.3655      0.00  Q          |          |          |        V|
-----------------------------------------------------------------------
```

Appendix J.1V

Synthetic Unit Hydrograph Method Analysis
Post-Development Conditions
2-Year Storm

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
                Study date  05/27/22 File: MapesPost2AUH242.out


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

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6443

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



---------------------------------------------------------------------
MAPES AND TRUMBLE INDUSTRIAL FACILITY
UNIT HYDROGRAPH
POST-DEVELOPMENT CONDITIONS
2-YEAR, 24HR STORM, DA A
--------------------------------------------------------------------
Drainage Area =      18.09(Ac.)  =      0.028 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      18.09(Ac.)  =
0.028 Sq. Mi.
Length along longest watercourse =    1290.86(Ft.)
Length along longest watercourse measured to centroid =     632.74(Ft.)
Length along longest watercourse =      0.244 Mi.
Length along longest watercourse measured to centroid =      0.120 Mi.
Difference in elevation =      12.93(Ft.)
Slope along watercourse =     52.8875 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.044 Hr.
Lag time =     2.66 Min.
25% of lag time =     0.66 Min.
40% of lag time =     1.06 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:
```

```
Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       18.09            2.06                   37.27

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       18.09            5.31                   96.06

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    2.060(In)
Area Averaged 100-Year Rainfall =    5.310(In)

Point rain (area averaged) =    2.060(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    2.060(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    18.090           75.00         0.830
 Total Area Entered =     18.09(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
75.0  57.0      0.501     0.830        0.127       1.000      0.127
                                                  Sum (F) =   0.127
Area averaged mean soil loss (F) (In/Hr) =  0.127
Minimum soil loss rate ((In/Hr)) =  0.063
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.238
---------------------------------------------------------------------

                U n i t  H y d r o g r a p h
                        VALLEY S-Curve
--------------------------------------------------------------------
                Unit Hydrograph Data
---------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                           Graph %            (CFS)
---------------------------------------------------------------------
    1   0.083        188.172          41.282              7.526
    2   0.167        376.344          44.201              8.058
    3   0.250        564.517           9.293              1.694
    4   0.333        752.689           3.719              0.678
    5   0.417        940.861           1.505              0.274
                              Sum = 100.000   Sum=      18.231
-----------------------------------------------------------------------
```

```
The following loss rate calculations reflect use of the minimum calculated loss
rate subtracted from the Storm Rain to produce the maximum Effective Rain value

 Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
      (Hr.)  Percent   (In/Hr)         Max    |    Low        (In/Hr)
  1   0.08     0.07      0.016        (  0.225)       0.004          0.013
  2   0.17     0.07      0.016        (  0.224)       0.004          0.013
  3   0.25     0.07      0.016        (  0.223)       0.004          0.013
  4   0.33     0.10      0.025        (  0.222)       0.006          0.019
  5   0.42     0.10      0.025        (  0.221)       0.006          0.019
  6   0.50     0.10      0.025        (  0.220)       0.006          0.019
  7   0.58     0.10      0.025        (  0.219)       0.006          0.019
  8   0.67     0.10      0.025        (  0.218)       0.006          0.019
  9   0.75     0.10      0.025        (  0.218)       0.006          0.019
 10   0.83     0.13      0.033        (  0.217)       0.008          0.025
 11   0.92     0.13      0.033        (  0.216)       0.008          0.025
 12   1.00     0.13      0.033        (  0.215)       0.008          0.025
 13   1.08     0.10      0.025        (  0.214)       0.006          0.019
 14   1.17     0.10      0.025        (  0.213)       0.006          0.019
 15   1.25     0.10      0.025        (  0.213)       0.006          0.019
 16   1.33     0.10      0.025        (  0.212)       0.006          0.019
 17   1.42     0.10      0.025        (  0.211)       0.006          0.019
 18   1.50     0.10      0.025        (  0.210)       0.006          0.019
 19   1.58     0.10      0.025        (  0.209)       0.006          0.019
 20   1.67     0.10      0.025        (  0.208)       0.006          0.019
 21   1.75     0.10      0.025        (  0.207)       0.006          0.019
 22   1.83     0.13      0.033        (  0.207)       0.008          0.025
 23   1.92     0.13      0.033        (  0.206)       0.008          0.025
 24   2.00     0.13      0.033        (  0.205)       0.008          0.025
 25   2.08     0.13      0.033        (  0.204)       0.008          0.025
 26   2.17     0.13      0.033        (  0.203)       0.008          0.025
 27   2.25     0.13      0.033        (  0.202)       0.008          0.025
 28   2.33     0.13      0.033        (  0.202)       0.008          0.025
 29   2.42     0.13      0.033        (  0.201)       0.008          0.025
 30   2.50     0.13      0.033        (  0.200)       0.008          0.025
 31   2.58     0.17      0.041        (  0.199)       0.010          0.031
 32   2.67     0.17      0.041        (  0.198)       0.010          0.031
 33   2.75     0.17      0.041        (  0.198)       0.010          0.031
 34   2.83     0.17      0.041        (  0.197)       0.010          0.031
 35   2.92     0.17      0.041        (  0.196)       0.010          0.031
 36   3.00     0.17      0.041        (  0.195)       0.010          0.031
 37   3.08     0.17      0.041        (  0.194)       0.010          0.031
 38   3.17     0.17      0.041        (  0.194)       0.010          0.031
 39   3.25     0.17      0.041        (  0.193)       0.010          0.031
 40   3.33     0.17      0.041        (  0.192)       0.010          0.031
 41   3.42     0.17      0.041        (  0.191)       0.010          0.031
 42   3.50     0.17      0.041        (  0.190)       0.010          0.031
 43   3.58     0.17      0.041        (  0.190)       0.010          0.031
 44   3.67     0.17      0.041        (  0.189)       0.010          0.031
```

```
45   3.75     0.17      0.041        (  0.188)       0.010         0.031
46   3.83     0.20      0.049        (  0.187)       0.012         0.038
47   3.92     0.20      0.049        (  0.186)       0.012         0.038
48   4.00     0.20      0.049        (  0.186)       0.012         0.038
49   4.08     0.20      0.049        (  0.185)       0.012         0.038
50   4.17     0.20      0.049        (  0.184)       0.012         0.038
51   4.25     0.20      0.049        (  0.183)       0.012         0.038
52   4.33     0.23      0.058        (  0.182)       0.014         0.044
53   4.42     0.23      0.058        (  0.182)       0.014         0.044
54   4.50     0.23      0.058        (  0.181)       0.014         0.044
55   4.58     0.23      0.058        (  0.180)       0.014         0.044
56   4.67     0.23      0.058        (  0.179)       0.014         0.044
57   4.75     0.23      0.058        (  0.179)       0.014         0.044
58   4.83     0.27      0.066        (  0.178)       0.016         0.050
59   4.92     0.27      0.066        (  0.177)       0.016         0.050
60   5.00     0.27      0.066        (  0.176)       0.016         0.050
61   5.08     0.20      0.049        (  0.175)       0.012         0.038
62   5.17     0.20      0.049        (  0.175)       0.012         0.038
63   5.25     0.20      0.049        (  0.174)       0.012         0.038
64   5.33     0.23      0.058        (  0.173)       0.014         0.044
65   5.42     0.23      0.058        (  0.172)       0.014         0.044
66   5.50     0.23      0.058        (  0.172)       0.014         0.044
67   5.58     0.27      0.066        (  0.171)       0.016         0.050
68   5.67     0.27      0.066        (  0.170)       0.016         0.050
69   5.75     0.27      0.066        (  0.169)       0.016         0.050
70   5.83     0.27      0.066        (  0.169)       0.016         0.050
71   5.92     0.27      0.066        (  0.168)       0.016         0.050
72   6.00     0.27      0.066        (  0.167)       0.016         0.050
73   6.08     0.30      0.074        (  0.166)       0.018         0.057
74   6.17     0.30      0.074        (  0.166)       0.018         0.057
75   6.25     0.30      0.074        (  0.165)       0.018         0.057
76   6.33     0.30      0.074        (  0.164)       0.018         0.057
77   6.42     0.30      0.074        (  0.163)       0.018         0.057
78   6.50     0.30      0.074        (  0.163)       0.018         0.057
79   6.58     0.33      0.082        (  0.162)       0.020         0.063
80   6.67     0.33      0.082        (  0.161)       0.020         0.063
81   6.75     0.33      0.082        (  0.161)       0.020         0.063
82   6.83     0.33      0.082        (  0.160)       0.020         0.063
83   6.92     0.33      0.082        (  0.159)       0.020         0.063
84   7.00     0.33      0.082        (  0.158)       0.020         0.063
85   7.08     0.33      0.082        (  0.158)       0.020         0.063
86   7.17     0.33      0.082        (  0.157)       0.020         0.063
87   7.25     0.33      0.082        (  0.156)       0.020         0.063
88   7.33     0.37      0.091        (  0.156)       0.022         0.069
89   7.42     0.37      0.091        (  0.155)       0.022         0.069
90   7.50     0.37      0.091        (  0.154)       0.022         0.069
91   7.58     0.40      0.099        (  0.153)       0.024         0.075
92   7.67     0.40      0.099        (  0.153)       0.024         0.075
93   7.75     0.40      0.099        (  0.152)       0.024         0.075
94   7.83     0.43      0.107        (  0.151)       0.025         0.082
```

```
 95   7.92      0.43      0.107        (  0.151)       0.025         0.082
 96   8.00      0.43      0.107        (  0.150)       0.025         0.082
 97   8.08      0.50      0.124        (  0.149)       0.029         0.094
 98   8.17      0.50      0.124        (  0.148)       0.029         0.094
 99   8.25      0.50      0.124        (  0.148)       0.029         0.094
100   8.33      0.50      0.124        (  0.147)       0.029         0.094
101   8.42      0.50      0.124        (  0.146)       0.029         0.094
102   8.50      0.50      0.124        (  0.146)       0.029         0.094
103   8.58      0.53      0.132        (  0.145)       0.031         0.100
104   8.67      0.53      0.132        (  0.144)       0.031         0.100
105   8.75      0.53      0.132        (  0.144)       0.031         0.100
106   8.83      0.57      0.140        (  0.143)       0.033         0.107
107   8.92      0.57      0.140        (  0.142)       0.033         0.107
108   9.00      0.57      0.140        (  0.142)       0.033         0.107
109   9.08      0.63      0.157        (  0.141)       0.037         0.119
110   9.17      0.63      0.157        (  0.140)       0.037         0.119
111   9.25      0.63      0.157        (  0.140)       0.037         0.119
112   9.33      0.67      0.165        (  0.139)       0.039         0.126
113   9.42      0.67      0.165        (  0.138)       0.039         0.126
114   9.50      0.67      0.165        (  0.138)       0.039         0.126
115   9.58      0.70      0.173        (  0.137)       0.041         0.132
116   9.67      0.70      0.173        (  0.136)       0.041         0.132
117   9.75      0.70      0.173        (  0.136)       0.041         0.132
118   9.83      0.73      0.181        (  0.135)       0.043         0.138
119   9.92      0.73      0.181        (  0.134)       0.043         0.138
120  10.00      0.73      0.181        (  0.134)       0.043         0.138
121  10.08      0.50      0.124        (  0.133)       0.029         0.094
122  10.17      0.50      0.124        (  0.132)       0.029         0.094
123  10.25      0.50      0.124        (  0.132)       0.029         0.094
124  10.33      0.50      0.124        (  0.131)       0.029         0.094
125  10.42      0.50      0.124        (  0.131)       0.029         0.094
126  10.50      0.50      0.124        (  0.130)       0.029         0.094
127  10.58      0.67      0.165        (  0.129)       0.039         0.126
128  10.67      0.67      0.165        (  0.129)       0.039         0.126
129  10.75      0.67      0.165        (  0.128)       0.039         0.126
130  10.83      0.67      0.165        (  0.127)       0.039         0.126
131  10.92      0.67      0.165        (  0.127)       0.039         0.126
132  11.00      0.67      0.165        (  0.126)       0.039         0.126
133  11.08      0.63      0.157        (  0.126)       0.037         0.119
134  11.17      0.63      0.157        (  0.125)       0.037         0.119
135  11.25      0.63      0.157        (  0.124)       0.037         0.119
136  11.33      0.63      0.157        (  0.124)       0.037         0.119
137  11.42      0.63      0.157        (  0.123)       0.037         0.119
138  11.50      0.63      0.157        (  0.122)       0.037         0.119
139  11.58      0.57      0.140        (  0.122)       0.033         0.107
140  11.67      0.57      0.140        (  0.121)       0.033         0.107
141  11.75      0.57      0.140        (  0.121)       0.033         0.107
142  11.83      0.60      0.148        (  0.120)       0.035         0.113
143  11.92      0.60      0.148        (  0.119)       0.035         0.113
144  12.00      0.60      0.148        (  0.119)       0.035         0.113
```

145	12.08	0.83	0.206	(0.118)	0.049	0.157
146	12.17	0.83	0.206	(0.118)	0.049	0.157
147	12.25	0.83	0.206	(0.117)	0.049	0.157
148	12.33	0.87	0.214	(0.116)	0.051	0.163
149	12.42	0.87	0.214	(0.116)	0.051	0.163
150	12.50	0.87	0.214	(0.115)	0.051	0.163
151	12.58	0.93	0.231	(0.115)	0.055	0.176
152	12.67	0.93	0.231	(0.114)	0.055	0.176
153	12.75	0.93	0.231	(0.114)	0.055	0.176
154	12.83	0.97	0.239	(0.113)	0.057	0.182
155	12.92	0.97	0.239	(0.112)	0.057	0.182
156	13.00	0.97	0.239	(0.112)	0.057	0.182
157	13.08	1.13	0.280	(0.111)	0.067	0.213
158	13.17	1.13	0.280	(0.111)	0.067	0.213
159	13.25	1.13	0.280	(0.110)	0.067	0.213
160	13.33	1.13	0.280	(0.110)	0.067	0.213
161	13.42	1.13	0.280	(0.109)	0.067	0.213
162	13.50	1.13	0.280	(0.108)	0.067	0.213
163	13.58	0.77	0.190	(0.108)	0.045	0.144
164	13.67	0.77	0.190	(0.107)	0.045	0.144
165	13.75	0.77	0.190	(0.107)	0.045	0.144
166	13.83	0.77	0.190	(0.106)	0.045	0.144
167	13.92	0.77	0.190	(0.106)	0.045	0.144
168	14.00	0.77	0.190	(0.105)	0.045	0.144
169	14.08	0.90	0.222	(0.105)	0.053	0.170
170	14.17	0.90	0.222	(0.104)	0.053	0.170
171	14.25	0.90	0.222	(0.104)	0.053	0.170
172	14.33	0.87	0.214	(0.103)	0.051	0.163
173	14.42	0.87	0.214	(0.103)	0.051	0.163
174	14.50	0.87	0.214	(0.102)	0.051	0.163
175	14.58	0.87	0.214	(0.101)	0.051	0.163
176	14.67	0.87	0.214	(0.101)	0.051	0.163
177	14.75	0.87	0.214	(0.100)	0.051	0.163
178	14.83	0.83	0.206	(0.100)	0.049	0.157
179	14.92	0.83	0.206	(0.099)	0.049	0.157
180	15.00	0.83	0.206	(0.099)	0.049	0.157
181	15.08	0.80	0.198	(0.098)	0.047	0.151
182	15.17	0.80	0.198	(0.098)	0.047	0.151
183	15.25	0.80	0.198	(0.097)	0.047	0.151
184	15.33	0.77	0.190	(0.097)	0.045	0.144
185	15.42	0.77	0.190	(0.096)	0.045	0.144
186	15.50	0.77	0.190	(0.096)	0.045	0.144
187	15.58	0.63	0.157	(0.095)	0.037	0.119
188	15.67	0.63	0.157	(0.095)	0.037	0.119
189	15.75	0.63	0.157	(0.094)	0.037	0.119
190	15.83	0.63	0.157	(0.094)	0.037	0.119
191	15.92	0.63	0.157	(0.093)	0.037	0.119
192	16.00	0.63	0.157	(0.093)	0.037	0.119
193	16.08	0.13	0.033	(0.093)	0.008	0.025
194	16.17	0.13	0.033	(0.092)	0.008	0.025

```
195   16.25      0.13       0.033         (   0.092)        0.008          0.025
196   16.33      0.13       0.033         (   0.091)        0.008          0.025
197   16.42      0.13       0.033         (   0.091)        0.008          0.025
198   16.50      0.13       0.033         (   0.090)        0.008          0.025
199   16.58      0.10       0.025         (   0.090)        0.006          0.019
200   16.67      0.10       0.025         (   0.089)        0.006          0.019
201   16.75      0.10       0.025         (   0.089)        0.006          0.019
202   16.83      0.10       0.025         (   0.088)        0.006          0.019
203   16.92      0.10       0.025         (   0.088)        0.006          0.019
204   17.00      0.10       0.025         (   0.087)        0.006          0.019
205   17.08      0.17       0.041         (   0.087)        0.010          0.031
206   17.17      0.17       0.041         (   0.087)        0.010          0.031
207   17.25      0.17       0.041         (   0.086)        0.010          0.031
208   17.33      0.17       0.041         (   0.086)        0.010          0.031
209   17.42      0.17       0.041         (   0.085)        0.010          0.031
210   17.50      0.17       0.041         (   0.085)        0.010          0.031
211   17.58      0.17       0.041         (   0.084)        0.010          0.031
212   17.67      0.17       0.041         (   0.084)        0.010          0.031
213   17.75      0.17       0.041         (   0.084)        0.010          0.031
214   17.83      0.13       0.033         (   0.083)        0.008          0.025
215   17.92      0.13       0.033         (   0.083)        0.008          0.025
216   18.00      0.13       0.033         (   0.082)        0.008          0.025
217   18.08      0.13       0.033         (   0.082)        0.008          0.025
218   18.17      0.13       0.033         (   0.082)        0.008          0.025
219   18.25      0.13       0.033         (   0.081)        0.008          0.025
220   18.33      0.13       0.033         (   0.081)        0.008          0.025
221   18.42      0.13       0.033         (   0.080)        0.008          0.025
222   18.50      0.13       0.033         (   0.080)        0.008          0.025
223   18.58      0.10       0.025         (   0.080)        0.006          0.019
224   18.67      0.10       0.025         (   0.079)        0.006          0.019
225   18.75      0.10       0.025         (   0.079)        0.006          0.019
226   18.83      0.07       0.016         (   0.078)        0.004          0.013
227   18.92      0.07       0.016         (   0.078)        0.004          0.013
228   19.00      0.07       0.016         (   0.078)        0.004          0.013
229   19.08      0.10       0.025         (   0.077)        0.006          0.019
230   19.17      0.10       0.025         (   0.077)        0.006          0.019
231   19.25      0.10       0.025         (   0.077)        0.006          0.019
232   19.33      0.13       0.033         (   0.076)        0.008          0.025
233   19.42      0.13       0.033         (   0.076)        0.008          0.025
234   19.50      0.13       0.033         (   0.076)        0.008          0.025
235   19.58      0.10       0.025         (   0.075)        0.006          0.019
236   19.67      0.10       0.025         (   0.075)        0.006          0.019
237   19.75      0.10       0.025         (   0.075)        0.006          0.019
238   19.83      0.07       0.016         (   0.074)        0.004          0.013
239   19.92      0.07       0.016         (   0.074)        0.004          0.013
240   20.00      0.07       0.016         (   0.074)        0.004          0.013
241   20.08      0.10       0.025         (   0.073)        0.006          0.019
242   20.17      0.10       0.025         (   0.073)        0.006          0.019
243   20.25      0.10       0.025         (   0.073)        0.006          0.019
244   20.33      0.10       0.025         (   0.072)        0.006          0.019
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245  20.42     0.10      0.025       (  0.072)      0.006        0.019
246  20.50     0.10      0.025       (  0.072)      0.006        0.019
247  20.58     0.10      0.025       (  0.071)      0.006        0.019
248  20.67     0.10      0.025       (  0.071)      0.006        0.019
249  20.75     0.10      0.025       (  0.071)      0.006        0.019
250  20.83     0.07      0.016       (  0.070)      0.004        0.013
251  20.92     0.07      0.016       (  0.070)      0.004        0.013
252  21.00     0.07      0.016       (  0.070)      0.004        0.013
253  21.08     0.10      0.025       (  0.070)      0.006        0.019
254  21.17     0.10      0.025       (  0.069)      0.006        0.019
255  21.25     0.10      0.025       (  0.069)      0.006        0.019
256  21.33     0.07      0.016       (  0.069)      0.004        0.013
257  21.42     0.07      0.016       (  0.069)      0.004        0.013
258  21.50     0.07      0.016       (  0.068)      0.004        0.013
259  21.58     0.10      0.025       (  0.068)      0.006        0.019
260  21.67     0.10      0.025       (  0.068)      0.006        0.019
261  21.75     0.10      0.025       (  0.068)      0.006        0.019
262  21.83     0.07      0.016       (  0.067)      0.004        0.013
263  21.92     0.07      0.016       (  0.067)      0.004        0.013
264  22.00     0.07      0.016       (  0.067)      0.004        0.013
265  22.08     0.10      0.025       (  0.067)      0.006        0.019
266  22.17     0.10      0.025       (  0.066)      0.006        0.019
267  22.25     0.10      0.025       (  0.066)      0.006        0.019
268  22.33     0.07      0.016       (  0.066)      0.004        0.013
269  22.42     0.07      0.016       (  0.066)      0.004        0.013
270  22.50     0.07      0.016       (  0.066)      0.004        0.013
271  22.58     0.07      0.016       (  0.065)      0.004        0.013
272  22.67     0.07      0.016       (  0.065)      0.004        0.013
273  22.75     0.07      0.016       (  0.065)      0.004        0.013
274  22.83     0.07      0.016       (  0.065)      0.004        0.013
275  22.92     0.07      0.016       (  0.065)      0.004        0.013
276  23.00     0.07      0.016       (  0.065)      0.004        0.013
277  23.08     0.07      0.016       (  0.064)      0.004        0.013
278  23.17     0.07      0.016       (  0.064)      0.004        0.013
279  23.25     0.07      0.016       (  0.064)      0.004        0.013
280  23.33     0.07      0.016       (  0.064)      0.004        0.013
281  23.42     0.07      0.016       (  0.064)      0.004        0.013
282  23.50     0.07      0.016       (  0.064)      0.004        0.013
283  23.58     0.07      0.016       (  0.064)      0.004        0.013
284  23.67     0.07      0.016       (  0.064)      0.004        0.013
285  23.75     0.07      0.016       (  0.063)      0.004        0.013
286  23.83     0.07      0.016       (  0.063)      0.004        0.013
287  23.92     0.07      0.016       (  0.063)      0.004        0.013
288  24.00     0.07      0.016       (  0.063)      0.004        0.013
                (Loss Rate Not Used)
    Sum =     100.0                                  Sum =    18.8
       Flood volume = Effective rainfall      1.57(In)
        times area      18.1(Ac.)/[(In)/(Ft.)] =      2.4(Ac.Ft)
       Total soil loss =      0.49(In)
       Total soil loss =     0.739(Ac.Ft)
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      Total rainfall =      2.06(In)
      Flood volume =      103074.7 Cubic Feet
      Total soil loss =       32193.9 Cubic Feet
      --------------------------------------------------------------------
       Peak flow rate of this hydrograph =      3.894(CFS)
      --------------------------------------------------------------------
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          24 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      --------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0007      0.09  Q         |         |         |         |
  0+10       0.0020      0.20  Q         |         |         |         |
  0+15       0.0035      0.22  Q         |         |         |         |
  0+20       0.0054      0.27  VQ        |         |         |         |
  0+25       0.0076      0.33  VQ        |         |         |         |
  0+30       0.0100      0.34  VQ        |         |         |         |
  0+35       0.0123      0.34  VQ        |         |         |         |
  0+40       0.0147      0.34  VQ        |         |         |         |
  0+45       0.0170      0.34  VQ        |         |         |         |
  0+50       0.0197      0.39  VQ        |         |         |         |
  0+55       0.0228      0.44  VQ        |         |         |         |
  1+ 0       0.0259      0.45  VQ        |         |         |         |
  1+ 5       0.0287      0.41  VQ        |         |         |         |
  1+10       0.0312      0.36  VQ        |         |         |         |
  1+15       0.0336      0.35  VQ        |         |         |         |
  1+20       0.0360      0.35  VQ        |         |         |         |
  1+25       0.0383      0.34  VQ        |         |         |         |
  1+30       0.0407      0.34  VQ        |         |         |         |
  1+35       0.0431      0.34  VQ        |         |         |         |
  1+40       0.0454      0.34  VQ        |         |         |         |
  1+45       0.0478      0.34  VQ        |         |         |         |
  1+50       0.0505      0.39  VQ        |         |         |         |
  1+55       0.0535      0.44  VQ        |         |         |         |
  2+ 0       0.0566      0.45  VQ        |         |         |         |
  2+ 5       0.0598      0.46  |Q        |         |         |         |
  2+10       0.0629      0.46  |Q        |         |         |         |
  2+15       0.0661      0.46  |Q        |         |         |         |
  2+20       0.0693      0.46  |Q        |         |         |         |
  2+25       0.0724      0.46  |Q        |         |         |         |
  2+30       0.0756      0.46  |Q        |         |         |         |
  2+35       0.0790      0.51  |VQ       |         |         |         |
  2+40       0.0829      0.56  |VQ       |         |         |         |
  2+45       0.0868      0.57  |VQ       |         |         |         |
  2+50       0.0907      0.57  |VQ       |         |         |         |
  2+55       0.0947      0.57  |VQ       |         |         |         |
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3+ 0       0.0986      0.57 |VQ       |         |         |         |
3+ 5       0.1025      0.57 |VQ       |         |         |         |
3+10       0.1065      0.57 |VQ       |         |         |         |
3+15       0.1104      0.57 |VQ       |         |         |         |
3+20       0.1144      0.57 |VQ       |         |         |         |
3+25       0.1183      0.57 | Q       |         |         |         |
3+30       0.1223      0.57 | Q       |         |         |         |
3+35       0.1262      0.57 | Q       |         |         |         |
3+40       0.1301      0.57 | Q       |         |         |         |
3+45       0.1341      0.57 | Q       |         |         |         |
3+50       0.1384      0.62 | Q       |         |         |         |
3+55       0.1430      0.67 | Q       |         |         |         |
4+ 0       0.1477      0.68 | Q       |         |         |         |
4+ 5       0.1524      0.69 | Q       |         |         |         |
4+10       0.1571      0.69 | Q       |         |         |         |
4+15       0.1619      0.69 | Q       |         |         |         |
4+20       0.1669      0.73 | Q       |         |         |         |
4+25       0.1723      0.79 | VQ      |         |         |         |
4+30       0.1778      0.80 |  Q      |         |         |         |
4+35       0.1833      0.80 |  Q      |         |         |         |
4+40       0.1888      0.80 |  Q      |         |         |         |
4+45       0.1944      0.80 |  Q      |         |         |         |
4+50       0.2002      0.85 |  Q      |         |         |         |
4+55       0.2064      0.90 |  Q      |         |         |         |
5+ 0       0.2127      0.91 |  Q      |         |         |         |
5+ 5       0.2183      0.82 |  Q      |         |         |         |
5+10       0.2233      0.72 | QV      |         |         |         |
5+15       0.2281      0.70 | QV      |         |         |         |
5+20       0.2332      0.74 | QV      |         |         |         |
5+25       0.2386      0.79 |  QV     |         |         |         |
5+30       0.2441      0.80 |  QV     |         |         |         |
5+35       0.2499      0.85 |  QV     |         |         |         |
5+40       0.2561      0.90 |  QV     |         |         |         |
5+45       0.2624      0.91 |  QV     |         |         |         |
5+50       0.2687      0.91 |  QV     |         |         |         |
5+55       0.2750      0.92 |  QV     |         |         |         |
6+ 0       0.2813      0.92 |  QV     |         |         |         |
6+ 5       0.2879      0.96 |  QV     |         |         |         |
6+10       0.2949      1.01 |   Q     |         |         |         |
6+15       0.3020      1.02 |   QV    |         |         |         |
6+20       0.3090      1.03 |   QV    |         |         |         |
6+25       0.3161      1.03 |   QV    |         |         |         |
6+30       0.3232      1.03 |   QV    |         |         |         |
6+35       0.3307      1.08 |   QV    |         |         |         |
6+40       0.3384      1.13 |   QV    |         |         |         |
6+45       0.3463      1.14 |   QV    |         |         |         |
6+50       0.3542      1.14 |   QV    |         |         |         |
6+55       0.3620      1.15 |   Q V   |         |         |         |
7+ 0       0.3699      1.15 |   Q V   |         |         |         |
7+ 5       0.3778      1.15 |   Q V   |         |         |         |
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 7+10       0.3857      1.15  |   Q V   |         |         |         |
 7+15       0.3936      1.15  |   Q V   |         |         |         |
 7+20       0.4018      1.19  |   Q V   |         |         |         |
 7+25       0.4104      1.24  |   Q V   |         |         |         |
 7+30       0.4190      1.25  |    Q V  |         |         |         |
 7+35       0.4280      1.31  |    Q V  |         |         |         |
 7+40       0.4373      1.36  |    Q V  |         |         |         |
 7+45       0.4468      1.37  |    Q V  |         |         |         |
 7+50       0.4565      1.42  |    Q V  |         |         |         |
 7+55       0.4667      1.47  |    Q V  |         |         |         |
 8+ 0       0.4769      1.48  |    Q  V |         |         |         |
 8+ 5       0.4878      1.58  |     Q V |         |         |         |
 8+10       0.4994      1.68  |     Q V |         |         |         |
 8+15       0.5111      1.71  |     Q V |         |         |         |
 8+20       0.5229      1.71  |     Q V |         |         |         |
 8+25       0.5348      1.72  |     Q  V|         |         |         |
 8+30       0.5466      1.72  |     Q  V|         |         |         |
 8+35       0.5588      1.77  |      Q V|         |         |         |
 8+40       0.5713      1.82  |      Q V|         |         |         |
 8+45       0.5839      1.83  |      Q V|         |         |         |
 8+50       0.5968      1.88  |      Q  V         |         |         |
 8+55       0.6101      1.93  |      Q  V         |         |         |
 9+ 0       0.6234      1.94  |      Q  V         |         |         |
 9+ 5       0.6375      2.04  |       Q V         |         |         |
 9+10       0.6523      2.14  |       Q |V        |         |         |
 9+15       0.6672      2.16  |       Q |V        |         |         |
 9+20       0.6824      2.22  |       Q |V        |         |         |
 9+25       0.6981      2.27  |        Q|V        |         |         |
 9+30       0.7138      2.28  |        Q| V       |         |         |
 9+35       0.7299      2.34  |        Q| V       |         |         |
 9+40       0.7464      2.39  |        Q| V       |         |         |
 9+45       0.7629      2.40  |        Q| V       |         |         |
 9+50       0.7798      2.45  |        Q|  V      |         |         |
 9+55       0.7970      2.50  |         Q  V      |         |         |
10+ 0       0.8143      2.51  |         Q  V      |         |         |
10+ 5       0.8294      2.19  |       Q |   V     |         |         |
10+10       0.8420      1.83  |      Q  |   V     |         |         |
10+15       0.8541      1.76  |      Q  |   V     |         |         |
10+20       0.8661      1.73  |     Q   |   V     |         |         |
10+25       0.8779      1.72  |     Q   |   V     |         |         |
10+30       0.8897      1.72  |     Q   |    V    |         |         |
10+35       0.9032      1.95  |      Q  |    V    |         |         |
10+40       0.9184      2.21  |       Q |    V    |         |         |
10+45       0.9340      2.26  |        Q|    V    |         |         |
10+50       0.9497      2.28  |        Q|     V   |         |         |
10+55       0.9654      2.29  |        Q|     V   |         |         |
11+ 0       0.9812      2.29  |        Q|     V   |         |         |
11+ 5       0.9967      2.24  |       Q |     V   |         |         |
11+10       1.0118      2.19  |       Q |      V  |         |         |
11+15       1.0268      2.18  |       Q |      V  |         |         |
```

```
11+20       1.0418      2.18  |       Q |      V  |         |         |
11+25       1.0568      2.18  |       Q |      V  |         |         |
11+30       1.0718      2.18  |       Q |       V |         |         |
11+35       1.0861      2.08  |       Q |       V |         |         |
11+40       1.0997      1.98  |      Q  |       V |         |         |
11+45       1.1132      1.96  |      Q  |       V |         |         |
11+50       1.1270      2.00  |      Q  |        V|         |         |
11+55       1.1411      2.04  |       Q |        V|         |         |
12+ 0       1.1552      2.06  |       Q |        V|         |         |
12+ 5       1.1717      2.39  |        Q|        V|         |         |
12+10       1.1906      2.75  |         Q         V         |         |
12+15       1.2100      2.82  |         |Q        V         |         |
12+20       1.2300      2.90  |         |Q        V         |         |
12+25       1.2504      2.96  |         |Q        |V        |         |
12+30       1.2709      2.97  |         |Q        |V        |         |
12+35       1.2920      3.07  |         | Q       |V        |         |
12+40       1.3139      3.17  |         | Q       | V       |         |
12+45       1.3359      3.19  |         | Q       | V       |         |
12+50       1.3583      3.25  |         |  Q      | V       |         |
12+55       1.3810      3.30  |         |  Q      |  V      |         |
13+ 0       1.4038      3.32  |         |  Q      |  V      |         |
13+ 5       1.4283      3.56  |         |   Q     |   V     |         |
13+10       1.4546      3.81  |         |    Q    |   V     |         |
13+15       1.4812      3.86  |         |    Q    |    V    |         |
13+20       1.5080      3.89  |         |    Q    |    V    |         |
13+25       1.5348      3.89  |         |    Q    |    V    |         |
13+30       1.5616      3.89  |         |    Q    |     V   |         |
13+35       1.5848      3.37  |         |  Q      |     V   |         |
13+40       1.6042      2.82  |         |Q        |      V  |         |
13+45       1.6228      2.70  |         Q         |      V  |         |
13+50       1.6411      2.65  |         Q         |      V  |         |
13+55       1.6592      2.63  |         Q         |       V |         |
14+ 0       1.6774      2.63  |         Q         |       V |         |
14+ 5       1.6968      2.82  |         |Q        |       V |         |
14+10       1.7177      3.03  |         | Q       |        V|         |
14+15       1.7388      3.07  |         | Q       |        V|         |
14+20       1.7597      3.04  |         | Q       |        V|         |
14+25       1.7803      2.99  |         |Q        |         V         |
14+30       1.8009      2.98  |         |Q        |         V         |
14+35       1.8214      2.98  |         |Q        |         V         |
14+40       1.8419      2.98  |         |Q        |         |V        |
14+45       1.8624      2.98  |         |Q        |         |V        |
14+50       1.8826      2.93  |         |Q        |         |V        |
14+55       1.9024      2.88  |         |Q        |         | V       |
15+ 0       1.9222      2.87  |         |Q        |         | V       |
15+ 5       1.9416      2.82  |         |Q        |         | V       |
15+10       1.9606      2.77  |         |Q        |         |  V      |
15+15       1.9796      2.75  |         |Q        |         |  V      |
15+20       1.9982      2.70  |         Q         |         |  V      |
15+25       2.0165      2.65  |         Q         |         |   V     |
```

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15+30       2.0347      2.64  |         Q         |         |   V     |
15+35       2.0515      2.45  |        Q|         |         |   V     |
15+40       2.0670      2.24  |       Q |         |         |   V     |
15+45       2.0821      2.20  |       Q |         |         |    V    |
15+50       2.0972      2.18  |       Q |         |         |    V    |
15+55       2.1121      2.18  |       Q |         |         |    V    |
16+ 0       2.1271      2.18  |       Q |         |         |    V    |
16+ 5       2.1372      1.47  |    Q    |         |         |     V   |
16+10       2.1421      0.71  | Q       |         |         |     V   |
16+15       2.1459      0.55  | Q       |         |         |     V   |
16+20       2.1492      0.48  |Q        |         |         |     V   |
16+25       2.1524      0.46  |Q        |         |         |     V   |
16+30       2.1555      0.46  |Q        |         |         |     V   |
16+35       2.1583      0.41  |Q        |         |         |     V   |
16+40       2.1608      0.36  |Q        |         |         |     V   |
16+45       2.1632      0.35  |Q        |         |         |     V   |
16+50       2.1656      0.35  |Q        |         |         |     V   |
16+55       2.1680      0.34  |Q        |         |         |     V   |
17+ 0       2.1703      0.34  |Q        |         |         |     V   |
17+ 5       2.1734      0.44  |Q        |         |         |     V   |
17+10       2.1771      0.54  | Q       |         |         |     V   |
17+15       2.1809      0.56  | Q       |         |         |     V   |
17+20       2.1849      0.57  | Q       |         |         |     V   |
17+25       2.1888      0.57  | Q       |         |         |      V  |
17+30       2.1927      0.57  | Q       |         |         |      V  |
17+35       2.1967      0.57  | Q       |         |         |      V  |
17+40       2.2006      0.57  | Q       |         |         |      V  |
17+45       2.2046      0.57  | Q       |         |         |      V  |
17+50       2.2082      0.53  | Q       |         |         |      V  |
17+55       2.2115      0.47  |Q        |         |         |      V  |
18+ 0       2.2147      0.46  |Q        |         |         |      V  |
18+ 5       2.2178      0.46  |Q        |         |         |      V  |
18+10       2.2210      0.46  |Q        |         |         |      V  |
18+15       2.2241      0.46  |Q        |         |         |      V  |
18+20       2.2273      0.46  |Q        |         |         |      V  |
18+25       2.2304      0.46  |Q        |         |         |      V  |
18+30       2.2336      0.46  |Q        |         |         |      V  |
18+35       2.2364      0.41  |Q        |         |         |      V  |
18+40       2.2389      0.36  |Q        |         |         |      V  |
18+45       2.2413      0.35  |Q        |         |         |      V  |
18+50       2.2434      0.30  |Q        |         |         |      V  |
18+55       2.2451      0.25  Q         |         |         |      V  |
19+ 0       2.2467      0.24  Q         |         |         |      V  |
19+ 5       2.2486      0.28  |Q        |         |         |       V |
19+10       2.2508      0.33  |Q        |         |         |       V |
19+15       2.2532      0.34  |Q        |         |         |       V |
19+20       2.2559      0.39  |Q        |         |         |       V |
19+25       2.2589      0.44  |Q        |         |         |       V |
19+30       2.2620      0.45  |Q        |         |         |       V |
19+35       2.2648      0.41  |Q        |         |         |       V |
```

```
19+40       2.2673      0.36  |Q        |         |         |       V |
19+45       2.2697      0.35  |Q        |         |         |       V |
19+50       2.2718      0.30  |Q        |         |         |       V |
19+55       2.2735      0.25  Q         |         |         |       V |
20+ 0       2.2751      0.24  Q         |         |         |       V |
20+ 5       2.2770      0.28  |Q        |         |         |       V |
20+10       2.2792      0.33  |Q        |         |         |       V |
20+15       2.2816      0.34  |Q        |         |         |       V |
20+20       2.2839      0.34  |Q        |         |         |       V |
20+25       2.2863      0.34  |Q        |         |         |       V |
20+30       2.2887      0.34  |Q        |         |         |       V |
20+35       2.2910      0.34  |Q        |         |         |       V |
20+40       2.2934      0.34  |Q        |         |         |       V |
20+45       2.2958      0.34  |Q        |         |         |       V |
20+50       2.2978      0.30  |Q        |         |         |       V |
20+55       2.2995      0.25  Q         |         |         |       V |
21+ 0       2.3011      0.24  Q         |         |         |       V |
21+ 5       2.3030      0.28  |Q        |         |         |       V |
21+10       2.3053      0.33  |Q        |         |         |       V |
21+15       2.3076      0.34  |Q        |         |         |        V|
21+20       2.3096      0.29  |Q        |         |         |        V|
21+25       2.3113      0.25  Q         |         |         |        V|
21+30       2.3129      0.24  Q         |         |         |        V|
21+35       2.3149      0.28  |Q        |         |         |        V|
21+40       2.3171      0.33  |Q        |         |         |        V|
21+45       2.3194      0.34  |Q        |         |         |        V|
21+50       2.3215      0.29  |Q        |         |         |        V|
21+55       2.3232      0.25  Q         |         |         |        V|
22+ 0       2.3248      0.24  Q         |         |         |        V|
22+ 5       2.3267      0.28  |Q        |         |         |        V|
22+10       2.3289      0.33  |Q        |         |         |        V|
22+15       2.3313      0.34  |Q        |         |         |        V|
22+20       2.3333      0.29  |Q        |         |         |        V|
22+25       2.3350      0.25  Q         |         |         |        V|
22+30       2.3366      0.24  Q         |         |         |        V|
22+35       2.3382      0.23  Q         |         |         |        V|
22+40       2.3398      0.23  Q         |         |         |        V|
22+45       2.3413      0.23  Q         |         |         |        V|
22+50       2.3429      0.23  Q         |         |         |        V|
22+55       2.3445      0.23  Q         |         |         |        V|
23+ 0       2.3461      0.23  Q         |         |         |        V|
23+ 5       2.3477      0.23  Q         |         |         |        V|
23+10       2.3492      0.23  Q         |         |         |        V|
23+15       2.3508      0.23  Q         |         |         |        V|
23+20       2.3524      0.23  Q         |         |         |        V|
23+25       2.3540      0.23  Q         |         |         |        V|
23+30       2.3555      0.23  Q         |         |         |        V|
23+35       2.3571      0.23  Q         |         |         |        V|
23+40       2.3587      0.23  Q         |         |         |        V|
23+45       2.3603      0.23  Q         |         |         |        V|
```

```
   23+50       2.3619      0.23  Q         |         |         |       V|
   23+55       2.3634      0.23  Q         |         |         |       V|
   24+ 0       2.3650      0.23  Q         |         |         |       V|
   24+ 5       2.3659      0.13  Q         |         |         |       V|
   24+10       2.3662      0.03  Q         |         |         |       V|
   24+15       2.3662      0.01  Q         |         |         |       V|
   24+20       2.3663      0.00  Q         |         |         |        V
----------------------------------------------------------------------
```

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
                Study date  05/27/22 File: MapesPost2BUH242.out


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

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6443

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format




---------------------------------------------------------------------
MAPES AND TRUMBLE INDUSTRIAL FACILITY
UNIT HYDROGRAPH
POST-DEVELOPMENT CONDITIONS
2-YEAR, 6HR STORM, DA B
--------------------------------------------------------------------
Drainage Area =       0.92(Ac.)  =      0.001 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       0.92(Ac.)  =
0.001 Sq. Mi.
Length along longest watercourse =     834.61(Ft.)
Length along longest watercourse measured to centroid =     558.41(Ft.)
Length along longest watercourse =      0.158 Mi.
Length along longest watercourse measured to centroid =      0.106 Mi.
Difference in elevation =       9.65(Ft.)
Slope along watercourse =     61.0489 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.035 Hr.
Lag time =     2.09 Min.
25% of lag time =     0.52 Min.
40% of lag time =     0.84 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:
```

```
        Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
                0.92            2.06                    1.90

        100 YEAR Area rainfall data:


        Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
                0.92            5.31                    4.89

        STORM EVENT (YEAR) =    2.00
        Area Averaged 2-Year Rainfall =    2.060(In)
        Area Averaged 100-Year Rainfall =    5.310(In)

        Point rain (area averaged) =    2.060(In)
        Areal adjustment factor =  100.00 %
        Adjusted average point rain =    2.060(In)

        Sub-Area Data:
        Area(Ac.)         Runoff Index   Impervious %
             0.920           75.00         0.730
         Total Area Entered =      0.92(Ac.)


        RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
        AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
        75.0  57.0      0.501     0.730        0.172       1.000      0.172
                                                          Sum (F) =   0.172
        Area averaged mean soil loss (F) (In/Hr) =  0.172
        Minimum soil loss rate ((In/Hr)) =  0.086
        (for 24 hour storm duration)
        Soil low loss rate (decimal) =   0.313
        ---------------------------------------------------------------------

                        U n i t  H y d r o g r a p h
                                VALLEY S-Curve
        --------------------------------------------------------------------
                        Unit Hydrograph Data
        ---------------------------------------------------------------------
        Unit time period   Time % of lag   Distribution   Unit Hydrograph
            (hrs)                           Graph %            (CFS)
        ---------------------------------------------------------------------
            1   0.083        239.327         49.466              0.459
            2   0.167        478.653         40.724              0.378
            3   0.250        717.980          7.375              0.068
            4   0.333        957.306          2.435              0.023
                                      Sum = 100.000   Sum=       0.927
-----------------------------------------------------------------------
```

```
The following loss rate calculations reflect use of the minimum calculated loss
rate subtracted from the Storm Rain to produce the maximum Effective Rain value

 Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
      (Hr.)  Percent   (In/Hr)         Max   |   Low         (In/Hr)
  1   0.08     0.07      0.016        (  0.304)       0.005         0.011
  2   0.17     0.07      0.016        (  0.303)       0.005         0.011
  3   0.25     0.07      0.016        (  0.302)       0.005         0.011
  4   0.33     0.10      0.025        (  0.301)       0.008         0.017
  5   0.42     0.10      0.025        (  0.300)       0.008         0.017
  6   0.50     0.10      0.025        (  0.299)       0.008         0.017
  7   0.58     0.10      0.025        (  0.297)       0.008         0.017
  8   0.67     0.10      0.025        (  0.296)       0.008         0.017
  9   0.75     0.10      0.025        (  0.295)       0.008         0.017
 10   0.83     0.13      0.033        (  0.294)       0.010         0.023
 11   0.92     0.13      0.033        (  0.293)       0.010         0.023
 12   1.00     0.13      0.033        (  0.292)       0.010         0.023
 13   1.08     0.10      0.025        (  0.290)       0.008         0.017
 14   1.17     0.10      0.025        (  0.289)       0.008         0.017
 15   1.25     0.10      0.025        (  0.288)       0.008         0.017
 16   1.33     0.10      0.025        (  0.287)       0.008         0.017
 17   1.42     0.10      0.025        (  0.286)       0.008         0.017
 18   1.50     0.10      0.025        (  0.285)       0.008         0.017
 19   1.58     0.10      0.025        (  0.284)       0.008         0.017
 20   1.67     0.10      0.025        (  0.282)       0.008         0.017
 21   1.75     0.10      0.025        (  0.281)       0.008         0.017
 22   1.83     0.13      0.033        (  0.280)       0.010         0.023
 23   1.92     0.13      0.033        (  0.279)       0.010         0.023
 24   2.00     0.13      0.033        (  0.278)       0.010         0.023
 25   2.08     0.13      0.033        (  0.277)       0.010         0.023
 26   2.17     0.13      0.033        (  0.276)       0.010         0.023
 27   2.25     0.13      0.033        (  0.275)       0.010         0.023
 28   2.33     0.13      0.033        (  0.273)       0.010         0.023
 29   2.42     0.13      0.033        (  0.272)       0.010         0.023
 30   2.50     0.13      0.033        (  0.271)       0.010         0.023
 31   2.58     0.17      0.041        (  0.270)       0.013         0.028
 32   2.67     0.17      0.041        (  0.269)       0.013         0.028
 33   2.75     0.17      0.041        (  0.268)       0.013         0.028
 34   2.83     0.17      0.041        (  0.267)       0.013         0.028
 35   2.92     0.17      0.041        (  0.266)       0.013         0.028
 36   3.00     0.17      0.041        (  0.265)       0.013         0.028
 37   3.08     0.17      0.041        (  0.263)       0.013         0.028
 38   3.17     0.17      0.041        (  0.262)       0.013         0.028
 39   3.25     0.17      0.041        (  0.261)       0.013         0.028
 40   3.33     0.17      0.041        (  0.260)       0.013         0.028
 41   3.42     0.17      0.041        (  0.259)       0.013         0.028
 42   3.50     0.17      0.041        (  0.258)       0.013         0.028
 43   3.58     0.17      0.041        (  0.257)       0.013         0.028
 44   3.67     0.17      0.041        (  0.256)       0.013         0.028
 45   3.75     0.17      0.041        (  0.255)       0.013         0.028
```

```
46   3.83     0.20      0.049       (  0.254)      0.015        0.034
47   3.92     0.20      0.049       (  0.253)      0.015        0.034
48   4.00     0.20      0.049       (  0.252)      0.015        0.034
49   4.08     0.20      0.049       (  0.250)      0.015        0.034
50   4.17     0.20      0.049       (  0.249)      0.015        0.034
51   4.25     0.20      0.049       (  0.248)      0.015        0.034
52   4.33     0.23      0.058       (  0.247)      0.018        0.040
53   4.42     0.23      0.058       (  0.246)      0.018        0.040
54   4.50     0.23      0.058       (  0.245)      0.018        0.040
55   4.58     0.23      0.058       (  0.244)      0.018        0.040
56   4.67     0.23      0.058       (  0.243)      0.018        0.040
57   4.75     0.23      0.058       (  0.242)      0.018        0.040
58   4.83     0.27      0.066       (  0.241)      0.021        0.045
59   4.92     0.27      0.066       (  0.240)      0.021        0.045
60   5.00     0.27      0.066       (  0.239)      0.021        0.045
61   5.08     0.20      0.049       (  0.238)      0.015        0.034
62   5.17     0.20      0.049       (  0.237)      0.015        0.034
63   5.25     0.20      0.049       (  0.236)      0.015        0.034
64   5.33     0.23      0.058       (  0.235)      0.018        0.040
65   5.42     0.23      0.058       (  0.234)      0.018        0.040
66   5.50     0.23      0.058       (  0.233)      0.018        0.040
67   5.58     0.27      0.066       (  0.232)      0.021        0.045
68   5.67     0.27      0.066       (  0.231)      0.021        0.045
69   5.75     0.27      0.066       (  0.230)      0.021        0.045
70   5.83     0.27      0.066       (  0.229)      0.021        0.045
71   5.92     0.27      0.066       (  0.228)      0.021        0.045
72   6.00     0.27      0.066       (  0.227)      0.021        0.045
73   6.08     0.30      0.074       (  0.226)      0.023        0.051
74   6.17     0.30      0.074       (  0.225)      0.023        0.051
75   6.25     0.30      0.074       (  0.224)      0.023        0.051
76   6.33     0.30      0.074       (  0.223)      0.023        0.051
77   6.42     0.30      0.074       (  0.222)      0.023        0.051
78   6.50     0.30      0.074       (  0.221)      0.023        0.051
79   6.58     0.33      0.082       (  0.220)      0.026        0.057
80   6.67     0.33      0.082       (  0.219)      0.026        0.057
81   6.75     0.33      0.082       (  0.218)      0.026        0.057
82   6.83     0.33      0.082       (  0.217)      0.026        0.057
83   6.92     0.33      0.082       (  0.216)      0.026        0.057
84   7.00     0.33      0.082       (  0.215)      0.026        0.057
85   7.08     0.33      0.082       (  0.214)      0.026        0.057
86   7.17     0.33      0.082       (  0.213)      0.026        0.057
87   7.25     0.33      0.082       (  0.212)      0.026        0.057
88   7.33     0.37      0.091       (  0.211)      0.028        0.062
89   7.42     0.37      0.091       (  0.210)      0.028        0.062
90   7.50     0.37      0.091       (  0.209)      0.028        0.062
91   7.58     0.40      0.099       (  0.208)      0.031        0.068
92   7.67     0.40      0.099       (  0.207)      0.031        0.068
93   7.75     0.40      0.099       (  0.206)      0.031        0.068
94   7.83     0.43      0.107       (  0.205)      0.034        0.074
95   7.92     0.43      0.107       (  0.204)      0.034        0.074
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 96   8.00     0.43     0.107       (  0.203)      0.034         0.074
 97   8.08     0.50     0.124       (  0.202)      0.039         0.085
 98   8.17     0.50     0.124       (  0.201)      0.039         0.085
 99   8.25     0.50     0.124       (  0.200)      0.039         0.085
100   8.33     0.50     0.124       (  0.199)      0.039         0.085
101   8.42     0.50     0.124       (  0.199)      0.039         0.085
102   8.50     0.50     0.124       (  0.198)      0.039         0.085
103   8.58     0.53     0.132       (  0.197)      0.041         0.091
104   8.67     0.53     0.132       (  0.196)      0.041         0.091
105   8.75     0.53     0.132       (  0.195)      0.041         0.091
106   8.83     0.57     0.140       (  0.194)      0.044         0.096
107   8.92     0.57     0.140       (  0.193)      0.044         0.096
108   9.00     0.57     0.140       (  0.192)      0.044         0.096
109   9.08     0.63     0.157       (  0.191)      0.049         0.108
110   9.17     0.63     0.157       (  0.190)      0.049         0.108
111   9.25     0.63     0.157       (  0.189)      0.049         0.108
112   9.33     0.67     0.165       (  0.188)      0.052         0.113
113   9.42     0.67     0.165       (  0.188)      0.052         0.113
114   9.50     0.67     0.165       (  0.187)      0.052         0.113
115   9.58     0.70     0.173       (  0.186)      0.054         0.119
116   9.67     0.70     0.173       (  0.185)      0.054         0.119
117   9.75     0.70     0.173       (  0.184)      0.054         0.119
118   9.83     0.73     0.181       (  0.183)      0.057         0.125
119   9.92     0.73     0.181       (  0.182)      0.057         0.125
120  10.00     0.73     0.181       (  0.181)      0.057         0.125
121  10.08     0.50     0.124       (  0.180)      0.039         0.085
122  10.17     0.50     0.124       (  0.180)      0.039         0.085
123  10.25     0.50     0.124       (  0.179)      0.039         0.085
124  10.33     0.50     0.124       (  0.178)      0.039         0.085
125  10.42     0.50     0.124       (  0.177)      0.039         0.085
126  10.50     0.50     0.124       (  0.176)      0.039         0.085
127  10.58     0.67     0.165       (  0.175)      0.052         0.113
128  10.67     0.67     0.165       (  0.174)      0.052         0.113
129  10.75     0.67     0.165       (  0.174)      0.052         0.113
130  10.83     0.67     0.165       (  0.173)      0.052         0.113
131  10.92     0.67     0.165       (  0.172)      0.052         0.113
132  11.00     0.67     0.165       (  0.171)      0.052         0.113
133  11.08     0.63     0.157       (  0.170)      0.049         0.108
134  11.17     0.63     0.157       (  0.169)      0.049         0.108
135  11.25     0.63     0.157       (  0.168)      0.049         0.108
136  11.33     0.63     0.157       (  0.168)      0.049         0.108
137  11.42     0.63     0.157       (  0.167)      0.049         0.108
138  11.50     0.63     0.157       (  0.166)      0.049         0.108
139  11.58     0.57     0.140       (  0.165)      0.044         0.096
140  11.67     0.57     0.140       (  0.164)      0.044         0.096
141  11.75     0.57     0.140       (  0.164)      0.044         0.096
142  11.83     0.60     0.148       (  0.163)      0.046         0.102
143  11.92     0.60     0.148       (  0.162)      0.046         0.102
144  12.00     0.60     0.148       (  0.161)      0.046         0.102
145  12.08     0.83     0.206       (  0.160)      0.064         0.142
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146	12.17	0.83	0.206	(0.159)	0.064	0.142
147	12.25	0.83	0.206	(0.159)	0.064	0.142
148	12.33	0.87	0.214	(0.158)	0.067	0.147
149	12.42	0.87	0.214	(0.157)	0.067	0.147
150	12.50	0.87	0.214	(0.156)	0.067	0.147
151	12.58	0.93	0.231	(0.156)	0.072	0.159
152	12.67	0.93	0.231	(0.155)	0.072	0.159
153	12.75	0.93	0.231	(0.154)	0.072	0.159
154	12.83	0.97	0.239	(0.153)	0.075	0.164
155	12.92	0.97	0.239	(0.152)	0.075	0.164
156	13.00	0.97	0.239	(0.152)	0.075	0.164
157	13.08	1.13	0.280	(0.151)	0.088	0.192
158	13.17	1.13	0.280	(0.150)	0.088	0.192
159	13.25	1.13	0.280	(0.149)	0.088	0.192
160	13.33	1.13	0.280	(0.149)	0.088	0.192
161	13.42	1.13	0.280	(0.148)	0.088	0.192
162	13.50	1.13	0.280	(0.147)	0.088	0.192
163	13.58	0.77	0.190	(0.146)	0.059	0.130
164	13.67	0.77	0.190	(0.146)	0.059	0.130
165	13.75	0.77	0.190	(0.145)	0.059	0.130
166	13.83	0.77	0.190	(0.144)	0.059	0.130
167	13.92	0.77	0.190	(0.143)	0.059	0.130
168	14.00	0.77	0.190	(0.143)	0.059	0.130
169	14.08	0.90	0.222	(0.142)	0.070	0.153
170	14.17	0.90	0.222	(0.141)	0.070	0.153
171	14.25	0.90	0.222	(0.140)	0.070	0.153
172	14.33	0.87	0.214	(0.140)	0.067	0.147
173	14.42	0.87	0.214	(0.139)	0.067	0.147
174	14.50	0.87	0.214	(0.138)	0.067	0.147
175	14.58	0.87	0.214	(0.138)	0.067	0.147
176	14.67	0.87	0.214	(0.137)	0.067	0.147
177	14.75	0.87	0.214	(0.136)	0.067	0.147
178	14.83	0.83	0.206	(0.135)	0.064	0.142
179	14.92	0.83	0.206	(0.135)	0.064	0.142
180	15.00	0.83	0.206	(0.134)	0.064	0.142
181	15.08	0.80	0.198	(0.133)	0.062	0.136
182	15.17	0.80	0.198	(0.133)	0.062	0.136
183	15.25	0.80	0.198	(0.132)	0.062	0.136
184	15.33	0.77	0.190	(0.131)	0.059	0.130
185	15.42	0.77	0.190	(0.131)	0.059	0.130
186	15.50	0.77	0.190	(0.130)	0.059	0.130
187	15.58	0.63	0.157	(0.129)	0.049	0.108
188	15.67	0.63	0.157	(0.129)	0.049	0.108
189	15.75	0.63	0.157	(0.128)	0.049	0.108
190	15.83	0.63	0.157	(0.127)	0.049	0.108
191	15.92	0.63	0.157	(0.127)	0.049	0.108
192	16.00	0.63	0.157	(0.126)	0.049	0.108
193	16.08	0.13	0.033	(0.125)	0.010	0.023
194	16.17	0.13	0.033	(0.125)	0.010	0.023
195	16.25	0.13	0.033	(0.124)	0.010	0.023

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196  16.33     0.13      0.033       (  0.124)      0.010        0.023
197  16.42     0.13      0.033       (  0.123)      0.010        0.023
198  16.50     0.13      0.033       (  0.122)      0.010        0.023
199  16.58     0.10      0.025       (  0.122)      0.008        0.017
200  16.67     0.10      0.025       (  0.121)      0.008        0.017
201  16.75     0.10      0.025       (  0.120)      0.008        0.017
202  16.83     0.10      0.025       (  0.120)      0.008        0.017
203  16.92     0.10      0.025       (  0.119)      0.008        0.017
204  17.00     0.10      0.025       (  0.119)      0.008        0.017
205  17.08     0.17      0.041       (  0.118)      0.013        0.028
206  17.17     0.17      0.041       (  0.117)      0.013        0.028
207  17.25     0.17      0.041       (  0.117)      0.013        0.028
208  17.33     0.17      0.041       (  0.116)      0.013        0.028
209  17.42     0.17      0.041       (  0.116)      0.013        0.028
210  17.50     0.17      0.041       (  0.115)      0.013        0.028
211  17.58     0.17      0.041       (  0.114)      0.013        0.028
212  17.67     0.17      0.041       (  0.114)      0.013        0.028
213  17.75     0.17      0.041       (  0.113)      0.013        0.028
214  17.83     0.13      0.033       (  0.113)      0.010        0.023
215  17.92     0.13      0.033       (  0.112)      0.010        0.023
216  18.00     0.13      0.033       (  0.112)      0.010        0.023
217  18.08     0.13      0.033       (  0.111)      0.010        0.023
218  18.17     0.13      0.033       (  0.111)      0.010        0.023
219  18.25     0.13      0.033       (  0.110)      0.010        0.023
220  18.33     0.13      0.033       (  0.110)      0.010        0.023
221  18.42     0.13      0.033       (  0.109)      0.010        0.023
222  18.50     0.13      0.033       (  0.108)      0.010        0.023
223  18.58     0.10      0.025       (  0.108)      0.008        0.017
224  18.67     0.10      0.025       (  0.107)      0.008        0.017
225  18.75     0.10      0.025       (  0.107)      0.008        0.017
226  18.83     0.07      0.016       (  0.106)      0.005        0.011
227  18.92     0.07      0.016       (  0.106)      0.005        0.011
228  19.00     0.07      0.016       (  0.105)      0.005        0.011
229  19.08     0.10      0.025       (  0.105)      0.008        0.017
230  19.17     0.10      0.025       (  0.104)      0.008        0.017
231  19.25     0.10      0.025       (  0.104)      0.008        0.017
232  19.33     0.13      0.033       (  0.103)      0.010        0.023
233  19.42     0.13      0.033       (  0.103)      0.010        0.023
234  19.50     0.13      0.033       (  0.102)      0.010        0.023
235  19.58     0.10      0.025       (  0.102)      0.008        0.017
236  19.67     0.10      0.025       (  0.102)      0.008        0.017
237  19.75     0.10      0.025       (  0.101)      0.008        0.017
238  19.83     0.07      0.016       (  0.101)      0.005        0.011
239  19.92     0.07      0.016       (  0.100)      0.005        0.011
240  20.00     0.07      0.016       (  0.100)      0.005        0.011
241  20.08     0.10      0.025       (  0.099)      0.008        0.017
242  20.17     0.10      0.025       (  0.099)      0.008        0.017
243  20.25     0.10      0.025       (  0.098)      0.008        0.017
244  20.33     0.10      0.025       (  0.098)      0.008        0.017
245  20.42     0.10      0.025       (  0.098)      0.008        0.017
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246  20.50     0.10      0.025        (  0.097)       0.008        0.017
247  20.58     0.10      0.025        (  0.097)       0.008        0.017
248  20.67     0.10      0.025        (  0.096)       0.008        0.017
249  20.75     0.10      0.025        (  0.096)       0.008        0.017
250  20.83     0.07      0.016        (  0.096)       0.005        0.011
251  20.92     0.07      0.016        (  0.095)       0.005        0.011
252  21.00     0.07      0.016        (  0.095)       0.005        0.011
253  21.08     0.10      0.025        (  0.094)       0.008        0.017
254  21.17     0.10      0.025        (  0.094)       0.008        0.017
255  21.25     0.10      0.025        (  0.094)       0.008        0.017
256  21.33     0.07      0.016        (  0.093)       0.005        0.011
257  21.42     0.07      0.016        (  0.093)       0.005        0.011
258  21.50     0.07      0.016        (  0.093)       0.005        0.011
259  21.58     0.10      0.025        (  0.092)       0.008        0.017
260  21.67     0.10      0.025        (  0.092)       0.008        0.017
261  21.75     0.10      0.025        (  0.092)       0.008        0.017
262  21.83     0.07      0.016        (  0.091)       0.005        0.011
263  21.92     0.07      0.016        (  0.091)       0.005        0.011
264  22.00     0.07      0.016        (  0.091)       0.005        0.011
265  22.08     0.10      0.025        (  0.090)       0.008        0.017
266  22.17     0.10      0.025        (  0.090)       0.008        0.017
267  22.25     0.10      0.025        (  0.090)       0.008        0.017
268  22.33     0.07      0.016        (  0.089)       0.005        0.011
269  22.42     0.07      0.016        (  0.089)       0.005        0.011
270  22.50     0.07      0.016        (  0.089)       0.005        0.011
271  22.58     0.07      0.016        (  0.089)       0.005        0.011
272  22.67     0.07      0.016        (  0.088)       0.005        0.011
273  22.75     0.07      0.016        (  0.088)       0.005        0.011
274  22.83     0.07      0.016        (  0.088)       0.005        0.011
275  22.92     0.07      0.016        (  0.088)       0.005        0.011
276  23.00     0.07      0.016        (  0.088)       0.005        0.011
277  23.08     0.07      0.016        (  0.087)       0.005        0.011
278  23.17     0.07      0.016        (  0.087)       0.005        0.011
279  23.25     0.07      0.016        (  0.087)       0.005        0.011
280  23.33     0.07      0.016        (  0.087)       0.005        0.011
281  23.42     0.07      0.016        (  0.087)       0.005        0.011
282  23.50     0.07      0.016        (  0.086)       0.005        0.011
283  23.58     0.07      0.016        (  0.086)       0.005        0.011
284  23.67     0.07      0.016        (  0.086)       0.005        0.011
285  23.75     0.07      0.016        (  0.086)       0.005        0.011
286  23.83     0.07      0.016        (  0.086)       0.005        0.011
287  23.92     0.07      0.016        (  0.086)       0.005        0.011
288  24.00     0.07      0.016        (  0.086)       0.005        0.011
                (Loss Rate Not Used)
    Sum =     100.0                                    Sum =    17.0
       Flood volume = Effective rainfall      1.42(In)
        times area       0.9(Ac.)/[(In)/(Ft.)] =       0.1(Ac.Ft)
       Total soil loss =      0.64(In)
       Total soil loss =     0.049(Ac.Ft)
       Total rainfall =      2.06(In)
```

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      Flood volume =        4726.3 Cubic Feet
      Total soil loss =        2153.3 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =      0.179(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          24 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
------------------------------------------------------------------------
  0+ 5       0.0000      0.01  Q          |         |         |         |
  0+10       0.0001      0.01  Q          |         |         |         |
  0+15       0.0002      0.01  Q          |         |         |         |
  0+20       0.0003      0.01  Q          |         |         |         |
  0+25       0.0004      0.02  Q          |         |         |         |
  0+30       0.0005      0.02  Q          |         |         |         |
  0+35       0.0006      0.02  Q          |         |         |         |
  0+40       0.0007      0.02  Q          |         |         |         |
  0+45       0.0008      0.02  Q          |         |         |         |
  0+50       0.0009      0.02  Q          |         |         |         |
  0+55       0.0011      0.02  Q          |         |         |         |
  1+ 0       0.0012      0.02  Q          |         |         |         |
  1+ 5       0.0013      0.02  Q          |         |         |         |
  1+10       0.0015      0.02  Q          |         |         |         |
  1+15       0.0016      0.02  Q          |         |         |         |
  1+20       0.0017      0.02  Q          |         |         |         |
  1+25       0.0018      0.02  Q          |         |         |         |
  1+30       0.0019      0.02  Q          |         |         |         |
  1+35       0.0020      0.02  Q          |         |         |         |
  1+40       0.0021      0.02  Q          |         |         |         |
  1+45       0.0022      0.02  Q          |         |         |         |
  1+50       0.0023      0.02  Q          |         |         |         |
  1+55       0.0025      0.02  Q          |         |         |         |
  2+ 0       0.0026      0.02  Q          |         |         |         |
  2+ 5       0.0028      0.02  QV         |         |         |         |
  2+10       0.0029      0.02  QV         |         |         |         |
  2+15       0.0031      0.02  QV         |         |         |         |
  2+20       0.0032      0.02  QV         |         |         |         |
  2+25       0.0033      0.02  QV         |         |         |         |
  2+30       0.0035      0.02  QV         |         |         |         |
  2+35       0.0037      0.02  QV         |         |         |         |
  2+40       0.0038      0.03  QV         |         |         |         |
  2+45       0.0040      0.03  QV         |         |         |         |
  2+50       0.0042      0.03  QV         |         |         |         |
  2+55       0.0044      0.03  QV         |         |         |         |
  3+ 0       0.0046      0.03  QV         |         |         |         |
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3+ 5       0.0047      0.03  QV         |         |         |         |
3+10       0.0049      0.03  QV         |         |         |         |
3+15       0.0051      0.03  QV         |         |         |         |
3+20       0.0053      0.03  QV         |         |         |         |
3+25       0.0055      0.03  Q V        |         |         |         |
3+30       0.0056      0.03  Q V        |         |         |         |
3+35       0.0058      0.03  Q V        |         |         |         |
3+40       0.0060      0.03  Q V        |         |         |         |
3+45       0.0062      0.03  Q V        |         |         |         |
3+50       0.0064      0.03  Q V        |         |         |         |
3+55       0.0066      0.03  Q V        |         |         |         |
4+ 0       0.0068      0.03  Q V        |         |         |         |
4+ 5       0.0070      0.03  Q V        |         |         |         |
4+10       0.0072      0.03  Q V        |         |         |         |
4+15       0.0075      0.03  Q V        |         |         |         |
4+20       0.0077      0.03  Q V        |         |         |         |
4+25       0.0079      0.04  Q V        |         |         |         |
4+30       0.0082      0.04  Q  V       |         |         |         |
4+35       0.0084      0.04  Q  V       |         |         |         |
4+40       0.0087      0.04  Q  V       |         |         |         |
4+45       0.0090      0.04  Q  V       |         |         |         |
4+50       0.0092      0.04  Q  V       |         |         |         |
4+55       0.0095      0.04  Q  V       |         |         |         |
5+ 0       0.0098      0.04  Q  V       |         |         |         |
5+ 5       0.0101      0.04  Q  V       |         |         |         |
5+10       0.0103      0.03  Q  V       |         |         |         |
5+15       0.0105      0.03  Q  V       |         |         |         |
5+20       0.0107      0.03  Q  V       |         |         |         |
5+25       0.0110      0.04  Q   V      |         |         |         |
5+30       0.0112      0.04  Q   V      |         |         |         |
5+35       0.0115      0.04  Q   V      |         |         |         |
5+40       0.0118      0.04  Q   V      |         |         |         |
5+45       0.0121      0.04  Q   V      |         |         |         |
5+50       0.0124      0.04  Q   V      |         |         |         |
5+55       0.0127      0.04  Q   V      |         |         |         |
6+ 0       0.0129      0.04  Q   V      |         |         |         |
6+ 5       0.0133      0.04  Q   V      |         |         |         |
6+10       0.0136      0.05  Q    V     |         |         |         |
6+15       0.0139      0.05  Q    V     |         |         |         |
6+20       0.0142      0.05  Q    V     |         |         |         |
6+25       0.0146      0.05  Q    V     |         |         |         |
6+30       0.0149      0.05  Q    V     |         |         |         |
6+35       0.0152      0.05  Q    V     |         |         |         |
6+40       0.0156      0.05  Q    V     |         |         |         |
6+45       0.0159      0.05  Q    V     |         |         |         |
6+50       0.0163      0.05  Q     V    |         |         |         |
6+55       0.0167      0.05  Q     V    |         |         |         |
7+ 0       0.0170      0.05  Q     V    |         |         |         |
7+ 5       0.0174      0.05  Q     V    |         |         |         |
7+10       0.0177      0.05  Q     V    |         |         |         |
```

```
 7+15       0.0181      0.05  Q     V   |         |         |         |
 7+20       0.0185      0.06  Q     V   |         |         |         |
 7+25       0.0189      0.06  Q     V   |         |         |         |
 7+30       0.0193      0.06  Q      V  |         |         |         |
 7+35       0.0197      0.06  Q      V  |         |         |         |
 7+40       0.0201      0.06  Q      V  |         |         |         |
 7+45       0.0206      0.06  Q      V  |         |         |         |
 7+50       0.0210      0.07  Q      V  |         |         |         |
 7+55       0.0215      0.07  Q      V  |         |         |         |
 8+ 0       0.0219      0.07  Q       V |         |         |         |
 8+ 5       0.0225      0.07  Q       V |         |         |         |
 8+10       0.0230      0.08  Q       V |         |         |         |
 8+15       0.0235      0.08  Q       V |         |         |         |
 8+20       0.0241      0.08  Q       V |         |         |         |
 8+25       0.0246      0.08  Q        V|         |         |         |
 8+30       0.0252      0.08  Q        V|         |         |         |
 8+35       0.0257      0.08  Q        V|         |         |         |
 8+40       0.0263      0.08  Q        V|         |         |         |
 8+45       0.0269      0.08  Q        V|         |         |         |
 8+50       0.0275      0.09  Q         V         |         |         |
 8+55       0.0281      0.09  Q         V         |         |         |
 9+ 0       0.0287      0.09  Q         V         |         |         |
 9+ 5       0.0293      0.09  Q         V         |         |         |
 9+10       0.0300      0.10  Q         |V        |         |         |
 9+15       0.0307      0.10  Q         |V        |         |         |
 9+20       0.0314      0.10  Q         |V        |         |         |
 9+25       0.0321      0.10  Q         |V        |         |         |
 9+30       0.0329      0.10  Q         | V       |         |         |
 9+35       0.0336      0.11  Q         | V       |         |         |
 9+40       0.0344      0.11  Q         | V       |         |         |
 9+45       0.0351      0.11  Q         | V       |         |         |
 9+50       0.0359      0.11  Q         |  V      |         |         |
 9+55       0.0367      0.12  Q         |  V      |         |         |
10+ 0       0.0375      0.12  Q         |  V      |         |         |
10+ 5       0.0381      0.10  Q         |   V     |         |         |
10+10       0.0387      0.08  Q         |   V     |         |         |
10+15       0.0393      0.08  Q         |   V     |         |         |
10+20       0.0398      0.08  Q         |   V     |         |         |
10+25       0.0403      0.08  Q         |   V     |         |         |
10+30       0.0409      0.08  Q         |    V    |         |         |
10+35       0.0415      0.09  Q         |    V    |         |         |
10+40       0.0422      0.10  Q         |    V    |         |         |
10+45       0.0429      0.10  Q         |    V    |         |         |
10+50       0.0437      0.11  Q         |     V   |         |         |
10+55       0.0444      0.11  Q         |     V   |         |         |
11+ 0       0.0451      0.11  Q         |     V   |         |         |
11+ 5       0.0458      0.10  Q         |     V   |         |         |
11+10       0.0465      0.10  Q         |      V  |         |         |
11+15       0.0472      0.10  Q         |      V  |         |         |
11+20       0.0479      0.10  Q         |      V  |         |         |
```

```
11+25       0.0486      0.10  Q         |      V  |         |         |
11+30       0.0493      0.10  Q         |       V |         |         |
11+35       0.0499      0.09  Q         |       V |         |         |
11+40       0.0505      0.09  Q         |       V |         |         |
11+45       0.0512      0.09  Q         |       V |         |         |
11+50       0.0518      0.09  Q         |        V|         |         |
11+55       0.0524      0.09  Q         |        V|         |         |
12+ 0       0.0531      0.09  Q         |        V|         |         |
12+ 5       0.0539      0.11  Q         |        V|         |         |
12+10       0.0547      0.13  Q         |         V         |         |
12+15       0.0556      0.13  Q         |         V         |         |
12+20       0.0566      0.13  Q         |         V         |         |
12+25       0.0575      0.14  Q         |         |V        |         |
12+30       0.0584      0.14  Q         |         |V        |         |
12+35       0.0594      0.14  Q         |         |V        |         |
12+40       0.0604      0.15  Q         |         | V       |         |
12+45       0.0614      0.15  Q         |         | V       |         |
12+50       0.0625      0.15  Q         |         |  V      |         |
12+55       0.0635      0.15  Q         |         |  V      |         |
13+ 0       0.0646      0.15  Q         |         |  V      |         |
13+ 5       0.0657      0.17  Q         |         |   V     |         |
13+10       0.0669      0.18  Q         |         |   V     |         |
13+15       0.0681      0.18  Q         |         |    V    |         |
13+20       0.0694      0.18  Q         |         |    V    |         |
13+25       0.0706      0.18  Q         |         |     V   |         |
13+30       0.0718      0.18  Q         |         |     V   |         |
13+35       0.0728      0.15  Q         |         |     V   |         |
13+40       0.0737      0.13  Q         |         |      V  |         |
13+45       0.0746      0.12  Q         |         |      V  |         |
13+50       0.0754      0.12  Q         |         |      V  |         |
13+55       0.0762      0.12  Q         |         |       V |         |
14+ 0       0.0771      0.12  Q         |         |       V |         |
14+ 5       0.0780      0.13  Q         |         |       V |         |
14+10       0.0789      0.14  Q         |         |        V|         |
14+15       0.0799      0.14  Q         |         |        V|         |
14+20       0.0809      0.14  Q         |         |        V|         |
14+25       0.0818      0.14  Q         |         |         V         |
14+30       0.0827      0.14  Q         |         |         V         |
14+35       0.0837      0.14  Q         |         |         V         |
14+40       0.0846      0.14  Q         |         |         |V        |
14+45       0.0856      0.14  Q         |         |         |V        |
14+50       0.0865      0.13  Q         |         |         |V        |
14+55       0.0874      0.13  Q         |         |         | V       |
15+ 0       0.0883      0.13  Q         |         |         | V       |
15+ 5       0.0892      0.13  Q         |         |         | V       |
15+10       0.0901      0.13  Q         |         |         |  V      |
15+15       0.0909      0.13  Q         |         |         |  V      |
15+20       0.0918      0.12  Q         |         |         |  V      |
15+25       0.0926      0.12  Q         |         |         |   V     |
15+30       0.0934      0.12  Q         |         |         |   V     |
```

```
15+35       0.0942      0.11  Q         |         |         |   V     |
15+40       0.0949      0.10  Q         |         |         |   V     |
15+45       0.0956      0.10  Q         |         |         |    V    |
15+50       0.0963      0.10  Q         |         |         |    V    |
15+55       0.0970      0.10  Q         |         |         |    V    |
16+ 0       0.0977      0.10  Q         |         |         |     V   |
16+ 5       0.0981      0.06  Q         |         |         |     V   |
16+10       0.0983      0.03  Q         |         |         |     V   |
16+15       0.0984      0.02  Q         |         |         |     V   |
16+20       0.0986      0.02  Q         |         |         |     V   |
16+25       0.0987      0.02  Q         |         |         |     V   |
16+30       0.0989      0.02  Q         |         |         |     V   |
16+35       0.0990      0.02  Q         |         |         |     V   |
16+40       0.0991      0.02  Q         |         |         |     V   |
16+45       0.0992      0.02  Q         |         |         |     V   |
16+50       0.0993      0.02  Q         |         |         |     V   |
16+55       0.0994      0.02  Q         |         |         |     V   |
17+ 0       0.0995      0.02  Q         |         |         |     V   |
17+ 5       0.0997      0.02  Q         |         |         |     V   |
17+10       0.0999      0.03  Q         |         |         |     V   |
17+15       0.1000      0.03  Q         |         |         |     V   |
17+20       0.1002      0.03  Q         |         |         |     V   |
17+25       0.1004      0.03  Q         |         |         |      V  |
17+30       0.1006      0.03  Q         |         |         |      V  |
17+35       0.1008      0.03  Q         |         |         |      V  |
17+40       0.1009      0.03  Q         |         |         |      V  |
17+45       0.1011      0.03  Q         |         |         |      V  |
17+50       0.1013      0.02  Q         |         |         |      V  |
17+55       0.1014      0.02  Q         |         |         |      V  |
18+ 0       0.1016      0.02  Q         |         |         |      V  |
18+ 5       0.1017      0.02  Q         |         |         |      V  |
18+10       0.1019      0.02  Q         |         |         |      V  |
18+15       0.1020      0.02  Q         |         |         |      V  |
18+20       0.1022      0.02  Q         |         |         |      V  |
18+25       0.1023      0.02  Q         |         |         |      V  |
18+30       0.1024      0.02  Q         |         |         |      V  |
18+35       0.1026      0.02  Q         |         |         |      V  |
18+40       0.1027      0.02  Q         |         |         |      V  |
18+45       0.1028      0.02  Q         |         |         |      V  |
18+50       0.1029      0.01  Q         |         |         |      V  |
18+55       0.1030      0.01  Q         |         |         |      V  |
19+ 0       0.1030      0.01  Q         |         |         |      V  |
19+ 5       0.1031      0.01  Q         |         |         |       V |
19+10       0.1032      0.02  Q         |         |         |       V |
19+15       0.1033      0.02  Q         |         |         |       V |
19+20       0.1035      0.02  Q         |         |         |       V |
19+25       0.1036      0.02  Q         |         |         |       V |
19+30       0.1037      0.02  Q         |         |         |       V |
19+35       0.1039      0.02  Q         |         |         |       V |
19+40       0.1040      0.02  Q         |         |         |       V |
```

```
19+45          0.1041       0.02  Q          |          |          |       V |
19+50          0.1042       0.01  Q          |          |          |       V |
19+55          0.1043       0.01  Q          |          |          |       V |
20+ 0          0.1043       0.01  Q          |          |          |       V |
20+ 5          0.1044       0.01  Q          |          |          |       V |
20+10          0.1045       0.02  Q          |          |          |       V |
20+15          0.1046       0.02  Q          |          |          |       V |
20+20          0.1047       0.02  Q          |          |          |       V |
20+25          0.1049       0.02  Q          |          |          |       V |
20+30          0.1050       0.02  Q          |          |          |       V |
20+35          0.1051       0.02  Q          |          |          |       V |
20+40          0.1052       0.02  Q          |          |          |       V |
20+45          0.1053       0.02  Q          |          |          |       V |
20+50          0.1054       0.01  Q          |          |          |       V |
20+55          0.1055       0.01  Q          |          |          |       V |
21+ 0          0.1055       0.01  Q          |          |          |       V |
21+ 5          0.1056       0.01  Q          |          |          |       V |
21+10          0.1057       0.02  Q          |          |          |       V |
21+15          0.1058       0.02  Q          |          |          |        V|
21+20          0.1059       0.01  Q          |          |          |        V|
21+25          0.1060       0.01  Q          |          |          |        V|
21+30          0.1061       0.01  Q          |          |          |        V|
21+35          0.1062       0.01  Q          |          |          |        V|
21+40          0.1063       0.02  Q          |          |          |        V|
21+45          0.1064       0.02  Q          |          |          |        V|
21+50          0.1065       0.01  Q          |          |          |        V|
21+55          0.1065       0.01  Q          |          |          |        V|
22+ 0          0.1066       0.01  Q          |          |          |        V|
22+ 5          0.1067       0.01  Q          |          |          |        V|
22+10          0.1068       0.02  Q          |          |          |        V|
22+15          0.1069       0.02  Q          |          |          |        V|
22+20          0.1070       0.01  Q          |          |          |        V|
22+25          0.1071       0.01  Q          |          |          |        V|
22+30          0.1072       0.01  Q          |          |          |        V|
22+35          0.1072       0.01  Q          |          |          |        V|
22+40          0.1073       0.01  Q          |          |          |        V|
22+45          0.1074       0.01  Q          |          |          |        V|
22+50          0.1074       0.01  Q          |          |          |        V|
22+55          0.1075       0.01  Q          |          |          |        V|
23+ 0          0.1076       0.01  Q          |          |          |        V|
23+ 5          0.1077       0.01  Q          |          |          |        V|
23+10          0.1077       0.01  Q          |          |          |        V|
23+15          0.1078       0.01  Q          |          |          |        V|
23+20          0.1079       0.01  Q          |          |          |        V|
23+25          0.1079       0.01  Q          |          |          |        V|
23+30          0.1080       0.01  Q          |          |          |        V|
23+35          0.1081       0.01  Q          |          |          |        V|
23+40          0.1082       0.01  Q          |          |          |        V|
23+45          0.1082       0.01  Q          |          |          |        V|
23+50          0.1083       0.01  Q          |          |          |        V|
```

```
   23+55        0.1084      0.01  Q          |          |          |        V|
   24+ 0        0.1085      0.01  Q          |          |          |        V|
   24+ 5        0.1085      0.01  Q          |          |          |        V|
   24+10        0.1085      0.00  Q          |          |          |        V|
   24+15        0.1085      0.00  Q          |          |          |         V
----------------------------------------------------------------------
```

Appendix J.V

Synthetic Unit Hydrograph Method Analysis
Post-Development Conditions
10-Year Storm

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
                Study date  05/27/22 File: MapesPost10AUH2410.out


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

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6443

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format




---------------------------------------------------------------------
MAPES AND TRUMBLE INDUSTRIAL FACILITY
UNIT HYDROGRAPH
POST-DEVELOPMENT CONDITIONS
10-YEAR, 24HR STORM, DA A
--------------------------------------------------------------------
Drainage Area =      18.09(Ac.)  =      0.028 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      18.09(Ac.)  =
0.028 Sq. Mi.
Length along longest watercourse =    1290.86(Ft.)
Length along longest watercourse measured to centroid =     632.74(Ft.)
Length along longest watercourse =      0.244 Mi.
Length along longest watercourse measured to centroid =      0.120 Mi.
Difference in elevation =      12.93(Ft.)
Slope along watercourse =     52.8875 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.044 Hr.
Lag time =     2.66 Min.
25% of lag time =     0.66 Min.
40% of lag time =     1.06 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:
```

```
        Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
               18.09            2.06                   37.27

        100 YEAR Area rainfall data:


        Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
               18.09            5.31                   96.06

        STORM EVENT (YEAR) =   10.00
        Area Averaged 2-Year Rainfall =    2.060(In)
        Area Averaged 100-Year Rainfall =    5.310(In)

        Point rain (area averaged) =    3.397(In)
        Areal adjustment factor =  100.00 %
        Adjusted average point rain =    3.397(In)

        Sub-Area Data:
        Area(Ac.)         Runoff Index   Impervious %
            18.090           75.00         0.830
         Total Area Entered =     18.09(Ac.)


        RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
        AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
        75.0  75.0      0.303     0.830       0.077       1.000      0.077
                                                          Sum (F) =   0.077
        Area averaged mean soil loss (F) (In/Hr) =  0.077
        Minimum soil loss rate ((In/Hr)) =  0.038
        (for 24 hour storm duration)
        Soil low loss rate (decimal) =   0.238
        ---------------------------------------------------------------------

                        U n i t   H y d r o g r a p h
                                VALLEY S-Curve
        --------------------------------------------------------------------
                        Unit Hydrograph Data
        ---------------------------------------------------------------------
        Unit time period   Time % of lag   Distribution   Unit Hydrograph
            (hrs)                           Graph %           (CFS)
        ---------------------------------------------------------------------
            1   0.083        188.172         41.282              7.526
            2   0.167        376.344         44.201              8.058
            3   0.250        564.517          9.293              1.694
            4   0.333        752.689          3.719              0.678
            5   0.417        940.861          1.505              0.274
                                       Sum = 100.000   Sum=      18.231
-----------------------------------------------------------------------
```

```
The following loss rate calculations reflect use of the minimum calculated loss
rate subtracted from the Storm Rain to produce the maximum Effective Rain value

 Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
      (Hr.)  Percent   (In/Hr)         Max    |   Low        (In/Hr)
   1  0.08     0.07      0.027        (  0.136)       0.006         0.021
   2  0.17     0.07      0.027        (  0.135)       0.006         0.021
   3  0.25     0.07      0.027        (  0.135)       0.006         0.021
   4  0.33     0.10      0.041        (  0.134)       0.010         0.031
   5  0.42     0.10      0.041        (  0.134)       0.010         0.031
   6  0.50     0.10      0.041        (  0.133)       0.010         0.031
   7  0.58     0.10      0.041        (  0.133)       0.010         0.031
   8  0.67     0.10      0.041        (  0.132)       0.010         0.031
   9  0.75     0.10      0.041        (  0.132)       0.010         0.031
  10  0.83     0.13      0.054        (  0.131)       0.013         0.041
  11  0.92     0.13      0.054        (  0.131)       0.013         0.041
  12  1.00     0.13      0.054        (  0.130)       0.013         0.041
  13  1.08     0.10      0.041        (  0.130)       0.010         0.031
  14  1.17     0.10      0.041        (  0.129)       0.010         0.031
  15  1.25     0.10      0.041        (  0.129)       0.010         0.031
  16  1.33     0.10      0.041        (  0.128)       0.010         0.031
  17  1.42     0.10      0.041        (  0.128)       0.010         0.031
  18  1.50     0.10      0.041        (  0.127)       0.010         0.031
  19  1.58     0.10      0.041        (  0.127)       0.010         0.031
  20  1.67     0.10      0.041        (  0.126)       0.010         0.031
  21  1.75     0.10      0.041        (  0.126)       0.010         0.031
  22  1.83     0.13      0.054        (  0.125)       0.013         0.041
  23  1.92     0.13      0.054        (  0.125)       0.013         0.041
  24  2.00     0.13      0.054        (  0.124)       0.013         0.041
  25  2.08     0.13      0.054        (  0.124)       0.013         0.041
  26  2.17     0.13      0.054        (  0.123)       0.013         0.041
  27  2.25     0.13      0.054        (  0.123)       0.013         0.041
  28  2.33     0.13      0.054        (  0.122)       0.013         0.041
  29  2.42     0.13      0.054        (  0.122)       0.013         0.041
  30  2.50     0.13      0.054        (  0.121)       0.013         0.041
  31  2.58     0.17      0.068        (  0.121)       0.016         0.052
  32  2.67     0.17      0.068        (  0.120)       0.016         0.052
  33  2.75     0.17      0.068        (  0.120)       0.016         0.052
  34  2.83     0.17      0.068        (  0.119)       0.016         0.052
  35  2.92     0.17      0.068        (  0.119)       0.016         0.052
  36  3.00     0.17      0.068        (  0.118)       0.016         0.052
  37  3.08     0.17      0.068        (  0.118)       0.016         0.052
  38  3.17     0.17      0.068        (  0.117)       0.016         0.052
  39  3.25     0.17      0.068        (  0.117)       0.016         0.052
  40  3.33     0.17      0.068        (  0.116)       0.016         0.052
  41  3.42     0.17      0.068        (  0.116)       0.016         0.052
  42  3.50     0.17      0.068        (  0.115)       0.016         0.052
  43  3.58     0.17      0.068        (  0.115)       0.016         0.052
  44  3.67     0.17      0.068        (  0.114)       0.016         0.052
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45	3.75	0.17	0.068	(0.114)	0.016	0.052
46	3.83	0.20	0.082	(0.113)	0.019	0.062
47	3.92	0.20	0.082	(0.113)	0.019	0.062
48	4.00	0.20	0.082	(0.112)	0.019	0.062
49	4.08	0.20	0.082	(0.112)	0.019	0.062
50	4.17	0.20	0.082	(0.111)	0.019	0.062
51	4.25	0.20	0.082	(0.111)	0.019	0.062
52	4.33	0.23	0.095	(0.110)	0.023	0.072
53	4.42	0.23	0.095	(0.110)	0.023	0.072
54	4.50	0.23	0.095	(0.109)	0.023	0.072
55	4.58	0.23	0.095	(0.109)	0.023	0.072
56	4.67	0.23	0.095	(0.109)	0.023	0.072
57	4.75	0.23	0.095	(0.108)	0.023	0.072
58	4.83	0.27	0.109	(0.108)	0.026	0.083
59	4.92	0.27	0.109	(0.107)	0.026	0.083
60	5.00	0.27	0.109	(0.107)	0.026	0.083
61	5.08	0.20	0.082	(0.106)	0.019	0.062
62	5.17	0.20	0.082	(0.106)	0.019	0.062
63	5.25	0.20	0.082	(0.105)	0.019	0.062
64	5.33	0.23	0.095	(0.105)	0.023	0.072
65	5.42	0.23	0.095	(0.104)	0.023	0.072
66	5.50	0.23	0.095	(0.104)	0.023	0.072
67	5.58	0.27	0.109	(0.103)	0.026	0.083
68	5.67	0.27	0.109	(0.103)	0.026	0.083
69	5.75	0.27	0.109	(0.103)	0.026	0.083
70	5.83	0.27	0.109	(0.102)	0.026	0.083
71	5.92	0.27	0.109	(0.102)	0.026	0.083
72	6.00	0.27	0.109	(0.101)	0.026	0.083
73	6.08	0.30	0.122	(0.101)	0.029	0.093
74	6.17	0.30	0.122	(0.100)	0.029	0.093
75	6.25	0.30	0.122	(0.100)	0.029	0.093
76	6.33	0.30	0.122	(0.099)	0.029	0.093
77	6.42	0.30	0.122	(0.099)	0.029	0.093
78	6.50	0.30	0.122	(0.099)	0.029	0.093
79	6.58	0.33	0.136	(0.098)	0.032	0.104
80	6.67	0.33	0.136	(0.098)	0.032	0.104
81	6.75	0.33	0.136	(0.097)	0.032	0.104
82	6.83	0.33	0.136	(0.097)	0.032	0.104
83	6.92	0.33	0.136	(0.096)	0.032	0.104
84	7.00	0.33	0.136	(0.096)	0.032	0.104
85	7.08	0.33	0.136	(0.095)	0.032	0.104
86	7.17	0.33	0.136	(0.095)	0.032	0.104
87	7.25	0.33	0.136	(0.095)	0.032	0.104
88	7.33	0.37	0.149	(0.094)	0.036	0.114
89	7.42	0.37	0.149	(0.094)	0.036	0.114
90	7.50	0.37	0.149	(0.093)	0.036	0.114
91	7.58	0.40	0.163	(0.093)	0.039	0.124
92	7.67	0.40	0.163	(0.092)	0.039	0.124
93	7.75	0.40	0.163	(0.092)	0.039	0.124
94	7.83	0.43	0.177	(0.092)	0.042	0.135

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 95   7.92      0.43      0.177       (  0.091)      0.042       0.135
 96   8.00      0.43      0.177       (  0.091)      0.042       0.135
 97   8.08      0.50      0.204       (  0.090)      0.049       0.155
 98   8.17      0.50      0.204       (  0.090)      0.049       0.155
 99   8.25      0.50      0.204       (  0.089)      0.049       0.155
100   8.33      0.50      0.204       (  0.089)      0.049       0.155
101   8.42      0.50      0.204       (  0.089)      0.049       0.155
102   8.50      0.50      0.204       (  0.088)      0.049       0.155
103   8.58      0.53      0.217       (  0.088)      0.052       0.166
104   8.67      0.53      0.217       (  0.087)      0.052       0.166
105   8.75      0.53      0.217       (  0.087)      0.052       0.166
106   8.83      0.57      0.231       (  0.087)      0.055       0.176
107   8.92      0.57      0.231       (  0.086)      0.055       0.176
108   9.00      0.57      0.231       (  0.086)      0.055       0.176
109   9.08      0.63      0.258       (  0.085)      0.061       0.197
110   9.17      0.63      0.258       (  0.085)      0.061       0.197
111   9.25      0.63      0.258       (  0.085)      0.061       0.197
112   9.33      0.67      0.272       (  0.084)      0.065       0.207
113   9.42      0.67      0.272       (  0.084)      0.065       0.207
114   9.50      0.67      0.272       (  0.083)      0.065       0.207
115   9.58      0.70      0.285       (  0.083)      0.068       0.217
116   9.67      0.70      0.285       (  0.083)      0.068       0.217
117   9.75      0.70      0.285       (  0.082)      0.068       0.217
118   9.83      0.73      0.299       (  0.082)      0.071       0.228
119   9.92      0.73      0.299       (  0.081)      0.071       0.228
120  10.00      0.73      0.299       (  0.081)      0.071       0.228
121  10.08      0.50      0.204       (  0.081)      0.049       0.155
122  10.17      0.50      0.204       (  0.080)      0.049       0.155
123  10.25      0.50      0.204       (  0.080)      0.049       0.155
124  10.33      0.50      0.204       (  0.079)      0.049       0.155
125  10.42      0.50      0.204       (  0.079)      0.049       0.155
126  10.50      0.50      0.204       (  0.079)      0.049       0.155
127  10.58      0.67      0.272       (  0.078)      0.065       0.207
128  10.67      0.67      0.272       (  0.078)      0.065       0.207
129  10.75      0.67      0.272       (  0.077)      0.065       0.207
130  10.83      0.67      0.272       (  0.077)      0.065       0.207
131  10.92      0.67      0.272       (  0.077)      0.065       0.207
132  11.00      0.67      0.272       (  0.076)      0.065       0.207
133  11.08      0.63      0.258       (  0.076)      0.061       0.197
134  11.17      0.63      0.258       (  0.076)      0.061       0.197
135  11.25      0.63      0.258       (  0.075)      0.061       0.197
136  11.33      0.63      0.258       (  0.075)      0.061       0.197
137  11.42      0.63      0.258       (  0.074)      0.061       0.197
138  11.50      0.63      0.258       (  0.074)      0.061       0.197
139  11.58      0.57      0.231       (  0.074)      0.055       0.176
140  11.67      0.57      0.231       (  0.073)      0.055       0.176
141  11.75      0.57      0.231       (  0.073)      0.055       0.176
142  11.83      0.60      0.245       (  0.073)      0.058       0.186
143  11.92      0.60      0.245       (  0.072)      0.058       0.186
144  12.00      0.60      0.245       (  0.072)      0.058       0.186
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145	12.08	0.83	0.340	0.072	(0.081)	0.268
146	12.17	0.83	0.340	0.071	(0.081)	0.268
147	12.25	0.83	0.340	0.071	(0.081)	0.269
148	12.33	0.87	0.353	0.070	(0.084)	0.283
149	12.42	0.87	0.353	0.070	(0.084)	0.283
150	12.50	0.87	0.353	0.070	(0.084)	0.284
151	12.58	0.93	0.380	0.069	(0.091)	0.311
152	12.67	0.93	0.380	0.069	(0.091)	0.311
153	12.75	0.93	0.380	0.069	(0.091)	0.312
154	12.83	0.97	0.394	0.068	(0.094)	0.326
155	12.92	0.97	0.394	0.068	(0.094)	0.326
156	13.00	0.97	0.394	0.068	(0.094)	0.326
157	13.08	1.13	0.462	0.067	(0.110)	0.395
158	13.17	1.13	0.462	0.067	(0.110)	0.395
159	13.25	1.13	0.462	0.067	(0.110)	0.395
160	13.33	1.13	0.462	0.066	(0.110)	0.396
161	13.42	1.13	0.462	0.066	(0.110)	0.396
162	13.50	1.13	0.462	0.066	(0.110)	0.396
163	13.58	0.77	0.313	0.065	(0.074)	0.247
164	13.67	0.77	0.313	0.065	(0.074)	0.248
165	13.75	0.77	0.313	0.065	(0.074)	0.248
166	13.83	0.77	0.313	0.064	(0.074)	0.248
167	13.92	0.77	0.313	0.064	(0.074)	0.249
168	14.00	0.77	0.313	0.064	(0.074)	0.249
169	14.08	0.90	0.367	0.063	(0.087)	0.304
170	14.17	0.90	0.367	0.063	(0.087)	0.304
171	14.25	0.90	0.367	0.063	(0.087)	0.304
172	14.33	0.87	0.353	0.062	(0.084)	0.291
173	14.42	0.87	0.353	0.062	(0.084)	0.291
174	14.50	0.87	0.353	0.062	(0.084)	0.292
175	14.58	0.87	0.353	0.061	(0.084)	0.292
176	14.67	0.87	0.353	0.061	(0.084)	0.292
177	14.75	0.87	0.353	0.061	(0.084)	0.292
178	14.83	0.83	0.340	0.060	(0.081)	0.279
179	14.92	0.83	0.340	0.060	(0.081)	0.280
180	15.00	0.83	0.340	0.060	(0.081)	0.280
181	15.08	0.80	0.326	0.060	(0.078)	0.267
182	15.17	0.80	0.326	0.059	(0.078)	0.267
183	15.25	0.80	0.326	0.059	(0.078)	0.267
184	15.33	0.77	0.313	0.059	(0.074)	0.254
185	15.42	0.77	0.313	0.058	(0.074)	0.254
186	15.50	0.77	0.313	0.058	(0.074)	0.254
187	15.58	0.63	0.258	0.058	(0.061)	0.200
188	15.67	0.63	0.258	0.057	(0.061)	0.201
189	15.75	0.63	0.258	0.057	(0.061)	0.201
190	15.83	0.63	0.258	0.057	(0.061)	0.201
191	15.92	0.63	0.258	0.057	(0.061)	0.202
192	16.00	0.63	0.258	0.056	(0.061)	0.202
193	16.08	0.13	0.054	(0.056)	0.013	0.041
194	16.17	0.13	0.054	(0.056)	0.013	0.041

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195  16.25     0.13     0.054        (  0.055)       0.013         0.041
196  16.33     0.13     0.054        (  0.055)       0.013         0.041
197  16.42     0.13     0.054        (  0.055)       0.013         0.041
198  16.50     0.13     0.054        (  0.055)       0.013         0.041
199  16.58     0.10     0.041        (  0.054)       0.010         0.031
200  16.67     0.10     0.041        (  0.054)       0.010         0.031
201  16.75     0.10     0.041        (  0.054)       0.010         0.031
202  16.83     0.10     0.041        (  0.053)       0.010         0.031
203  16.92     0.10     0.041        (  0.053)       0.010         0.031
204  17.00     0.10     0.041        (  0.053)       0.010         0.031
205  17.08     0.17     0.068        (  0.053)       0.016         0.052
206  17.17     0.17     0.068        (  0.052)       0.016         0.052
207  17.25     0.17     0.068        (  0.052)       0.016         0.052
208  17.33     0.17     0.068        (  0.052)       0.016         0.052
209  17.42     0.17     0.068        (  0.052)       0.016         0.052
210  17.50     0.17     0.068        (  0.051)       0.016         0.052
211  17.58     0.17     0.068        (  0.051)       0.016         0.052
212  17.67     0.17     0.068        (  0.051)       0.016         0.052
213  17.75     0.17     0.068        (  0.051)       0.016         0.052
214  17.83     0.13     0.054        (  0.050)       0.013         0.041
215  17.92     0.13     0.054        (  0.050)       0.013         0.041
216  18.00     0.13     0.054        (  0.050)       0.013         0.041
217  18.08     0.13     0.054        (  0.050)       0.013         0.041
218  18.17     0.13     0.054        (  0.049)       0.013         0.041
219  18.25     0.13     0.054        (  0.049)       0.013         0.041
220  18.33     0.13     0.054        (  0.049)       0.013         0.041
221  18.42     0.13     0.054        (  0.049)       0.013         0.041
222  18.50     0.13     0.054        (  0.048)       0.013         0.041
223  18.58     0.10     0.041        (  0.048)       0.010         0.031
224  18.67     0.10     0.041        (  0.048)       0.010         0.031
225  18.75     0.10     0.041        (  0.048)       0.010         0.031
226  18.83     0.07     0.027        (  0.047)       0.006         0.021
227  18.92     0.07     0.027        (  0.047)       0.006         0.021
228  19.00     0.07     0.027        (  0.047)       0.006         0.021
229  19.08     0.10     0.041        (  0.047)       0.010         0.031
230  19.17     0.10     0.041        (  0.047)       0.010         0.031
231  19.25     0.10     0.041        (  0.046)       0.010         0.031
232  19.33     0.13     0.054        (  0.046)       0.013         0.041
233  19.42     0.13     0.054        (  0.046)       0.013         0.041
234  19.50     0.13     0.054        (  0.046)       0.013         0.041
235  19.58     0.10     0.041        (  0.046)       0.010         0.031
236  19.67     0.10     0.041        (  0.045)       0.010         0.031
237  19.75     0.10     0.041        (  0.045)       0.010         0.031
238  19.83     0.07     0.027        (  0.045)       0.006         0.021
239  19.92     0.07     0.027        (  0.045)       0.006         0.021
240  20.00     0.07     0.027        (  0.045)       0.006         0.021
241  20.08     0.10     0.041        (  0.044)       0.010         0.031
242  20.17     0.10     0.041        (  0.044)       0.010         0.031
243  20.25     0.10     0.041        (  0.044)       0.010         0.031
244  20.33     0.10     0.041        (  0.044)       0.010         0.031
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245  20.42     0.10      0.041       (  0.044)       0.010        0.031
246  20.50     0.10      0.041       (  0.043)       0.010        0.031
247  20.58     0.10      0.041       (  0.043)       0.010        0.031
248  20.67     0.10      0.041       (  0.043)       0.010        0.031
249  20.75     0.10      0.041       (  0.043)       0.010        0.031
250  20.83     0.07      0.027       (  0.043)       0.006        0.021
251  20.92     0.07      0.027       (  0.042)       0.006        0.021
252  21.00     0.07      0.027       (  0.042)       0.006        0.021
253  21.08     0.10      0.041       (  0.042)       0.010        0.031
254  21.17     0.10      0.041       (  0.042)       0.010        0.031
255  21.25     0.10      0.041       (  0.042)       0.010        0.031
256  21.33     0.07      0.027       (  0.042)       0.006        0.021
257  21.42     0.07      0.027       (  0.041)       0.006        0.021
258  21.50     0.07      0.027       (  0.041)       0.006        0.021
259  21.58     0.10      0.041       (  0.041)       0.010        0.031
260  21.67     0.10      0.041       (  0.041)       0.010        0.031
261  21.75     0.10      0.041       (  0.041)       0.010        0.031
262  21.83     0.07      0.027       (  0.041)       0.006        0.021
263  21.92     0.07      0.027       (  0.041)       0.006        0.021
264  22.00     0.07      0.027       (  0.040)       0.006        0.021
265  22.08     0.10      0.041       (  0.040)       0.010        0.031
266  22.17     0.10      0.041       (  0.040)       0.010        0.031
267  22.25     0.10      0.041       (  0.040)       0.010        0.031
268  22.33     0.07      0.027       (  0.040)       0.006        0.021
269  22.42     0.07      0.027       (  0.040)       0.006        0.021
270  22.50     0.07      0.027       (  0.040)       0.006        0.021
271  22.58     0.07      0.027       (  0.040)       0.006        0.021
272  22.67     0.07      0.027       (  0.039)       0.006        0.021
273  22.75     0.07      0.027       (  0.039)       0.006        0.021
274  22.83     0.07      0.027       (  0.039)       0.006        0.021
275  22.92     0.07      0.027       (  0.039)       0.006        0.021
276  23.00     0.07      0.027       (  0.039)       0.006        0.021
277  23.08     0.07      0.027       (  0.039)       0.006        0.021
278  23.17     0.07      0.027       (  0.039)       0.006        0.021
279  23.25     0.07      0.027       (  0.039)       0.006        0.021
280  23.33     0.07      0.027       (  0.039)       0.006        0.021
281  23.42     0.07      0.027       (  0.039)       0.006        0.021
282  23.50     0.07      0.027       (  0.039)       0.006        0.021
283  23.58     0.07      0.027       (  0.039)       0.006        0.021
284  23.67     0.07      0.027       (  0.038)       0.006        0.021
285  23.75     0.07      0.027       (  0.038)       0.006        0.021
286  23.83     0.07      0.027       (  0.038)       0.006        0.021
287  23.92     0.07      0.027       (  0.038)       0.006        0.021
288  24.00     0.07      0.027       (  0.038)       0.006        0.021
                (Loss Rate Not Used)
    Sum =     100.0                                   Sum =    32.0
       Flood volume = Effective rainfall      2.67(In)
        times area      18.1(Ac.)/[(In)/(Ft.)] =       4.0(Ac.Ft)
       Total soil loss =      0.73(In)
       Total soil loss =     1.102(Ac.Ft)
```

```
      Total rainfall =      3.40(In)
      Flood volume =      175076.2 Cubic Feet
      Total soil loss =       47990.7 Cubic Feet
      --------------------------------------------------------------------
       Peak flow rate of this hydrograph =      7.224(CFS)
      --------------------------------------------------------------------
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          24 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      --------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0011      0.16  Q         |         |         |         |
  0+10       0.0033      0.32  VQ        |         |         |         |
  0+15       0.0058      0.36  VQ        |         |         |         |
  0+20       0.0089      0.45  VQ        |         |         |         |
  0+25       0.0126      0.54  V Q       |         |         |         |
  0+30       0.0164      0.56  V Q       |         |         |         |
  0+35       0.0203      0.56  V Q       |         |         |         |
  0+40       0.0242      0.57  V Q       |         |         |         |
  0+45       0.0281      0.57  V Q       |         |         |         |
  0+50       0.0325      0.64  V Q       |         |         |         |
  0+55       0.0375      0.73  V Q       |         |         |         |
  1+ 0       0.0427      0.75  V Q       |         |         |         |
  1+ 5       0.0473      0.67  V Q       |         |         |         |
  1+10       0.0514      0.59  V Q       |         |         |         |
  1+15       0.0554      0.58  V Q       |         |         |         |
  1+20       0.0593      0.57  V Q       |         |         |         |
  1+25       0.0632      0.57  V Q       |         |         |         |
  1+30       0.0671      0.57  V Q       |         |         |         |
  1+35       0.0710      0.57  V Q       |         |         |         |
  1+40       0.0749      0.57  V Q       |         |         |         |
  1+45       0.0788      0.57  V Q       |         |         |         |
  1+50       0.0833      0.64  V Q       |         |         |         |
  1+55       0.0883      0.73  V Q       |         |         |         |
  2+ 0       0.0934      0.75  V Q       |         |         |         |
  2+ 5       0.0986      0.75  V  Q      |         |         |         |
  2+10       0.1038      0.76  |V Q      |         |         |         |
  2+15       0.1090      0.76  |V Q      |         |         |         |
  2+20       0.1142      0.76  |V Q      |         |         |         |
  2+25       0.1194      0.76  |V Q      |         |         |         |
  2+30       0.1246      0.76  |V Q      |         |         |         |
  2+35       0.1303      0.83  |V Q      |         |         |         |
  2+40       0.1367      0.92  |V Q      |         |         |         |
  2+45       0.1431      0.93  |V Q      |         |         |         |
  2+50       0.1496      0.94  |V Q      |         |         |         |
  2+55       0.1561      0.94  |V Q      |         |         |         |
```

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3+ 0       0.1626      0.94  |V Q      |         |         |         |
3+ 5       0.1691      0.94  |V Q      |         |         |         |
3+10       0.1756      0.94  |V Q      |         |         |         |
3+15       0.1821      0.94  |V Q      |         |         |         |
3+20       0.1886      0.94  |V Q      |         |         |         |
3+25       0.1951      0.94  |V Q      |         |         |         |
3+30       0.2016      0.94  | VQ      |         |         |         |
3+35       0.2081      0.94  | VQ      |         |         |         |
3+40       0.2146      0.94  | VQ      |         |         |         |
3+45       0.2211      0.94  | VQ      |         |         |         |
3+50       0.2282      1.02  | V Q     |         |         |         |
3+55       0.2358      1.11  | V Q     |         |         |         |
4+ 0       0.2435      1.12  | V Q     |         |         |         |
4+ 5       0.2513      1.13  | V Q     |         |         |         |
4+10       0.2591      1.13  | V Q     |         |         |         |
4+15       0.2669      1.13  | V Q     |         |         |         |
4+20       0.2752      1.21  | V Q     |         |         |         |
4+25       0.2842      1.29  | V  Q    |         |         |         |
4+30       0.2932      1.31  | V  Q    |         |         |         |
4+35       0.3023      1.32  |  V Q    |         |         |         |
4+40       0.3114      1.32  |  V Q    |         |         |         |
4+45       0.3205      1.32  |  V Q    |         |         |         |
4+50       0.3301      1.40  |  V Q    |         |         |         |
4+55       0.3404      1.48  |  V Q    |         |         |         |
5+ 0       0.3507      1.50  |  V  Q   |         |         |         |
5+ 5       0.3600      1.35  |  V Q    |         |         |         |
5+10       0.3682      1.19  |  VQ     |         |         |         |
5+15       0.3761      1.15  |  VQ     |         |         |         |
5+20       0.3845      1.22  |  VQ     |         |         |         |
5+25       0.3934      1.29  |  V Q    |         |         |         |
5+30       0.4025      1.31  |   VQ    |         |         |         |
5+35       0.4121      1.40  |   VQ    |         |         |         |
5+40       0.4223      1.48  |   VQ    |         |         |         |
5+45       0.4326      1.50  |   V Q   |         |         |         |
5+50       0.4430      1.51  |   V Q   |         |         |         |
5+55       0.4534      1.51  |   V Q   |         |         |         |
6+ 0       0.4638      1.51  |   V Q   |         |         |         |
6+ 5       0.4748      1.59  |   V Q   |         |         |         |
6+10       0.4863      1.67  |   V Q   |         |         |         |
6+15       0.4979      1.69  |   V Q   |         |         |         |
6+20       0.5096      1.70  |    VQ   |         |         |         |
6+25       0.5213      1.70  |    VQ   |         |         |         |
6+30       0.5330      1.70  |    VQ   |         |         |         |
6+35       0.5453      1.78  |    V Q  |         |         |         |
6+40       0.5581      1.86  |    V Q  |         |         |         |
6+45       0.5710      1.88  |    V Q  |         |         |         |
6+50       0.5840      1.89  |    V Q  |         |         |         |
6+55       0.5970      1.89  |    V Q  |         |         |         |
7+ 0       0.6100      1.89  |     VQ  |         |         |         |
7+ 5       0.6230      1.89  |     VQ  |         |         |         |
```

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  7+10       0.6361      1.89  |     VQ  |         |         |         |
  7+15       0.6491      1.89  |     VQ  |         |         |         |
  7+20       0.6626      1.97  |     VQ  |         |         |         |
  7+25       0.6767      2.05  |     V Q |         |         |         |
  7+30       0.6910      2.07  |     V Q |         |         |         |
  7+35       0.7058      2.15  |      VQ |         |         |         |
  7+40       0.7212      2.24  |      VQ |         |         |         |
  7+45       0.7367      2.26  |      V Q|         |         |         |
  7+50       0.7529      2.34  |      V Q|         |         |         |
  7+55       0.7696      2.43  |      V Q|         |         |         |
  8+ 0       0.7864      2.45  |      V Q|         |         |         |
  8+ 5       0.8044      2.61  |       V Q         |         |         |
  8+10       0.8235      2.78  |       V |Q        |         |         |
  8+15       0.8429      2.81  |       V |Q        |         |         |
  8+20       0.8624      2.83  |       V |Q        |         |         |
  8+25       0.8819      2.83  |       V |Q        |         |         |
  8+30       0.9014      2.83  |       V |Q        |         |         |
  8+35       0.9214      2.91  |        V|Q        |         |         |
  8+40       0.9421      2.99  |        V|Q        |         |         |
  8+45       0.9628      3.01  |        V| Q       |         |         |
  8+50       0.9841      3.10  |        V| Q       |         |         |
  8+55       1.0061      3.18  |         V Q       |         |         |
  9+ 0       1.0281      3.20  |         V Q       |         |         |
  9+ 5       1.0513      3.36  |         V  Q      |         |         |
  9+10       1.0756      3.53  |         V   Q     |         |         |
  9+15       1.1002      3.57  |         V   Q     |         |         |
  9+20       1.1254      3.66  |         |V  Q     |         |         |
  9+25       1.1512      3.75  |         |V  Q     |         |         |
  9+30       1.1772      3.77  |         |V   Q    |         |         |
  9+35       1.2037      3.85  |         |V   Q    |         |         |
  9+40       1.2308      3.94  |         | V  Q    |         |         |
  9+45       1.2581      3.96  |         | V  Q    |         |         |
  9+50       1.2859      4.04  |         | V   Q   |         |         |
  9+55       1.3143      4.13  |         |  V  Q   |         |         |
 10+ 0       1.3429      4.15  |         |  V  Q   |         |         |
 10+ 5       1.3677      3.61  |         |  VQ     |         |         |
 10+10       1.3886      3.02  |         | QV      |         |         |
 10+15       1.4085      2.90  |         |Q  V     |         |         |
 10+20       1.4282      2.85  |         |Q  V     |         |         |
 10+25       1.4477      2.83  |         |Q  V     |         |         |
 10+30       1.4672      2.83  |         |Q  V     |         |         |
 10+35       1.4894      3.22  |         | Q V     |         |         |
 10+40       1.5145      3.64  |         |   QV    |         |         |
 10+45       1.5401      3.73  |         |   QV    |         |         |
 10+50       1.5661      3.76  |         |    Q    |         |         |
 10+55       1.5921      3.78  |         |    Q    |         |         |
 11+ 0       1.6181      3.78  |         |    QV   |         |         |
 11+ 5       1.6436      3.70  |         |   Q V   |         |         |
 11+10       1.6685      3.62  |         |   Q V   |         |         |
 11+15       1.6933      3.60  |         |   Q V   |         |         |
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11+20       1.7180      3.59  |         |   Q  V  |         |         |
11+25       1.7427      3.59  |         |   Q  V  |         |         |
11+30       1.7674      3.59  |         |   Q  V  |         |         |
11+35       1.7911      3.43  |         |  Q   V  |         |         |
11+40       1.8135      3.27  |         |  Q    V |         |         |
11+45       1.8358      3.23  |         | Q     V |         |         |
11+50       1.8585      3.29  |         |  Q    V |         |         |
11+55       1.8817      3.37  |         |  Q    V |         |         |
12+ 0       1.9050      3.39  |         |  Q    V |         |         |
12+ 5       1.9327      4.01  |         |     Q  V|         |         |
12+10       1.9649      4.68  |         |       QV|         |         |
12+15       1.9981      4.82  |         |        Q|         |         |
12+20       2.0324      4.99  |         |        QV         |         |
12+25       2.0677      5.12  |         |         Q         |         |
12+30       2.1032      5.15  |         |         Q         |         |
12+35       2.1402      5.37  |         |         |Q        |         |
12+40       2.1788      5.60  |         |         |VQ       |         |
12+45       2.2178      5.66  |         |         | Q       |         |
12+50       2.2576      5.78  |         |         | VQ      |         |
12+55       2.2982      5.91  |         |         | VQ      |         |
13+ 0       2.3391      5.93  |         |         |  Q      |         |
13+ 5       2.3836      6.46  |         |         |  V Q    |         |
13+10       2.4320      7.02  |         |         |   V   Q |         |
13+15       2.4812      7.14  |         |         |   V   Q |         |
13+20       2.5307      7.19  |         |         |    V  Q |         |
13+25       2.5804      7.22  |         |         |    V  Q |         |
13+30       2.6302      7.22  |         |         |     V Q |         |
13+35       2.6722      6.11  |         |         |   Q V   |         |
13+40       2.7060      4.91  |         |        Q|     V   |         |
13+45       2.7381      4.66  |         |       Q |      V  |         |
13+50       2.7695      4.56  |         |       Q |      V  |         |
13+55       2.8007      4.53  |         |       Q |      V  |         |
14+ 0       2.8319      4.53  |         |       Q |       V |         |
14+ 5       2.8660      4.95  |         |        Q|       V |         |
14+10       2.9032      5.39  |         |         |Q      V |         |
14+15       2.9410      5.49  |         |         |Q       V|         |
14+20       2.9784      5.43  |         |         |Q       V|         |
14+25       3.0152      5.34  |         |         |Q        V         |
14+30       3.0519      5.33  |         |         |Q        V         |
14+35       3.0885      5.32  |         |         |Q        V         |
14+40       3.1252      5.32  |         |         |Q        |V        |
14+45       3.1619      5.33  |         |         |Q        |V        |
14+50       3.1980      5.23  |         |         Q         |V        |
14+55       3.2333      5.13  |         |         Q         | V       |
15+ 0       3.2685      5.11  |         |         Q         | V       |
15+ 5       3.3030      5.01  |         |         Q         | V       |
15+10       3.3367      4.90  |         |        Q|         |  V      |
15+15       3.3703      4.88  |         |        Q|         |  V      |
15+20       3.4032      4.78  |         |        Q|         |  V      |
15+25       3.4354      4.67  |         |       Q |         |   V     |
```

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15+30       3.4674      4.65  |         |       Q |         |   V     |
15+35       3.4966      4.24  |         |     Q   |         |   V     |
15+40       3.5228      3.80  |         |    Q    |         |    V    |
15+45       3.5483      3.71  |         |   Q     |         |    V    |
15+50       3.5737      3.68  |         |   Q     |         |    V    |
15+55       3.5990      3.67  |         |   Q     |         |    V    |
16+ 0       3.6243      3.68  |         |   Q     |         |     V   |
16+ 5       3.6414      2.47  |        Q|         |         |     V   |
16+10       3.6495      1.18  |   Q     |         |         |     V   |
16+15       3.6557      0.91  |  Q      |         |         |     V   |
16+20       3.6612      0.80  |  Q      |         |         |     V   |
16+25       3.6664      0.76  |  Q      |         |         |     V   |
16+30       3.6716      0.76  |  Q      |         |         |     V   |
16+35       3.6763      0.68  | Q       |         |         |     V   |
16+40       3.6804      0.59  | Q       |         |         |     V   |
16+45       3.6844      0.58  | Q       |         |         |     V   |
16+50       3.6883      0.57  | Q       |         |         |     V   |
16+55       3.6922      0.57  | Q       |         |         |     V   |
17+ 0       3.6961      0.57  | Q       |         |         |     V   |
17+ 5       3.7011      0.72  | Q       |         |         |     V   |
17+10       3.7072      0.89  |  Q      |         |         |     V   |
17+15       3.7136      0.92  |  Q      |         |         |     V   |
17+20       3.7200      0.94  |  Q      |         |         |      V  |
17+25       3.7265      0.94  |  Q      |         |         |      V  |
17+30       3.7330      0.94  |  Q      |         |         |      V  |
17+35       3.7395      0.94  |  Q      |         |         |      V  |
17+40       3.7460      0.94  |  Q      |         |         |      V  |
17+45       3.7526      0.94  |  Q      |         |         |      V  |
17+50       3.7585      0.87  |  Q      |         |         |      V  |
17+55       3.7639      0.78  |  Q      |         |         |      V  |
18+ 0       3.7692      0.77  |  Q      |         |         |      V  |
18+ 5       3.7744      0.76  |  Q      |         |         |      V  |
18+10       3.7796      0.76  |  Q      |         |         |      V  |
18+15       3.7848      0.76  |  Q      |         |         |      V  |
18+20       3.7900      0.76  |  Q      |         |         |      V  |
18+25       3.7952      0.76  |  Q      |         |         |      V  |
18+30       3.8004      0.76  |  Q      |         |         |      V  |
18+35       3.8051      0.68  | Q       |         |         |      V  |
18+40       3.8092      0.59  | Q       |         |         |      V  |
18+45       3.8131      0.58  | Q       |         |         |      V  |
18+50       3.8165      0.49  |Q        |         |         |      V  |
18+55       3.8193      0.41  |Q        |         |         |       V |
19+ 0       3.8220      0.39  |Q        |         |         |       V |
19+ 5       3.8251      0.46  |Q        |         |         |       V |
19+10       3.8289      0.54  | Q       |         |         |       V |
19+15       3.8327      0.56  | Q       |         |         |       V |
19+20       3.8371      0.64  | Q       |         |         |       V |
19+25       3.8421      0.73  | Q       |         |         |       V |
19+30       3.8473      0.75  | Q       |         |         |       V |
19+35       3.8519      0.67  | Q       |         |         |       V |
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19+40       3.8560      0.59  | Q       |         |         |       V |
19+45       3.8600      0.58  | Q       |         |         |       V |
19+50       3.8634      0.49  |Q        |         |         |       V |
19+55       3.8661      0.41  |Q        |         |         |       V |
20+ 0       3.8688      0.39  |Q        |         |         |       V |
20+ 5       3.8720      0.46  |Q        |         |         |       V |
20+10       3.8757      0.54  | Q       |         |         |       V |
20+15       3.8795      0.56  | Q       |         |         |       V |
20+20       3.8834      0.56  | Q       |         |         |       V |
20+25       3.8873      0.57  | Q       |         |         |       V |
20+30       3.8912      0.57  | Q       |         |         |       V |
20+35       3.8951      0.57  | Q       |         |         |       V |
20+40       3.8990      0.57  | Q       |         |         |       V |
20+45       3.9029      0.57  | Q       |         |         |       V |
20+50       3.9063      0.49  |Q        |         |         |       V |
20+55       3.9091      0.41  |Q        |         |         |       V |
21+ 0       3.9117      0.39  |Q        |         |         |       V |
21+ 5       3.9149      0.46  |Q        |         |         |       V |
21+10       3.9186      0.54  | Q       |         |         |       V |
21+15       3.9224      0.56  | Q       |         |         |        V|
21+20       3.9258      0.49  |Q        |         |         |        V|
21+25       3.9286      0.41  |Q        |         |         |        V|
21+30       3.9312      0.39  |Q        |         |         |        V|
21+35       3.9344      0.46  |Q        |         |         |        V|
21+40       3.9381      0.54  | Q       |         |         |        V|
21+45       3.9420      0.56  | Q       |         |         |        V|
21+50       3.9453      0.49  |Q        |         |         |        V|
21+55       3.9481      0.41  |Q        |         |         |        V|
22+ 0       3.9508      0.39  |Q        |         |         |        V|
22+ 5       3.9539      0.46  |Q        |         |         |        V|
22+10       3.9576      0.54  | Q       |         |         |        V|
22+15       3.9615      0.56  | Q       |         |         |        V|
22+20       3.9648      0.49  |Q        |         |         |        V|
22+25       3.9676      0.41  |Q        |         |         |        V|
22+30       3.9703      0.39  |Q        |         |         |        V|
22+35       3.9729      0.38  |Q        |         |         |        V|
22+40       3.9755      0.38  |Q        |         |         |        V|
22+45       3.9781      0.38  |Q        |         |         |        V|
22+50       3.9807      0.38  |Q        |         |         |        V|
22+55       3.9833      0.38  |Q        |         |         |        V|
23+ 0       3.9859      0.38  |Q        |         |         |        V|
23+ 5       3.9885      0.38  |Q        |         |         |        V|
23+10       3.9911      0.38  |Q        |         |         |        V|
23+15       3.9937      0.38  |Q        |         |         |        V|
23+20       3.9963      0.38  |Q        |         |         |        V|
23+25       3.9989      0.38  |Q        |         |         |        V|
23+30       4.0015      0.38  |Q        |         |         |        V|
23+35       4.0041      0.38  |Q        |         |         |        V|
23+40       4.0067      0.38  |Q        |         |         |        V|
23+45       4.0093      0.38  |Q        |         |         |        V|
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  23+50       4.0119      0.38  |Q         |         |         |        V|
  23+55       4.0145      0.38  |Q         |         |         |        V|
  24+ 0       4.0171      0.38  |Q         |         |         |        V|
  24+ 5       4.0186      0.22  Q          |         |         |        V|
  24+10       4.0190      0.05  Q          |         |         |        V|
  24+15       4.0192      0.02  Q          |         |         |        V|
  24+20       4.0192      0.01  Q          |         |         |        V|
-----------------------------------------------------------------------
```

```
        U n i t   H y d r o g r a p h   A n a l y s i s

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                Study date  05/27/22 File: MapesPost10BUH2410.out


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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6443

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format




---------------------------------------------------------------------
MAPES AND TRUMBLE INDUSTRIAL FACILITY
UNIT HYDROGRAPH
POST-DEVELOPMENT CONDITIONS
10-YEAR, 24HR STORM, DA B
--------------------------------------------------------------------
Drainage Area =       0.92(Ac.)  =      0.001 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       0.92(Ac.)  =
0.001 Sq. Mi.
Length along longest watercourse =     834.61(Ft.)
Length along longest watercourse measured to centroid =     558.41(Ft.)
Length along longest watercourse =      0.158 Mi.
Length along longest watercourse measured to centroid =      0.106 Mi.
Difference in elevation =       9.65(Ft.)
Slope along watercourse =     61.0489 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.035 Hr.
Lag time =     2.09 Min.
25% of lag time =     0.52 Min.
40% of lag time =     0.84 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:
```

```
Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        0.92            2.06                    1.90

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        0.92            5.31                    4.89

STORM EVENT (YEAR) =   10.00
Area Averaged 2-Year Rainfall =    2.060(In)
Area Averaged 100-Year Rainfall =    5.310(In)

Point rain (area averaged) =    3.397(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    3.397(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
     0.920           75.00         0.730
 Total Area Entered =      0.92(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
75.0  75.0      0.303     0.730        0.104       1.000      0.104
                                                  Sum (F) =   0.104
Area averaged mean soil loss (F) (In/Hr) =  0.104
Minimum soil loss rate ((In/Hr)) =  0.052
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.313
---------------------------------------------------------------------

                U n i t  H y d r o g r a p h
                        VALLEY S-Curve
--------------------------------------------------------------------
                Unit Hydrograph Data
---------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                           Graph %            (CFS)
---------------------------------------------------------------------
    1   0.083        239.327          49.466              0.459
    2   0.167        478.653          40.724              0.378
    3   0.250        717.980           7.375              0.068
    4   0.333        957.306           2.435              0.023
                              Sum = 100.000   Sum=       0.927
-----------------------------------------------------------------------
```

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The following loss rate calculations reflect use of the minimum calculated loss
rate subtracted from the Storm Rain to produce the maximum Effective Rain value

 Unit Time    Pattern   Storm Rain     Loss rate(In./Hr)     Effective
      (Hr.)  Percent   (In/Hr)          Max   |   Low        (In/Hr)
  1   0.08     0.07      0.027       (  0.184)       0.009        0.019
  2   0.17     0.07      0.027       (  0.184)       0.009        0.019
  3   0.25     0.07      0.027       (  0.183)       0.009        0.019
  4   0.33     0.10      0.041       (  0.182)       0.013        0.028
  5   0.42     0.10      0.041       (  0.181)       0.013        0.028
  6   0.50     0.10      0.041       (  0.181)       0.013        0.028
  7   0.58     0.10      0.041       (  0.180)       0.013        0.028
  8   0.67     0.10      0.041       (  0.179)       0.013        0.028
  9   0.75     0.10      0.041       (  0.179)       0.013        0.028
 10   0.83     0.13      0.054       (  0.178)       0.017        0.037
 11   0.92     0.13      0.054       (  0.177)       0.017        0.037
 12   1.00     0.13      0.054       (  0.176)       0.017        0.037
 13   1.08     0.10      0.041       (  0.176)       0.013        0.028
 14   1.17     0.10      0.041       (  0.175)       0.013        0.028
 15   1.25     0.10      0.041       (  0.174)       0.013        0.028
 16   1.33     0.10      0.041       (  0.174)       0.013        0.028
 17   1.42     0.10      0.041       (  0.173)       0.013        0.028
 18   1.50     0.10      0.041       (  0.172)       0.013        0.028
 19   1.58     0.10      0.041       (  0.172)       0.013        0.028
 20   1.67     0.10      0.041       (  0.171)       0.013        0.028
 21   1.75     0.10      0.041       (  0.170)       0.013        0.028
 22   1.83     0.13      0.054       (  0.170)       0.017        0.037
 23   1.92     0.13      0.054       (  0.169)       0.017        0.037
 24   2.00     0.13      0.054       (  0.168)       0.017        0.037
 25   2.08     0.13      0.054       (  0.168)       0.017        0.037
 26   2.17     0.13      0.054       (  0.167)       0.017        0.037
 27   2.25     0.13      0.054       (  0.166)       0.017        0.037
 28   2.33     0.13      0.054       (  0.165)       0.017        0.037
 29   2.42     0.13      0.054       (  0.165)       0.017        0.037
 30   2.50     0.13      0.054       (  0.164)       0.017        0.037
 31   2.58     0.17      0.068       (  0.163)       0.021        0.047
 32   2.67     0.17      0.068       (  0.163)       0.021        0.047
 33   2.75     0.17      0.068       (  0.162)       0.021        0.047
 34   2.83     0.17      0.068       (  0.161)       0.021        0.047
 35   2.92     0.17      0.068       (  0.161)       0.021        0.047
 36   3.00     0.17      0.068       (  0.160)       0.021        0.047
 37   3.08     0.17      0.068       (  0.159)       0.021        0.047
 38   3.17     0.17      0.068       (  0.159)       0.021        0.047
 39   3.25     0.17      0.068       (  0.158)       0.021        0.047
 40   3.33     0.17      0.068       (  0.157)       0.021        0.047
 41   3.42     0.17      0.068       (  0.157)       0.021        0.047
 42   3.50     0.17      0.068       (  0.156)       0.021        0.047
 43   3.58     0.17      0.068       (  0.156)       0.021        0.047
 44   3.67     0.17      0.068       (  0.155)       0.021        0.047
 45   3.75     0.17      0.068       (  0.154)       0.021        0.047
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46   3.83      0.20       0.082         (  0.154)       0.026        0.056
47   3.92      0.20       0.082         (  0.153)       0.026        0.056
48   4.00      0.20       0.082         (  0.152)       0.026        0.056
49   4.08      0.20       0.082         (  0.152)       0.026        0.056
50   4.17      0.20       0.082         (  0.151)       0.026        0.056
51   4.25      0.20       0.082         (  0.150)       0.026        0.056
52   4.33      0.23       0.095         (  0.150)       0.030        0.065
53   4.42      0.23       0.095         (  0.149)       0.030        0.065
54   4.50      0.23       0.095         (  0.148)       0.030        0.065
55   4.58      0.23       0.095         (  0.148)       0.030        0.065
56   4.67      0.23       0.095         (  0.147)       0.030        0.065
57   4.75      0.23       0.095         (  0.147)       0.030        0.065
58   4.83      0.27       0.109         (  0.146)       0.034        0.075
59   4.92      0.27       0.109         (  0.145)       0.034        0.075
60   5.00      0.27       0.109         (  0.145)       0.034        0.075
61   5.08      0.20       0.082         (  0.144)       0.026        0.056
62   5.17      0.20       0.082         (  0.143)       0.026        0.056
63   5.25      0.20       0.082         (  0.143)       0.026        0.056
64   5.33      0.23       0.095         (  0.142)       0.030        0.065
65   5.42      0.23       0.095         (  0.141)       0.030        0.065
66   5.50      0.23       0.095         (  0.141)       0.030        0.065
67   5.58      0.27       0.109         (  0.140)       0.034        0.075
68   5.67      0.27       0.109         (  0.140)       0.034        0.075
69   5.75      0.27       0.109         (  0.139)       0.034        0.075
70   5.83      0.27       0.109         (  0.138)       0.034        0.075
71   5.92      0.27       0.109         (  0.138)       0.034        0.075
72   6.00      0.27       0.109         (  0.137)       0.034        0.075
73   6.08      0.30       0.122         (  0.137)       0.038        0.084
74   6.17      0.30       0.122         (  0.136)       0.038        0.084
75   6.25      0.30       0.122         (  0.135)       0.038        0.084
76   6.33      0.30       0.122         (  0.135)       0.038        0.084
77   6.42      0.30       0.122         (  0.134)       0.038        0.084
78   6.50      0.30       0.122         (  0.134)       0.038        0.084
79   6.58      0.33       0.136         (  0.133)       0.043        0.093
80   6.67      0.33       0.136         (  0.132)       0.043        0.093
81   6.75      0.33       0.136         (  0.132)       0.043        0.093
82   6.83      0.33       0.136         (  0.131)       0.043        0.093
83   6.92      0.33       0.136         (  0.131)       0.043        0.093
84   7.00      0.33       0.136         (  0.130)       0.043        0.093
85   7.08      0.33       0.136         (  0.129)       0.043        0.093
86   7.17      0.33       0.136         (  0.129)       0.043        0.093
87   7.25      0.33       0.136         (  0.128)       0.043        0.093
88   7.33      0.37       0.149         (  0.128)       0.047        0.103
89   7.42      0.37       0.149         (  0.127)       0.047        0.103
90   7.50      0.37       0.149         (  0.126)       0.047        0.103
91   7.58      0.40       0.163         (  0.126)       0.051        0.112
92   7.67      0.40       0.163         (  0.125)       0.051        0.112
93   7.75      0.40       0.163         (  0.125)       0.051        0.112
94   7.83      0.43       0.177         (  0.124)       0.055        0.121
95   7.92      0.43       0.177         (  0.124)       0.055        0.121
```

96	8.00	0.43	0.177	(0.123)	0.055	0.121
97	8.08	0.50	0.204	(0.122)	0.064	0.140
98	8.17	0.50	0.204	(0.122)	0.064	0.140
99	8.25	0.50	0.204	(0.121)	0.064	0.140
100	8.33	0.50	0.204	(0.121)	0.064	0.140
101	8.42	0.50	0.204	(0.120)	0.064	0.140
102	8.50	0.50	0.204	(0.120)	0.064	0.140
103	8.58	0.53	0.217	(0.119)	0.068	0.149
104	8.67	0.53	0.217	(0.118)	0.068	0.149
105	8.75	0.53	0.217	(0.118)	0.068	0.149
106	8.83	0.57	0.231	(0.117)	0.072	0.159
107	8.92	0.57	0.231	(0.117)	0.072	0.159
108	9.00	0.57	0.231	(0.116)	0.072	0.159
109	9.08	0.63	0.258	(0.116)	0.081	0.177
110	9.17	0.63	0.258	(0.115)	0.081	0.177
111	9.25	0.63	0.258	(0.115)	0.081	0.177
112	9.33	0.67	0.272	(0.114)	0.085	0.187
113	9.42	0.67	0.272	(0.114)	0.085	0.187
114	9.50	0.67	0.272	(0.113)	0.085	0.187
115	9.58	0.70	0.285	(0.112)	0.089	0.196
116	9.67	0.70	0.285	(0.112)	0.089	0.196
117	9.75	0.70	0.285	(0.111)	0.089	0.196
118	9.83	0.73	0.299	(0.111)	0.094	0.205
119	9.92	0.73	0.299	(0.110)	0.094	0.205
120	10.00	0.73	0.299	(0.110)	0.094	0.205
121	10.08	0.50	0.204	(0.109)	0.064	0.140
122	10.17	0.50	0.204	(0.109)	0.064	0.140
123	10.25	0.50	0.204	(0.108)	0.064	0.140
124	10.33	0.50	0.204	(0.108)	0.064	0.140
125	10.42	0.50	0.204	(0.107)	0.064	0.140
126	10.50	0.50	0.204	(0.107)	0.064	0.140
127	10.58	0.67	0.272	(0.106)	0.085	0.187
128	10.67	0.67	0.272	(0.106)	0.085	0.187
129	10.75	0.67	0.272	(0.105)	0.085	0.187
130	10.83	0.67	0.272	(0.105)	0.085	0.187
131	10.92	0.67	0.272	(0.104)	0.085	0.187
132	11.00	0.67	0.272	(0.103)	0.085	0.187
133	11.08	0.63	0.258	(0.103)	0.081	0.177
134	11.17	0.63	0.258	(0.102)	0.081	0.177
135	11.25	0.63	0.258	(0.102)	0.081	0.177
136	11.33	0.63	0.258	(0.101)	0.081	0.177
137	11.42	0.63	0.258	(0.101)	0.081	0.177
138	11.50	0.63	0.258	(0.100)	0.081	0.177
139	11.58	0.57	0.231	(0.100)	0.072	0.159
140	11.67	0.57	0.231	(0.099)	0.072	0.159
141	11.75	0.57	0.231	(0.099)	0.072	0.159
142	11.83	0.60	0.245	(0.098)	0.077	0.168
143	11.92	0.60	0.245	(0.098)	0.077	0.168
144	12.00	0.60	0.245	(0.098)	0.077	0.168
145	12.08	0.83	0.340	0.097	(0.106)	0.243

146	12.17	0.83	0.340	0.097	(0.106)	0.243
147	12.25	0.83	0.340	0.096	(0.106)	0.244
148	12.33	0.87	0.353	0.096	(0.111)	0.258
149	12.42	0.87	0.353	0.095	(0.111)	0.258
150	12.50	0.87	0.353	0.095	(0.111)	0.259
151	12.58	0.93	0.380	0.094	(0.119)	0.286
152	12.67	0.93	0.380	0.094	(0.119)	0.287
153	12.75	0.93	0.380	0.093	(0.119)	0.287
154	12.83	0.97	0.394	0.093	(0.123)	0.301
155	12.92	0.97	0.394	0.092	(0.123)	0.302
156	13.00	0.97	0.394	0.092	(0.123)	0.302
157	13.08	1.13	0.462	0.091	(0.145)	0.371
158	13.17	1.13	0.462	0.091	(0.145)	0.371
159	13.25	1.13	0.462	0.090	(0.145)	0.372
160	13.33	1.13	0.462	0.090	(0.145)	0.372
161	13.42	1.13	0.462	0.089	(0.145)	0.373
162	13.50	1.13	0.462	0.089	(0.145)	0.373
163	13.58	0.77	0.313	0.089	(0.098)	0.224
164	13.67	0.77	0.313	0.088	(0.098)	0.224
165	13.75	0.77	0.313	0.088	(0.098)	0.225
166	13.83	0.77	0.313	0.087	(0.098)	0.225
167	13.92	0.77	0.313	0.087	(0.098)	0.226
168	14.00	0.77	0.313	0.086	(0.098)	0.226
169	14.08	0.90	0.367	0.086	(0.115)	0.281
170	14.17	0.90	0.367	0.085	(0.115)	0.281
171	14.25	0.90	0.367	0.085	(0.115)	0.282
172	14.33	0.87	0.353	0.085	(0.111)	0.269
173	14.42	0.87	0.353	0.084	(0.111)	0.269
174	14.50	0.87	0.353	0.084	(0.111)	0.270
175	14.58	0.87	0.353	0.083	(0.111)	0.270
176	14.67	0.87	0.353	0.083	(0.111)	0.270
177	14.75	0.87	0.353	0.082	(0.111)	0.271
178	14.83	0.83	0.340	0.082	(0.106)	0.258
179	14.92	0.83	0.340	0.082	(0.106)	0.258
180	15.00	0.83	0.340	0.081	(0.106)	0.259
181	15.08	0.80	0.326	0.081	(0.102)	0.245
182	15.17	0.80	0.326	0.080	(0.102)	0.246
183	15.25	0.80	0.326	0.080	(0.102)	0.246
184	15.33	0.77	0.313	0.080	(0.098)	0.233
185	15.42	0.77	0.313	0.079	(0.098)	0.233
186	15.50	0.77	0.313	0.079	(0.098)	0.234
187	15.58	0.63	0.258	0.078	(0.081)	0.180
188	15.67	0.63	0.258	0.078	(0.081)	0.180
189	15.75	0.63	0.258	0.078	(0.081)	0.181
190	15.83	0.63	0.258	0.077	(0.081)	0.181
191	15.92	0.63	0.258	0.077	(0.081)	0.181
192	16.00	0.63	0.258	0.076	(0.081)	0.182
193	16.08	0.13	0.054	(0.076)	0.017	0.037
194	16.17	0.13	0.054	(0.076)	0.017	0.037
195	16.25	0.13	0.054	(0.075)	0.017	0.037

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196  16.33     0.13      0.054       (  0.075)       0.017        0.037
197  16.42     0.13      0.054       (  0.074)       0.017        0.037
198  16.50     0.13      0.054       (  0.074)       0.017        0.037
199  16.58     0.10      0.041       (  0.074)       0.013        0.028
200  16.67     0.10      0.041       (  0.073)       0.013        0.028
201  16.75     0.10      0.041       (  0.073)       0.013        0.028
202  16.83     0.10      0.041       (  0.073)       0.013        0.028
203  16.92     0.10      0.041       (  0.072)       0.013        0.028
204  17.00     0.10      0.041       (  0.072)       0.013        0.028
205  17.08     0.17      0.068       (  0.071)       0.021        0.047
206  17.17     0.17      0.068       (  0.071)       0.021        0.047
207  17.25     0.17      0.068       (  0.071)       0.021        0.047
208  17.33     0.17      0.068       (  0.070)       0.021        0.047
209  17.42     0.17      0.068       (  0.070)       0.021        0.047
210  17.50     0.17      0.068       (  0.070)       0.021        0.047
211  17.58     0.17      0.068       (  0.069)       0.021        0.047
212  17.67     0.17      0.068       (  0.069)       0.021        0.047
213  17.75     0.17      0.068       (  0.069)       0.021        0.047
214  17.83     0.13      0.054       (  0.068)       0.017        0.037
215  17.92     0.13      0.054       (  0.068)       0.017        0.037
216  18.00     0.13      0.054       (  0.068)       0.017        0.037
217  18.08     0.13      0.054       (  0.067)       0.017        0.037
218  18.17     0.13      0.054       (  0.067)       0.017        0.037
219  18.25     0.13      0.054       (  0.067)       0.017        0.037
220  18.33     0.13      0.054       (  0.066)       0.017        0.037
221  18.42     0.13      0.054       (  0.066)       0.017        0.037
222  18.50     0.13      0.054       (  0.066)       0.017        0.037
223  18.58     0.10      0.041       (  0.065)       0.013        0.028
224  18.67     0.10      0.041       (  0.065)       0.013        0.028
225  18.75     0.10      0.041       (  0.065)       0.013        0.028
226  18.83     0.07      0.027       (  0.064)       0.009        0.019
227  18.92     0.07      0.027       (  0.064)       0.009        0.019
228  19.00     0.07      0.027       (  0.064)       0.009        0.019
229  19.08     0.10      0.041       (  0.063)       0.013        0.028
230  19.17     0.10      0.041       (  0.063)       0.013        0.028
231  19.25     0.10      0.041       (  0.063)       0.013        0.028
232  19.33     0.13      0.054       (  0.063)       0.017        0.037
233  19.42     0.13      0.054       (  0.062)       0.017        0.037
234  19.50     0.13      0.054       (  0.062)       0.017        0.037
235  19.58     0.10      0.041       (  0.062)       0.013        0.028
236  19.67     0.10      0.041       (  0.061)       0.013        0.028
237  19.75     0.10      0.041       (  0.061)       0.013        0.028
238  19.83     0.07      0.027       (  0.061)       0.009        0.019
239  19.92     0.07      0.027       (  0.061)       0.009        0.019
240  20.00     0.07      0.027       (  0.060)       0.009        0.019
241  20.08     0.10      0.041       (  0.060)       0.013        0.028
242  20.17     0.10      0.041       (  0.060)       0.013        0.028
243  20.25     0.10      0.041       (  0.060)       0.013        0.028
244  20.33     0.10      0.041       (  0.059)       0.013        0.028
245  20.42     0.10      0.041       (  0.059)       0.013        0.028
```

```
246  20.50     0.10      0.041       (  0.059)       0.013        0.028
247  20.58     0.10      0.041       (  0.059)       0.013        0.028
248  20.67     0.10      0.041       (  0.058)       0.013        0.028
249  20.75     0.10      0.041       (  0.058)       0.013        0.028
250  20.83     0.07      0.027       (  0.058)       0.009        0.019
251  20.92     0.07      0.027       (  0.058)       0.009        0.019
252  21.00     0.07      0.027       (  0.057)       0.009        0.019
253  21.08     0.10      0.041       (  0.057)       0.013        0.028
254  21.17     0.10      0.041       (  0.057)       0.013        0.028
255  21.25     0.10      0.041       (  0.057)       0.013        0.028
256  21.33     0.07      0.027       (  0.056)       0.009        0.019
257  21.42     0.07      0.027       (  0.056)       0.009        0.019
258  21.50     0.07      0.027       (  0.056)       0.009        0.019
259  21.58     0.10      0.041       (  0.056)       0.013        0.028
260  21.67     0.10      0.041       (  0.056)       0.013        0.028
261  21.75     0.10      0.041       (  0.055)       0.013        0.028
262  21.83     0.07      0.027       (  0.055)       0.009        0.019
263  21.92     0.07      0.027       (  0.055)       0.009        0.019
264  22.00     0.07      0.027       (  0.055)       0.009        0.019
265  22.08     0.10      0.041       (  0.055)       0.013        0.028
266  22.17     0.10      0.041       (  0.055)       0.013        0.028
267  22.25     0.10      0.041       (  0.054)       0.013        0.028
268  22.33     0.07      0.027       (  0.054)       0.009        0.019
269  22.42     0.07      0.027       (  0.054)       0.009        0.019
270  22.50     0.07      0.027       (  0.054)       0.009        0.019
271  22.58     0.07      0.027       (  0.054)       0.009        0.019
272  22.67     0.07      0.027       (  0.054)       0.009        0.019
273  22.75     0.07      0.027       (  0.053)       0.009        0.019
274  22.83     0.07      0.027       (  0.053)       0.009        0.019
275  22.92     0.07      0.027       (  0.053)       0.009        0.019
276  23.00     0.07      0.027       (  0.053)       0.009        0.019
277  23.08     0.07      0.027       (  0.053)       0.009        0.019
278  23.17     0.07      0.027       (  0.053)       0.009        0.019
279  23.25     0.07      0.027       (  0.053)       0.009        0.019
280  23.33     0.07      0.027       (  0.053)       0.009        0.019
281  23.42     0.07      0.027       (  0.052)       0.009        0.019
282  23.50     0.07      0.027       (  0.052)       0.009        0.019
283  23.58     0.07      0.027       (  0.052)       0.009        0.019
284  23.67     0.07      0.027       (  0.052)       0.009        0.019
285  23.75     0.07      0.027       (  0.052)       0.009        0.019
286  23.83     0.07      0.027       (  0.052)       0.009        0.019
287  23.92     0.07      0.027       (  0.052)       0.009        0.019
288  24.00     0.07      0.027       (  0.052)       0.009        0.019
                (Loss Rate Not Used)
    Sum =     100.0                                   Sum =    29.1
       Flood volume = Effective rainfall      2.43(In)
        times area       0.9(Ac.)/[(In)/(Ft.)] =       0.2(Ac.Ft)
       Total soil loss =      0.97(In)
       Total soil loss =     0.074(Ac.Ft)
       Total rainfall =      3.40(In)
```

```
      Flood volume =        8100.5 Cubic Feet
      Total soil loss =        3244.4 Cubic Feet
      --------------------------------------------------------------------
       Peak flow rate of this hydrograph =      0.346(CFS)
      --------------------------------------------------------------------
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          24 - H O U R    S T O R M
                     R u n o f f     H y d r o g r a p h
      --------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0001      0.01  Q         |         |         |         |
  0+10       0.0002      0.02  Q         |         |         |         |
  0+15       0.0003      0.02  Q         |         |         |         |
  0+20       0.0004      0.02  Q         |         |         |         |
  0+25       0.0006      0.03  Q         |         |         |         |
  0+30       0.0008      0.03  Q         |         |         |         |
  0+35       0.0010      0.03  Q         |         |         |         |
  0+40       0.0011      0.03  Q         |         |         |         |
  0+45       0.0013      0.03  Q         |         |         |         |
  0+50       0.0015      0.03  Q         |         |         |         |
  0+55       0.0018      0.03  Q         |         |         |         |
  1+ 0       0.0020      0.03  Q         |         |         |         |
  1+ 5       0.0022      0.03  Q         |         |         |         |
  1+10       0.0024      0.03  Q         |         |         |         |
  1+15       0.0026      0.03  Q         |         |         |         |
  1+20       0.0028      0.03  Q         |         |         |         |
  1+25       0.0029      0.03  Q         |         |         |         |
  1+30       0.0031      0.03  Q         |         |         |         |
  1+35       0.0033      0.03  Q         |         |         |         |
  1+40       0.0035      0.03  Q         |         |         |         |
  1+45       0.0036      0.03  Q         |         |         |         |
  1+50       0.0039      0.03  Q         |         |         |         |
  1+55       0.0041      0.03  Q         |         |         |         |
  2+ 0       0.0043      0.03  Q         |         |         |         |
  2+ 5       0.0046      0.03  Q         |         |         |         |
  2+10       0.0048      0.03  QV        |         |         |         |
  2+15       0.0050      0.03  QV        |         |         |         |
  2+20       0.0053      0.03  QV        |         |         |         |
  2+25       0.0055      0.03  QV        |         |         |         |
  2+30       0.0058      0.03  QV        |         |         |         |
  2+35       0.0060      0.04  QV        |         |         |         |
  2+40       0.0063      0.04  QV        |         |         |         |
  2+45       0.0066      0.04  QV        |         |         |         |
  2+50       0.0069      0.04  QV        |         |         |         |
  2+55       0.0072      0.04  QV        |         |         |         |
  3+ 0       0.0075      0.04  QV        |         |         |         |
```

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3+ 5       0.0078      0.04  QV         |         |         |         |
3+10       0.0081      0.04  QV         |         |         |         |
3+15       0.0084      0.04  QV         |         |         |         |
3+20       0.0087      0.04  QV         |         |         |         |
3+25       0.0090      0.04  QV         |         |         |         |
3+30       0.0093      0.04  QV         |         |         |         |
3+35       0.0096      0.04  Q V        |         |         |         |
3+40       0.0099      0.04  Q V        |         |         |         |
3+45       0.0102      0.04  Q V        |         |         |         |
3+50       0.0105      0.05  Q V        |         |         |         |
3+55       0.0109      0.05  Q V        |         |         |         |
4+ 0       0.0112      0.05  Q V        |         |         |         |
4+ 5       0.0116      0.05  Q V        |         |         |         |
4+10       0.0119      0.05  Q V        |         |         |         |
4+15       0.0123      0.05  Q V        |         |         |         |
4+20       0.0127      0.06  Q V        |         |         |         |
4+25       0.0131      0.06  Q V        |         |         |         |
4+30       0.0135      0.06  Q V        |         |         |         |
4+35       0.0139      0.06  Q V        |         |         |         |
4+40       0.0144      0.06  Q  V       |         |         |         |
4+45       0.0148      0.06  Q  V       |         |         |         |
4+50       0.0152      0.06  Q  V       |         |         |         |
4+55       0.0157      0.07  Q  V       |         |         |         |
5+ 0       0.0162      0.07  Q  V       |         |         |         |
5+ 5       0.0166      0.06  Q  V       |         |         |         |
5+10       0.0169      0.05  Q  V       |         |         |         |
5+15       0.0173      0.05  Q  V       |         |         |         |
5+20       0.0177      0.06  Q  V       |         |         |         |
5+25       0.0181      0.06  Q  V       |         |         |         |
5+30       0.0185      0.06  Q  V       |         |         |         |
5+35       0.0190      0.06  Q   V      |         |         |         |
5+40       0.0194      0.07  Q   V      |         |         |         |
5+45       0.0199      0.07  Q   V      |         |         |         |
5+50       0.0204      0.07  Q   V      |         |         |         |
5+55       0.0209      0.07  Q   V      |         |         |         |
6+ 0       0.0214      0.07  Q   V      |         |         |         |
6+ 5       0.0219      0.07  Q   V      |         |         |         |
6+10       0.0224      0.08  Q   V      |         |         |         |
6+15       0.0229      0.08  Q   V      |         |         |         |
6+20       0.0235      0.08  Q    V     |         |         |         |
6+25       0.0240      0.08  Q    V     |         |         |         |
6+30       0.0245      0.08  Q    V     |         |         |         |
6+35       0.0251      0.08  Q    V     |         |         |         |
6+40       0.0257      0.09  Q    V     |         |         |         |
6+45       0.0263      0.09  Q    V     |         |         |         |
6+50       0.0269      0.09  Q    V     |         |         |         |
6+55       0.0275      0.09  Q    V     |         |         |         |
7+ 0       0.0281      0.09  Q     V    |         |         |         |
7+ 5       0.0287      0.09  Q     V    |         |         |         |
7+10       0.0293      0.09  Q     V    |         |         |         |
```

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 7+15       0.0299      0.09  Q     V   |         |         |         |
 7+20       0.0305      0.09  Q     V   |         |         |         |
 7+25       0.0311      0.09  Q     V   |         |         |         |
 7+30       0.0318      0.10  Q     V   |         |         |         |
 7+35       0.0325      0.10  Q     V   |         |         |         |
 7+40       0.0332      0.10  Q      V  |         |         |         |
 7+45       0.0339      0.10  Q      V  |         |         |         |
 7+50       0.0346      0.11  Q      V  |         |         |         |
 7+55       0.0354      0.11  Q      V  |         |         |         |
 8+ 0       0.0362      0.11  Q      V  |         |         |         |
 8+ 5       0.0370      0.12  Q      V  |         |         |         |
 8+10       0.0379      0.13  Q       V |         |         |         |
 8+15       0.0388      0.13  Q       V |         |         |         |
 8+20       0.0397      0.13  Q       V |         |         |         |
 8+25       0.0406      0.13  Q       V |         |         |         |
 8+30       0.0415      0.13  Q       V |         |         |         |
 8+35       0.0424      0.13  Q        V|         |         |         |
 8+40       0.0434      0.14  Q        V|         |         |         |
 8+45       0.0443      0.14  Q        V|         |         |         |
 8+50       0.0453      0.14  Q        V|         |         |         |
 8+55       0.0463      0.15  Q        V|         |         |         |
 9+ 0       0.0473      0.15  Q         V         |         |         |
 9+ 5       0.0484      0.16  Q         V         |         |         |
 9+10       0.0495      0.16  Q         V         |         |         |
 9+15       0.0506      0.16  Q         V         |         |         |
 9+20       0.0518      0.17  Q         |V        |         |         |
 9+25       0.0530      0.17  Q         |V        |         |         |
 9+30       0.0542      0.17  Q         |V        |         |         |
 9+35       0.0554      0.18  Q         |V        |         |         |
 9+40       0.0566      0.18  Q         | V       |         |         |
 9+45       0.0579      0.18  Q         | V       |         |         |
 9+50       0.0592      0.19  Q         | V       |         |         |
 9+55       0.0605      0.19  Q         |  V      |         |         |
10+ 0       0.0618      0.19  Q         |  V      |         |         |
10+ 5       0.0629      0.16  Q         |  V      |         |         |
10+10       0.0638      0.14  Q         |  V      |         |         |
10+15       0.0647      0.13  Q         |  V      |         |         |
10+20       0.0656      0.13  Q         |   V     |         |         |
10+25       0.0665      0.13  Q         |   V     |         |         |
10+30       0.0674      0.13  Q         |   V     |         |         |
10+35       0.0685      0.15  Q         |   V     |         |         |
10+40       0.0696      0.17  Q         |   V     |         |         |
10+45       0.0708      0.17  Q         |    V    |         |         |
10+50       0.0720      0.17  Q         |    V    |         |         |
10+55       0.0732      0.17  Q         |    V    |         |         |
11+ 0       0.0744      0.17  Q         |     V   |         |         |
11+ 5       0.0756      0.17  Q         |     V   |         |         |
11+10       0.0767      0.17  Q         |     V   |         |         |
11+15       0.0778      0.16  Q         |     V   |         |         |
11+20       0.0790      0.16  Q         |     V   |         |         |
```

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11+25       0.0801      0.16  Q         |      V  |         |         |
11+30       0.0812      0.16  Q         |      V  |         |         |
11+35       0.0823      0.16  Q         |      V  |         |         |
11+40       0.0833      0.15  Q         |      V  |         |         |
11+45       0.0844      0.15  Q         |       V |         |         |
11+50       0.0854      0.15  Q         |       V |         |         |
11+55       0.0865      0.16  Q         |       V |         |         |
12+ 0       0.0875      0.16  Q         |       V |         |         |
12+ 5       0.0888      0.19  Q         |        V|         |         |
12+10       0.0904      0.22  Q         |        V|         |         |
12+15       0.0919      0.22  Q         |        V|         |         |
12+20       0.0935      0.23  Q         |         V         |         |
12+25       0.0951      0.24  Q         |         V         |         |
12+30       0.0968      0.24  Q         |         V         |         |
12+35       0.0985      0.25  |Q        |         |V        |         |
12+40       0.1003      0.26  |Q        |         |V        |         |
12+45       0.1022      0.27  |Q        |         |V        |         |
12+50       0.1040      0.27  |Q        |         | V       |         |
12+55       0.1060      0.28  |Q        |         | V       |         |
13+ 0       0.1079      0.28  |Q        |         |  V      |         |
13+ 5       0.1100      0.31  |Q        |         |  V      |         |
13+10       0.1124      0.34  |Q        |         |   V     |         |
13+15       0.1147      0.34  |Q        |         |   V     |         |
13+20       0.1171      0.34  |Q        |         |    V    |         |
13+25       0.1195      0.35  |Q        |         |    V    |         |
13+30       0.1219      0.35  |Q        |         |     V   |         |
13+35       0.1238      0.28  |Q        |         |     V   |         |
13+40       0.1253      0.22  Q         |         |     V   |         |
13+45       0.1268      0.21  Q         |         |      V  |         |
13+50       0.1282      0.21  Q         |         |      V  |         |
13+55       0.1296      0.21  Q         |         |      V  |         |
14+ 0       0.1311      0.21  Q         |         |       V |         |
14+ 5       0.1327      0.23  Q         |         |       V |         |
14+10       0.1345      0.26  |Q        |         |       V |         |
14+15       0.1362      0.26  |Q        |         |        V|         |
14+20       0.1380      0.26  |Q        |         |        V|         |
14+25       0.1397      0.25  |Q        |         |         V         |
14+30       0.1415      0.25  |Q        |         |         V         |
14+35       0.1432      0.25  |Q        |         |         V         |
14+40       0.1449      0.25  |Q        |         |         |V        |
14+45       0.1466      0.25  |Q        |         |         |V        |
14+50       0.1483      0.25  Q         |         |         |V        |
14+55       0.1500      0.24  Q         |         |         | V       |
15+ 0       0.1516      0.24  Q         |         |         | V       |
15+ 5       0.1532      0.23  Q         |         |         | V       |
15+10       0.1548      0.23  Q         |         |         |  V      |
15+15       0.1564      0.23  Q         |         |         |  V      |
15+20       0.1579      0.22  Q         |         |         |  V      |
15+25       0.1594      0.22  Q         |         |         |   V     |
15+30       0.1609      0.22  Q         |         |         |   V     |
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15+35       0.1622      0.19  Q         |         |         |   V     |
15+40       0.1634      0.17  Q         |         |         |    V    |
15+45       0.1646      0.17  Q         |         |         |    V    |
15+50       0.1657      0.17  Q         |         |         |    V    |
15+55       0.1669      0.17  Q         |         |         |    V    |
16+ 0       0.1681      0.17  Q         |         |         |     V   |
16+ 5       0.1688      0.10  Q         |         |         |     V   |
16+10       0.1691      0.05  Q         |         |         |     V   |
16+15       0.1694      0.04  Q         |         |         |     V   |
16+20       0.1696      0.03  Q         |         |         |     V   |
16+25       0.1698      0.03  Q         |         |         |     V   |
16+30       0.1701      0.03  Q         |         |         |     V   |
16+35       0.1703      0.03  Q         |         |         |     V   |
16+40       0.1705      0.03  Q         |         |         |     V   |
16+45       0.1706      0.03  Q         |         |         |     V   |
16+50       0.1708      0.03  Q         |         |         |     V   |
16+55       0.1710      0.03  Q         |         |         |     V   |
17+ 0       0.1712      0.03  Q         |         |         |     V   |
17+ 5       0.1714      0.03  Q         |         |         |     V   |
17+10       0.1717      0.04  Q         |         |         |     V   |
17+15       0.1720      0.04  Q         |         |         |     V   |
17+20       0.1723      0.04  Q         |         |         |      V  |
17+25       0.1726      0.04  Q         |         |         |      V  |
17+30       0.1729      0.04  Q         |         |         |      V  |
17+35       0.1732      0.04  Q         |         |         |      V  |
17+40       0.1735      0.04  Q         |         |         |      V  |
17+45       0.1738      0.04  Q         |         |         |      V  |
17+50       0.1741      0.04  Q         |         |         |      V  |
17+55       0.1743      0.04  Q         |         |         |      V  |
18+ 0       0.1745      0.03  Q         |         |         |      V  |
18+ 5       0.1748      0.03  Q         |         |         |      V  |
18+10       0.1750      0.03  Q         |         |         |      V  |
18+15       0.1753      0.03  Q         |         |         |      V  |
18+20       0.1755      0.03  Q         |         |         |      V  |
18+25       0.1757      0.03  Q         |         |         |      V  |
18+30       0.1760      0.03  Q         |         |         |      V  |
18+35       0.1762      0.03  Q         |         |         |      V  |
18+40       0.1764      0.03  Q         |         |         |      V  |
18+45       0.1765      0.03  Q         |         |         |      V  |
18+50       0.1767      0.02  Q         |         |         |       V |
18+55       0.1768      0.02  Q         |         |         |       V |
19+ 0       0.1769      0.02  Q         |         |         |       V |
19+ 5       0.1771      0.02  Q         |         |         |       V |
19+10       0.1773      0.03  Q         |         |         |       V |
19+15       0.1774      0.03  Q         |         |         |       V |
19+20       0.1776      0.03  Q         |         |         |       V |
19+25       0.1779      0.03  Q         |         |         |       V |
19+30       0.1781      0.03  Q         |         |         |       V |
19+35       0.1783      0.03  Q         |         |         |       V |
19+40       0.1785      0.03  Q         |         |         |       V |
```

```
19+45       0.1787      0.03  Q         |         |         |       V |
19+50       0.1788      0.02  Q         |         |         |       V |
19+55       0.1790      0.02  Q         |         |         |       V |
20+ 0       0.1791      0.02  Q         |         |         |       V |
20+ 5       0.1792      0.02  Q         |         |         |       V |
20+10       0.1794      0.03  Q         |         |         |       V |
20+15       0.1796      0.03  Q         |         |         |       V |
20+20       0.1798      0.03  Q         |         |         |       V |
20+25       0.1799      0.03  Q         |         |         |       V |
20+30       0.1801      0.03  Q         |         |         |       V |
20+35       0.1803      0.03  Q         |         |         |       V |
20+40       0.1805      0.03  Q         |         |         |       V |
20+45       0.1807      0.03  Q         |         |         |       V |
20+50       0.1808      0.02  Q         |         |         |       V |
20+55       0.1809      0.02  Q         |         |         |       V |
21+ 0       0.1811      0.02  Q         |         |         |       V |
21+ 5       0.1812      0.02  Q         |         |         |       V |
21+10       0.1814      0.03  Q         |         |         |        V|
21+15       0.1816      0.03  Q         |         |         |        V|
21+20       0.1817      0.02  Q         |         |         |        V|
21+25       0.1818      0.02  Q         |         |         |        V|
21+30       0.1820      0.02  Q         |         |         |        V|
21+35       0.1821      0.02  Q         |         |         |        V|
21+40       0.1823      0.03  Q         |         |         |        V|
21+45       0.1824      0.03  Q         |         |         |        V|
21+50       0.1826      0.02  Q         |         |         |        V|
21+55       0.1827      0.02  Q         |         |         |        V|
22+ 0       0.1828      0.02  Q         |         |         |        V|
22+ 5       0.1830      0.02  Q         |         |         |        V|
22+10       0.1832      0.03  Q         |         |         |        V|
22+15       0.1833      0.03  Q         |         |         |        V|
22+20       0.1835      0.02  Q         |         |         |        V|
22+25       0.1836      0.02  Q         |         |         |        V|
22+30       0.1837      0.02  Q         |         |         |        V|
22+35       0.1839      0.02  Q         |         |         |        V|
22+40       0.1840      0.02  Q         |         |         |        V|
22+45       0.1841      0.02  Q         |         |         |        V|
22+50       0.1842      0.02  Q         |         |         |        V|
22+55       0.1843      0.02  Q         |         |         |        V|
23+ 0       0.1845      0.02  Q         |         |         |        V|
23+ 5       0.1846      0.02  Q         |         |         |        V|
23+10       0.1847      0.02  Q         |         |         |        V|
23+15       0.1848      0.02  Q         |         |         |        V|
23+20       0.1849      0.02  Q         |         |         |        V|
23+25       0.1851      0.02  Q         |         |         |        V|
23+30       0.1852      0.02  Q         |         |         |        V|
23+35       0.1853      0.02  Q         |         |         |        V|
23+40       0.1854      0.02  Q         |         |         |        V|
23+45       0.1855      0.02  Q         |         |         |        V|
23+50       0.1856      0.02  Q         |         |         |        V|
```

```
   23+55       0.1858      0.02  Q         |         |         |       V|
   24+ 0       0.1859      0.02  Q         |         |         |       V|
   24+ 5       0.1859      0.01  Q         |         |         |       V|
   24+10       0.1860      0.00  Q         |         |         |       V|
   24+15       0.1860      0.00  Q         |         |         |        V
----------------------------------------------------------------------
```

Appendix J.VI

Synthetic Unit Hydrograph Method Analysis
Post-Development Conditions
100-Year Storm

```
                U n i t   H y d r o g r a p h   A n a l y s i s

                Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
                        Study date  05/27/22 File: MapesPost100AUH24100.out


        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        ------------------------------------------------------------------------

        Riverside County Synthetic Unit Hydrology Method
        RCFC & WCD Manual date - April 1978


        Program License Serial Number 6443

        ---------------------------------------------------------------------
         English (in-lb) Input Units Used
         English Rainfall Data (Inches) Input Values Used

         English Units used in output format



        ---------------------------------------------------------------------
        MAPES AND TRUMBLE INDUSTRIAL FACILITY
        UNIT HYDROGRAPH
        POST-DEVELOPMENT CONDITIONS
        100-YEAR, 24HR STORM, DA A
        --------------------------------------------------------------------
        Drainage Area =      18.09(Ac.)  =      0.028 Sq. Mi.
        Drainage Area for Depth-Area Areal Adjustment =      18.09(Ac.)  =
0.028 Sq. Mi.
        Length along longest watercourse =    1290.86(Ft.)
        Length along longest watercourse measured to centroid =     632.74(Ft.)
        Length along longest watercourse =      0.244 Mi.
        Length along longest watercourse measured to centroid =      0.120 Mi.
        Difference in elevation =      12.93(Ft.)
        Slope along watercourse =     52.8875 Ft./Mi.
        Average Manning's 'N' = 0.015
        Lag time =    0.044 Hr.
        Lag time =     2.66 Min.
        25% of lag time =     0.66 Min.
        40% of lag time =     1.06 Min.
        Unit time =     5.00 Min.
        Duration of storm = 24 Hour(s)
        User Entered Base Flow =     0.00(CFS)

        2 YEAR Area rainfall data:
```

```
        Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
               18.09            2.06                   37.27

        100 YEAR Area rainfall data:


        Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
               18.09            5.31                   96.06

        STORM EVENT (YEAR) =  100.00
        Area Averaged 2-Year Rainfall =    2.060(In)
        Area Averaged 100-Year Rainfall =    5.310(In)

        Point rain (area averaged) =    5.310(In)
        Areal adjustment factor =  100.00 %
        Adjusted average point rain =    5.310(In)

        Sub-Area Data:
        Area(Ac.)         Runoff Index   Impervious %
            18.090           75.00         0.830
         Total Area Entered =     18.09(Ac.)


        RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
        AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
        75.0  88.0      0.153     0.830       0.039       1.000      0.039
                                                          Sum (F) =   0.039
        Area averaged mean soil loss (F) (In/Hr) =  0.039
        Minimum soil loss rate ((In/Hr)) =  0.019
        (for 24 hour storm duration)
        Soil low loss rate (decimal) =   0.238
        ---------------------------------------------------------------------

                        U n i t  H y d r o g r a p h
                                VALLEY S-Curve
        --------------------------------------------------------------------
                        Unit Hydrograph Data
        ---------------------------------------------------------------------
        Unit time period   Time % of lag   Distribution   Unit Hydrograph
            (hrs)                           Graph %            (CFS)
        ---------------------------------------------------------------------
            1   0.083        188.172         41.282              7.526
            2   0.167        376.344         44.201              8.058
            3   0.250        564.517          9.293              1.694
            4   0.333        752.689          3.719              0.678
            5   0.417        940.861          1.505              0.274
                                      Sum = 100.000   Sum=      18.231
-----------------------------------------------------------------------
```

```
The following loss rate calculations reflect use of the minimum calculated loss
rate subtracted from the Storm Rain to produce the maximum Effective Rain value

 Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
      (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
  1   0.08     0.07      0.042       (  0.069)       0.010        0.032
  2   0.17     0.07      0.042       (  0.068)       0.010        0.032
  3   0.25     0.07      0.042       (  0.068)       0.010        0.032
  4   0.33     0.10      0.064       (  0.068)       0.015        0.049
  5   0.42     0.10      0.064       (  0.067)       0.015        0.049
  6   0.50     0.10      0.064       (  0.067)       0.015        0.049
  7   0.58     0.10      0.064       (  0.067)       0.015        0.049
  8   0.67     0.10      0.064       (  0.067)       0.015        0.049
  9   0.75     0.10      0.064       (  0.066)       0.015        0.049
 10   0.83     0.13      0.085       (  0.066)       0.020        0.065
 11   0.92     0.13      0.085       (  0.066)       0.020        0.065
 12   1.00     0.13      0.085       (  0.066)       0.020        0.065
 13   1.08     0.10      0.064       (  0.065)       0.015        0.049
 14   1.17     0.10      0.064       (  0.065)       0.015        0.049
 15   1.25     0.10      0.064       (  0.065)       0.015        0.049
 16   1.33     0.10      0.064       (  0.065)       0.015        0.049
 17   1.42     0.10      0.064       (  0.064)       0.015        0.049
 18   1.50     0.10      0.064       (  0.064)       0.015        0.049
 19   1.58     0.10      0.064       (  0.064)       0.015        0.049
 20   1.67     0.10      0.064       (  0.064)       0.015        0.049
 21   1.75     0.10      0.064       (  0.063)       0.015        0.049
 22   1.83     0.13      0.085       (  0.063)       0.020        0.065
 23   1.92     0.13      0.085       (  0.063)       0.020        0.065
 24   2.00     0.13      0.085       (  0.063)       0.020        0.065
 25   2.08     0.13      0.085       (  0.062)       0.020        0.065
 26   2.17     0.13      0.085       (  0.062)       0.020        0.065
 27   2.25     0.13      0.085       (  0.062)       0.020        0.065
 28   2.33     0.13      0.085       (  0.062)       0.020        0.065
 29   2.42     0.13      0.085       (  0.061)       0.020        0.065
 30   2.50     0.13      0.085       (  0.061)       0.020        0.065
 31   2.58     0.17      0.106       (  0.061)       0.025        0.081
 32   2.67     0.17      0.106       (  0.061)       0.025        0.081
 33   2.75     0.17      0.106       (  0.060)       0.025        0.081
 34   2.83     0.17      0.106       (  0.060)       0.025        0.081
 35   2.92     0.17      0.106       (  0.060)       0.025        0.081
 36   3.00     0.17      0.106       (  0.060)       0.025        0.081
 37   3.08     0.17      0.106       (  0.059)       0.025        0.081
 38   3.17     0.17      0.106       (  0.059)       0.025        0.081
 39   3.25     0.17      0.106       (  0.059)       0.025        0.081
 40   3.33     0.17      0.106       (  0.059)       0.025        0.081
 41   3.42     0.17      0.106       (  0.058)       0.025        0.081
 42   3.50     0.17      0.106       (  0.058)       0.025        0.081
 43   3.58     0.17      0.106       (  0.058)       0.025        0.081
 44   3.67     0.17      0.106       (  0.058)       0.025        0.081
```

45	3.75	0.17	0.106	(0.057)	0.025	0.081
46	3.83	0.20	0.127	(0.057)	0.030	0.097
47	3.92	0.20	0.127	(0.057)	0.030	0.097
48	4.00	0.20	0.127	(0.057)	0.030	0.097
49	4.08	0.20	0.127	(0.056)	0.030	0.097
50	4.17	0.20	0.127	(0.056)	0.030	0.097
51	4.25	0.20	0.127	(0.056)	0.030	0.097
52	4.33	0.23	0.149	(0.056)	0.035	0.113
53	4.42	0.23	0.149	(0.055)	0.035	0.113
54	4.50	0.23	0.149	(0.055)	0.035	0.113
55	4.58	0.23	0.149	(0.055)	0.035	0.113
56	4.67	0.23	0.149	(0.055)	0.035	0.113
57	4.75	0.23	0.149	(0.054)	0.035	0.113
58	4.83	0.27	0.170	(0.054)	0.040	0.129
59	4.92	0.27	0.170	(0.054)	0.040	0.129
60	5.00	0.27	0.170	(0.054)	0.040	0.129
61	5.08	0.20	0.127	(0.054)	0.030	0.097
62	5.17	0.20	0.127	(0.053)	0.030	0.097
63	5.25	0.20	0.127	(0.053)	0.030	0.097
64	5.33	0.23	0.149	(0.053)	0.035	0.113
65	5.42	0.23	0.149	(0.053)	0.035	0.113
66	5.50	0.23	0.149	(0.052)	0.035	0.113
67	5.58	0.27	0.170	(0.052)	0.040	0.129
68	5.67	0.27	0.170	(0.052)	0.040	0.129
69	5.75	0.27	0.170	(0.052)	0.040	0.129
70	5.83	0.27	0.170	(0.051)	0.040	0.129
71	5.92	0.27	0.170	(0.051)	0.040	0.129
72	6.00	0.27	0.170	(0.051)	0.040	0.129
73	6.08	0.30	0.191	(0.051)	0.045	0.146
74	6.17	0.30	0.191	(0.051)	0.045	0.146
75	6.25	0.30	0.191	(0.050)	0.045	0.146
76	6.33	0.30	0.191	(0.050)	0.045	0.146
77	6.42	0.30	0.191	(0.050)	0.045	0.146
78	6.50	0.30	0.191	(0.050)	0.045	0.146
79	6.58	0.33	0.212	0.049	(0.051)	0.163
80	6.67	0.33	0.212	0.049	(0.051)	0.163
81	6.75	0.33	0.212	0.049	(0.051)	0.163
82	6.83	0.33	0.212	0.049	(0.051)	0.164
83	6.92	0.33	0.212	0.049	(0.051)	0.164
84	7.00	0.33	0.212	0.048	(0.051)	0.164
85	7.08	0.33	0.212	0.048	(0.051)	0.164
86	7.17	0.33	0.212	0.048	(0.051)	0.164
87	7.25	0.33	0.212	0.048	(0.051)	0.165
88	7.33	0.37	0.234	0.047	(0.056)	0.186
89	7.42	0.37	0.234	0.047	(0.056)	0.186
90	7.50	0.37	0.234	0.047	(0.056)	0.187
91	7.58	0.40	0.255	0.047	(0.061)	0.208
92	7.67	0.40	0.255	0.047	(0.061)	0.208
93	7.75	0.40	0.255	0.046	(0.061)	0.208
94	7.83	0.43	0.276	0.046	(0.066)	0.230

```
  95   7.92     0.43      0.276          0.046    (  0.066)        0.230
  96   8.00     0.43      0.276          0.046    (  0.066)        0.230
  97   8.08     0.50      0.319          0.046    (  0.076)        0.273
  98   8.17     0.50      0.319          0.045    (  0.076)        0.273
  99   8.25     0.50      0.319          0.045    (  0.076)        0.273
 100   8.33     0.50      0.319          0.045    (  0.076)        0.274
 101   8.42     0.50      0.319          0.045    (  0.076)        0.274
 102   8.50     0.50      0.319          0.044    (  0.076)        0.274
 103   8.58     0.53      0.340          0.044    (  0.081)        0.296
 104   8.67     0.53      0.340          0.044    (  0.081)        0.296
 105   8.75     0.53      0.340          0.044    (  0.081)        0.296
 106   8.83     0.57      0.361          0.044    (  0.086)        0.317
 107   8.92     0.57      0.361          0.043    (  0.086)        0.318
 108   9.00     0.57      0.361          0.043    (  0.086)        0.318
 109   9.08     0.63      0.404          0.043    (  0.096)        0.361
 110   9.17     0.63      0.404          0.043    (  0.096)        0.361
 111   9.25     0.63      0.404          0.043    (  0.096)        0.361
 112   9.33     0.67      0.425          0.042    (  0.101)        0.382
 113   9.42     0.67      0.425          0.042    (  0.101)        0.383
 114   9.50     0.67      0.425          0.042    (  0.101)        0.383
 115   9.58     0.70      0.446          0.042    (  0.106)        0.404
 116   9.67     0.70      0.446          0.042    (  0.106)        0.404
 117   9.75     0.70      0.446          0.041    (  0.106)        0.405
 118   9.83     0.73      0.467          0.041    (  0.111)        0.426
 119   9.92     0.73      0.467          0.041    (  0.111)        0.426
 120  10.00     0.73      0.467          0.041    (  0.111)        0.426
 121  10.08     0.50      0.319          0.041    (  0.076)        0.278
 122  10.17     0.50      0.319          0.040    (  0.076)        0.278
 123  10.25     0.50      0.319          0.040    (  0.076)        0.278
 124  10.33     0.50      0.319          0.040    (  0.076)        0.279
 125  10.42     0.50      0.319          0.040    (  0.076)        0.279
 126  10.50     0.50      0.319          0.040    (  0.076)        0.279
 127  10.58     0.67      0.425          0.039    (  0.101)        0.385
 128  10.67     0.67      0.425          0.039    (  0.101)        0.386
 129  10.75     0.67      0.425          0.039    (  0.101)        0.386
 130  10.83     0.67      0.425          0.039    (  0.101)        0.386
 131  10.92     0.67      0.425          0.039    (  0.101)        0.386
 132  11.00     0.67      0.425          0.038    (  0.101)        0.386
 133  11.08     0.63      0.404          0.038    (  0.096)        0.365
 134  11.17     0.63      0.404          0.038    (  0.096)        0.365
 135  11.25     0.63      0.404          0.038    (  0.096)        0.366
 136  11.33     0.63      0.404          0.038    (  0.096)        0.366
 137  11.42     0.63      0.404          0.038    (  0.096)        0.366
 138  11.50     0.63      0.404          0.037    (  0.096)        0.366
 139  11.58     0.57      0.361          0.037    (  0.086)        0.324
 140  11.67     0.57      0.361          0.037    (  0.086)        0.324
 141  11.75     0.57      0.361          0.037    (  0.086)        0.324
 142  11.83     0.60      0.382          0.037    (  0.091)        0.346
 143  11.92     0.60      0.382          0.036    (  0.091)        0.346
 144  12.00     0.60      0.382          0.036    (  0.091)        0.346
```

```
145  12.08     0.83      0.531          0.036    (  0.126)        0.495
146  12.17     0.83      0.531          0.036    (  0.126)        0.495
147  12.25     0.83      0.531          0.036    (  0.126)        0.495
148  12.33     0.87      0.552          0.036    (  0.131)        0.517
149  12.42     0.87      0.552          0.035    (  0.131)        0.517
150  12.50     0.87      0.552          0.035    (  0.131)        0.517
151  12.58     0.93      0.595          0.035    (  0.142)        0.560
152  12.67     0.93      0.595          0.035    (  0.142)        0.560
153  12.75     0.93      0.595          0.035    (  0.142)        0.560
154  12.83     0.97      0.616          0.034    (  0.147)        0.581
155  12.92     0.97      0.616          0.034    (  0.147)        0.582
156  13.00     0.97      0.616          0.034    (  0.147)        0.582
157  13.08     1.13      0.722          0.034    (  0.172)        0.688
158  13.17     1.13      0.722          0.034    (  0.172)        0.688
159  13.25     1.13      0.722          0.034    (  0.172)        0.689
160  13.33     1.13      0.722          0.033    (  0.172)        0.689
161  13.42     1.13      0.722          0.033    (  0.172)        0.689
162  13.50     1.13      0.722          0.033    (  0.172)        0.689
163  13.58     0.77      0.489          0.033    (  0.116)        0.456
164  13.67     0.77      0.489          0.033    (  0.116)        0.456
165  13.75     0.77      0.489          0.033    (  0.116)        0.456
166  13.83     0.77      0.489          0.032    (  0.116)        0.456
167  13.92     0.77      0.489          0.032    (  0.116)        0.456
168  14.00     0.77      0.489          0.032    (  0.116)        0.456
169  14.08     0.90      0.573          0.032    (  0.136)        0.542
170  14.17     0.90      0.573          0.032    (  0.136)        0.542
171  14.25     0.90      0.573          0.032    (  0.136)        0.542
172  14.33     0.87      0.552          0.031    (  0.131)        0.521
173  14.42     0.87      0.552          0.031    (  0.131)        0.521
174  14.50     0.87      0.552          0.031    (  0.131)        0.521
175  14.58     0.87      0.552          0.031    (  0.131)        0.521
176  14.67     0.87      0.552          0.031    (  0.131)        0.521
177  14.75     0.87      0.552          0.031    (  0.131)        0.522
178  14.83     0.83      0.531          0.031    (  0.126)        0.500
179  14.92     0.83      0.531          0.030    (  0.126)        0.501
180  15.00     0.83      0.531          0.030    (  0.126)        0.501
181  15.08     0.80      0.510          0.030    (  0.121)        0.480
182  15.17     0.80      0.510          0.030    (  0.121)        0.480
183  15.25     0.80      0.510          0.030    (  0.121)        0.480
184  15.33     0.77      0.489          0.030    (  0.116)        0.459
185  15.42     0.77      0.489          0.029    (  0.116)        0.459
186  15.50     0.77      0.489          0.029    (  0.116)        0.459
187  15.58     0.63      0.404          0.029    (  0.096)        0.374
188  15.67     0.63      0.404          0.029    (  0.096)        0.375
189  15.75     0.63      0.404          0.029    (  0.096)        0.375
190  15.83     0.63      0.404          0.029    (  0.096)        0.375
191  15.92     0.63      0.404          0.029    (  0.096)        0.375
192  16.00     0.63      0.404          0.028    (  0.096)        0.375
193  16.08     0.13      0.085       (  0.028)       0.020        0.065
194  16.17     0.13      0.085       (  0.028)       0.020        0.065
```

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195  16.25     0.13      0.085       (  0.028)      0.020         0.065
196  16.33     0.13      0.085       (  0.028)      0.020         0.065
197  16.42     0.13      0.085       (  0.028)      0.020         0.065
198  16.50     0.13      0.085       (  0.028)      0.020         0.065
199  16.58     0.10      0.064       (  0.027)      0.015         0.049
200  16.67     0.10      0.064       (  0.027)      0.015         0.049
201  16.75     0.10      0.064       (  0.027)      0.015         0.049
202  16.83     0.10      0.064       (  0.027)      0.015         0.049
203  16.92     0.10      0.064       (  0.027)      0.015         0.049
204  17.00     0.10      0.064       (  0.027)      0.015         0.049
205  17.08     0.17      0.106       (  0.027)      0.025         0.081
206  17.17     0.17      0.106       (  0.026)      0.025         0.081
207  17.25     0.17      0.106       (  0.026)      0.025         0.081
208  17.33     0.17      0.106       (  0.026)      0.025         0.081
209  17.42     0.17      0.106       (  0.026)      0.025         0.081
210  17.50     0.17      0.106       (  0.026)      0.025         0.081
211  17.58     0.17      0.106       (  0.026)      0.025         0.081
212  17.67     0.17      0.106       (  0.026)      0.025         0.081
213  17.75     0.17      0.106       (  0.026)      0.025         0.081
214  17.83     0.13      0.085       (  0.025)      0.020         0.065
215  17.92     0.13      0.085       (  0.025)      0.020         0.065
216  18.00     0.13      0.085       (  0.025)      0.020         0.065
217  18.08     0.13      0.085       (  0.025)      0.020         0.065
218  18.17     0.13      0.085       (  0.025)      0.020         0.065
219  18.25     0.13      0.085       (  0.025)      0.020         0.065
220  18.33     0.13      0.085       (  0.025)      0.020         0.065
221  18.42     0.13      0.085       (  0.025)      0.020         0.065
222  18.50     0.13      0.085       (  0.024)      0.020         0.065
223  18.58     0.10      0.064       (  0.024)      0.015         0.049
224  18.67     0.10      0.064       (  0.024)      0.015         0.049
225  18.75     0.10      0.064       (  0.024)      0.015         0.049
226  18.83     0.07      0.042       (  0.024)      0.010         0.032
227  18.92     0.07      0.042       (  0.024)      0.010         0.032
228  19.00     0.07      0.042       (  0.024)      0.010         0.032
229  19.08     0.10      0.064       (  0.024)      0.015         0.049
230  19.17     0.10      0.064       (  0.023)      0.015         0.049
231  19.25     0.10      0.064       (  0.023)      0.015         0.049
232  19.33     0.13      0.085       (  0.023)      0.020         0.065
233  19.42     0.13      0.085       (  0.023)      0.020         0.065
234  19.50     0.13      0.085       (  0.023)      0.020         0.065
235  19.58     0.10      0.064       (  0.023)      0.015         0.049
236  19.67     0.10      0.064       (  0.023)      0.015         0.049
237  19.75     0.10      0.064       (  0.023)      0.015         0.049
238  19.83     0.07      0.042       (  0.023)      0.010         0.032
239  19.92     0.07      0.042       (  0.023)      0.010         0.032
240  20.00     0.07      0.042       (  0.022)      0.010         0.032
241  20.08     0.10      0.064       (  0.022)      0.015         0.049
242  20.17     0.10      0.064       (  0.022)      0.015         0.049
243  20.25     0.10      0.064       (  0.022)      0.015         0.049
244  20.33     0.10      0.064       (  0.022)      0.015         0.049
```

```
245  20.42     0.10      0.064       (  0.022)       0.015        0.049
246  20.50     0.10      0.064       (  0.022)       0.015        0.049
247  20.58     0.10      0.064       (  0.022)       0.015        0.049
248  20.67     0.10      0.064       (  0.022)       0.015        0.049
249  20.75     0.10      0.064       (  0.022)       0.015        0.049
250  20.83     0.07      0.042       (  0.022)       0.010        0.032
251  20.92     0.07      0.042       (  0.021)       0.010        0.032
252  21.00     0.07      0.042       (  0.021)       0.010        0.032
253  21.08     0.10      0.064       (  0.021)       0.015        0.049
254  21.17     0.10      0.064       (  0.021)       0.015        0.049
255  21.25     0.10      0.064       (  0.021)       0.015        0.049
256  21.33     0.07      0.042       (  0.021)       0.010        0.032
257  21.42     0.07      0.042       (  0.021)       0.010        0.032
258  21.50     0.07      0.042       (  0.021)       0.010        0.032
259  21.58     0.10      0.064       (  0.021)       0.015        0.049
260  21.67     0.10      0.064       (  0.021)       0.015        0.049
261  21.75     0.10      0.064       (  0.021)       0.015        0.049
262  21.83     0.07      0.042       (  0.021)       0.010        0.032
263  21.92     0.07      0.042       (  0.020)       0.010        0.032
264  22.00     0.07      0.042       (  0.020)       0.010        0.032
265  22.08     0.10      0.064       (  0.020)       0.015        0.049
266  22.17     0.10      0.064       (  0.020)       0.015        0.049
267  22.25     0.10      0.064       (  0.020)       0.015        0.049
268  22.33     0.07      0.042       (  0.020)       0.010        0.032
269  22.42     0.07      0.042       (  0.020)       0.010        0.032
270  22.50     0.07      0.042       (  0.020)       0.010        0.032
271  22.58     0.07      0.042       (  0.020)       0.010        0.032
272  22.67     0.07      0.042       (  0.020)       0.010        0.032
273  22.75     0.07      0.042       (  0.020)       0.010        0.032
274  22.83     0.07      0.042       (  0.020)       0.010        0.032
275  22.92     0.07      0.042       (  0.020)       0.010        0.032
276  23.00     0.07      0.042       (  0.020)       0.010        0.032
277  23.08     0.07      0.042       (  0.020)       0.010        0.032
278  23.17     0.07      0.042       (  0.020)       0.010        0.032
279  23.25     0.07      0.042       (  0.020)       0.010        0.032
280  23.33     0.07      0.042       (  0.020)       0.010        0.032
281  23.42     0.07      0.042       (  0.020)       0.010        0.032
282  23.50     0.07      0.042       (  0.019)       0.010        0.032
283  23.58     0.07      0.042       (  0.019)       0.010        0.032
284  23.67     0.07      0.042       (  0.019)       0.010        0.032
285  23.75     0.07      0.042       (  0.019)       0.010        0.032
286  23.83     0.07      0.042       (  0.019)       0.010        0.032
287  23.92     0.07      0.042       (  0.019)       0.010        0.032
288  24.00     0.07      0.042       (  0.019)       0.010        0.032
                (Loss Rate Not Used)
    Sum =     100.0                                  Sum =    55.8
       Flood volume = Effective rainfall      4.65(In)
        times area      18.1(Ac.)/[(In)/(Ft.)] =      7.0(Ac.Ft)
       Total soil loss =      0.66(In)
       Total soil loss =     0.995(Ac.Ft)
```

```
      Total rainfall =      5.31(In)
      Flood volume =      305343.4 Cubic Feet
      Total soil loss =       43334.4 Cubic Feet
      --------------------------------------------------------------------
       Peak flow rate of this hydrograph =     12.566(CFS)
      --------------------------------------------------------------------
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          24 - H O U R    S T O R M
                     R u n o f f     H y d r o g r a p h
      --------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
-----------------------------------------------------------------------
  0+ 5      0.0017      0.24  Q         |         |         |         |
  0+10      0.0052      0.50  VQ        |         |         |         |
  0+15      0.0090      0.56  VQ        |         |         |         |
  0+20      0.0139      0.70  VQ        |         |         |         |
  0+25      0.0197      0.84  VQ        |         |         |         |
  0+30      0.0257      0.87  VQ        |         |         |         |
  0+35      0.0317      0.88  VQ        |         |         |         |
  0+40      0.0378      0.89  VQ        |         |         |         |
  0+45      0.0439      0.89  VQ        |         |         |         |
  0+50      0.0509      1.01  V Q       |         |         |         |
  0+55      0.0587      1.14  V Q       |         |         |         |
  1+ 0      0.0667      1.17  V Q       |         |         |         |
  1+ 5      0.0740      1.05  V Q       |         |         |         |
  1+10      0.0804      0.93  VQ        |         |         |         |
  1+15      0.0866      0.90  VQ        |         |         |         |
  1+20      0.0927      0.89  VQ        |         |         |         |
  1+25      0.0988      0.89  VQ        |         |         |         |
  1+30      0.1049      0.89  VQ        |         |         |         |
  1+35      0.1110      0.89  VQ        |         |         |         |
  1+40      0.1171      0.89  VQ        |         |         |         |
  1+45      0.1232      0.89  VQ        |         |         |         |
  1+50      0.1301      1.01  V Q       |         |         |         |
  1+55      0.1380      1.14  V Q       |         |         |         |
  2+ 0      0.1460      1.17  V Q       |         |         |         |
  2+ 5      0.1541      1.18  V Q       |         |         |         |
  2+10      0.1622      1.18  V Q       |         |         |         |
  2+15      0.1704      1.18  V Q       |         |         |         |
  2+20      0.1785      1.18  |VQ       |         |         |         |
  2+25      0.1866      1.18  |VQ       |         |         |         |
  2+30      0.1948      1.18  |VQ       |         |         |         |
  2+35      0.2038      1.30  |VQ       |         |         |         |
  2+40      0.2136      1.43  |VQ       |         |         |         |
  2+45      0.2237      1.46  |VQ       |         |         |         |
  2+50      0.2338      1.47  |VQ       |         |         |         |
  2+55      0.2440      1.48  |VQ       |         |         |         |
```

```
3+ 0       0.2541      1.48  |VQ       |         |         |         |
3+ 5       0.2643      1.48  |VQ       |         |         |         |
3+10       0.2745      1.48  |VQ       |         |         |         |
3+15       0.2846      1.48  |VQ       |         |         |         |
3+20       0.2948      1.48  |VQ       |         |         |         |
3+25       0.3050      1.48  |VQ       |         |         |         |
3+30       0.3151      1.48  |VQ       |         |         |         |
3+35       0.3253      1.48  |VQ       |         |         |         |
3+40       0.3355      1.48  |VQ       |         |         |         |
3+45       0.3456      1.48  |VQ       |         |         |         |
3+50       0.3566      1.60  | VQ      |         |         |         |
3+55       0.3685      1.73  | VQ      |         |         |         |
4+ 0       0.3806      1.76  | VQ      |         |         |         |
4+ 5       0.3928      1.77  | VQ      |         |         |         |
4+10       0.4050      1.77  | VQ      |         |         |         |
4+15       0.4172      1.77  | VQ      |         |         |         |
4+20       0.4302      1.89  | VQ      |         |         |         |
4+25       0.4442      2.02  | V Q     |         |         |         |
4+30       0.4583      2.05  | V Q     |         |         |         |
4+35       0.4725      2.06  | V Q     |         |         |         |
4+40       0.4867      2.07  | V Q     |         |         |         |
4+45       0.5010      2.07  | V Q     |         |         |         |
4+50       0.5160      2.19  | V Q     |         |         |         |
4+55       0.5320      2.32  |  VQ     |         |         |         |
5+ 0       0.5482      2.35  |  VQ     |         |         |         |
5+ 5       0.5627      2.11  |  VQ     |         |         |         |
5+10       0.5755      1.86  |  Q      |         |         |         |
5+15       0.5879      1.80  |  Q      |         |         |         |
5+20       0.6010      1.90  |  Q      |         |         |         |
5+25       0.6150      2.02  |  VQ     |         |         |         |
5+30       0.6291      2.05  |  VQ     |         |         |         |
5+35       0.6441      2.18  |  VQ     |         |         |         |
5+40       0.6601      2.32  |  VQ     |         |         |         |
5+45       0.6763      2.35  |  VQ     |         |         |         |
5+50       0.6925      2.36  |  VQ     |         |         |         |
5+55       0.7088      2.36  |   Q     |         |         |         |
6+ 0       0.7250      2.36  |   Q     |         |         |         |
6+ 5       0.7421      2.48  |   Q     |         |         |         |
6+10       0.7601      2.61  |   VQ    |         |         |         |
6+15       0.7783      2.64  |   VQ    |         |         |         |
6+20       0.7966      2.65  |   VQ    |         |         |         |
6+25       0.8149      2.66  |   VQ    |         |         |         |
6+30       0.8332      2.66  |   VQ    |         |         |         |
6+35       0.8524      2.79  |   VQ    |         |         |         |
6+40       0.8726      2.93  |   VQ    |         |         |         |
6+45       0.8929      2.96  |    Q    |         |         |         |
6+50       0.9134      2.98  |    Q    |         |         |         |
6+55       0.9340      2.99  |    Q    |         |         |         |
7+ 0       0.9546      2.99  |    Q    |         |         |         |
7+ 5       0.9752      2.99  |    Q    |         |         |         |
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 7+10       0.9958      3.00  |    Q    |         |         |         |
 7+15       1.0165      3.00  |    VQ   |         |         |         |
 7+20       1.0383      3.17  |    VQ   |         |         |         |
 7+25       1.0613      3.34  |     Q   |         |         |         |
 7+30       1.0846      3.38  |     Q   |         |         |         |
 7+35       1.1091      3.56  |     VQ  |         |         |         |
 7+40       1.1349      3.74  |     VQ  |         |         |         |
 7+45       1.1609      3.78  |     VQ  |         |         |         |
 7+50       1.1881      3.96  |     VQ  |         |         |         |
 7+55       1.2166      4.14  |     V Q |         |         |         |
 8+ 0       1.2454      4.18  |      VQ |         |         |         |
 8+ 5       1.2765      4.52  |      V Q|         |         |         |
 8+10       1.3101      4.87  |      V Q|         |         |         |
 8+15       1.3441      4.94  |      V Q|         |         |         |
 8+20       1.3784      4.98  |      V Q|         |         |         |
 8+25       1.4128      4.99  |       VQ|         |         |         |
 8+30       1.4472      5.00  |       VQ|         |         |         |
 8+35       1.4827      5.16  |       V Q         |         |         |
 8+40       1.5195      5.34  |       V Q         |         |         |
 8+45       1.5565      5.38  |       V Q         |         |         |
 8+50       1.5948      5.55  |        V|Q        |         |         |
 8+55       1.6342      5.73  |        V|Q        |         |         |
 9+ 0       1.6740      5.77  |        V|Q        |         |         |
 9+ 5       1.7161      6.11  |        V| Q       |         |         |
 9+10       1.7606      6.46  |         V Q       |         |         |
 9+15       1.8057      6.54  |         V  Q      |         |         |
 9+20       1.8520      6.73  |         V  Q      |         |         |
 9+25       1.8997      6.92  |         V  Q      |         |         |
 9+30       1.9476      6.96  |         |V Q      |         |         |
 9+35       1.9968      7.14  |         |V  Q     |         |         |
 9+40       2.0472      7.32  |         |V  Q     |         |         |
 9+45       2.0978      7.36  |         |V  Q     |         |         |
 9+50       2.1497      7.54  |         | V  Q    |         |         |
 9+55       2.2029      7.72  |         | V  Q    |         |         |
10+ 0       2.2563      7.76  |         | V  Q    |         |         |
10+ 5       2.3021      6.65  |         |  Q      |         |         |
10+10       2.3397      5.46  |         Q  V      |         |         |
10+15       2.3757      5.22  |         Q  V      |         |         |
10+20       2.4109      5.12  |         Q  V      |         |         |
10+25       2.4459      5.08  |         Q  V      |         |         |
10+30       2.4809      5.09  |         Q   V     |         |         |
10+35       2.5215      5.89  |         |Q  V     |         |         |
10+40       2.5680      6.75  |         |  QV     |         |         |
10+45       2.6157      6.93  |         |  QV     |         |         |
10+50       2.6640      7.01  |         |   QV    |         |         |
10+55       2.7124      7.04  |         |   QV    |         |         |
11+ 0       2.7610      7.04  |         |   QV    |         |         |
11+ 5       2.8084      6.89  |         |  Q  V   |         |         |
11+10       2.8547      6.72  |         |  Q  V   |         |         |
11+15       2.9007      6.69  |         |  Q  V   |         |         |
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11+20       2.9467      6.68  |         |  Q  V   |         |         |
11+25       2.9926      6.67  |         |  Q   V  |         |         |
11+30       3.0386      6.68  |         |  Q   V  |         |         |
11+35       3.0824      6.36  |         | Q    V  |         |         |
11+40       3.1239      6.02  |         | Q    V  |         |         |
11+45       3.1649      5.95  |         |Q      V |         |         |
11+50       3.2068      6.09  |         | Q     V |         |         |
11+55       3.2499      6.25  |         | Q     V |         |         |
12+ 0       3.2932      6.29  |         | Q     V |         |         |
12+ 5       3.3443      7.43  |         |   Q    V|         |         |
12+10       3.4038      8.63  |         |      Q V|         |         |
12+15       3.4650      8.89  |         |      Q V|         |         |
12+20       3.5280      9.15  |         |       Q V         |         |
12+25       3.5926      9.37  |         |       Q V         |         |
12+30       3.6574      9.41  |         |       Q V         |         |
12+35       3.7245      9.75  |         |        Q|V        |         |
12+40       3.7940     10.10  |         |         QV        |         |
12+45       3.8641     10.17  |         |         Q V       |         |
12+50       3.9355     10.36  |         |         Q V       |         |
12+55       4.0081     10.55  |         |         |QV       |         |
13+ 0       4.0810     10.59  |         |         |Q V      |         |
13+ 5       4.1596     11.41  |         |         | QV      |         |
13+10       4.2441     12.27  |         |         |   Q     |         |
13+15       4.3299     12.46  |         |         |   Q     |         |
13+20       4.4162     12.53  |         |         |    Q    |         |
13+25       4.5027     12.56  |         |         |    Q    |         |
13+30       4.5893     12.57  |         |         |    QV   |         |
13+35       4.6637     10.81  |         |         |Q    V   |         |
13+40       4.7252      8.93  |         |      Q  |     V   |         |
13+45       4.7840      8.54  |         |      Q  |      V  |         |
13+50       4.8417      8.38  |         |     Q   |      V  |         |
13+55       4.8990      8.32  |         |     Q   |      V  |         |
14+ 0       4.9563      8.32  |         |     Q   |       V |         |
14+ 5       5.0181      8.97  |         |      Q  |       V |         |
14+10       5.0846      9.65  |         |        Q|        V|         |
14+15       5.1520      9.80  |         |        Q|        V|         |
14+20       5.2189      9.70  |         |        Q|        V|         |
14+25       5.2847      9.56  |         |        Q|         V         |
14+30       5.3503      9.52  |         |        Q|         V         |
14+35       5.4158      9.51  |         |        Q|         V         |
14+40       5.4812      9.51  |         |        Q|         |V        |
14+45       5.5468      9.51  |         |        Q|         |V        |
14+50       5.6112      9.35  |         |       Q |         | V       |
14+55       5.6744      9.19  |         |       Q |         | V       |
15+ 0       5.7375      9.15  |         |       Q |         | V       |
15+ 5       5.7993      8.98  |         |      Q  |         |  V      |
15+10       5.8600      8.81  |         |      Q  |         |  V      |
15+15       5.9204      8.77  |         |      Q  |         |  V      |
15+20       5.9796      8.60  |         |      Q  |         |   V     |
15+25       6.0377      8.43  |         |     Q   |         |   V     |
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15+30       6.0955      8.39  |         |     Q   |         |   V     |
15+35       6.1488      7.74  |         |    Q    |         |    V    |
15+40       6.1974      7.06  |         |   Q     |         |    V    |
15+45       6.2450      6.91  |         |  Q      |         |    V    |
15+50       6.2923      6.86  |         |  Q      |         |    V    |
15+55       6.3394      6.84  |         |  Q      |         |     V   |
16+ 0       6.3865      6.84  |         |  Q      |         |     V   |
16+ 5       6.4175      4.51  |        Q|         |         |     V   |
16+10       6.4313      2.00  |   Q     |         |         |     V   |
16+15       6.4415      1.48  | Q       |         |         |     V   |
16+20       6.4502      1.27  | Q       |         |         |     V   |
16+25       6.4583      1.18  | Q       |         |         |     V   |
16+30       6.4665      1.18  | Q       |         |         |     V   |
16+35       6.4738      1.06  | Q       |         |         |     V   |
16+40       6.4802      0.93  |Q        |         |         |     V   |
16+45       6.4864      0.90  |Q        |         |         |      V  |
16+50       6.4925      0.89  |Q        |         |         |      V  |
16+55       6.4986      0.89  |Q        |         |         |      V  |
17+ 0       6.5047      0.89  |Q        |         |         |      V  |
17+ 5       6.5125      1.13  | Q       |         |         |      V  |
17+10       6.5220      1.39  | Q       |         |         |      V  |
17+15       6.5320      1.45  | Q       |         |         |      V  |
17+20       6.5421      1.47  | Q       |         |         |      V  |
17+25       6.5523      1.48  | Q       |         |         |      V  |
17+30       6.5624      1.48  | Q       |         |         |      V  |
17+35       6.5726      1.48  | Q       |         |         |      V  |
17+40       6.5828      1.48  | Q       |         |         |      V  |
17+45       6.5929      1.48  | Q       |         |         |      V  |
17+50       6.6023      1.35  | Q       |         |         |      V  |
17+55       6.6107      1.22  | Q       |         |         |      V  |
18+ 0       6.6189      1.20  | Q       |         |         |      V  |
18+ 5       6.6271      1.19  | Q       |         |         |      V  |
18+10       6.6352      1.18  | Q       |         |         |      V  |
18+15       6.6433      1.18  | Q       |         |         |      V  |
18+20       6.6515      1.18  | Q       |         |         |      V  |
18+25       6.6596      1.18  | Q       |         |         |       V |
18+30       6.6677      1.18  | Q       |         |         |       V |
18+35       6.6750      1.06  | Q       |         |         |       V |
18+40       6.6814      0.93  |Q        |         |         |       V |
18+45       6.6876      0.90  |Q        |         |         |       V |
18+50       6.6929      0.77  |Q        |         |         |       V |
18+55       6.6973      0.63  |Q        |         |         |       V |
19+ 0       6.7015      0.61  |Q        |         |         |       V |
19+ 5       6.7064      0.72  |Q        |         |         |       V |
19+10       6.7122      0.84  |Q        |         |         |       V |
19+15       6.7182      0.87  |Q        |         |         |       V |
19+20       6.7251      1.00  | Q       |         |         |       V |
19+25       6.7329      1.14  | Q       |         |         |       V |
19+30       6.7410      1.17  | Q       |         |         |       V |
19+35       6.7482      1.05  | Q       |         |         |       V |
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19+40       6.7546      0.93  |Q        |         |         |       V |
19+45       6.7608      0.90  |Q        |         |         |       V |
19+50       6.7661      0.77  |Q        |         |         |       V |
19+55       6.7705      0.63  |Q        |         |         |       V |
20+ 0       6.7747      0.61  |Q        |         |         |       V |
20+ 5       6.7796      0.72  |Q        |         |         |       V |
20+10       6.7854      0.84  |Q        |         |         |       V |
20+15       6.7914      0.87  |Q        |         |         |       V |
20+20       6.7975      0.88  |Q        |         |         |       V |
20+25       6.8036      0.89  |Q        |         |         |       V |
20+30       6.8097      0.89  |Q        |         |         |       V |
20+35       6.8158      0.89  |Q        |         |         |       V |
20+40       6.8219      0.89  |Q        |         |         |       V |
20+45       6.8280      0.89  |Q        |         |         |       V |
20+50       6.8332      0.76  |Q        |         |         |       V |
20+55       6.8376      0.63  |Q        |         |         |        V|
21+ 0       6.8418      0.61  |Q        |         |         |        V|
21+ 5       6.8467      0.72  |Q        |         |         |        V|
21+10       6.8525      0.84  |Q        |         |         |        V|
21+15       6.8585      0.87  |Q        |         |         |        V|
21+20       6.8637      0.76  |Q        |         |         |        V|
21+25       6.8681      0.63  |Q        |         |         |        V|
21+30       6.8722      0.61  |Q        |         |         |        V|
21+35       6.8772      0.72  |Q        |         |         |        V|
21+40       6.8830      0.84  |Q        |         |         |        V|
21+45       6.8890      0.87  |Q        |         |         |        V|
21+50       6.8942      0.76  |Q        |         |         |        V|
21+55       6.8986      0.63  |Q        |         |         |        V|
22+ 0       6.9027      0.61  |Q        |         |         |        V|
22+ 5       6.9077      0.72  |Q        |         |         |        V|
22+10       6.9135      0.84  |Q        |         |         |        V|
22+15       6.9195      0.87  |Q        |         |         |        V|
22+20       6.9247      0.76  |Q        |         |         |        V|
22+25       6.9291      0.63  |Q        |         |         |        V|
22+30       6.9332      0.61  |Q        |         |         |        V|
22+35       6.9373      0.59  |Q        |         |         |        V|
22+40       6.9414      0.59  |Q        |         |         |        V|
22+45       6.9455      0.59  |Q        |         |         |        V|
22+50       6.9495      0.59  |Q        |         |         |        V|
22+55       6.9536      0.59  |Q        |         |         |        V|
23+ 0       6.9577      0.59  |Q        |         |         |        V|
23+ 5       6.9617      0.59  |Q        |         |         |        V|
23+10       6.9658      0.59  |Q        |         |         |        V|
23+15       6.9699      0.59  |Q        |         |         |        V|
23+20       6.9739      0.59  |Q        |         |         |        V|
23+25       6.9780      0.59  |Q        |         |         |        V|
23+30       6.9821      0.59  |Q        |         |         |        V|
23+35       6.9861      0.59  |Q        |         |         |        V|
23+40       6.9902      0.59  |Q        |         |         |        V|
23+45       6.9943      0.59  |Q        |         |         |        V|
```

```
    23+50        6.9983      0.59  |Q          |          |          |        V|
    23+55        7.0024      0.59  |Q          |          |          |        V|
    24+ 0        7.0065      0.59  |Q          |          |          |        V|
    24+ 5        7.0089      0.35  Q           |          |          |        V|
    24+10        7.0094      0.09  Q           |          |          |        V|
    24+15        7.0097      0.03  Q           |          |          |        V|
    24+20        7.0097      0.01  Q           |          |          |         V
-------------------------------------------------------------------------
```

```
                U n i t   H y d r o g r a p h   A n a l y s i s

                Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
                        Study date  05/27/22 File: MapesPost100BUH24100.out


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

        Riverside County Synthetic Unit Hydrology Method
        RCFC & WCD Manual date - April 1978


        Program License Serial Number 6443

        ---------------------------------------------------------------------
         English (in-lb) Input Units Used
         English Rainfall Data (Inches) Input Values Used

         English Units used in output format



        ---------------------------------------------------------------------
        MAPES AND TRUMBLE INDUSTRIAL FACILITY
        UNIT HYDROGRAPH
        POST-DEVELOPMENT CONDITIONS
        100-YEAR, 24HR STORM, DA B
        --------------------------------------------------------------------
        Drainage Area =       0.92(Ac.)  =      0.001 Sq. Mi.
        Drainage Area for Depth-Area Areal Adjustment =       0.92(Ac.)  =
0.001 Sq. Mi.
        Length along longest watercourse =     834.61(Ft.)
        Length along longest watercourse measured to centroid =     558.41(Ft.)
        Length along longest watercourse =      0.158 Mi.
        Length along longest watercourse measured to centroid =      0.106 Mi.
        Difference in elevation =       9.65(Ft.)
        Slope along watercourse =     61.0489 Ft./Mi.
        Average Manning's 'N' = 0.015
        Lag time =    0.035 Hr.
        Lag time =     2.09 Min.
        25% of lag time =     0.52 Min.
        40% of lag time =     0.84 Min.
        Unit time =     5.00 Min.
        Duration of storm = 24 Hour(s)
        User Entered Base Flow =     0.00(CFS)

        2 YEAR Area rainfall data:
```

```
        Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
                0.92            2.06                    1.90

        100 YEAR Area rainfall data:


        Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
                0.92            5.31                    4.89

        STORM EVENT (YEAR) =  100.00
        Area Averaged 2-Year Rainfall =    2.060(In)
        Area Averaged 100-Year Rainfall =    5.310(In)

        Point rain (area averaged) =    5.310(In)
        Areal adjustment factor =  100.00 %
        Adjusted average point rain =    5.310(In)

        Sub-Area Data:
        Area(Ac.)         Runoff Index   Impervious %
             0.920           75.00         0.730
         Total Area Entered =      0.92(Ac.)


        RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
        AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
        75.0  88.0      0.153     0.730        0.052       1.000      0.052
                                                          Sum (F) =   0.052
        Area averaged mean soil loss (F) (In/Hr) =  0.052
        Minimum soil loss rate ((In/Hr)) =  0.026
        (for 24 hour storm duration)
        Soil low loss rate (decimal) =   0.313
        ---------------------------------------------------------------------

                        U n i t  H y d r o g r a p h
                                VALLEY S-Curve
        --------------------------------------------------------------------
                        Unit Hydrograph Data
        ---------------------------------------------------------------------
        Unit time period   Time % of lag   Distribution   Unit Hydrograph
            (hrs)                           Graph %            (CFS)
        ---------------------------------------------------------------------
            1   0.083        239.327         49.466              0.459
            2   0.167        478.653         40.724              0.378
            3   0.250        717.980          7.375              0.068
            4   0.333        957.306          2.435              0.023
                                      Sum = 100.000   Sum=       0.927
-----------------------------------------------------------------------
```

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The following loss rate calculations reflect use of the minimum calculated loss
rate subtracted from the Storm Rain to produce the maximum Effective Rain value

 Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
      (Hr.)  Percent   (In/Hr)          Max    |   Low        (In/Hr)
  1   0.08     0.07      0.042        (  0.093)       0.013        0.029
  2   0.17     0.07      0.042        (  0.093)       0.013        0.029
  3   0.25     0.07      0.042        (  0.092)       0.013        0.029
  4   0.33     0.10      0.064        (  0.092)       0.020        0.044
  5   0.42     0.10      0.064        (  0.091)       0.020        0.044
  6   0.50     0.10      0.064        (  0.091)       0.020        0.044
  7   0.58     0.10      0.064        (  0.091)       0.020        0.044
  8   0.67     0.10      0.064        (  0.090)       0.020        0.044
  9   0.75     0.10      0.064        (  0.090)       0.020        0.044
 10   0.83     0.13      0.085        (  0.090)       0.027        0.058
 11   0.92     0.13      0.085        (  0.089)       0.027        0.058
 12   1.00     0.13      0.085        (  0.089)       0.027        0.058
 13   1.08     0.10      0.064        (  0.089)       0.020        0.044
 14   1.17     0.10      0.064        (  0.088)       0.020        0.044
 15   1.25     0.10      0.064        (  0.088)       0.020        0.044
 16   1.33     0.10      0.064        (  0.088)       0.020        0.044
 17   1.42     0.10      0.064        (  0.087)       0.020        0.044
 18   1.50     0.10      0.064        (  0.087)       0.020        0.044
 19   1.58     0.10      0.064        (  0.087)       0.020        0.044
 20   1.67     0.10      0.064        (  0.086)       0.020        0.044
 21   1.75     0.10      0.064        (  0.086)       0.020        0.044
 22   1.83     0.13      0.085        (  0.086)       0.027        0.058
 23   1.92     0.13      0.085        (  0.085)       0.027        0.058
 24   2.00     0.13      0.085        (  0.085)       0.027        0.058
 25   2.08     0.13      0.085        (  0.084)       0.027        0.058
 26   2.17     0.13      0.085        (  0.084)       0.027        0.058
 27   2.25     0.13      0.085        (  0.084)       0.027        0.058
 28   2.33     0.13      0.085        (  0.083)       0.027        0.058
 29   2.42     0.13      0.085        (  0.083)       0.027        0.058
 30   2.50     0.13      0.085        (  0.083)       0.027        0.058
 31   2.58     0.17      0.106        (  0.082)       0.033        0.073
 32   2.67     0.17      0.106        (  0.082)       0.033        0.073
 33   2.75     0.17      0.106        (  0.082)       0.033        0.073
 34   2.83     0.17      0.106        (  0.081)       0.033        0.073
 35   2.92     0.17      0.106        (  0.081)       0.033        0.073
 36   3.00     0.17      0.106        (  0.081)       0.033        0.073
 37   3.08     0.17      0.106        (  0.080)       0.033        0.073
 38   3.17     0.17      0.106        (  0.080)       0.033        0.073
 39   3.25     0.17      0.106        (  0.080)       0.033        0.073
 40   3.33     0.17      0.106        (  0.079)       0.033        0.073
 41   3.42     0.17      0.106        (  0.079)       0.033        0.073
 42   3.50     0.17      0.106        (  0.079)       0.033        0.073
 43   3.58     0.17      0.106        (  0.078)       0.033        0.073
 44   3.67     0.17      0.106        (  0.078)       0.033        0.073
 45   3.75     0.17      0.106        (  0.078)       0.033        0.073
```

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46   3.83     0.20     0.127        (  0.077)       0.040         0.088
47   3.92     0.20     0.127        (  0.077)       0.040         0.088
48   4.00     0.20     0.127        (  0.077)       0.040         0.088
49   4.08     0.20     0.127        (  0.076)       0.040         0.088
50   4.17     0.20     0.127        (  0.076)       0.040         0.088
51   4.25     0.20     0.127        (  0.076)       0.040         0.088
52   4.33     0.23     0.149        (  0.075)       0.047         0.102
53   4.42     0.23     0.149        (  0.075)       0.047         0.102
54   4.50     0.23     0.149        (  0.075)       0.047         0.102
55   4.58     0.23     0.149        (  0.075)       0.047         0.102
56   4.67     0.23     0.149        (  0.074)       0.047         0.102
57   4.75     0.23     0.149        (  0.074)       0.047         0.102
58   4.83     0.27     0.170        (  0.074)       0.053         0.117
59   4.92     0.27     0.170        (  0.073)       0.053         0.117
60   5.00     0.27     0.170        (  0.073)       0.053         0.117
61   5.08     0.20     0.127        (  0.073)       0.040         0.088
62   5.17     0.20     0.127        (  0.072)       0.040         0.088
63   5.25     0.20     0.127        (  0.072)       0.040         0.088
64   5.33     0.23     0.149        (  0.072)       0.047         0.102
65   5.42     0.23     0.149        (  0.071)       0.047         0.102
66   5.50     0.23     0.149        (  0.071)       0.047         0.102
67   5.58     0.27     0.170        (  0.071)       0.053         0.117
68   5.67     0.27     0.170        (  0.070)       0.053         0.117
69   5.75     0.27     0.170        (  0.070)       0.053         0.117
70   5.83     0.27     0.170        (  0.070)       0.053         0.117
71   5.92     0.27     0.170        (  0.069)       0.053         0.117
72   6.00     0.27     0.170        (  0.069)       0.053         0.117
73   6.08     0.30     0.191        (  0.069)       0.060         0.131
74   6.17     0.30     0.191        (  0.069)       0.060         0.131
75   6.25     0.30     0.191        (  0.068)       0.060         0.131
76   6.33     0.30     0.191        (  0.068)       0.060         0.131
77   6.42     0.30     0.191        (  0.068)       0.060         0.131
78   6.50     0.30     0.191        (  0.067)       0.060         0.131
79   6.58     0.33     0.212        (  0.067)       0.066         0.146
80   6.67     0.33     0.212        (  0.067)       0.066         0.146
81   6.75     0.33     0.212           0.066     (  0.066)         0.146
82   6.83     0.33     0.212           0.066     (  0.066)         0.146
83   6.92     0.33     0.212           0.066     (  0.066)         0.147
84   7.00     0.33     0.212           0.066     (  0.066)         0.147
85   7.08     0.33     0.212           0.065     (  0.066)         0.147
86   7.17     0.33     0.212           0.065     (  0.066)         0.147
87   7.25     0.33     0.212           0.065     (  0.066)         0.148
88   7.33     0.37     0.234           0.064     (  0.073)         0.169
89   7.42     0.37     0.234           0.064     (  0.073)         0.170
90   7.50     0.37     0.234           0.064     (  0.073)         0.170
91   7.58     0.40     0.255           0.063     (  0.080)         0.191
92   7.67     0.40     0.255           0.063     (  0.080)         0.192
93   7.75     0.40     0.255           0.063     (  0.080)         0.192
94   7.83     0.43     0.276           0.063     (  0.086)         0.214
95   7.92     0.43     0.276           0.062     (  0.086)         0.214
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  96   8.00      0.43      0.276          0.062     (   0.086)        0.214
  97   8.08      0.50      0.319          0.062     (   0.100)        0.257
  98   8.17      0.50      0.319          0.061     (   0.100)        0.257
  99   8.25      0.50      0.319          0.061     (   0.100)        0.257
 100   8.33      0.50      0.319          0.061     (   0.100)        0.258
 101   8.42      0.50      0.319          0.061     (   0.100)        0.258
 102   8.50      0.50      0.319          0.060     (   0.100)        0.258
 103   8.58      0.53      0.340          0.060     (   0.106)        0.280
 104   8.67      0.53      0.340          0.060     (   0.106)        0.280
 105   8.75      0.53      0.340          0.059     (   0.106)        0.280
 106   8.83      0.57      0.361          0.059     (   0.113)        0.302
 107   8.92      0.57      0.361          0.059     (   0.113)        0.302
 108   9.00      0.57      0.361          0.059     (   0.113)        0.302
 109   9.08      0.63      0.404          0.058     (   0.126)        0.345
 110   9.17      0.63      0.404          0.058     (   0.126)        0.345
 111   9.25      0.63      0.404          0.058     (   0.126)        0.346
 112   9.33      0.67      0.425          0.058     (   0.133)        0.367
 113   9.42      0.67      0.425          0.057     (   0.133)        0.368
 114   9.50      0.67      0.425          0.057     (   0.133)        0.368
 115   9.58      0.70      0.446          0.057     (   0.140)        0.389
 116   9.67      0.70      0.446          0.056     (   0.140)        0.390
 117   9.75      0.70      0.446          0.056     (   0.140)        0.390
 118   9.83      0.73      0.467          0.056     (   0.146)        0.411
 119   9.92      0.73      0.467          0.056     (   0.146)        0.412
 120  10.00      0.73      0.467          0.055     (   0.146)        0.412
 121  10.08      0.50      0.319          0.055     (   0.100)        0.264
 122  10.17      0.50      0.319          0.055     (   0.100)        0.264
 123  10.25      0.50      0.319          0.055     (   0.100)        0.264
 124  10.33      0.50      0.319          0.054     (   0.100)        0.264
 125  10.42      0.50      0.319          0.054     (   0.100)        0.265
 126  10.50      0.50      0.319          0.054     (   0.100)        0.265
 127  10.58      0.67      0.425          0.053     (   0.133)        0.371
 128  10.67      0.67      0.425          0.053     (   0.133)        0.372
 129  10.75      0.67      0.425          0.053     (   0.133)        0.372
 130  10.83      0.67      0.425          0.053     (   0.133)        0.372
 131  10.92      0.67      0.425          0.052     (   0.133)        0.372
 132  11.00      0.67      0.425          0.052     (   0.133)        0.373
 133  11.08      0.63      0.404          0.052     (   0.126)        0.352
 134  11.17      0.63      0.404          0.052     (   0.126)        0.352
 135  11.25      0.63      0.404          0.051     (   0.126)        0.352
 136  11.33      0.63      0.404          0.051     (   0.126)        0.352
 137  11.42      0.63      0.404          0.051     (   0.126)        0.353
 138  11.50      0.63      0.404          0.051     (   0.126)        0.353
 139  11.58      0.57      0.361          0.050     (   0.113)        0.311
 140  11.67      0.57      0.361          0.050     (   0.113)        0.311
 141  11.75      0.57      0.361          0.050     (   0.113)        0.311
 142  11.83      0.60      0.382          0.050     (   0.120)        0.333
 143  11.92      0.60      0.382          0.049     (   0.120)        0.333
 144  12.00      0.60      0.382          0.049     (   0.120)        0.333
 145  12.08      0.83      0.531          0.049     (   0.166)        0.482
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146  12.17     0.83      0.531          0.049    (  0.166)         0.482
147  12.25     0.83      0.531          0.048    (  0.166)         0.483
148  12.33     0.87      0.552          0.048    (  0.173)         0.504
149  12.42     0.87      0.552          0.048    (  0.173)         0.504
150  12.50     0.87      0.552          0.048    (  0.173)         0.505
151  12.58     0.93      0.595          0.047    (  0.186)         0.547
152  12.67     0.93      0.595          0.047    (  0.186)         0.547
153  12.75     0.93      0.595          0.047    (  0.186)         0.548
154  12.83     0.97      0.616          0.047    (  0.193)         0.569
155  12.92     0.97      0.616          0.047    (  0.193)         0.569
156  13.00     0.97      0.616          0.046    (  0.193)         0.570
157  13.08     1.13      0.722          0.046    (  0.226)         0.676
158  13.17     1.13      0.722          0.046    (  0.226)         0.676
159  13.25     1.13      0.722          0.046    (  0.226)         0.677
160  13.33     1.13      0.722          0.045    (  0.226)         0.677
161  13.42     1.13      0.722          0.045    (  0.226)         0.677
162  13.50     1.13      0.722          0.045    (  0.226)         0.677
163  13.58     0.77      0.489          0.045    (  0.153)         0.444
164  13.67     0.77      0.489          0.044    (  0.153)         0.444
165  13.75     0.77      0.489          0.044    (  0.153)         0.444
166  13.83     0.77      0.489          0.044    (  0.153)         0.445
167  13.92     0.77      0.489          0.044    (  0.153)         0.445
168  14.00     0.77      0.489          0.044    (  0.153)         0.445
169  14.08     0.90      0.573          0.043    (  0.179)         0.530
170  14.17     0.90      0.573          0.043    (  0.179)         0.530
171  14.25     0.90      0.573          0.043    (  0.179)         0.531
172  14.33     0.87      0.552          0.043    (  0.173)         0.510
173  14.42     0.87      0.552          0.042    (  0.173)         0.510
174  14.50     0.87      0.552          0.042    (  0.173)         0.510
175  14.58     0.87      0.552          0.042    (  0.173)         0.510
176  14.67     0.87      0.552          0.042    (  0.173)         0.510
177  14.75     0.87      0.552          0.042    (  0.173)         0.511
178  14.83     0.83      0.531          0.041    (  0.166)         0.490
179  14.92     0.83      0.531          0.041    (  0.166)         0.490
180  15.00     0.83      0.531          0.041    (  0.166)         0.490
181  15.08     0.80      0.510          0.041    (  0.160)         0.469
182  15.17     0.80      0.510          0.041    (  0.160)         0.469
183  15.25     0.80      0.510          0.040    (  0.160)         0.469
184  15.33     0.77      0.489          0.040    (  0.153)         0.448
185  15.42     0.77      0.489          0.040    (  0.153)         0.449
186  15.50     0.77      0.489          0.040    (  0.153)         0.449
187  15.58     0.63      0.404          0.039    (  0.126)         0.364
188  15.67     0.63      0.404          0.039    (  0.126)         0.364
189  15.75     0.63      0.404          0.039    (  0.126)         0.364
190  15.83     0.63      0.404          0.039    (  0.126)         0.365
191  15.92     0.63      0.404          0.039    (  0.126)         0.365
192  16.00     0.63      0.404          0.038    (  0.126)         0.365
193  16.08     0.13      0.085       (  0.038)        0.027         0.058
194  16.17     0.13      0.085       (  0.038)        0.027         0.058
195  16.25     0.13      0.085       (  0.038)        0.027         0.058
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196  16.33     0.13      0.085       (  0.038)       0.027        0.058
197  16.42     0.13      0.085       (  0.038)       0.027        0.058
198  16.50     0.13      0.085       (  0.037)       0.027        0.058
199  16.58     0.10      0.064       (  0.037)       0.020        0.044
200  16.67     0.10      0.064       (  0.037)       0.020        0.044
201  16.75     0.10      0.064       (  0.037)       0.020        0.044
202  16.83     0.10      0.064       (  0.037)       0.020        0.044
203  16.92     0.10      0.064       (  0.036)       0.020        0.044
204  17.00     0.10      0.064       (  0.036)       0.020        0.044
205  17.08     0.17      0.106       (  0.036)       0.033        0.073
206  17.17     0.17      0.106       (  0.036)       0.033        0.073
207  17.25     0.17      0.106       (  0.036)       0.033        0.073
208  17.33     0.17      0.106       (  0.035)       0.033        0.073
209  17.42     0.17      0.106       (  0.035)       0.033        0.073
210  17.50     0.17      0.106       (  0.035)       0.033        0.073
211  17.58     0.17      0.106       (  0.035)       0.033        0.073
212  17.67     0.17      0.106       (  0.035)       0.033        0.073
213  17.75     0.17      0.106       (  0.035)       0.033        0.073
214  17.83     0.13      0.085       (  0.034)       0.027        0.058
215  17.92     0.13      0.085       (  0.034)       0.027        0.058
216  18.00     0.13      0.085       (  0.034)       0.027        0.058
217  18.08     0.13      0.085       (  0.034)       0.027        0.058
218  18.17     0.13      0.085       (  0.034)       0.027        0.058
219  18.25     0.13      0.085       (  0.034)       0.027        0.058
220  18.33     0.13      0.085       (  0.033)       0.027        0.058
221  18.42     0.13      0.085       (  0.033)       0.027        0.058
222  18.50     0.13      0.085       (  0.033)       0.027        0.058
223  18.58     0.10      0.064       (  0.033)       0.020        0.044
224  18.67     0.10      0.064       (  0.033)       0.020        0.044
225  18.75     0.10      0.064       (  0.033)       0.020        0.044
226  18.83     0.07      0.042       (  0.032)       0.013        0.029
227  18.92     0.07      0.042       (  0.032)       0.013        0.029
228  19.00     0.07      0.042       (  0.032)       0.013        0.029
229  19.08     0.10      0.064       (  0.032)       0.020        0.044
230  19.17     0.10      0.064       (  0.032)       0.020        0.044
231  19.25     0.10      0.064       (  0.032)       0.020        0.044
232  19.33     0.13      0.085       (  0.032)       0.027        0.058
233  19.42     0.13      0.085       (  0.031)       0.027        0.058
234  19.50     0.13      0.085       (  0.031)       0.027        0.058
235  19.58     0.10      0.064       (  0.031)       0.020        0.044
236  19.67     0.10      0.064       (  0.031)       0.020        0.044
237  19.75     0.10      0.064       (  0.031)       0.020        0.044
238  19.83     0.07      0.042       (  0.031)       0.013        0.029
239  19.92     0.07      0.042       (  0.031)       0.013        0.029
240  20.00     0.07      0.042       (  0.030)       0.013        0.029
241  20.08     0.10      0.064       (  0.030)       0.020        0.044
242  20.17     0.10      0.064       (  0.030)       0.020        0.044
243  20.25     0.10      0.064       (  0.030)       0.020        0.044
244  20.33     0.10      0.064       (  0.030)       0.020        0.044
245  20.42     0.10      0.064       (  0.030)       0.020        0.044
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246  20.50     0.10      0.064       (  0.030)       0.020        0.044
247  20.58     0.10      0.064       (  0.030)       0.020        0.044
248  20.67     0.10      0.064       (  0.029)       0.020        0.044
249  20.75     0.10      0.064       (  0.029)       0.020        0.044
250  20.83     0.07      0.042       (  0.029)       0.013        0.029
251  20.92     0.07      0.042       (  0.029)       0.013        0.029
252  21.00     0.07      0.042       (  0.029)       0.013        0.029
253  21.08     0.10      0.064       (  0.029)       0.020        0.044
254  21.17     0.10      0.064       (  0.029)       0.020        0.044
255  21.25     0.10      0.064       (  0.029)       0.020        0.044
256  21.33     0.07      0.042       (  0.028)       0.013        0.029
257  21.42     0.07      0.042       (  0.028)       0.013        0.029
258  21.50     0.07      0.042       (  0.028)       0.013        0.029
259  21.58     0.10      0.064       (  0.028)       0.020        0.044
260  21.67     0.10      0.064       (  0.028)       0.020        0.044
261  21.75     0.10      0.064       (  0.028)       0.020        0.044
262  21.83     0.07      0.042       (  0.028)       0.013        0.029
263  21.92     0.07      0.042       (  0.028)       0.013        0.029
264  22.00     0.07      0.042       (  0.028)       0.013        0.029
265  22.08     0.10      0.064       (  0.028)       0.020        0.044
266  22.17     0.10      0.064       (  0.027)       0.020        0.044
267  22.25     0.10      0.064       (  0.027)       0.020        0.044
268  22.33     0.07      0.042       (  0.027)       0.013        0.029
269  22.42     0.07      0.042       (  0.027)       0.013        0.029
270  22.50     0.07      0.042       (  0.027)       0.013        0.029
271  22.58     0.07      0.042       (  0.027)       0.013        0.029
272  22.67     0.07      0.042       (  0.027)       0.013        0.029
273  22.75     0.07      0.042       (  0.027)       0.013        0.029
274  22.83     0.07      0.042       (  0.027)       0.013        0.029
275  22.92     0.07      0.042       (  0.027)       0.013        0.029
276  23.00     0.07      0.042       (  0.027)       0.013        0.029
277  23.08     0.07      0.042       (  0.027)       0.013        0.029
278  23.17     0.07      0.042       (  0.027)       0.013        0.029
279  23.25     0.07      0.042       (  0.027)       0.013        0.029
280  23.33     0.07      0.042       (  0.026)       0.013        0.029
281  23.42     0.07      0.042       (  0.026)       0.013        0.029
282  23.50     0.07      0.042       (  0.026)       0.013        0.029
283  23.58     0.07      0.042       (  0.026)       0.013        0.029
284  23.67     0.07      0.042       (  0.026)       0.013        0.029
285  23.75     0.07      0.042       (  0.026)       0.013        0.029
286  23.83     0.07      0.042       (  0.026)       0.013        0.029
287  23.92     0.07      0.042       (  0.026)       0.013        0.029
288  24.00     0.07      0.042       (  0.026)       0.013        0.029
                (Loss Rate Not Used)
    Sum =     100.0                                   Sum =    53.1
       Flood volume = Effective rainfall      4.43(In)
        times area       0.9(Ac.)/[(In)/(Ft.)] =       0.3(Ac.Ft)
       Total soil loss =      0.88(In)
       Total soil loss =     0.068(Ac.Ft)
       Total rainfall =      5.31(In)
```

```
      Flood volume =       14785.9 Cubic Feet
      Total soil loss =        2947.4 Cubic Feet
      --------------------------------------------------------------------
       Peak flow rate of this hydrograph =      0.628(CFS)
      --------------------------------------------------------------------
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          24 - H O U R   S T O R M
                     R u n o f f      H y d r o g r a p h
      --------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0001      0.01  Q          |         |         |         |
  0+10       0.0003      0.02  Q          |         |         |         |
  0+15       0.0004      0.03  Q          |         |         |         |
  0+20       0.0007      0.03  Q          |         |         |         |
  0+25       0.0009      0.04  Q          |         |         |         |
  0+30       0.0012      0.04  Q          |         |         |         |
  0+35       0.0015      0.04  Q          |         |         |         |
  0+40       0.0018      0.04  Q          |         |         |         |
  0+45       0.0021      0.04  Q          |         |         |         |
  0+50       0.0024      0.05  Q          |         |         |         |
  0+55       0.0028      0.05  Q          |         |         |         |
  1+ 0       0.0031      0.05  Q          |         |         |         |
  1+ 5       0.0034      0.05  Q          |         |         |         |
  1+10       0.0037      0.04  Q          |         |         |         |
  1+15       0.0040      0.04  Q          |         |         |         |
  1+20       0.0043      0.04  Q          |         |         |         |
  1+25       0.0046      0.04  Q          |         |         |         |
  1+30       0.0049      0.04  Q          |         |         |         |
  1+35       0.0051      0.04  Q          |         |         |         |
  1+40       0.0054      0.04  Q          |         |         |         |
  1+45       0.0057      0.04  Q          |         |         |         |
  1+50       0.0060      0.05  Q          |         |         |         |
  1+55       0.0064      0.05  Q          |         |         |         |
  2+ 0       0.0068      0.05  Q          |         |         |         |
  2+ 5       0.0071      0.05  Q          |         |         |         |
  2+10       0.0075      0.05  Q          |         |         |         |
  2+15       0.0079      0.05  Q          |         |         |         |
  2+20       0.0082      0.05  Q          |         |         |         |
  2+25       0.0086      0.05  QV         |         |         |         |
  2+30       0.0090      0.05  QV         |         |         |         |
  2+35       0.0094      0.06  QV         |         |         |         |
  2+40       0.0099      0.07  QV         |         |         |         |
  2+45       0.0103      0.07  QV         |         |         |         |
  2+50       0.0108      0.07  QV         |         |         |         |
  2+55       0.0113      0.07  QV         |         |         |         |
  3+ 0       0.0117      0.07  QV         |         |         |         |
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3+ 5       0.0122      0.07  QV        |         |         |         |
3+10       0.0127      0.07  QV        |         |         |         |
3+15       0.0131      0.07  QV        |         |         |         |
3+20       0.0136      0.07  QV        |         |         |         |
3+25       0.0141      0.07  QV        |         |         |         |
3+30       0.0145      0.07  QV        |         |         |         |
3+35       0.0150      0.07  QV        |         |         |         |
3+40       0.0155      0.07  QV        |         |         |         |
3+45       0.0159      0.07  QV        |         |         |         |
3+50       0.0164      0.07  QV        |         |         |         |
3+55       0.0170      0.08  Q V       |         |         |         |
4+ 0       0.0175      0.08  Q V       |         |         |         |
4+ 5       0.0181      0.08  Q V       |         |         |         |
4+10       0.0187      0.08  Q V       |         |         |         |
4+15       0.0192      0.08  Q V       |         |         |         |
4+20       0.0198      0.09  Q V       |         |         |         |
4+25       0.0205      0.09  Q V       |         |         |         |
4+30       0.0211      0.09  Q V       |         |         |         |
4+35       0.0218      0.09  Q V       |         |         |         |
4+40       0.0224      0.09  Q V       |         |         |         |
4+45       0.0231      0.09  Q V       |         |         |         |
4+50       0.0238      0.10  Q V       |         |         |         |
4+55       0.0245      0.11  Q V       |         |         |         |
5+ 0       0.0253      0.11  Q V       |         |         |         |
5+ 5       0.0259      0.09  Q  V      |         |         |         |
5+10       0.0265      0.08  Q  V      |         |         |         |
5+15       0.0271      0.08  Q  V      |         |         |         |
5+20       0.0277      0.09  Q  V      |         |         |         |
5+25       0.0283      0.09  Q  V      |         |         |         |
5+30       0.0290      0.09  Q  V      |         |         |         |
5+35       0.0297      0.10  Q  V      |         |         |         |
5+40       0.0304      0.11  Q  V      |         |         |         |
5+45       0.0311      0.11  Q  V      |         |         |         |
5+50       0.0319      0.11  Q  V      |         |         |         |
5+55       0.0326      0.11  Q  V      |         |         |         |
6+ 0       0.0334      0.11  Q  V      |         |         |         |
6+ 5       0.0342      0.11  Q   V     |         |         |         |
6+10       0.0350      0.12  Q   V     |         |         |         |
6+15       0.0358      0.12  Q   V     |         |         |         |
6+20       0.0367      0.12  Q   V     |         |         |         |
6+25       0.0375      0.12  Q   V     |         |         |         |
6+30       0.0383      0.12  Q   V     |         |         |         |
6+35       0.0392      0.13  Q   V     |         |         |         |
6+40       0.0402      0.13  Q   V     |         |         |         |
6+45       0.0411      0.14  Q   V     |         |         |         |
6+50       0.0420      0.14  Q   V     |         |         |         |
6+55       0.0430      0.14  Q    V    |         |         |         |
7+ 0       0.0439      0.14  Q    V    |         |         |         |
7+ 5       0.0448      0.14  Q    V    |         |         |         |
7+10       0.0458      0.14  Q    V    |         |         |         |
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 7+15       0.0467       0.14  Q    V    |         |         |         |
 7+20       0.0477       0.15  Q    V    |         |         |         |
 7+25       0.0488       0.16  Q    V    |         |         |         |
 7+30       0.0499       0.16  Q    V    |         |         |         |
 7+35       0.0510       0.17  Q     V   |         |         |         |
 7+40       0.0522       0.18  Q     V   |         |         |         |
 7+45       0.0535       0.18  Q     V   |         |         |         |
 7+50       0.0548       0.19  Q     V   |         |         |         |
 7+55       0.0561       0.20  Q     V   |         |         |         |
 8+ 0       0.0575       0.20  Q     V   |         |         |         |
 8+ 5       0.0590       0.22  Q     V   |         |         |         |
 8+10       0.0606       0.23  Q      V  |         |         |         |
 8+15       0.0622       0.24  Q      V  |         |         |         |
 8+20       0.0639       0.24  Q      V  |         |         |         |
 8+25       0.0655       0.24  Q      V  |         |         |         |
 8+30       0.0672       0.24  Q      V  |         |         |         |
 8+35       0.0689       0.25  Q       V |         |         |         |
 8+40       0.0707       0.26  |Q      V |         |         |         |
 8+45       0.0724       0.26  |Q      V |         |         |         |
 8+50       0.0743       0.27  |Q      V |         |         |         |
 8+55       0.0762       0.28  |Q      V |         |         |         |
 9+ 0       0.0782       0.28  |Q       V|         |         |         |
 9+ 5       0.0802       0.30  |Q       V|         |         |         |
 9+10       0.0824       0.32  |Q       V|         |         |         |
 9+15       0.0846       0.32  |Q       V|         |         |         |
 9+20       0.0869       0.33  |Q        V         |         |         |
 9+25       0.0892       0.34  |Q        V         |         |         |
 9+30       0.0916       0.34  |Q        V         |         |         |
 9+35       0.0940       0.35  |Q        |V        |         |         |
 9+40       0.0964       0.36  |Q        |V        |         |         |
 9+45       0.0989       0.36  |Q        |V        |         |         |
 9+50       0.1015       0.37  |Q        |V        |         |         |
 9+55       0.1041       0.38  |Q        | V       |         |         |
10+ 0       0.1067       0.38  |Q        | V       |         |         |
10+ 5       0.1089       0.31  |Q        | V       |         |         |
10+10       0.1107       0.26  |Q        |  V      |         |         |
10+15       0.1124       0.25  Q         |  V      |         |         |
10+20       0.1141       0.25  Q         |  V      |         |         |
10+25       0.1158       0.25  Q         |  V      |         |         |
10+30       0.1175       0.25  Q         |  V      |         |         |
10+35       0.1195       0.29  |Q        |   V     |         |         |
10+40       0.1218       0.33  |Q        |   V     |         |         |
10+45       0.1241       0.34  |Q        |   V     |         |         |
10+50       0.1265       0.35  |Q        |   V     |         |         |
10+55       0.1289       0.35  |Q        |    V    |         |         |
11+ 0       0.1313       0.35  |Q        |    V    |         |         |
11+ 5       0.1336       0.34  |Q        |    V    |         |         |
11+10       0.1359       0.33  |Q        |     V   |         |         |
11+15       0.1381       0.33  |Q        |     V   |         |         |
11+20       0.1404       0.33  |Q        |     V   |         |         |
```

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11+25       0.1426      0.33  |Q        |     V   |         |         |
11+30       0.1449      0.33  |Q        |      V  |         |         |
11+35       0.1470      0.31  |Q        |      V  |         |         |
11+40       0.1490      0.29  |Q        |      V  |         |         |
11+45       0.1510      0.29  |Q        |      V  |         |         |
11+50       0.1530      0.30  |Q        |       V |         |         |
11+55       0.1552      0.31  |Q        |       V |         |         |
12+ 0       0.1573      0.31  |Q        |       V |         |         |
12+ 5       0.1599      0.38  |Q        |       V |         |         |
12+10       0.1629      0.43  |Q        |        V|         |         |
12+15       0.1659      0.44  |Q        |        V|         |         |
12+20       0.1691      0.46  |Q        |        V|         |         |
12+25       0.1723      0.47  |Q        |         V         |         |
12+30       0.1755      0.47  |Q        |         V         |         |
12+35       0.1789      0.49  |Q        |         |V        |         |
12+40       0.1823      0.50  | Q       |         |V        |         |
12+45       0.1858      0.51  | Q       |         |V        |         |
12+50       0.1894      0.52  | Q       |         | V       |         |
12+55       0.1930      0.53  | Q       |         | V       |         |
13+ 0       0.1966      0.53  | Q       |         |  V      |         |
13+ 5       0.2006      0.58  | Q       |         |  V      |         |
13+10       0.2049      0.62  | Q       |         |   V     |         |
13+15       0.2092      0.63  | Q       |         |   V     |         |
13+20       0.2135      0.63  | Q       |         |    V    |         |
13+25       0.2178      0.63  | Q       |         |    V    |         |
13+30       0.2222      0.63  | Q       |         |     V   |         |
13+35       0.2257      0.52  | Q       |         |     V   |         |
13+40       0.2287      0.43  |Q        |         |     V   |         |
13+45       0.2316      0.42  |Q        |         |      V  |         |
13+50       0.2344      0.41  |Q        |         |      V  |         |
13+55       0.2373      0.41  |Q        |         |      V  |         |
14+ 0       0.2401      0.41  |Q        |         |       V |         |
14+ 5       0.2432      0.45  |Q        |         |       V |         |
14+10       0.2466      0.48  |Q        |         |        V|         |
14+15       0.2499      0.49  |Q        |         |        V|         |
14+20       0.2533      0.48  |Q        |         |        V|         |
14+25       0.2565      0.47  |Q        |         |         V         |
14+30       0.2598      0.47  |Q        |         |         V         |
14+35       0.2631      0.47  |Q        |         |         V         |
14+40       0.2663      0.47  |Q        |         |         |V        |
14+45       0.2696      0.47  |Q        |         |         |V        |
14+50       0.2728      0.46  |Q        |         |         | V       |
14+55       0.2759      0.46  |Q        |         |         | V       |
15+ 0       0.2791      0.45  |Q        |         |         | V       |
15+ 5       0.2821      0.44  |Q        |         |         |  V      |
15+10       0.2851      0.44  |Q        |         |         |  V      |
15+15       0.2881      0.44  |Q        |         |         |  V      |
15+20       0.2911      0.43  |Q        |         |         |   V     |
15+25       0.2939      0.42  |Q        |         |         |   V     |
15+30       0.2968      0.42  |Q        |         |         |   V     |
```

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15+35       0.2994      0.38  |Q        |         |         |    V    |
15+40       0.3018      0.35  |Q        |         |         |    V    |
15+45       0.3041      0.34  |Q        |         |         |    V    |
15+50       0.3065      0.34  |Q        |         |         |     V   |
15+55       0.3088      0.34  |Q        |         |         |     V   |
16+ 0       0.3111      0.34  |Q        |         |         |     V   |
16+ 5       0.3125      0.20  Q         |         |         |     V   |
16+10       0.3131      0.08  Q         |         |         |     V   |
16+15       0.3135      0.06  Q         |         |         |     V   |
16+20       0.3138      0.05  Q         |         |         |     V   |
16+25       0.3142      0.05  Q         |         |         |      V  |
16+30       0.3146      0.05  Q         |         |         |      V  |
16+35       0.3149      0.05  Q         |         |         |      V  |
16+40       0.3152      0.04  Q         |         |         |      V  |
16+45       0.3155      0.04  Q         |         |         |      V  |
16+50       0.3158      0.04  Q         |         |         |      V  |
16+55       0.3160      0.04  Q         |         |         |      V  |
17+ 0       0.3163      0.04  Q         |         |         |      V  |
17+ 5       0.3167      0.05  Q         |         |         |      V  |
17+10       0.3171      0.07  Q         |         |         |      V  |
17+15       0.3176      0.07  Q         |         |         |      V  |
17+20       0.3181      0.07  Q         |         |         |      V  |
17+25       0.3185      0.07  Q         |         |         |      V  |
17+30       0.3190      0.07  Q         |         |         |      V  |
17+35       0.3195      0.07  Q         |         |         |      V  |
17+40       0.3199      0.07  Q         |         |         |      V  |
17+45       0.3204      0.07  Q         |         |         |      V  |
17+50       0.3208      0.06  Q         |         |         |      V  |
17+55       0.3212      0.06  Q         |         |         |      V  |
18+ 0       0.3216      0.05  Q         |         |         |      V  |
18+ 5       0.3220      0.05  Q         |         |         |      V  |
18+10       0.3223      0.05  Q         |         |         |      V  |
18+15       0.3227      0.05  Q         |         |         |       V |
18+20       0.3231      0.05  Q         |         |         |       V |
18+25       0.3234      0.05  Q         |         |         |       V |
18+30       0.3238      0.05  Q         |         |         |       V |
18+35       0.3241      0.05  Q         |         |         |       V |
18+40       0.3244      0.04  Q         |         |         |       V |
18+45       0.3247      0.04  Q         |         |         |       V |
18+50       0.3250      0.03  Q         |         |         |       V |
18+55       0.3251      0.03  Q         |         |         |       V |
19+ 0       0.3253      0.03  Q         |         |         |       V |
19+ 5       0.3256      0.03  Q         |         |         |       V |
19+10       0.3258      0.04  Q         |         |         |       V |
19+15       0.3261      0.04  Q         |         |         |       V |
19+20       0.3264      0.05  Q         |         |         |       V |
19+25       0.3268      0.05  Q         |         |         |       V |
19+30       0.3272      0.05  Q         |         |         |       V |
19+35       0.3275      0.05  Q         |         |         |       V |
19+40       0.3278      0.04  Q         |         |         |       V |
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19+45       0.3281      0.04  Q          |         |         |      V |
19+50       0.3283      0.03  Q          |         |         |      V |
19+55       0.3285      0.03  Q          |         |         |      V |
20+ 0       0.3287      0.03  Q          |         |         |      V |
20+ 5       0.3289      0.03  Q          |         |         |      V |
20+10       0.3292      0.04  Q          |         |         |      V |
20+15       0.3295      0.04  Q          |         |         |      V |
20+20       0.3298      0.04  Q          |         |         |      V |
20+25       0.3300      0.04  Q          |         |         |      V |
20+30       0.3303      0.04  Q          |         |         |      V |
20+35       0.3306      0.04  Q          |         |         |      V |
20+40       0.3309      0.04  Q          |         |         |      V |
20+45       0.3312      0.04  Q          |         |         |       V|
20+50       0.3314      0.03  Q          |         |         |       V|
20+55       0.3316      0.03  Q          |         |         |       V|
21+ 0       0.3318      0.03  Q          |         |         |       V|
21+ 5       0.3320      0.03  Q          |         |         |       V|
21+10       0.3323      0.04  Q          |         |         |       V|
21+15       0.3325      0.04  Q          |         |         |       V|
21+20       0.3328      0.03  Q          |         |         |       V|
21+25       0.3330      0.03  Q          |         |         |       V|
21+30       0.3332      0.03  Q          |         |         |       V|
21+35       0.3334      0.03  Q          |         |         |       V|
21+40       0.3337      0.04  Q          |         |         |       V|
21+45       0.3339      0.04  Q          |         |         |       V|
21+50       0.3342      0.03  Q          |         |         |       V|
21+55       0.3344      0.03  Q          |         |         |       V|
22+ 0       0.3346      0.03  Q          |         |         |       V|
22+ 5       0.3348      0.03  Q          |         |         |       V|
22+10       0.3351      0.04  Q          |         |         |       V|
22+15       0.3353      0.04  Q          |         |         |       V|
22+20       0.3356      0.03  Q          |         |         |       V|
22+25       0.3358      0.03  Q          |         |         |       V|
22+30       0.3360      0.03  Q          |         |         |       V|
22+35       0.3362      0.03  Q          |         |         |       V|
22+40       0.3363      0.03  Q          |         |         |       V|
22+45       0.3365      0.03  Q          |         |         |       V|
22+50       0.3367      0.03  Q          |         |         |       V|
22+55       0.3369      0.03  Q          |         |         |       V|
23+ 0       0.3371      0.03  Q          |         |         |       V|
23+ 5       0.3373      0.03  Q          |         |         |       V|
23+10       0.3375      0.03  Q          |         |         |       V|
23+15       0.3376      0.03  Q          |         |         |       V|
23+20       0.3378      0.03  Q          |         |         |       V|
23+25       0.3380      0.03  Q          |         |         |       V|
23+30       0.3382      0.03  Q          |         |         |       V|
23+35       0.3384      0.03  Q          |         |         |       V|
23+40       0.3386      0.03  Q          |         |         |       V|
23+45       0.3388      0.03  Q          |         |         |       V|
23+50       0.3389      0.03  Q          |         |         |       V|
```

```
    23+55       0.3391      0.03  Q         |         |         |       V|
    24+ 0       0.3393      0.03  Q         |         |         |       V|
    24+ 5       0.3394      0.01  Q         |         |         |       V|
    24+10       0.3394      0.00  Q         |         |         |       V|
    24+15       0.3394      0.00  Q         |         |         |        V
-----------------------------------------------------------------
```

Appendix K

Basin Analysis

Pond Report

Pond No. 1 - Mapes Industrial - DA A

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
8.00	108.00	n/a	26,993	26,993
8.50	108.50	n/a	2,083	29,075
9.00	109.00	n/a	2,018	31,093
9.50	109.50	n/a	1,935	33,028
10.00	110.00	n/a	1,830	34,858
10.50	110.50	n/a	1,699	36,557
11.00	111.00	n/a	1,536	38,092
11.50	111.50	n/a	1,328	39,420
12.00	112.00	n/a	1,049	40,469
12.50	112.50	n/a	585	41,054

Culvert / Orifice Structures

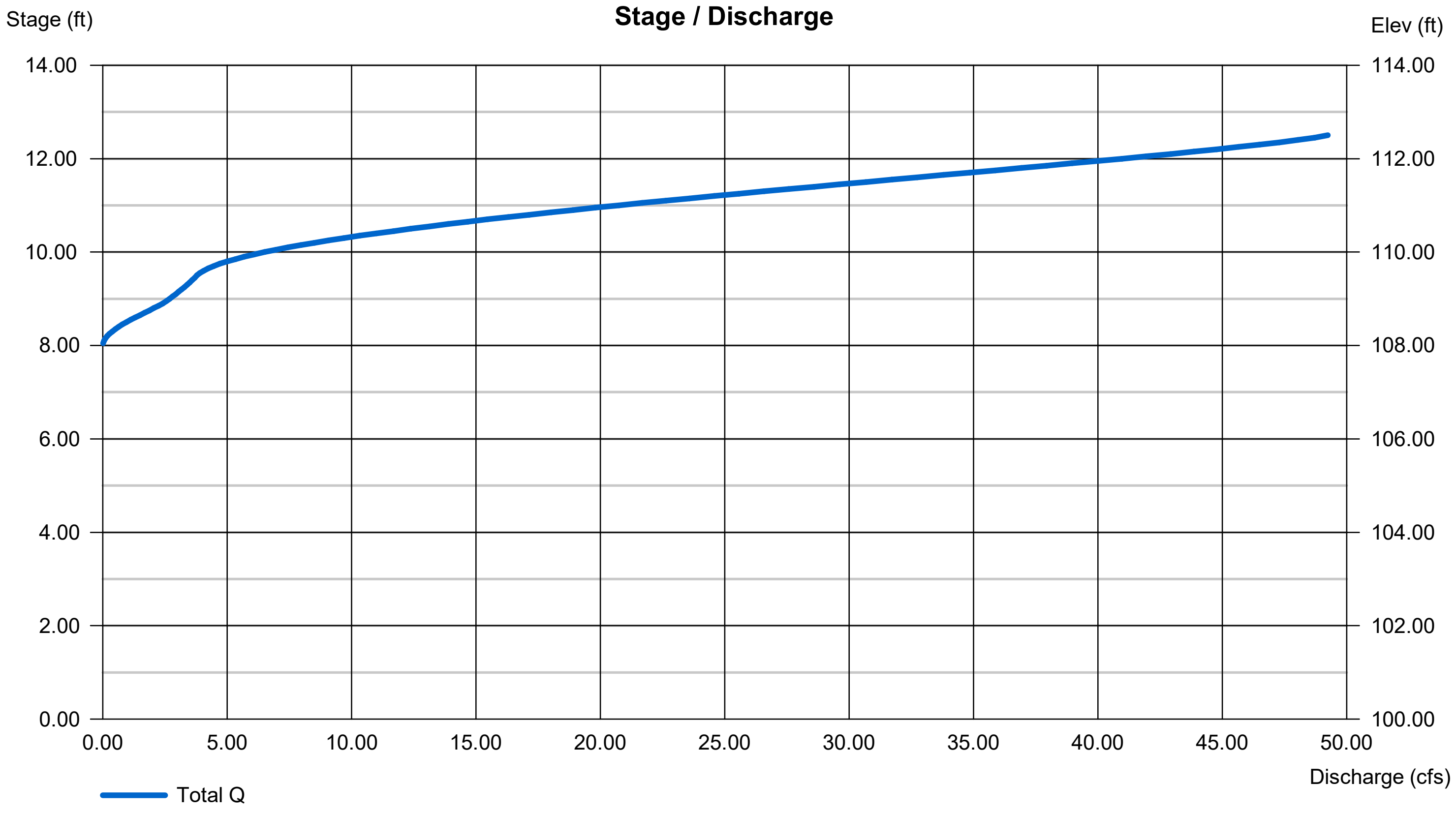
		[A]	[B]	[C]	[PrfRsr]
Rise (in)	=	12.00	36.00	0.00	0.00
Span (in)	=	12.00	36.00	0.00	0.00
No. Barrels	=	1	1	0	0
Invert El. (ft)	=	108.00	109.50	0.00	0.00
Length (ft)	=	0.00	0.00	0.00	0.00
Slope (%)	=	0.00	0.00	0.00	n/a
N-Value	=	.013	.013	.013	n/a
Orifice Coeff.	=	0.60	0.60	0.60	0.60
Multi-Stage	=	n/a	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) = 0.000 (by Wet area)
TW Elev. (ft) = 0.00

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



Pond Report

Pond No. 1 - Mapes Industrial - DA A

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
8.00	108.00	n/a	26,993	26,993
8.50	108.50	n/a	2,083	29,075
9.00	109.00	n/a	2,018	31,093
9.50	109.50	n/a	1,935	33,028
10.00	110.00	n/a	1,830	34,858
10.50	110.50	n/a	1,699	36,557
11.00	111.00	n/a	1,536	38,092
11.50	111.50	n/a	1,328	39,420
12.00	112.00	n/a	1,049	40,469
12.50	112.50	n/a	585	41,054

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	36.00	0.00	0.00
Span (in)	= 12.00	36.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 108.00	109.50	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) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
8.00	26,993	108.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
8.50	29,075	108.50	0.95 ic	0.00	---	---	---	---	---	---	---	---	0.947
9.00	31,093	109.00	2.67 ic	0.00	---	---	---	---	---	---	---	---	2.674
9.50	33,028	109.50	3.78 ic	0.00	---	---	---	---	---	---	---	---	3.781
10.00	34,858	110.00	4.63 ic	1.87 ic	---	---	---	---	---	---	---	---	6.501
10.50	36,557	110.50	5.35 ic	7.03 ic	---	---	---	---	---	---	---	---	12.38
11.00	38,092	111.00	5.98 ic	14.77 ic	---	---	---	---	---	---	---	---	20.75
11.50	39,420	111.50	6.55 ic	24.12 ic	---	---	---	---	---	---	---	---	30.67
12.00	40,469	112.00	7.07 ic	33.89 ic	---	---	---	---	---	---	---	---	40.97
12.50	41,054	112.50	7.56 ic	41.68 ic	---	---	---	---	---	---	---	---	49.24

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Monday, 05 / 30 / 2022

Pond No. 2 - Mapes Industrial - DA B

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
4.50	104.50	n/a	1,257	1,257
5.00	105.00	n/a	200	1,456
5.50	105.50	n/a	196	1,652
6.00	106.00	n/a	190	1,842
6.50	106.50	n/a	180	2,022
7.00	107.00	n/a	165	2,187
7.50	107.50	n/a	145	2,332
8.00	108.00	n/a	116	2,448
8.50	108.50	n/a	65	2,513

Culvert / Orifice Structures

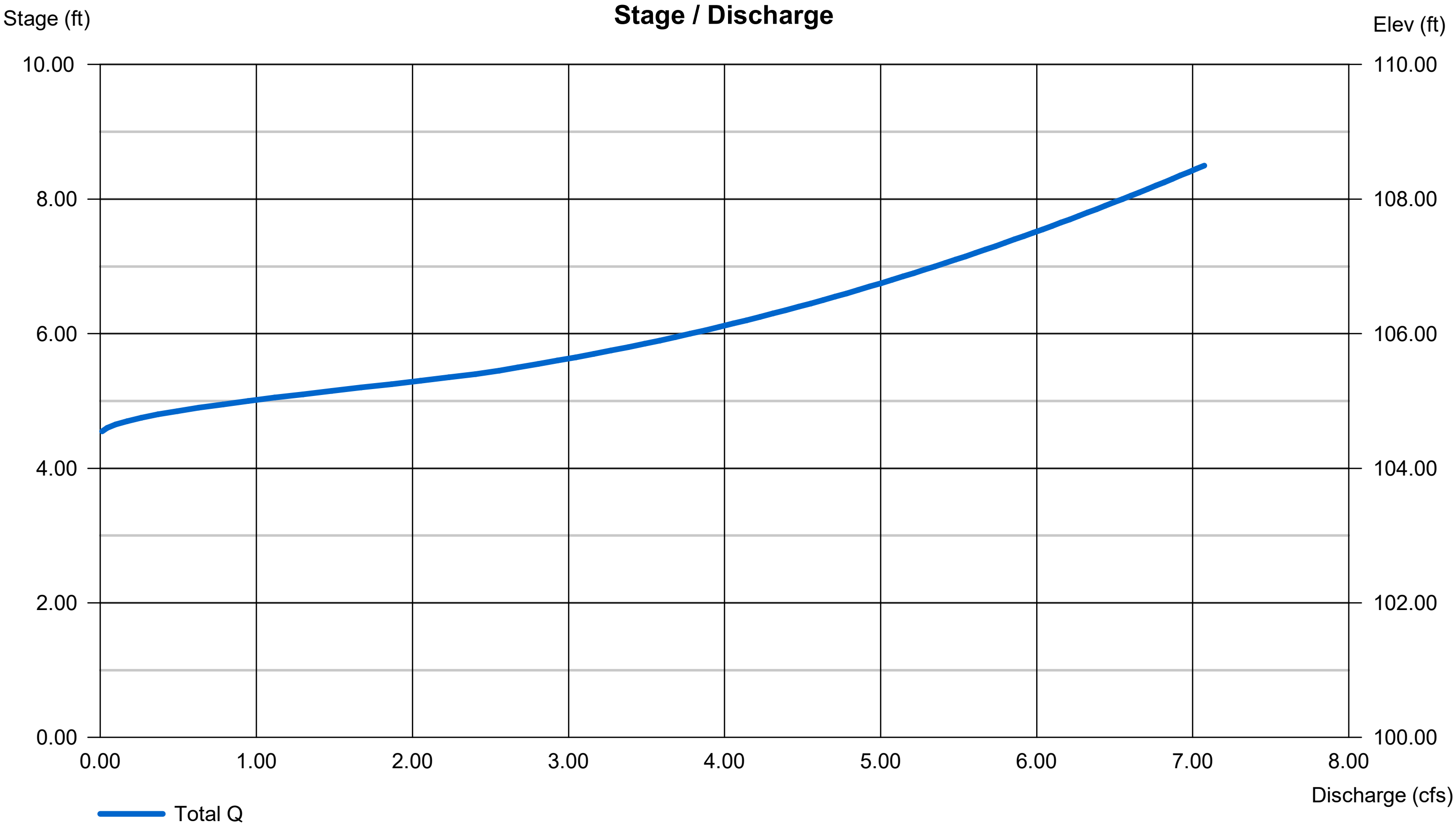
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 104.50	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	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) = 0.000 (by Wet area)
TW Elev. (ft) = 0.00

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



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4 Monday, 05 / 30 / 2022

Pond No. 2 - Mapes Industrial - DA B

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
4.50	104.50	n/a	1,257	1,257
5.00	105.00	n/a	200	1,456
5.50	105.50	n/a	196	1,652
6.00	106.00	n/a	190	1,842
6.50	106.50	n/a	180	2,022
7.00	107.00	n/a	165	2,187
7.50	107.50	n/a	145	2,332
8.00	108.00	n/a	116	2,448
8.50	108.50	n/a	65	2,513

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 104.50	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) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	---	---	---	---	---	---	---	---	---	0.000
4.50	1,257	104.50	0.00	---	---	---	---	---	---	---	---	---	0.000
5.00	1,456	105.00	0.95 ic	---	---	---	---	---	---	---	---	---	0.947
5.50	1,652	105.50	2.67 ic	---	---	---	---	---	---	---	---	---	2.674
6.00	1,842	106.00	3.78 ic	---	---	---	---	---	---	---	---	---	3.781
6.50	2,022	106.50	4.63 ic	---	---	---	---	---	---	---	---	---	4.631
7.00	2,187	107.00	5.35 ic	---	---	---	---	---	---	---	---	---	5.347
7.50	2,332	107.50	5.98 ic	---	---	---	---	---	---	---	---	---	5.979
8.00	2,448	108.00	6.55 ic	---	---	---	---	---	---	---	---	---	6.549
8.50	2,513	108.50	7.07 ic	---	---	---	---	---	---	---	---	---	7.074

Appendix K.1

Basin Analysis
2-Year Storm

```
                     FLOOD HYDROGRAPH ROUTING PROGRAM
            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018
                        Study date: 05/30/22


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


MAPES AND TRUMBLE INDUSTRIAL FACILITY
BASIN ROUTING
POST-DEVELOPMENT CONDITIONS
2-YEAR STORM, DA A
--------------------------------------------------------------------


Program License Serial Number 6443

--------------------------------------------------------------------
******************** HYDROGRAPH INFORMATION **********************

                From study/file name: MapesPost2AUH24.rte
****************************HYDROGRAPH DATA****************************
                Number of intervals =   292
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =        3.894 (CFS)
                Total volume =       2.366 (Ac.Ft)
        Status of hydrographs being held in storage
                   Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
        Peak (CFS)      0.000     0.000     0.000     0.000     0.000
        Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
***********************************************************************



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        0.000 to Point/Station        0.000
**** RETARDING BASIN ROUTING ****
______________________________________________________________________

User entry of depth-outflow-storage data
--------------------------------------------------------------------
Total number of inflow hydrograph intervals = 292
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)
--------------------------------------------------------------------
--------------------------------------------------------------------
Initial basin depth =   0.00 (Ft.)
Initial basin storage =      0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)
```

```
       ---------------------------------------------------------------------
       --------------------------------------------------------------------
       Depth vs. Storage and Depth vs. Discharge data:
        Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
            (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)    (Ac.Ft)
       ---------------------------------------------------------------------
         0.000      0.000      0.000      0.000        0.000
         8.000      0.620      0.001      0.620        0.620
         8.500      0.667      0.950      0.664        0.670
         9.000      0.714      2.670      0.705        0.723
         9.500      0.758      3.780      0.745        0.771
        10.000      0.800      6.500      0.778        0.822
        10.500      0.839     12.380      0.796        0.882
        11.000      0.874     20.750      0.803        0.945
        11.500      0.905     30.670      0.799        1.011
        12.000      0.929     40.970      0.788        1.070
        12.500      0.942     49.240      0.772        1.112
       --------------------------------------------------------------------
                       Hydrograph Detention Basin Routing
       ---------------------------------------------------------------------

       Graph values: 'I'= unit inflow; 'O'=outflow at time shown
       ---------------------------------------------------------------------
 Time   Inflow  Outflow    Storage                                     Depth
(Hours)  (CFS)   (CFS)     (Ac.Ft) .0       1.0    1.95    2.92    3.89 (Ft.)
 0.083    0.09    0.00      0.000  O       |       |       |       |     0.00
 0.167    0.20    0.00      0.001  OI      |       |       |       |     0.02
 0.250    0.22    0.00      0.003  OI      |       |       |       |     0.04
 0.333    0.27    0.00      0.004  O I     |       |       |       |     0.06
 0.417    0.33    0.00      0.006  O I     |       |       |       |     0.08
 0.500    0.34    0.00      0.009  O I     |       |       |       |     0.11
 0.583    0.34    0.00      0.011  O I     |       |       |       |     0.14
 0.667    0.34    0.00      0.013  O I     |       |       |       |     0.17
 0.750    0.34    0.00      0.016  O I     |       |       |       |     0.20
 0.833    0.39    0.00      0.018  O  I    |       |       |       |     0.24
 0.917    0.44    0.00      0.021  O  I    |       |       |       |     0.27
 1.000    0.45    0.00      0.024  O  I    |       |       |       |     0.31
 1.083    0.41    0.00      0.027  O  I    |       |       |       |     0.35
 1.167    0.36    0.00      0.030  O I     |       |       |       |     0.39
 1.250    0.35    0.00      0.032  O I     |       |       |       |     0.42
 1.333    0.35    0.00      0.035  O I     |       |       |       |     0.45
 1.417    0.34    0.00      0.037  O I     |       |       |       |     0.48
 1.500    0.34    0.00      0.040  O I     |       |       |       |     0.51
 1.583    0.34    0.00      0.042  O I     |       |       |       |     0.54
 1.667    0.34    0.00      0.044  O I     |       |       |       |     0.57
 1.750    0.34    0.00      0.047  O I     |       |       |       |     0.60
 1.833    0.39    0.00      0.049  O  I    |       |       |       |     0.63
 1.917    0.44    0.00      0.052  O  I    |       |       |       |     0.67
 2.000    0.45    0.00      0.055  O  I    |       |       |       |     0.71
 2.083    0.46    0.00      0.058  O  I    |       |       |       |     0.75
```

```
2.167    0.46    0.00      0.061  O  I    |       |       |       |     0.79
2.250    0.46    0.00      0.065  O  I    |       |       |       |     0.83
2.333    0.46    0.00      0.068  O  I    |       |       |       |     0.87
2.417    0.46    0.00      0.071  O  I    |       |       |       |     0.91
2.500    0.46    0.00      0.074  O  I    |       |       |       |     0.95
2.583    0.51    0.00      0.077  O   I   |       |       |       |     1.00
2.667    0.56    0.00      0.081  O   I   |       |       |       |     1.04
2.750    0.57    0.00      0.085  O   I   |       |       |       |     1.09
2.833    0.57    0.00      0.089  O   I   |       |       |       |     1.14
2.917    0.57    0.00      0.093  O   I   |       |       |       |     1.20
3.000    0.57    0.00      0.097  O   I   |       |       |       |     1.25
3.083    0.57    0.00      0.101  O   I   |       |       |       |     1.30
3.167    0.57    0.00      0.104  O   I   |       |       |       |     1.35
3.250    0.57    0.00      0.108  O   I   |       |       |       |     1.40
3.333    0.57    0.00      0.112  O   I   |       |       |       |     1.45
3.417    0.57    0.00      0.116  O   I   |       |       |       |     1.50
3.500    0.57    0.00      0.120  O   I   |       |       |       |     1.55
3.583    0.57    0.00      0.124  O   I   |       |       |       |     1.60
3.667    0.57    0.00      0.128  O   I   |       |       |       |     1.65
3.750    0.57    0.00      0.132  O   I   |       |       |       |     1.70
3.833    0.62    0.00      0.136  O    I  |       |       |       |     1.76
3.917    0.67    0.00      0.141  O    I  |       |       |       |     1.81
4.000    0.68    0.00      0.145  O    I  |       |       |       |     1.87
4.083    0.69    0.00      0.150  O    I  |       |       |       |     1.94
4.167    0.69    0.00      0.155  O    I  |       |       |       |     2.00
4.250    0.69    0.00      0.159  O    I  |       |       |       |     2.06
4.333    0.73    0.00      0.164  O     I |       |       |       |     2.12
4.417    0.79    0.00      0.170  O     I |       |       |       |     2.19
4.500    0.80    0.00      0.175  O     I |       |       |       |     2.26
4.583    0.80    0.00      0.181  O     I |       |       |       |     2.33
4.667    0.80    0.00      0.186  O     I |       |       |       |     2.40
4.750    0.80    0.00      0.192  O     I |       |       |       |     2.47
4.833    0.85    0.00      0.197  O     I |       |       |       |     2.54
4.917    0.90    0.00      0.203  O      I|       |       |       |     2.62
5.000    0.91    0.00      0.209  O      I|       |       |       |     2.70
5.083    0.82    0.00      0.215  O     I |       |       |       |     2.78
5.167    0.72    0.00      0.221  O    I  |       |       |       |     2.85
5.250    0.70    0.00      0.226  O    I  |       |       |       |     2.91
5.333    0.74    0.00      0.231  O     I |       |       |       |     2.97
5.417    0.79    0.00      0.236  O     I |       |       |       |     3.04
5.500    0.80    0.00      0.241  O     I |       |       |       |     3.11
5.583    0.85    0.00      0.247  O     I |       |       |       |     3.19
5.667    0.90    0.00      0.253  O      I|       |       |       |     3.26
5.750    0.91    0.00      0.259  O      I|       |       |       |     3.34
5.833    0.91    0.00      0.265  O      I|       |       |       |     3.42
5.917    0.92    0.00      0.272  O      I|       |       |       |     3.51
6.000    0.92    0.00      0.278  O      I|       |       |       |     3.59
6.083    0.96    0.00      0.284  O      I|       |       |       |     3.67
6.167    1.01    0.00      0.291  O       I       |       |       |     3.76
6.250    1.02    0.00      0.298  O       I       |       |       |     3.85
```

```
 6.333    1.03    0.00      0.305  O       I       |       |       |     3.94
 6.417    1.03    0.00      0.312  O       I       |       |       |     4.03
 6.500    1.03    0.00      0.320  O       I       |       |       |     4.12
 6.583    1.08    0.00      0.327  O       I       |       |       |     4.22
 6.667    1.13    0.00      0.334  O       |I      |       |       |     4.32
 6.750    1.14    0.00      0.342  O       |I      |       |       |     4.42
 6.833    1.14    0.00      0.350  O       |I      |       |       |     4.52
 6.917    1.15    0.00      0.358  O       |I      |       |       |     4.62
 7.000    1.15    0.00      0.366  O       |I      |       |       |     4.72
 7.083    1.15    0.00      0.374  O       |I      |       |       |     4.82
 7.167    1.15    0.00      0.382  O       |I      |       |       |     4.92
 7.250    1.15    0.00      0.390  O       |I      |       |       |     5.03
 7.333    1.19    0.00      0.398  O       |I      |       |       |     5.13
 7.417    1.24    0.00      0.406  O       | I     |       |       |     5.24
 7.500    1.25    0.00      0.415  O       | I     |       |       |     5.35
 7.583    1.31    0.00      0.423  O       | I     |       |       |     5.46
 7.667    1.36    0.00      0.433  O       |  I    |       |       |     5.58
 7.750    1.37    0.00      0.442  O       |  I    |       |       |     5.70
 7.833    1.42    0.00      0.451  O       |  I    |       |       |     5.83
 7.917    1.47    0.00      0.461  O       |   I   |       |       |     5.95
 8.000    1.48    0.00      0.472  O       |   I   |       |       |     6.09
 8.083    1.58    0.00      0.482  O       |   I   |       |       |     6.22
 8.167    1.68    0.00      0.493  O       |    I  |       |       |     6.37
 8.250    1.71    0.00      0.505  O       |     I |       |       |     6.52
 8.333    1.71    0.00      0.517  O       |     I |       |       |     6.67
 8.417    1.72    0.00      0.529  O       |     I |       |       |     6.82
 8.500    1.72    0.00      0.540  O       |     I |       |       |     6.97
 8.583    1.77    0.00      0.552  O       |     I |       |       |     7.13
 8.667    1.82    0.00      0.565  O       |     I |       |       |     7.29
 8.750    1.83    0.00      0.577  O       |      I|       |       |     7.45
 8.833    1.88    0.00      0.590  O       |      I|       |       |     7.61
 8.917    1.93    0.00      0.603  O       |      I|       |       |     7.78
 9.000    1.94    0.00      0.617  O       |      I|       |       |     7.95
 9.083    2.04    0.19      0.630  |O      |       I       |       |     8.10
 9.167    2.14    0.44      0.642  |  O    |       |I      |       |     8.23
 9.250    2.16    0.66      0.653  |    O  |       |I      |       |     8.35
 9.333    2.22    0.86      0.663  |      O|       | I     |       |     8.45
 9.417    2.27    1.11      0.671  |       |O      | I     |       |     8.55
 9.500    2.28    1.37      0.678  |       |  O    | I     |       |     8.62
 9.583    2.34    1.58      0.684  |       |   O   |  I    |       |     8.68
 9.667    2.39    1.76      0.689  |       |     O |  I    |       |     8.73
 9.750    2.40    1.90      0.693  |       |      O|  I    |       |     8.78
 9.833    2.45    2.02      0.696  |       |       O   I   |       |     8.81
 9.917    2.50    2.12      0.699  |       |       |O  I   |       |     8.84
10.000    2.51    2.21      0.701  |       |       | O I   |       |     8.87
10.083    2.19    2.24      0.702  |       |       |IO     |       |     8.87
10.167    1.83    2.19      0.701  |       |      I|O      |       |     8.86
10.250    1.76    2.10      0.698  |       |     I |O      |       |     8.83
10.333    1.73    2.02      0.696  |       |     I O       |       |     8.81
10.417    1.72    1.95      0.694  |       |     I O       |       |     8.79
```

```
10.500    1.72    1.90      0.693  |       |     IO|       |       |     8.78
10.583    1.95    1.89      0.693  |       |      OI       |       |     8.77
10.667    2.21    1.93      0.694  |       |      O| I     |       |     8.78
10.750    2.26    2.00      0.696  |       |       O I     |       |     8.80
10.833    2.28    2.06      0.697  |       |       O I     |       |     8.82
10.917    2.29    2.11      0.699  |       |       |OI     |       |     8.84
11.000    2.29    2.15      0.700  |       |       |OI     |       |     8.85
11.083    2.24    2.18      0.701  |       |       |OI     |       |     8.86
11.167    2.19    2.19      0.701  |       |       |OI     |       |     8.86
11.250    2.18    2.19      0.701  |       |       |O      |       |     8.86
11.333    2.18    2.18      0.701  |       |       |O      |       |     8.86
11.417    2.18    2.18      0.701  |       |       |O      |       |     8.86
11.500    2.18    2.18      0.701  |       |       |O      |       |     8.86
11.583    2.08    2.17      0.700  |       |       |O      |       |     8.85
11.667    1.98    2.14      0.699  |       |       IO      |       |     8.85
11.750    1.96    2.10      0.698  |       |       IO      |       |     8.83
11.833    2.00    2.07      0.698  |       |       IO      |       |     8.83
11.917    2.04    2.06      0.697  |       |       O       |       |     8.82
12.000    2.06    2.06      0.697  |       |       O       |       |     8.82
12.083    2.39    2.10      0.698  |       |       |O I    |       |     8.83
12.167    2.75    2.20      0.701  |       |       | O   I |       |     8.86
12.250    2.82    2.33      0.705  |       |       |  O   I|       |     8.90
12.333    2.90    2.45      0.708  |       |       |   O  I|       |     8.94
12.417    2.96    2.56      0.711  |       |       |    O  I       |     8.97
12.500    2.97    2.65      0.713  |       |       |    O  I       |     8.99
12.583    3.07    2.71      0.716  |       |       |     O |I      |     9.02
12.667    3.17    2.78      0.718  |       |       |     O | I     |     9.05
12.750    3.19    2.84      0.721  |       |       |      O| I     |     9.08
12.833    3.25    2.90      0.723  |       |       |      O| I     |     9.11
12.917    3.30    2.96      0.726  |       |       |       O  I    |     9.13
13.000    3.32    3.02      0.728  |       |       |       O  I    |     9.16
13.083    3.56    3.09      0.730  |       |       |       |O   I  |     9.19
13.167    3.81    3.18      0.734  |       |       |       | O    I|     9.23
13.250    3.86    3.29      0.738  |       |       |       |  O   I|     9.28
13.333    3.89    3.38      0.742  |       |       |       |  O   I|     9.32
13.417    3.89    3.46      0.745  |       |       |       |   O   I     9.36
13.500    3.89    3.53      0.748  |       |       |       |    O  I     9.39
13.583    3.37    3.55      0.749  |       |       |       |  I O  |     9.40
13.667    2.82    3.48      0.746  |       |       |      I|   O   |     9.36
13.750    2.70    3.36      0.741  |       |       |     I |  O    |     9.31
13.833    2.65    3.25      0.737  |       |       |    I  | O     |     9.26
13.917    2.63    3.15      0.733  |       |       |    I  |O      |     9.22
14.000    2.63    3.07      0.730  |       |       |    I  |O      |     9.18
14.083    2.82    3.02      0.728  |       |       |      IO       |     9.16
14.167    3.03    3.00      0.727  |       |       |       O       |     9.15
14.250    3.07    3.01      0.727  |       |       |       OI      |     9.15
14.333    3.04    3.02      0.728  |       |       |       O       |     9.16
14.417    2.99    3.02      0.728  |       |       |       O       |     9.16
14.500    2.98    3.01      0.728  |       |       |       O       |     9.15
14.583    2.98    3.01      0.727  |       |       |       O       |     9.15
```

```
14.667    2.98    3.00      0.727  |       |       |       O       |     9.15
14.750    2.98    3.00      0.727  |       |       |       O       |     9.15
14.833    2.93    2.99      0.727  |       |       |       O       |     9.14
14.917    2.88    2.98      0.726  |       |       |      IO       |     9.14
15.000    2.87    2.96      0.726  |       |       |      IO       |     9.13
15.083    2.82    2.94      0.725  |       |       |      IO       |     9.12
15.167    2.77    2.92      0.724  |       |       |     IO|       |     9.11
15.250    2.75    2.89      0.723  |       |       |     IO|       |     9.10
15.333    2.70    2.87      0.722  |       |       |     IO|       |     9.09
15.417    2.65    2.84      0.721  |       |       |    I O|       |     9.07
15.500    2.64    2.81      0.719  |       |       |    I O|       |     9.06
15.583    2.45    2.76      0.718  |       |       |   I O |       |     9.04
15.667    2.24    2.70      0.715  |       |       | I   O |       |     9.01
15.750    2.20    2.60      0.712  |       |       | I  O  |       |     8.98
15.833    2.18    2.51      0.710  |       |       |I  O   |       |     8.95
15.917    2.18    2.44      0.708  |       |       |I  O   |       |     8.93
16.000    2.18    2.38      0.706  |       |       |I O    |       |     8.91
16.083    1.47    2.25      0.703  |       |   I   | O     |       |     8.88
16.167    0.71    1.99      0.695  |    I  |       O       |       |     8.80
16.250    0.55    1.69      0.687  |   I   |    O  |       |       |     8.71
16.333    0.48    1.42      0.680  |  I    |  O    |       |       |     8.64
16.417    0.46    1.21      0.674  |  I    |O      |       |       |     8.58
16.500    0.46    1.04      0.670  |  I    O       |       |       |     8.53
16.583    0.41    0.92      0.666  |  I   O|       |       |       |     8.49
16.667    0.36    0.85      0.662  | I    O|       |       |       |     8.45
16.750    0.35    0.79      0.659  | I   O |       |       |       |     8.42
16.833    0.35    0.73      0.656  | I   O |       |       |       |     8.39
16.917    0.34    0.68      0.654  | I  O  |       |       |       |     8.36
17.000    0.34    0.64      0.652  | I  O  |       |       |       |     8.34
17.083    0.44    0.61      0.650  |  IO   |       |       |       |     8.32
17.167    0.54    0.59      0.649  |   O   |       |       |       |     8.31
17.250    0.56    0.59      0.649  |   O   |       |       |       |     8.31
17.333    0.57    0.58      0.649  |   O   |       |       |       |     8.31
17.417    0.57    0.58      0.649  |   O   |       |       |       |     8.31
17.500    0.57    0.58      0.649  |   O   |       |       |       |     8.31
17.583    0.57    0.58      0.649  |   O   |       |       |       |     8.30
17.667    0.57    0.58      0.649  |   O   |       |       |       |     8.30
17.750    0.57    0.58      0.649  |   O   |       |       |       |     8.30
17.833    0.53    0.57      0.648  |   O   |       |       |       |     8.30
17.917    0.47    0.56      0.648  |  IO   |       |       |       |     8.30
18.000    0.46    0.55      0.647  |  IO   |       |       |       |     8.29
18.083    0.46    0.54      0.647  |  IO   |       |       |       |     8.28
18.167    0.46    0.53      0.646  |  IO   |       |       |       |     8.28
18.250    0.46    0.52      0.646  |  IO   |       |       |       |     8.27
18.333    0.46    0.51      0.645  |  IO   |       |       |       |     8.27
18.417    0.46    0.51      0.645  |  IO   |       |       |       |     8.27
18.500    0.46    0.50      0.645  |  IO   |       |       |       |     8.26
18.583    0.41    0.49      0.644  |  IO   |       |       |       |     8.26
18.667    0.36    0.48      0.644  | IO    |       |       |       |     8.25
18.750    0.35    0.46      0.643  | IO    |       |       |       |     8.24
```

```
18.833    0.30    0.44      0.642  | IO    |       |       |       |     8.23
18.917    0.25    0.42      0.641  | IO    |       |       |       |     8.22
19.000    0.24    0.40      0.640  |I O    |       |       |       |     8.21
19.083    0.28    0.38      0.639  | IO    |       |       |       |     8.20
19.167    0.33    0.37      0.638  | IO    |       |       |       |     8.19
19.250    0.34    0.36      0.638  | O     |       |       |       |     8.19
19.333    0.39    0.36      0.638  | OI    |       |       |       |     8.19
19.417    0.44    0.37      0.638  |  O    |       |       |       |     8.19
19.500    0.45    0.38      0.639  |  O    |       |       |       |     8.20
19.583    0.41    0.39      0.639  |  O    |       |       |       |     8.20
19.667    0.36    0.39      0.639  | IO    |       |       |       |     8.20
19.750    0.35    0.38      0.639  | IO    |       |       |       |     8.20
19.833    0.30    0.38      0.639  | IO    |       |       |       |     8.20
19.917    0.25    0.36      0.638  | O     |       |       |       |     8.19
20.000    0.24    0.35      0.637  |IO     |       |       |       |     8.18
20.083    0.28    0.33      0.637  | O     |       |       |       |     8.18
20.167    0.33    0.33      0.636  | O     |       |       |       |     8.17
20.250    0.34    0.33      0.636  | O     |       |       |       |     8.17
20.333    0.34    0.33      0.636  | O     |       |       |       |     8.17
20.417    0.34    0.33      0.636  | O     |       |       |       |     8.17
20.500    0.34    0.33      0.637  | O     |       |       |       |     8.18
20.583    0.34    0.34      0.637  | O     |       |       |       |     8.18
20.667    0.34    0.34      0.637  | O     |       |       |       |     8.18
20.750    0.34    0.34      0.637  | O     |       |       |       |     8.18
20.833    0.30    0.34      0.637  | O     |       |       |       |     8.18
20.917    0.25    0.33      0.636  | O     |       |       |       |     8.17
21.000    0.24    0.32      0.636  |IO     |       |       |       |     8.17
21.083    0.28    0.31      0.635  | O     |       |       |       |     8.16
21.167    0.33    0.31      0.635  | O     |       |       |       |     8.16
21.250    0.34    0.31      0.635  | O     |       |       |       |     8.16
21.333    0.29    0.31      0.635  | O     |       |       |       |     8.16
21.417    0.25    0.31      0.635  | O     |       |       |       |     8.16
21.500    0.24    0.30      0.635  |IO     |       |       |       |     8.16
21.583    0.28    0.29      0.634  | O     |       |       |       |     8.15
21.667    0.33    0.29      0.634  | O     |       |       |       |     8.15
21.750    0.34    0.30      0.635  | O     |       |       |       |     8.16
21.833    0.29    0.30      0.635  | O     |       |       |       |     8.16
21.917    0.25    0.30      0.635  | O     |       |       |       |     8.16
22.000    0.24    0.29      0.634  |IO     |       |       |       |     8.15
22.083    0.28    0.29      0.634  | O     |       |       |       |     8.15
22.167    0.33    0.29      0.634  | O     |       |       |       |     8.15
22.250    0.34    0.29      0.634  | O     |       |       |       |     8.15
22.333    0.29    0.30      0.635  | O     |       |       |       |     8.16
22.417    0.25    0.29      0.634  | O     |       |       |       |     8.15
22.500    0.24    0.29      0.634  |IO     |       |       |       |     8.15
22.583    0.23    0.28      0.634  |IO     |       |       |       |     8.15
22.667    0.23    0.27      0.633  |IO     |       |       |       |     8.14
22.750    0.23    0.27      0.633  |IO     |       |       |       |     8.14
22.833    0.23    0.26      0.633  |IO     |       |       |       |     8.14
22.917    0.23    0.26      0.633  |IO     |       |       |       |     8.14
```

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23.000    0.23    0.25      0.633  |IO     |       |       |       |     8.13
23.083    0.23    0.25      0.632  |IO     |       |       |       |     8.13
23.167    0.23    0.25      0.632  |IO     |       |       |       |     8.13
23.250    0.23    0.25      0.632  |IO     |       |       |       |     8.13
23.333    0.23    0.24      0.632  |IO     |       |       |       |     8.13
23.417    0.23    0.24      0.632  |O      |       |       |       |     8.13
23.500    0.23    0.24      0.632  |O      |       |       |       |     8.13
23.583    0.23    0.24      0.632  |O      |       |       |       |     8.13
23.667    0.23    0.24      0.632  |O      |       |       |       |     8.12
23.750    0.23    0.24      0.632  |O      |       |       |       |     8.12
23.833    0.23    0.24      0.632  |O      |       |       |       |     8.12
23.917    0.23    0.23      0.632  |O      |       |       |       |     8.12
24.000    0.23    0.23      0.632  |O      |       |       |       |     8.12
24.083    0.13    0.23      0.631  |O      |       |       |       |     8.12
24.167    0.03    0.21      0.630  IO      |       |       |       |     8.11
24.250    0.01    0.18      0.629  IO      |       |       |       |     8.10
24.333    0.00    0.16      0.628  IO      |       |       |       |     8.08
24.417    0.00    0.14      0.627  IO      |       |       |       |     8.07
24.500    0.00    0.12      0.626  IO      |       |       |       |     8.06
24.583    0.00    0.11      0.625  O       |       |       |       |     8.06
24.667    0.00    0.09      0.625  O       |       |       |       |     8.05
24.750    0.00    0.08      0.624  O       |       |       |       |     8.04
24.833    0.00    0.07      0.623  O       |       |       |       |     8.04
24.917    0.00    0.06      0.623  O       |       |       |       |     8.03
25.000    0.00    0.05      0.623  O       |       |       |       |     8.03
25.083    0.00    0.05      0.622  O       |       |       |       |     8.02
25.167    0.00    0.04      0.622  O       |       |       |       |     8.02
25.250    0.00    0.03      0.622  O       |       |       |       |     8.02
25.333    0.00    0.03      0.621  O       |       |       |       |     8.02
25.417    0.00    0.03      0.621  O       |       |       |       |     8.01
25.500    0.00    0.02      0.621  O       |       |       |       |     8.01
25.583    0.00    0.02      0.621  O       |       |       |       |     8.01
25.667    0.00    0.02      0.621  O       |       |       |       |     8.01
25.750    0.00    0.02      0.621  O       |       |       |       |     8.01
25.833    0.00    0.01      0.621  O       |       |       |       |     8.01
25.917    0.00    0.01      0.621  O       |       |       |       |     8.01
26.000    0.00    0.01      0.620  O       |       |       |       |     8.00
26.083    0.00    0.01      0.620  O       |       |       |       |     8.00
26.167    0.00    0.01      0.620  O       |       |       |       |     8.00
26.250    0.00    0.01      0.620  O       |       |       |       |     8.00
26.333    0.00    0.01      0.620  O       |       |       |       |     8.00
26.417    0.00    0.00      0.620  O       |       |       |       |     8.00
26.500    0.00    0.00      0.620  O       |       |       |       |     8.00
26.583    0.00    0.00      0.620  O       |       |       |       |     8.00
26.667    0.00    0.00      0.620  O       |       |       |       |     8.00
26.750    0.00    0.00      0.620  O       |       |       |       |     8.00
26.833    0.00    0.00      0.620  O       |       |       |       |     8.00
26.917    0.00    0.00      0.620  O       |       |       |       |     8.00
27.000    0.00    0.00      0.620  O       |       |       |       |     8.00
27.083    0.00    0.00      0.620  O       |       |       |       |     8.00
```

```
27.167    0.00    0.00      0.620  O       |       |       |       |     8.00
27.250    0.00    0.00      0.620  O       |       |       |       |     8.00
27.333    0.00    0.00      0.620  O       |       |       |       |     8.00
27.417    0.00    0.00      0.620  O       |       |       |       |     8.00


       Remaining water in basin =    0.62 (Ac.Ft)


       ****************************HYDROGRAPH DATA****************************
                       Number of intervals =   329
                       Time interval =    5.0 (Min.)
                       Maximum/Peak flow rate =       3.547 (CFS)
                       Total volume =      1.746 (Ac.Ft)
               Status of hydrographs being held in storage
                          Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
               Peak (CFS)      0.000     0.000     0.000     0.000     0.000
               Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
       ***********************************************************************

       --------------------------------------------------------------------
```

```
                     FLOOD HYDROGRAPH ROUTING PROGRAM
            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018
                        Study date: 05/30/22


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


MAPES AND TRUMBLE INDUSTRIAL FACILITY
BASIN ROUTING
POST-DEVELOPMENT CONDITIONS
2-YEAR STORM, DA B
--------------------------------------------------------------------


Program License Serial Number 6443

--------------------------------------------------------------------
********************* HYDROGRAPH INFORMATION **********************

                From study/file name: MapesPost2BUH24.rte
****************************HYDROGRAPH DATA****************************
                Number of intervals =   291
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =       0.179 (CFS)
                Total volume =       0.109 (Ac.Ft)
        Status of hydrographs being held in storage
                   Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
        Peak (CFS)      0.000     0.000     0.000     0.000     0.000
        Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
***********************************************************************




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        0.000 to Point/Station        0.000
**** RETARDING BASIN ROUTING ****
______________________________________________________________________

User entry of depth-outflow-storage data
--------------------------------------------------------------------
Total number of inflow hydrograph intervals = 291
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)
--------------------------------------------------------------------
--------------------------------------------------------------------
Initial basin depth =   0.00 (Ft.)
Initial basin storage =      0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)
```

```
       ---------------------------------------------------------------------
       --------------------------------------------------------------------
       Depth vs. Storage and Depth vs. Discharge data:
        Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
            (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)    (Ac.Ft)
       ---------------------------------------------------------------------
         0.000      0.000      0.000      0.000        0.000
         4.500      0.029      0.001      0.029        0.029
         5.000      0.033      0.950      0.030        0.036
         5.500      0.038      2.670      0.029        0.047
         6.000      0.042      3.780      0.029        0.055
         6.500      0.046      4.630      0.030        0.062
         7.000      0.050      5.350      0.032        0.068
         7.500      0.054      5.980      0.033        0.075
         8.000      0.056      6.550      0.033        0.079
         8.500      0.058      7.070      0.034        0.082
       --------------------------------------------------------------------
                       Hydrograph Detention Basin Routing
       ---------------------------------------------------------------------

       Graph values: 'I'= unit inflow; 'O'=outflow at time shown
       ---------------------------------------------------------------------
 Time   Inflow  Outflow    Storage                                     Depth
(Hours)  (CFS)   (CFS)     (Ac.Ft) .0       0.0    0.09    0.13    0.18 (Ft.)
 0.083    0.01    0.00      0.000  O       |       |       |       |     0.00
 0.167    0.01    0.00      0.000  OI      |       |       |       |     0.01
 0.250    0.01    0.00      0.000  OI      |       |       |       |     0.02
 0.333    0.01    0.00      0.000  O I     |       |       |       |     0.03
 0.417    0.02    0.00      0.000  O I     |       |       |       |     0.05
 0.500    0.02    0.00      0.000  O I     |       |       |       |     0.07
 0.583    0.02    0.00      0.001  O I     |       |       |       |     0.08
 0.667    0.02    0.00      0.001  O I     |       |       |       |     0.10
 0.750    0.02    0.00      0.001  O I     |       |       |       |     0.12
 0.833    0.02    0.00      0.001  O  I    |       |       |       |     0.13
 0.917    0.02    0.00      0.001  O  I    |       |       |       |     0.15
 1.000    0.02    0.00      0.001  O  I    |       |       |       |     0.18
 1.083    0.02    0.00      0.001  O  I    |       |       |       |     0.20
 1.167    0.02    0.00      0.001  O I     |       |       |       |     0.22
 1.250    0.02    0.00      0.002  O I     |       |       |       |     0.23
 1.333    0.02    0.00      0.002  O I     |       |       |       |     0.25
 1.417    0.02    0.00      0.002  O I     |       |       |       |     0.27
 1.500    0.02    0.00      0.002  O I     |       |       |       |     0.28
 1.583    0.02    0.00      0.002  O I     |       |       |       |     0.30
 1.667    0.02    0.00      0.002  O I     |       |       |       |     0.32
 1.750    0.02    0.00      0.002  O I     |       |       |       |     0.33
 1.833    0.02    0.00      0.002  O  I    |       |       |       |     0.35
 1.917    0.02    0.00      0.002  O  I    |       |       |       |     0.37
 2.000    0.02    0.00      0.003  O  I    |       |       |       |     0.39
 2.083    0.02    0.00      0.003  O  I    |       |       |       |     0.42
 2.167    0.02    0.00      0.003  O  I    |       |       |       |     0.44
```

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2.250    0.02    0.00      0.003  O  I    |       |       |       |     0.46
2.333    0.02    0.00      0.003  O  I    |       |       |       |     0.48
2.417    0.02    0.00      0.003  O  I    |       |       |       |     0.51
2.500    0.02    0.00      0.003  O  I    |       |       |       |     0.53
2.583    0.02    0.00      0.004  O   I   |       |       |       |     0.55
2.667    0.03    0.00      0.004  O   I   |       |       |       |     0.58
2.750    0.03    0.00      0.004  O   I   |       |       |       |     0.61
2.833    0.03    0.00      0.004  O   I   |       |       |       |     0.63
2.917    0.03    0.00      0.004  O   I   |       |       |       |     0.66
3.000    0.03    0.00      0.004  O   I   |       |       |       |     0.69
3.083    0.03    0.00      0.005  O   I   |       |       |       |     0.72
3.167    0.03    0.00      0.005  O   I   |       |       |       |     0.75
3.250    0.03    0.00      0.005  O   I   |       |       |       |     0.77
3.333    0.03    0.00      0.005  O   I   |       |       |       |     0.80
3.417    0.03    0.00      0.005  O   I   |       |       |       |     0.83
3.500    0.03    0.00      0.006  O   I   |       |       |       |     0.86
3.583    0.03    0.00      0.006  O   I   |       |       |       |     0.88
3.667    0.03    0.00      0.006  O   I   |       |       |       |     0.91
3.750    0.03    0.00      0.006  O   I   |       |       |       |     0.94
3.833    0.03    0.00      0.006  O    I  |       |       |       |     0.97
3.917    0.03    0.00      0.006  O    I  |       |       |       |     1.00
4.000    0.03    0.00      0.007  O    I  |       |       |       |     1.03
4.083    0.03    0.00      0.007  O    I  |       |       |       |     1.07
4.167    0.03    0.00      0.007  O    I  |       |       |       |     1.10
4.250    0.03    0.00      0.007  O    I  |       |       |       |     1.13
4.333    0.03    0.00      0.008  O     I |       |       |       |     1.17
4.417    0.04    0.00      0.008  O     I |       |       |       |     1.21
4.500    0.04    0.00      0.008  O     I |       |       |       |     1.25
4.583    0.04    0.00      0.008  O     I |       |       |       |     1.28
4.667    0.04    0.00      0.009  O     I |       |       |       |     1.32
4.750    0.04    0.00      0.009  O     I |       |       |       |     1.36
4.833    0.04    0.00      0.009  O      I|       |       |       |     1.40
4.917    0.04    0.00      0.009  O      I|       |       |       |     1.45
5.000    0.04    0.00      0.010  O      I|       |       |       |     1.49
5.083    0.04    0.00      0.010  O     I |       |       |       |     1.53
5.167    0.03    0.00      0.010  O    I  |       |       |       |     1.57
5.250    0.03    0.00      0.010  O    I  |       |       |       |     1.60
5.333    0.03    0.00      0.011  O     I |       |       |       |     1.64
5.417    0.04    0.00      0.011  O     I |       |       |       |     1.67
5.500    0.04    0.00      0.011  O     I |       |       |       |     1.71
5.583    0.04    0.00      0.011  O      I|       |       |       |     1.75
5.667    0.04    0.00      0.012  O      I|       |       |       |     1.80
5.750    0.04    0.00      0.012  O      I|       |       |       |     1.84
5.833    0.04    0.00      0.012  O      I|       |       |       |     1.88
5.917    0.04    0.00      0.012  O      I|       |       |       |     1.93
6.000    0.04    0.00      0.013  O      I|       |       |       |     1.97
6.083    0.04    0.00      0.013  O      I|       |       |       |     2.02
6.167    0.05    0.00      0.013  O       I       |       |       |     2.07
6.250    0.05    0.00      0.014  O       I       |       |       |     2.12
6.333    0.05    0.00      0.014  O       I       |       |       |     2.17
```

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 6.417    0.05    0.00      0.014  O       I       |       |       |     2.22
 6.500    0.05    0.00      0.015  O       I       |       |       |     2.27
 6.583    0.05    0.00      0.015  O       I       |       |       |     2.32
 6.667    0.05    0.00      0.015  O       |I      |       |       |     2.37
 6.750    0.05    0.00      0.016  O       |I      |       |       |     2.43
 6.833    0.05    0.00      0.016  O       |I      |       |       |     2.48
 6.917    0.05    0.00      0.016  O       |I      |       |       |     2.54
 7.000    0.05    0.00      0.017  O       |I      |       |       |     2.59
 7.083    0.05    0.00      0.017  O       |I      |       |       |     2.65
 7.167    0.05    0.00      0.017  O       |I      |       |       |     2.70
 7.250    0.05    0.00      0.018  O       |I      |       |       |     2.76
 7.333    0.06    0.00      0.018  O       |I      |       |       |     2.82
 7.417    0.06    0.00      0.019  O       | I     |       |       |     2.88
 7.500    0.06    0.00      0.019  O       | I     |       |       |     2.94
 7.583    0.06    0.00      0.019  O       | I     |       |       |     3.00
 7.667    0.06    0.00      0.020  O       |  I    |       |       |     3.06
 7.750    0.06    0.00      0.020  O       |  I    |       |       |     3.13
 7.833    0.07    0.00      0.021  O       |  I    |       |       |     3.20
 7.917    0.07    0.00      0.021  O       |   I   |       |       |     3.27
 8.000    0.07    0.00      0.022  O       |   I   |       |       |     3.34
 8.083    0.07    0.00      0.022  O       |    I  |       |       |     3.42
 8.167    0.08    0.00      0.023  O       |    I  |       |       |     3.50
 8.250    0.08    0.00      0.023  O       |     I |       |       |     3.58
 8.333    0.08    0.00      0.024  O       |     I |       |       |     3.66
 8.417    0.08    0.00      0.024  O       |     I |       |       |     3.74
 8.500    0.08    0.00      0.025  O       |     I |       |       |     3.83
 8.583    0.08    0.00      0.025  O       |     I |       |       |     3.91
 8.667    0.08    0.00      0.026  O       |     I |       |       |     4.00
 8.750    0.08    0.00      0.026  O       |      I|       |       |     4.09
 8.833    0.09    0.00      0.027  O       |      I|       |       |     4.18
 8.917    0.09    0.00      0.028  O       |      I|       |       |     4.27
 9.000    0.09    0.00      0.028  O       |      I|       |       |     4.37
 9.083    0.09    0.00      0.029  O       |       I       |       |     4.46
 9.167    0.10    0.06      0.029  |       |O      |I      |       |     4.53
 9.250    0.10    0.09      0.029  |       |       OI      |       |     4.55
 9.333    0.10    0.10      0.029  |       |       |OI     |       |     4.55
 9.417    0.10    0.10      0.029  |       |       | O     |       |     4.55
 9.500    0.10    0.10      0.029  |       |       | O     |       |     4.55
 9.583    0.11    0.11      0.029  |       |       |  O    |       |     4.56
 9.667    0.11    0.11      0.029  |       |       |  O    |       |     4.56
 9.750    0.11    0.11      0.029  |       |       |  O    |       |     4.56
 9.833    0.11    0.11      0.029  |       |       |  OI   |       |     4.56
 9.917    0.12    0.11      0.029  |       |       |   O   |       |     4.56
10.000    0.12    0.12      0.029  |       |       |   O   |       |     4.56
10.083    0.10    0.11      0.029  |       |       |I O    |       |     4.56
10.167    0.08    0.09      0.029  |       |     I O       |       |     4.55
10.250    0.08    0.08      0.029  |       |     O |       |       |     4.54
10.333    0.08    0.08      0.029  |       |     O |       |       |     4.54
10.417    0.08    0.08      0.029  |       |     O |       |       |     4.54
10.500    0.08    0.08      0.029  |       |     O |       |       |     4.54
```

```
10.583    0.09    0.08      0.029  |       |      OI       |       |     4.54
10.667    0.10    0.10      0.029  |       |       |OI     |       |     4.55
10.750    0.10    0.10      0.029  |       |       | O     |       |     4.55
10.833    0.11    0.10      0.029  |       |       | O     |       |     4.55
10.917    0.11    0.10      0.029  |       |       | O     |       |     4.55
11.000    0.11    0.11      0.029  |       |       | O     |       |     4.55
11.083    0.10    0.10      0.029  |       |       | O     |       |     4.55
11.167    0.10    0.10      0.029  |       |       |IO     |       |     4.55
11.250    0.10    0.10      0.029  |       |       |O      |       |     4.55
11.333    0.10    0.10      0.029  |       |       |O      |       |     4.55
11.417    0.10    0.10      0.029  |       |       |O      |       |     4.55
11.500    0.10    0.10      0.029  |       |       |O      |       |     4.55
11.583    0.09    0.10      0.029  |       |       IO      |       |     4.55
11.667    0.09    0.09      0.029  |       |       O       |       |     4.55
11.750    0.09    0.09      0.029  |       |       O       |       |     4.55
11.833    0.09    0.09      0.029  |       |       O       |       |     4.55
11.917    0.09    0.09      0.029  |       |       O       |       |     4.55
12.000    0.09    0.09      0.029  |       |       O       |       |     4.55
12.083    0.11    0.10      0.029  |       |       | O I   |       |     4.55
12.167    0.13    0.12      0.029  |       |       |    OI |       |     4.56
12.250    0.13    0.13      0.030  |       |       |     OI|       |     4.57
12.333    0.13    0.13      0.030  |       |       |      O|       |     4.57
12.417    0.14    0.13      0.030  |       |       |       O       |     4.57
12.500    0.14    0.14      0.030  |       |       |       O       |     4.57
12.583    0.14    0.14      0.030  |       |       |       OI      |     4.57
12.667    0.15    0.14      0.030  |       |       |       |OI     |     4.58
12.750    0.15    0.15      0.030  |       |       |       | O     |     4.58
12.833    0.15    0.15      0.030  |       |       |       | O     |     4.58
12.917    0.15    0.15      0.030  |       |       |       | OI    |     4.58
13.000    0.15    0.15      0.030  |       |       |       |  O    |     4.58
13.083    0.17    0.16      0.030  |       |       |       |   OI  |     4.58
13.167    0.18    0.17      0.030  |       |       |       |     OI|     4.59
13.250    0.18    0.18      0.030  |       |       |       |      O|     4.59
13.333    0.18    0.18      0.030  |       |       |       |      OI     4.59
13.417    0.18    0.18      0.030  |       |       |       |      OI     4.59
13.500    0.18    0.18      0.030  |       |       |       |      OI     4.59
13.583    0.15    0.17      0.030  |       |       |       | I  O  |     4.59
13.667    0.13    0.14      0.030  |       |       |     I |O      |     4.57
13.750    0.12    0.13      0.030  |       |       |    IO |       |     4.57
13.833    0.12    0.12      0.030  |       |       |    O  |       |     4.56
13.917    0.12    0.12      0.030  |       |       |    O  |       |     4.56
14.000    0.12    0.12      0.030  |       |       |    O  |       |     4.56
14.083    0.13    0.13      0.030  |       |       |     OI|       |     4.57
14.167    0.14    0.13      0.030  |       |       |       OI      |     4.57
14.250    0.14    0.14      0.030  |       |       |       |O      |     4.57
14.333    0.14    0.14      0.030  |       |       |       IO      |     4.57
14.417    0.14    0.14      0.030  |       |       |       O       |     4.57
14.500    0.14    0.14      0.030  |       |       |       O       |     4.57
14.583    0.14    0.14      0.030  |       |       |       O       |     4.57
14.667    0.14    0.14      0.030  |       |       |       O       |     4.57
```

```
14.750    0.14    0.14      0.030  |       |       |       O       |     4.57
14.833    0.13    0.14      0.030  |       |       |       O       |     4.57
14.917    0.13    0.13      0.030  |       |       |      O|       |     4.57
15.000    0.13    0.13      0.030  |       |       |      O|       |     4.57
15.083    0.13    0.13      0.030  |       |       |      O|       |     4.57
15.167    0.13    0.13      0.030  |       |       |     O |       |     4.57
15.250    0.13    0.13      0.030  |       |       |     O |       |     4.57
15.333    0.12    0.12      0.030  |       |       |     O |       |     4.57
15.417    0.12    0.12      0.030  |       |       |    O  |       |     4.56
15.500    0.12    0.12      0.030  |       |       |    O  |       |     4.56
15.583    0.11    0.12      0.029  |       |       |  IO   |       |     4.56
15.667    0.10    0.11      0.029  |       |       | IO    |       |     4.56
15.750    0.10    0.10      0.029  |       |       |IO     |       |     4.55
15.833    0.10    0.10      0.029  |       |       |O      |       |     4.55
15.917    0.10    0.10      0.029  |       |       |O      |       |     4.55
16.000    0.10    0.10      0.029  |       |       |O      |       |     4.55
16.083    0.06    0.08      0.029  |       | I   O |       |       |     4.54
16.167    0.03    0.05      0.029  |    I  O       |       |       |     4.53
16.250    0.02    0.03      0.029  |   IO  |       |       |       |     4.51
16.333    0.02    0.02      0.029  |  IO   |       |       |       |     4.51
16.417    0.02    0.02      0.029  |  O    |       |       |       |     4.51
16.500    0.02    0.02      0.029  |  O    |       |       |       |     4.51
16.583    0.02    0.02      0.029  |  O    |       |       |       |     4.51
16.667    0.02    0.02      0.029  | IO    |       |       |       |     4.51
16.750    0.02    0.02      0.029  | O     |       |       |       |     4.51
16.833    0.02    0.02      0.029  | O     |       |       |       |     4.51
16.917    0.02    0.02      0.029  | O     |       |       |       |     4.51
17.000    0.02    0.02      0.029  | O     |       |       |       |     4.51
17.083    0.02    0.02      0.029  |  O    |       |       |       |     4.51
17.167    0.03    0.02      0.029  |   O   |       |       |       |     4.51
17.250    0.03    0.03      0.029  |   O   |       |       |       |     4.51
17.333    0.03    0.03      0.029  |   O   |       |       |       |     4.51
17.417    0.03    0.03      0.029  |   O   |       |       |       |     4.51
17.500    0.03    0.03      0.029  |   O   |       |       |       |     4.51
17.583    0.03    0.03      0.029  |   O   |       |       |       |     4.51
17.667    0.03    0.03      0.029  |   O   |       |       |       |     4.51
17.750    0.03    0.03      0.029  |   O   |       |       |       |     4.51
17.833    0.02    0.03      0.029  |   O   |       |       |       |     4.51
17.917    0.02    0.02      0.029  |  IO   |       |       |       |     4.51
18.000    0.02    0.02      0.029  |  O    |       |       |       |     4.51
18.083    0.02    0.02      0.029  |  O    |       |       |       |     4.51
18.167    0.02    0.02      0.029  |  O    |       |       |       |     4.51
18.250    0.02    0.02      0.029  |  O    |       |       |       |     4.51
18.333    0.02    0.02      0.029  |  O    |       |       |       |     4.51
18.417    0.02    0.02      0.029  |  O    |       |       |       |     4.51
18.500    0.02    0.02      0.029  |  O    |       |       |       |     4.51
18.583    0.02    0.02      0.029  |  O    |       |       |       |     4.51
18.667    0.02    0.02      0.029  | IO    |       |       |       |     4.51
18.750    0.02    0.02      0.029  | O     |       |       |       |     4.51
18.833    0.01    0.01      0.029  | O     |       |       |       |     4.51
```

```
18.917    0.01    0.01      0.029  |IO     |       |       |       |    4.51
19.000    0.01    0.01      0.029  |O      |       |       |       |    4.51
19.083    0.01    0.01      0.029  | O     |       |       |       |    4.51
19.167    0.02    0.01      0.029  | O     |       |       |       |    4.51
19.250    0.02    0.02      0.029  | O     |       |       |       |    4.51
19.333    0.02    0.02      0.029  |  O    |       |       |       |    4.51
19.417    0.02    0.02      0.029  |  O    |       |       |       |    4.51
19.500    0.02    0.02      0.029  |  O    |       |       |       |    4.51
19.583    0.02    0.02      0.029  |  O    |       |       |       |    4.51
19.667    0.02    0.02      0.029  | IO    |       |       |       |    4.51
19.750    0.02    0.02      0.029  | O     |       |       |       |    4.51
19.833    0.01    0.01      0.029  | O     |       |       |       |    4.51
19.917    0.01    0.01      0.029  |IO     |       |       |       |    4.51
20.000    0.01    0.01      0.029  |O      |       |       |       |    4.51
20.083    0.01    0.01      0.029  | O     |       |       |       |    4.51
20.167    0.02    0.01      0.029  | O     |       |       |       |    4.51
20.250    0.02    0.02      0.029  | O     |       |       |       |    4.51
20.333    0.02    0.02      0.029  | O     |       |       |       |    4.51
20.417    0.02    0.02      0.029  | O     |       |       |       |    4.51
20.500    0.02    0.02      0.029  | O     |       |       |       |    4.51
20.583    0.02    0.02      0.029  | O     |       |       |       |    4.51
20.667    0.02    0.02      0.029  | O     |       |       |       |    4.51
20.750    0.02    0.02      0.029  | O     |       |       |       |    4.51
20.833    0.01    0.01      0.029  | O     |       |       |       |    4.51
20.917    0.01    0.01      0.029  |IO     |       |       |       |    4.51
21.000    0.01    0.01      0.029  |O      |       |       |       |    4.51
21.083    0.01    0.01      0.029  | O     |       |       |       |    4.51
21.167    0.02    0.01      0.029  | O     |       |       |       |    4.51
21.250    0.02    0.02      0.029  | O     |       |       |       |    4.51
21.333    0.01    0.01      0.029  | O     |       |       |       |    4.51
21.417    0.01    0.01      0.029  |IO     |       |       |       |    4.51
21.500    0.01    0.01      0.029  |O      |       |       |       |    4.51
21.583    0.01    0.01      0.029  | O     |       |       |       |    4.51
21.667    0.02    0.01      0.029  | O     |       |       |       |    4.51
21.750    0.02    0.02      0.029  | O     |       |       |       |    4.51
21.833    0.01    0.01      0.029  | O     |       |       |       |    4.51
21.917    0.01    0.01      0.029  |IO     |       |       |       |    4.51
22.000    0.01    0.01      0.029  |O      |       |       |       |    4.51
22.083    0.01    0.01      0.029  | O     |       |       |       |    4.51
22.167    0.02    0.01      0.029  | O     |       |       |       |    4.51
22.250    0.02    0.02      0.029  | O     |       |       |       |    4.51
22.333    0.01    0.01      0.029  | O     |       |       |       |    4.51
22.417    0.01    0.01      0.029  |IO     |       |       |       |    4.51
22.500    0.01    0.01      0.029  |O      |       |       |       |    4.51
22.583    0.01    0.01      0.029  |O      |       |       |       |    4.51
22.667    0.01    0.01      0.029  |O      |       |       |       |    4.51
22.750    0.01    0.01      0.029  |O      |       |       |       |    4.51
22.833    0.01    0.01      0.029  |O      |       |       |       |    4.51
22.917    0.01    0.01      0.029  |O      |       |       |       |    4.51
23.000    0.01    0.01      0.029  |O      |       |       |       |    4.51
```

```
23.083    0.01    0.01      0.029  |O       |       |       |       |      4.51
23.167    0.01    0.01      0.029  |O       |       |       |       |      4.51
23.250    0.01    0.01      0.029  |O       |       |       |       |      4.51
23.333    0.01    0.01      0.029  |O       |       |       |       |      4.51
23.417    0.01    0.01      0.029  |O       |       |       |       |      4.51
23.500    0.01    0.01      0.029  |O       |       |       |       |      4.51
23.583    0.01    0.01      0.029  |O       |       |       |       |      4.51
23.667    0.01    0.01      0.029  |O       |       |       |       |      4.51
23.750    0.01    0.01      0.029  |O       |       |       |       |      4.51
23.833    0.01    0.01      0.029  |O       |       |       |       |      4.51
23.917    0.01    0.01      0.029  |O       |       |       |       |      4.51
24.000    0.01    0.01      0.029  |O       |       |       |       |      4.51
24.083    0.01    0.01      0.029  IO       |       |       |       |      4.50
24.167    0.00    0.00      0.029  O        |       |       |       |      4.50
24.250    0.00    0.00      0.029  O        |       |       |       |      4.50
24.333    0.00    0.00      0.029  O        |       |       |       |      4.50


       Remaining water in basin =    0.03 (Ac.Ft)


       ****************************HYDROGRAPH DATA****************************
                      Number of intervals =   292
                      Time interval =    5.0 (Min.)
                      Maximum/Peak flow rate =        0.179 (CFS)
                      Total volume =       0.080 (Ac.Ft)
               Status of hydrographs being held in storage
                         Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
               Peak (CFS)      0.000     0.000     0.000     0.000     0.000
               Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
       ***********************************************************************

       --------------------------------------------------------------------
```

Appendix K.1I

Basin Analysis
100-Year Storm

```
                     FLOOD HYDROGRAPH ROUTING PROGRAM
            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018
                        Study date: 05/30/22


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


MAPES AND TRUMBLE INDUSTRIAL FACILITY
BASIN ROUTING
POST-DEVELOPMENT CONDITIONS
100-YEAR STORM, DA A
--------------------------------------------------------------------


Program License Serial Number 6443

--------------------------------------------------------------------
******************** HYDROGRAPH INFORMATION **********************

                From study/file name: MapesPost100AUH24.rte
****************************HYDROGRAPH DATA***************************
                Number of intervals =   292
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =       12.566 (CFS)
                Total volume =       7.010 (Ac.Ft)
        Status of hydrographs being held in storage
                   Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
        Peak (CFS)      0.000     0.000     0.000     0.000     0.000
        Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
***********************************************************************



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        0.000 to Point/Station        0.000
**** RETARDING BASIN ROUTING ****
______________________________________________________________________

User entry of depth-outflow-storage data
--------------------------------------------------------------------
Total number of inflow hydrograph intervals = 292
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)
--------------------------------------------------------------------
--------------------------------------------------------------------
Initial basin depth =   0.00 (Ft.)
Initial basin storage =      0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)
```

```
       ---------------------------------------------------------------------
       --------------------------------------------------------------------
       Depth vs. Storage and Depth vs. Discharge data:
        Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
            (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)    (Ac.Ft)
       ---------------------------------------------------------------------
         0.000      0.000      0.000      0.000        0.000
         8.000      0.620      0.001      0.620        0.620
         8.500      0.667      0.950      0.664        0.670
         9.000      0.714      2.670      0.705        0.723
         9.500      0.758      3.780      0.745        0.771
        10.000      0.800      6.500      0.778        0.822
        10.500      0.839     12.380      0.796        0.882
        11.000      0.874     20.750      0.803        0.945
        11.500      0.905     30.670      0.799        1.011
        12.000      0.929     40.970      0.788        1.070
        12.500      0.942     49.240      0.772        1.112
       --------------------------------------------------------------------
                       Hydrograph Detention Basin Routing
       ---------------------------------------------------------------------

       Graph values: 'I'= unit inflow; 'O'=outflow at time shown
       ---------------------------------------------------------------------
 Time   Inflow  Outflow    Storage                                     Depth
(Hours)  (CFS)   (CFS)     (Ac.Ft) .0       3.1    6.28    9.42   12.57 (Ft.)
 0.083    0.24    0.00      0.001  O        |       |       |       |    0.01
 0.167    0.50    0.00      0.003  OI       |       |       |       |    0.04
 0.250    0.56    0.00      0.007  OI       |       |       |       |    0.09
 0.333    0.70    0.00      0.011  OI       |       |       |       |    0.15
 0.417    0.84    0.00      0.017  O I      |       |       |       |    0.22
 0.500    0.87    0.00      0.023  O I      |       |       |       |    0.29
 0.583    0.88    0.00      0.029  O I      |       |       |       |    0.37
 0.667    0.89    0.00      0.035  O I      |       |       |       |    0.45
 0.750    0.89    0.00      0.041  O I      |       |       |       |    0.53
 0.833    1.01    0.00      0.047  O I      |       |       |       |    0.61
 0.917    1.14    0.00      0.055  O I      |       |       |       |    0.71
 1.000    1.17    0.00      0.063  O I      |       |       |       |    0.81
 1.083    1.05    0.00      0.070  O I      |       |       |       |    0.91
 1.167    0.93    0.00      0.077  O I      |       |       |       |    1.00
 1.250    0.90    0.00      0.083  O I      |       |       |       |    1.08
 1.333    0.89    0.00      0.090  O I      |       |       |       |    1.16
 1.417    0.89    0.00      0.096  O I      |       |       |       |    1.24
 1.500    0.89    0.00      0.102  O I      |       |       |       |    1.31
 1.583    0.89    0.00      0.108  O I      |       |       |       |    1.39
 1.667    0.89    0.00      0.114  O I      |       |       |       |    1.47
 1.750    0.89    0.00      0.120  O I      |       |       |       |    1.55
 1.833    1.01    0.00      0.127  O I      |       |       |       |    1.63
 1.917    1.14    0.00      0.134  O I      |       |       |       |    1.73
 2.000    1.17    0.00      0.142  O I      |       |       |       |    1.83
 2.083    1.18    0.00      0.150  O I      |       |       |       |    1.94
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2.167    1.18    0.00      0.158  O  I    |       |       |       |     2.04
2.250    1.18    0.00      0.166  O  I    |       |       |       |     2.15
2.333    1.18    0.00      0.174  O  I    |       |       |       |     2.25
2.417    1.18    0.00      0.183  O  I    |       |       |       |     2.36
2.500    1.18    0.00      0.191  O  I    |       |       |       |     2.46
2.583    1.30    0.00      0.199  O  I    |       |       |       |     2.57
2.667    1.43    0.00      0.209  O  I    |       |       |       |     2.69
2.750    1.46    0.00      0.219  O  I    |       |       |       |     2.82
2.833    1.47    0.00      0.229  O  I    |       |       |       |     2.95
2.917    1.48    0.00      0.239  O  I    |       |       |       |     3.08
3.000    1.48    0.00      0.249  O  I    |       |       |       |     3.21
3.083    1.48    0.00      0.259  O  I    |       |       |       |     3.34
3.167    1.48    0.00      0.269  O  I    |       |       |       |     3.48
3.250    1.48    0.00      0.280  O  I    |       |       |       |     3.61
3.333    1.48    0.00      0.290  O  I    |       |       |       |     3.74
3.417    1.48    0.00      0.300  O  I    |       |       |       |     3.87
3.500    1.48    0.00      0.310  O  I    |       |       |       |     4.00
3.583    1.48    0.00      0.320  O  I    |       |       |       |     4.13
3.667    1.48    0.00      0.330  O  I    |       |       |       |     4.26
3.750    1.48    0.00      0.340  O  I    |       |       |       |     4.39
3.833    1.60    0.00      0.351  O   I   |       |       |       |     4.53
3.917    1.73    0.00      0.363  O   I   |       |       |       |     4.68
4.000    1.76    0.00      0.375  O   I   |       |       |       |     4.83
4.083    1.77    0.00      0.387  O   I   |       |       |       |     4.99
4.167    1.77    0.00      0.399  O   I   |       |       |       |     5.15
4.250    1.77    0.00      0.411  O   I   |       |       |       |     5.30
4.333    1.89    0.00      0.424  O   I   |       |       |       |     5.47
4.417    2.02    0.00      0.437  O    I  |       |       |       |     5.64
4.500    2.05    0.00      0.451  O    I  |       |       |       |     5.82
4.583    2.06    0.00      0.465  O    I  |       |       |       |     6.00
4.667    2.07    0.00      0.480  O    I  |       |       |       |     6.19
4.750    2.07    0.00      0.494  O    I  |       |       |       |     6.37
4.833    2.19    0.00      0.508  O    I  |       |       |       |     6.56
4.917    2.32    0.00      0.524  O    I  |       |       |       |     6.76
5.000    2.35    0.00      0.540  O    I  |       |       |       |     6.97
5.083    2.11    0.00      0.555  O    I  |       |       |       |     7.17
5.167    1.86    0.00      0.569  O   I   |       |       |       |     7.34
5.250    1.80    0.00      0.582  O   I   |       |       |       |     7.50
5.333    1.90    0.00      0.594  O   I   |       |       |       |     7.67
5.417    2.02    0.00      0.608  O    I  |       |       |       |     7.84
5.500    2.05    0.04      0.622  O    I  |       |       |       |     8.02
5.583    2.18    0.31      0.635  O    I  |       |       |       |     8.16
5.667    2.32    0.56      0.648  |O   I  |       |       |       |     8.29
5.750    2.35    0.79      0.659  | O  I  |       |       |       |     8.42
5.833    2.36    1.02      0.669  | O   I |       |       |       |     8.52
5.917    2.36    1.32      0.677  |  O  I |       |       |       |     8.61
6.000    2.36    1.56      0.684  |  O  I |       |       |       |     8.68
6.083    2.48    1.75      0.689  |   O I |       |       |       |     8.73
6.167    2.61    1.93      0.694  |   O I |       |       |       |     8.78
6.250    2.64    2.08      0.698  |    OI |       |       |       |     8.83
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 6.333    2.65    2.21      0.701  |    OI |       |       |       |     8.87
 6.417    2.66    2.31      0.704  |    OI |       |       |       |     8.90
 6.500    2.66    2.39      0.706  |     O |       |       |       |     8.92
 6.583    2.79    2.46      0.708  |     OI|       |       |       |     8.94
 6.667    2.93    2.55      0.711  |     OI|       |       |       |     8.97
 6.750    2.96    2.64      0.713  |     OI|       |       |       |     8.99
 6.833    2.98    2.70      0.715  |     OI|       |       |       |     9.01
 6.917    2.99    2.75      0.717  |     OI|       |       |       |     9.03
 7.000    2.99    2.78      0.719  |      O|       |       |       |     9.05
 7.083    2.99    2.82      0.720  |      O|       |       |       |     9.07
 7.167    3.00    2.85      0.721  |      O|       |       |       |     9.08
 7.250    3.00    2.87      0.722  |      O|       |       |       |     9.09
 7.333    3.17    2.90      0.723  |      OI       |       |       |     9.11
 7.417    3.34    2.96      0.725  |      OI       |       |       |     9.13
 7.500    3.38    3.02      0.728  |      OI       |       |       |     9.16
 7.583    3.56    3.10      0.731  |      O|I      |       |       |     9.19
 7.667    3.74    3.18      0.734  |       OI      |       |       |     9.23
 7.750    3.78    3.28      0.738  |       OI      |       |       |     9.27
 7.833    3.96    3.37      0.742  |       O I     |       |       |     9.32
 7.917    4.14    3.48      0.746  |       O I     |       |       |     9.36
 8.000    4.18    3.59      0.750  |       |OI     |       |       |     9.41
 8.083    4.52    3.71      0.755  |       |O I    |       |       |     9.47
 8.167    4.87    3.98      0.761  |       | O I   |       |       |     9.54
 8.250    4.94    4.32      0.766  |       | O I   |       |       |     9.60
 8.333    4.98    4.55      0.770  |       |  OI   |       |       |     9.64
 8.417    4.99    4.71      0.772  |       |  OI   |       |       |     9.67
 8.500    5.00    4.81      0.774  |       |   O   |       |       |     9.69
 8.583    5.16    4.91      0.775  |       |   OI  |       |       |     9.71
 8.667    5.34    5.03      0.777  |       |   OI  |       |       |     9.73
 8.750    5.38    5.15      0.779  |       |    O  |       |       |     9.75
 8.833    5.55    5.27      0.781  |       |    OI |       |       |     9.77
 8.917    5.73    5.40      0.783  |       |    OI |       |       |     9.80
 9.000    5.77    5.53      0.785  |       |     O |       |       |     9.82
 9.083    6.11    5.68      0.787  |       |     OI|       |       |     9.85
 9.167    6.46    5.90      0.791  |       |      OI       |       |     9.89
 9.250    6.54    6.12      0.794  |       |      OI       |       |     9.93
 9.333    6.73    6.31      0.797  |       |       OI      |       |     9.96
 9.417    6.92    6.50      0.800  |       |       OI      |       |    10.00
 9.500    6.96    6.80      0.802  |       |       |O      |       |    10.03
 9.583    7.14    6.97      0.803  |       |       |OI     |       |    10.04
 9.667    7.32    7.15      0.804  |       |       | O     |       |    10.05
 9.750    7.36    7.28      0.805  |       |       | O     |       |    10.07
 9.833    7.54    7.39      0.806  |       |       | OI    |       |    10.08
 9.917    7.72    7.55      0.807  |       |       |  O    |       |    10.09
10.000    7.76    7.68      0.808  |       |       |  O    |       |    10.10
10.083    6.65    7.35      0.806  |       |       I O     |       |    10.07
10.167    5.46    6.48      0.800  |       |    I  O       |       |    10.00
10.250    5.22    6.07      0.793  |       |    I O|       |       |     9.92
10.333    5.12    5.74      0.788  |       |    IO |       |       |     9.86
10.417    5.08    5.51      0.785  |       |   I O |       |       |     9.82
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10.500    5.09    5.35      0.782  |       |   IO  |       |       |     9.79
10.583    5.89    5.40      0.783  |       |    OI |       |       |     9.80
10.667    6.75    5.74      0.788  |       |     O |I      |       |     9.86
10.750    6.93    6.14      0.794  |       |      O|I      |       |     9.93
10.833    7.01    6.44      0.799  |       |       OI      |       |     9.99
10.917    7.04    6.79      0.802  |       |       |O      |       |    10.02
11.000    7.04    6.96      0.803  |       |       |O      |       |    10.04
11.083    6.89    6.96      0.803  |       |       |O      |       |    10.04
11.167    6.72    6.85      0.802  |       |       |O      |       |    10.03
11.250    6.69    6.75      0.802  |       |       |O      |       |    10.02
11.333    6.68    6.70      0.801  |       |       |O      |       |    10.02
11.417    6.67    6.68      0.801  |       |       IO      |       |    10.02
11.500    6.68    6.68      0.801  |       |       |O      |       |    10.02
11.583    6.36    6.57      0.800  |       |       O       |       |    10.01
11.667    6.02    6.40      0.798  |       |      IO       |       |     9.98
11.750    5.95    6.25      0.796  |       |      O|       |       |     9.95
11.833    6.09    6.17      0.795  |       |      O|       |       |     9.94
11.917    6.25    6.17      0.795  |       |      O|       |       |     9.94
12.000    6.29    6.20      0.795  |       |      OI       |       |     9.95
12.083    7.43    6.44      0.799  |       |       O I     |       |     9.99
12.167    8.63    7.48      0.806  |       |       |  O I  |       |    10.08
12.250    8.89    8.36      0.812  |       |       |    OI |       |    10.16
12.333    9.15    8.81      0.815  |       |       |     OI|       |    10.20
12.417    9.37    9.12      0.817  |       |       |      O|       |    10.22
12.500    9.41    9.30      0.819  |       |       |      O|       |    10.24
12.583    9.75    9.49      0.820  |       |       |       O       |    10.25
12.667   10.10    9.78      0.822  |       |       |       OI      |    10.28
12.750   10.17   10.02      0.823  |       |       |       |O      |    10.30
12.833   10.36   10.19      0.824  |       |       |       |OI     |    10.31
12.917   10.55   10.37      0.826  |       |       |       | O     |    10.33
13.000   10.59   10.51      0.827  |       |       |       | O     |    10.34
13.083   11.41   10.84      0.829  |       |       |       |  O I  |    10.37
13.167   12.27   11.52      0.833  |       |       |       |    O I|    10.43
13.250   12.46   12.10      0.837  |       |       |       |     OI|    10.48
13.333   12.53   12.37      0.839  |       |       |       |      O|    10.50
13.417   12.56   12.53      0.840  |       |       |       |      O|    10.51
13.500   12.57   12.56      0.840  |       |       |       |      OI    10.51
13.583   10.81   11.92      0.836  |       |       |       |  I  O |    10.46
13.667    8.93   10.52      0.827  |       |       |     I | O     |    10.34
13.750    8.54    9.30      0.819  |       |       |    I O|       |    10.24
13.833    8.38    8.72      0.815  |       |       |    IO |       |    10.19
13.917    8.32    8.47      0.813  |       |       |    O  |       |    10.17
14.000    8.32    8.37      0.812  |       |       |    O  |       |    10.16
14.083    8.97    8.56      0.814  |       |       |    OI |       |    10.17
14.167    9.65    9.07      0.817  |       |       |      OI       |    10.22
14.250    9.80    9.52      0.820  |       |       |       O       |    10.26
14.333    9.70    9.68      0.821  |       |       |       O       |    10.27
14.417    9.56    9.64      0.821  |       |       |       O       |    10.27
14.500    9.52    9.57      0.820  |       |       |       O       |    10.26
14.583    9.51    9.53      0.820  |       |       |       O       |    10.26
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14.667    9.51    9.52      0.820  |       |       |       O       |    10.26
14.750    9.51    9.51      0.820  |       |       |       O       |    10.26
14.833    9.35    9.46      0.820  |       |       |      IO       |    10.25
14.917    9.19    9.33      0.819  |       |       |      O|       |    10.24
15.000    9.15    9.22      0.818  |       |       |      O|       |    10.23
15.083    8.98    9.12      0.817  |       |       |     IO|       |    10.22
15.167    8.81    8.96      0.816  |       |       |     O |       |    10.21
15.250    8.77    8.85      0.816  |       |       |     O |       |    10.20
15.333    8.60    8.74      0.815  |       |       |    IO |       |    10.19
15.417    8.43    8.59      0.814  |       |       |    O  |       |    10.18
15.500    8.39    8.47      0.813  |       |       |    O  |       |    10.17
15.583    7.74    8.19      0.811  |       |       |  IO   |       |    10.14
15.667    7.06    7.65      0.808  |       |       |I O    |       |    10.10
15.750    6.91    7.20      0.805  |       |       |IO     |       |    10.06
15.833    6.86    6.98      0.803  |       |       |O      |       |    10.04
15.917    6.84    6.89      0.803  |       |       |O      |       |    10.03
16.000    6.84    6.86      0.802  |       |       |O      |       |    10.03
16.083    4.51    6.26      0.796  |       |  I   O|       |       |     9.96
16.167    2.00    5.16      0.779  |    I  |    O  |       |       |     9.75
16.250    1.48    3.91      0.760  |  I    |O      |       |       |     9.52
16.333    1.27    3.43      0.744  |  I    O       |       |       |     9.34
16.417    1.18    3.08      0.730  |  I   O|       |       |       |     9.18
16.500    1.18    2.78      0.718  |  I   O|       |       |       |     9.05
16.583    1.06    2.45      0.708  | I   O |       |       |       |     8.94
16.667    0.93    2.12      0.699  | I  O  |       |       |       |     8.84
16.750    0.90    1.85      0.692  | I O   |       |       |       |     8.76
16.833    0.89    1.64      0.686  | I O   |       |       |       |     8.70
16.917    0.89    1.47      0.681  | IO    |       |       |       |     8.65
17.000    0.89    1.34      0.678  | IO    |       |       |       |     8.61
17.083    1.13    1.26      0.676  | IO    |       |       |       |     8.59
17.167    1.39    1.26      0.676  |  O    |       |       |       |     8.59
17.250    1.45    1.30      0.677  |  O    |       |       |       |     8.60
17.333    1.47    1.33      0.677  |  O    |       |       |       |     8.61
17.417    1.48    1.36      0.678  |  O    |       |       |       |     8.62
17.500    1.48    1.39      0.679  |  O    |       |       |       |     8.63
17.583    1.48    1.41      0.680  |  O    |       |       |       |     8.63
17.667    1.48    1.42      0.680  |  O    |       |       |       |     8.64
17.750    1.48    1.44      0.680  |  O    |       |       |       |     8.64
17.833    1.35    1.43      0.680  |  O    |       |       |       |     8.64
17.917    1.22    1.40      0.679  |  O    |       |       |       |     8.63
18.000    1.20    1.36      0.678  |  O    |       |       |       |     8.62
18.083    1.19    1.32      0.677  |  O    |       |       |       |     8.61
18.167    1.18    1.29      0.676  |  O    |       |       |       |     8.60
18.250    1.18    1.26      0.676  |  O    |       |       |       |     8.59
18.333    1.18    1.25      0.675  |  O    |       |       |       |     8.59
18.417    1.18    1.23      0.675  |  O    |       |       |       |     8.58
18.500    1.18    1.22      0.674  |  O    |       |       |       |     8.58
18.583    1.06    1.20      0.674  | IO    |       |       |       |     8.57
18.667    0.93    1.15      0.673  | O     |       |       |       |     8.56
18.750    0.90    1.10      0.671  | O     |       |       |       |     8.54
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18.833     0.77     1.04      0.669  |IO      |        |        |        |      8.53
18.917     0.63     0.96      0.667  |IO      |        |        |        |      8.50
19.000     0.61     0.91      0.665  |IO      |        |        |        |      8.48
19.083     0.72     0.88      0.664  |IO      |        |        |        |      8.46
19.167     0.84     0.87      0.663  | O      |        |        |        |      8.46
19.250     0.87     0.87      0.663  | O      |        |        |        |      8.46
19.333     1.00     0.88      0.663  | O      |        |        |        |      8.46
19.417     1.14     0.90      0.665  | O      |        |        |        |      8.47
19.500     1.17     0.93      0.666  | O      |        |        |        |      8.49
19.583     1.05     0.96      0.667  | O      |        |        |        |      8.50
19.667     0.93     0.97      0.667  | O      |        |        |        |      8.51
19.750     0.90     0.96      0.667  | O      |        |        |        |      8.50
19.833     0.77     0.94      0.666  |IO      |        |        |        |      8.49
19.917     0.63     0.91      0.665  |IO      |        |        |        |      8.48
20.000     0.61     0.87      0.663  |IO      |        |        |        |      8.46
20.083     0.72     0.84      0.662  |IO      |        |        |        |      8.44
20.167     0.84     0.83      0.661  | O      |        |        |        |      8.44
20.250     0.87     0.84      0.661  | O      |        |        |        |      8.44
20.333     0.88     0.84      0.662  | O      |        |        |        |      8.44
20.417     0.89     0.85      0.662  | O      |        |        |        |      8.45
20.500     0.89     0.85      0.662  | O      |        |        |        |      8.45
20.583     0.89     0.86      0.662  | O      |        |        |        |      8.45
20.667     0.89     0.86      0.663  | O      |        |        |        |      8.45
20.750     0.89     0.86      0.663  | O      |        |        |        |      8.45
20.833     0.76     0.86      0.662  |IO      |        |        |        |      8.45
20.917     0.63     0.84      0.661  |IO      |        |        |        |      8.44
21.000     0.61     0.81      0.660  |IO      |        |        |        |      8.43
21.083     0.72     0.79      0.659  |IO      |        |        |        |      8.42
21.167     0.84     0.79      0.659  | O      |        |        |        |      8.42
21.250     0.87     0.80      0.659  | O      |        |        |        |      8.42
21.333     0.76     0.80      0.660  |IO      |        |        |        |      8.42
21.417     0.63     0.79      0.659  |IO      |        |        |        |      8.41
21.500     0.61     0.76      0.658  |O       |        |        |        |      8.40
21.583     0.72     0.75      0.657  |O       |        |        |        |      8.40
21.667     0.84     0.75      0.657  |OI      |        |        |        |      8.40
21.750     0.87     0.77      0.658  |OI      |        |        |        |      8.40
21.833     0.76     0.77      0.658  |O       |        |        |        |      8.41
21.917     0.63     0.76      0.658  |O       |        |        |        |      8.40
22.000     0.61     0.75      0.657  |O       |        |        |        |      8.39
22.083     0.72     0.73      0.656  |O       |        |        |        |      8.39
22.167     0.84     0.74      0.657  |OI      |        |        |        |      8.39
22.250     0.87     0.76      0.657  |OI      |        |        |        |      8.40
22.333     0.76     0.76      0.658  |O       |        |        |        |      8.40
22.417     0.63     0.75      0.657  |O       |        |        |        |      8.40
22.500     0.61     0.74      0.656  |O       |        |        |        |      8.39
22.583     0.59     0.72      0.656  |O       |        |        |        |      8.38
22.667     0.59     0.70      0.655  |O       |        |        |        |      8.37
22.750     0.59     0.69      0.654  |O       |        |        |        |      8.36
22.833     0.59     0.68      0.653  |O       |        |        |        |      8.36
22.917     0.59     0.66      0.653  |O       |        |        |        |      8.35
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23.000    0.59    0.65     0.652  |O       |       |       |       |      8.34
23.083    0.59    0.65     0.652  |O       |       |       |       |      8.34
23.167    0.59    0.64     0.652  |O       |       |       |       |      8.34
23.250    0.59    0.63     0.651  |O       |       |       |       |      8.33
23.333    0.59    0.63     0.651  |O       |       |       |       |      8.33
23.417    0.59    0.62     0.651  |O       |       |       |       |      8.33
23.500    0.59    0.62     0.651  |O       |       |       |       |      8.33
23.583    0.59    0.61     0.650  |O       |       |       |       |      8.32
23.667    0.59    0.61     0.650  |O       |       |       |       |      8.32
23.750    0.59    0.61     0.650  |O       |       |       |       |      8.32
23.833    0.59    0.61     0.650  |O       |       |       |       |      8.32
23.917    0.59    0.60     0.650  |O       |       |       |       |      8.32
24.000    0.59    0.60     0.650  |O       |       |       |       |      8.32
24.083    0.35    0.59     0.649  IO       |       |       |       |      8.31
24.167    0.09    0.54     0.647  IO       |       |       |       |      8.28
24.250    0.03    0.47     0.643  IO       |       |       |       |      8.25
24.333    0.01    0.42     0.641  IO       |       |       |       |      8.22
24.417    0.00    0.36     0.638  O        |       |       |       |      8.19
24.500    0.00    0.32     0.636  O        |       |       |       |      8.17
24.583    0.00    0.27     0.634  O        |       |       |       |      8.14
24.667    0.00    0.24     0.632  O        |       |       |       |      8.13
24.750    0.00    0.21     0.630  O        |       |       |       |      8.11
24.833    0.00    0.18     0.629  O        |       |       |       |      8.09
24.917    0.00    0.16     0.628  O        |       |       |       |      8.08
25.000    0.00    0.14     0.627  O        |       |       |       |      8.07
25.083    0.00    0.12     0.626  O        |       |       |       |      8.06
25.167    0.00    0.10     0.625  O        |       |       |       |      8.05
25.250    0.00    0.09     0.624  O        |       |       |       |      8.05
25.333    0.00    0.08     0.624  O        |       |       |       |      8.04
25.417    0.00    0.07     0.623  O        |       |       |       |      8.04
25.500    0.00    0.06     0.623  O        |       |       |       |      8.03
25.583    0.00    0.05     0.623  O        |       |       |       |      8.03
25.667    0.00    0.04     0.622  O        |       |       |       |      8.02
25.750    0.00    0.04     0.622  O        |       |       |       |      8.02
25.833    0.00    0.03     0.622  O        |       |       |       |      8.02
25.917    0.00    0.03     0.621  O        |       |       |       |      8.02
26.000    0.00    0.03     0.621  O        |       |       |       |      8.01
26.083    0.00    0.02     0.621  O        |       |       |       |      8.01
26.167    0.00    0.02     0.621  O        |       |       |       |      8.01
26.250    0.00    0.02     0.621  O        |       |       |       |      8.01
26.333    0.00    0.01     0.621  O        |       |       |       |      8.01
26.417    0.00    0.01     0.621  O        |       |       |       |      8.01
26.500    0.00    0.01     0.621  O        |       |       |       |      8.01
26.583    0.00    0.01     0.620  O        |       |       |       |      8.00
26.667    0.00    0.01     0.620  O        |       |       |       |      8.00
26.750    0.00    0.01     0.620  O        |       |       |       |      8.00
26.833    0.00    0.01     0.620  O        |       |       |       |      8.00
26.917    0.00    0.01     0.620  O        |       |       |       |      8.00
27.000    0.00    0.00     0.620  O        |       |       |       |      8.00
27.083    0.00    0.00     0.620  O        |       |       |       |      8.00
```

```
27.167    0.00    0.00      0.620  O       |       |       |       |     8.00
27.250    0.00    0.00      0.620  O       |       |       |       |     8.00
27.333    0.00    0.00      0.620  O       |       |       |       |     8.00
27.417    0.00    0.00      0.620  O       |       |       |       |     8.00
27.500    0.00    0.00      0.620  O       |       |       |       |     8.00
27.583    0.00    0.00      0.620  O       |       |       |       |     8.00
27.667    0.00    0.00      0.620  O       |       |       |       |     8.00
27.750    0.00    0.00      0.620  O       |       |       |       |     8.00
27.833    0.00    0.00      0.620  O       |       |       |       |     8.00
27.917    0.00    0.00      0.620  O       |       |       |       |     8.00
28.000    0.00    0.00      0.620  O       |       |       |       |     8.00

       Remaining water in basin =    0.62 (Ac.Ft)


       ****************************HYDROGRAPH DATA****************************
                       Number of intervals =   336
                       Time interval =    5.0 (Min.)
                       Maximum/Peak flow rate =       12.561 (CFS)
                       Total volume =       6.390 (Ac.Ft)
               Status of hydrographs being held in storage
                          Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
               Peak (CFS)      0.000     0.000     0.000     0.000     0.000
               Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
       ***********************************************************************

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```

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                    FLOOD HYDROGRAPH ROUTING PROGRAM
           Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018
                        Study date: 05/30/22

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


MAPES AND TRUMBLE INDUSTRIAL FACILITY
BASIN ROUTING
POST-DEVELOPMENT CONDITIONS
100-YEAR STORM, DA B
--------------------------------------------------------------------


Program License Serial Number 6443

--------------------------------------------------------------------
********************* HYDROGRAPH INFORMATION **********************

                From study/file name: MapesPost100BUH24.rte
****************************HYDROGRAPH DATA****************************
                Number of intervals =   291
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =       0.628 (CFS)
                Total volume =       0.339 (Ac.Ft)
        Status of hydrographs being held in storage
                   Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
        Peak (CFS)      0.000     0.000     0.000     0.000     0.000
        Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
***********************************************************************



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       0.000 to Point/Station       0.000
**** RETARDING BASIN ROUTING ****
______________________________________________________________________

User entry of depth-outflow-storage data
--------------------------------------------------------------------
Total number of inflow hydrograph intervals = 291
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)
--------------------------------------------------------------------
--------------------------------------------------------------------
Initial basin depth =   0.00 (Ft.)
Initial basin storage =      0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)
```

```
       ---------------------------------------------------------------------
       --------------------------------------------------------------------
       Depth vs. Storage and Depth vs. Discharge data:
        Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
            (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)    (Ac.Ft)
       ---------------------------------------------------------------------
         0.000      0.000      0.000      0.000        0.000
         4.500      0.029      0.001      0.029        0.029
         5.000      0.033      0.950      0.030        0.036
         5.500      0.038      2.670      0.029        0.047
         6.000      0.042      3.780      0.029        0.055
         6.500      0.046      4.630      0.030        0.062
         7.000      0.050      5.350      0.032        0.068
         7.500      0.054      5.980      0.033        0.075
         8.000      0.056      6.550      0.033        0.079
         8.500      0.058      7.070      0.034        0.082
       --------------------------------------------------------------------
                       Hydrograph Detention Basin Routing
       ---------------------------------------------------------------------

       Graph values: 'I'= unit inflow; 'O'=outflow at time shown
       ---------------------------------------------------------------------
 Time   Inflow  Outflow    Storage                                     Depth
(Hours)  (CFS)   (CFS)     (Ac.Ft) .0       0.2    0.31    0.47    0.63 (Ft.)
 0.083    0.01    0.00      0.000  O       |       |       |       |     0.01
 0.167    0.02    0.00      0.000  OI      |       |       |       |     0.03
 0.250    0.03    0.00      0.000  OI      |       |       |       |     0.05
 0.333    0.03    0.00      0.001  OI      |       |       |       |     0.09
 0.417    0.04    0.00      0.001  O I     |       |       |       |     0.13
 0.500    0.04    0.00      0.001  O I     |       |       |       |     0.17
 0.583    0.04    0.00      0.001  O I     |       |       |       |     0.21
 0.667    0.04    0.00      0.002  O I     |       |       |       |     0.25
 0.750    0.04    0.00      0.002  O I     |       |       |       |     0.30
 0.833    0.05    0.00      0.002  O I     |       |       |       |     0.34
 0.917    0.05    0.00      0.003  O I     |       |       |       |     0.40
 1.000    0.05    0.00      0.003  O I     |       |       |       |     0.46
 1.083    0.05    0.00      0.003  O I     |       |       |       |     0.51
 1.167    0.04    0.00      0.004  O I     |       |       |       |     0.56
 1.250    0.04    0.00      0.004  O I     |       |       |       |     0.60
 1.333    0.04    0.00      0.004  O I     |       |       |       |     0.64
 1.417    0.04    0.00      0.004  O I     |       |       |       |     0.69
 1.500    0.04    0.00      0.005  O I     |       |       |       |     0.73
 1.583    0.04    0.00      0.005  O I     |       |       |       |     0.77
 1.667    0.04    0.00      0.005  O I     |       |       |       |     0.82
 1.750    0.04    0.00      0.006  O I     |       |       |       |     0.86
 1.833    0.05    0.00      0.006  O I     |       |       |       |     0.91
 1.917    0.05    0.00      0.006  O I     |       |       |       |     0.96
 2.000    0.05    0.00      0.007  O I     |       |       |       |     1.02
 2.083    0.05    0.00      0.007  O I     |       |       |       |     1.07
 2.167    0.05    0.00      0.007  O I     |       |       |       |     1.13
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2.250    0.05    0.00      0.008  O I     |       |       |       |     1.19
2.333    0.05    0.00      0.008  O I     |       |       |       |     1.25
2.417    0.05    0.00      0.008  O I     |       |       |       |     1.31
2.500    0.05    0.00      0.009  O I     |       |       |       |     1.36
2.583    0.06    0.00      0.009  O  I    |       |       |       |     1.42
2.667    0.07    0.00      0.010  O  I    |       |       |       |     1.49
2.750    0.07    0.00      0.010  O  I    |       |       |       |     1.56
2.833    0.07    0.00      0.011  O  I    |       |       |       |     1.63
2.917    0.07    0.00      0.011  O  I    |       |       |       |     1.71
3.000    0.07    0.00      0.011  O  I    |       |       |       |     1.78
3.083    0.07    0.00      0.012  O  I    |       |       |       |     1.85
3.167    0.07    0.00      0.012  O  I    |       |       |       |     1.92
3.250    0.07    0.00      0.013  O  I    |       |       |       |     1.99
3.333    0.07    0.00      0.013  O  I    |       |       |       |     2.07
3.417    0.07    0.00      0.014  O  I    |       |       |       |     2.14
3.500    0.07    0.00      0.014  O  I    |       |       |       |     2.21
3.583    0.07    0.00      0.015  O  I    |       |       |       |     2.28
3.667    0.07    0.00      0.015  O  I    |       |       |       |     2.35
3.750    0.07    0.00      0.016  O  I    |       |       |       |     2.42
3.833    0.07    0.00      0.016  O  I    |       |       |       |     2.50
3.917    0.08    0.00      0.017  O   I   |       |       |       |     2.58
4.000    0.08    0.00      0.017  O   I   |       |       |       |     2.67
4.083    0.08    0.00      0.018  O   I   |       |       |       |     2.75
4.167    0.08    0.00      0.018  O   I   |       |       |       |     2.84
4.250    0.08    0.00      0.019  O   I   |       |       |       |     2.93
4.333    0.09    0.00      0.019  O   I   |       |       |       |     3.01
4.417    0.09    0.00      0.020  O   I   |       |       |       |     3.11
4.500    0.09    0.00      0.021  O   I   |       |       |       |     3.21
4.583    0.09    0.00      0.021  O   I   |       |       |       |     3.31
4.667    0.09    0.00      0.022  O   I   |       |       |       |     3.41
4.750    0.09    0.00      0.023  O   I   |       |       |       |     3.51
4.833    0.10    0.00      0.023  O    I  |       |       |       |     3.62
4.917    0.11    0.00      0.024  O    I  |       |       |       |     3.73
5.000    0.11    0.00      0.025  O    I  |       |       |       |     3.84
5.083    0.09    0.00      0.025  O   I   |       |       |       |     3.95
5.167    0.08    0.00      0.026  O   I   |       |       |       |     4.04
5.250    0.08    0.00      0.027  O   I   |       |       |       |     4.13
5.333    0.09    0.00      0.027  O   I   |       |       |       |     4.22
5.417    0.09    0.00      0.028  O   I   |       |       |       |     4.32
5.500    0.09    0.00      0.028  O   I   |       |       |       |     4.41
5.583    0.10    0.02      0.029  O    I  |       |       |       |     4.51
5.667    0.11    0.10      0.029  |   OI  |       |       |       |     4.55
5.750    0.11    0.11      0.029  |    O  |       |       |       |     4.56
5.833    0.11    0.11      0.029  |    O  |       |       |       |     4.56
5.917    0.11    0.11      0.029  |    O  |       |       |       |     4.56
6.000    0.11    0.11      0.029  |    O  |       |       |       |     4.56
6.083    0.11    0.11      0.029  |    O  |       |       |       |     4.56
6.167    0.12    0.12      0.029  |    OI |       |       |       |     4.56
6.250    0.12    0.12      0.030  |     O |       |       |       |     4.56
6.333    0.12    0.12      0.030  |     O |       |       |       |     4.56
```

```
 6.417    0.12    0.12      0.030  |     O |       |       |       |     4.56
 6.500    0.12    0.12      0.030  |     O |       |       |       |     4.56
 6.583    0.13    0.12      0.030  |     O |       |       |       |     4.57
 6.667    0.13    0.13      0.030  |     O |       |       |       |     4.57
 6.750    0.14    0.13      0.030  |     O |       |       |       |     4.57
 6.833    0.14    0.14      0.030  |     O |       |       |       |     4.57
 6.917    0.14    0.14      0.030  |     O |       |       |       |     4.57
 7.000    0.14    0.14      0.030  |     O |       |       |       |     4.57
 7.083    0.14    0.14      0.030  |     O |       |       |       |     4.57
 7.167    0.14    0.14      0.030  |     O |       |       |       |     4.57
 7.250    0.14    0.14      0.030  |     O |       |       |       |     4.57
 7.333    0.15    0.14      0.030  |      O|       |       |       |     4.57
 7.417    0.16    0.15      0.030  |      O|       |       |       |     4.58
 7.500    0.16    0.16      0.030  |      O|       |       |       |     4.58
 7.583    0.17    0.16      0.030  |       O       |       |       |     4.58
 7.667    0.18    0.17      0.030  |       O       |       |       |     4.59
 7.750    0.18    0.18      0.030  |       OI      |       |       |     4.59
 7.833    0.19    0.18      0.030  |       |O      |       |       |     4.60
 7.917    0.20    0.19      0.030  |       |O      |       |       |     4.60
 8.000    0.20    0.20      0.030  |       | O     |       |       |     4.60
 8.083    0.22    0.21      0.030  |       | OI    |       |       |     4.61
 8.167    0.23    0.22      0.030  |       |  O    |       |       |     4.62
 8.250    0.24    0.23      0.030  |       |  OI   |       |       |     4.62
 8.333    0.24    0.24      0.030  |       |   O   |       |       |     4.62
 8.417    0.24    0.24      0.030  |       |   O   |       |       |     4.63
 8.500    0.24    0.24      0.030  |       |   O   |       |       |     4.63
 8.583    0.25    0.24      0.030  |       |   O   |       |       |     4.63
 8.667    0.26    0.25      0.030  |       |   OI  |       |       |     4.63
 8.750    0.26    0.26      0.030  |       |    O  |       |       |     4.64
 8.833    0.27    0.26      0.030  |       |    O  |       |       |     4.64
 8.917    0.28    0.27      0.030  |       |    OI |       |       |     4.64
 9.000    0.28    0.28      0.030  |       |     O |       |       |     4.65
 9.083    0.30    0.29      0.030  |       |     OI|       |       |     4.65
 9.167    0.32    0.31      0.030  |       |      OI       |       |     4.66
 9.250    0.32    0.32      0.030  |       |       O       |       |     4.67
 9.333    0.33    0.32      0.030  |       |       O       |       |     4.67
 9.417    0.34    0.33      0.030  |       |       OI      |       |     4.68
 9.500    0.34    0.34      0.030  |       |       |O      |       |     4.68
 9.583    0.35    0.35      0.030  |       |       |O      |       |     4.68
 9.667    0.36    0.35      0.030  |       |       | O     |       |     4.69
 9.750    0.36    0.36      0.031  |       |       | O     |       |     4.69
 9.833    0.37    0.37      0.031  |       |       | O     |       |     4.69
 9.917    0.38    0.37      0.031  |       |       |  O    |       |     4.70
10.000    0.38    0.38      0.031  |       |       |  O    |       |     4.70
10.083    0.31    0.35      0.030  |       |      I|O      |       |     4.68
10.167    0.26    0.29      0.030  |       |    IO |       |       |     4.65
10.250    0.25    0.26      0.030  |       |   IO  |       |       |     4.63
10.333    0.25    0.25      0.030  |       |   O   |       |       |     4.63
10.417    0.25    0.25      0.030  |       |   O   |       |       |     4.63
10.500    0.25    0.25      0.030  |       |   O   |       |       |     4.63
```

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10.583    0.29    0.27      0.030  |       |    O I|       |       |     4.64
10.667    0.33    0.31      0.030  |       |      O|I      |       |     4.66
10.750    0.34    0.34      0.030  |       |       |O      |       |     4.68
10.833    0.35    0.34      0.030  |       |       |O      |       |     4.68
10.917    0.35    0.34      0.030  |       |       |O      |       |     4.68
11.000    0.35    0.35      0.030  |       |       |O      |       |     4.68
11.083    0.34    0.34      0.030  |       |       |O      |       |     4.68
11.167    0.33    0.33      0.030  |       |       O       |       |     4.67
11.250    0.33    0.33      0.030  |       |       O       |       |     4.67
11.333    0.33    0.33      0.030  |       |       O       |       |     4.67
11.417    0.33    0.33      0.030  |       |       O       |       |     4.67
11.500    0.33    0.33      0.030  |       |       O       |       |     4.67
11.583    0.31    0.32      0.030  |       |      IO       |       |     4.67
11.667    0.29    0.30      0.030  |       |     IO|       |       |     4.66
11.750    0.29    0.29      0.030  |       |     O |       |       |     4.65
11.833    0.30    0.29      0.030  |       |     OI|       |       |     4.65
11.917    0.31    0.30      0.030  |       |      O|       |       |     4.66
12.000    0.31    0.31      0.030  |       |      O|       |       |     4.66
12.083    0.38    0.34      0.030  |       |       |O I    |       |     4.68
12.167    0.43    0.40      0.031  |       |       |   O I |       |     4.71
12.250    0.44    0.43      0.031  |       |       |     O |       |     4.73
12.333    0.46    0.45      0.031  |       |       |     OI|       |     4.74
12.417    0.47    0.46      0.031  |       |       |      O|       |     4.74
12.500    0.47    0.47      0.031  |       |       |      O|       |     4.74
12.583    0.49    0.48      0.031  |       |       |       O       |     4.75
12.667    0.50    0.49      0.031  |       |       |       |O      |     4.76
12.750    0.51    0.50      0.031  |       |       |       |O      |     4.77
12.833    0.52    0.51      0.031  |       |       |       | O     |     4.77
12.917    0.53    0.52      0.031  |       |       |       | O     |     4.77
13.000    0.53    0.53      0.031  |       |       |       | O     |     4.78
13.083    0.58    0.55      0.031  |       |       |       |   OI  |     4.79
13.167    0.62    0.59      0.031  |       |       |       |     OI|     4.81
13.250    0.63    0.62      0.032  |       |       |       |      O|     4.83
13.333    0.63    0.63      0.032  |       |       |       |      O|     4.83
13.417    0.63    0.63      0.032  |       |       |       |      O|     4.83
13.500    0.63    0.63      0.032  |       |       |       |      OI     4.83
13.583    0.52    0.58      0.031  |       |       |       | I  O  |     4.81
13.667    0.43    0.49      0.031  |       |       |     I O       |     4.76
13.750    0.42    0.43      0.031  |       |       |    O  |       |     4.73
13.833    0.41    0.42      0.031  |       |       |    O  |       |     4.72
13.917    0.41    0.41      0.031  |       |       |    O  |       |     4.72
14.000    0.41    0.41      0.031  |       |       |    O  |       |     4.72
14.083    0.45    0.43      0.031  |       |       |    O I|       |     4.73
14.167    0.48    0.46      0.031  |       |       |      OI       |     4.74
14.250    0.49    0.48      0.031  |       |       |       O       |     4.75
14.333    0.48    0.49      0.031  |       |       |       O       |     4.76
14.417    0.47    0.48      0.031  |       |       |       O       |     4.75
14.500    0.47    0.47      0.031  |       |       |       O       |     4.75
14.583    0.47    0.47      0.031  |       |       |       O       |     4.75
14.667    0.47    0.47      0.031  |       |       |       O       |     4.75
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14.750    0.47    0.47      0.031  |       |       |       O       |     4.75
14.833    0.46    0.47      0.031  |       |       |      O|       |     4.75
14.917    0.46    0.46      0.031  |       |       |      O|       |     4.74
15.000    0.45    0.46      0.031  |       |       |      O|       |     4.74
15.083    0.44    0.45      0.031  |       |       |     O |       |     4.74
15.167    0.44    0.44      0.031  |       |       |     O |       |     4.73
15.250    0.44    0.44      0.031  |       |       |     O |       |     4.73
15.333    0.43    0.43      0.031  |       |       |    O  |       |     4.73
15.417    0.42    0.42      0.031  |       |       |    O  |       |     4.72
15.500    0.42    0.42      0.031  |       |       |    O  |       |     4.72
15.583    0.38    0.40      0.031  |       |       |  IO   |       |     4.71
15.667    0.35    0.37      0.031  |       |       |IO     |       |     4.69
15.750    0.34    0.34      0.030  |       |       |O      |       |     4.68
15.833    0.34    0.34      0.030  |       |       |O      |       |     4.68
15.917    0.34    0.34      0.030  |       |       |O      |       |     4.68
16.000    0.34    0.34      0.030  |       |       |O      |       |     4.68
16.083    0.20    0.28      0.030  |       | I   O |       |       |     4.64
16.167    0.08    0.15      0.030  |   I  O|       |       |       |     4.58
16.250    0.06    0.08      0.029  |  IO   |       |       |       |     4.54
16.333    0.05    0.06      0.029  | IO    |       |       |       |     4.53
16.417    0.05    0.05      0.029  | O     |       |       |       |     4.53
16.500    0.05    0.05      0.029  | O     |       |       |       |     4.53
16.583    0.05    0.05      0.029  | O     |       |       |       |     4.53
16.667    0.04    0.05      0.029  | O     |       |       |       |     4.52
16.750    0.04    0.04      0.029  | O     |       |       |       |     4.52
16.833    0.04    0.04      0.029  | O     |       |       |       |     4.52
16.917    0.04    0.04      0.029  | O     |       |       |       |     4.52
17.000    0.04    0.04      0.029  | O     |       |       |       |     4.52
17.083    0.05    0.05      0.029  | O     |       |       |       |     4.52
17.167    0.07    0.06      0.029  | OI    |       |       |       |     4.53
17.250    0.07    0.07      0.029  |  O    |       |       |       |     4.53
17.333    0.07    0.07      0.029  |  O    |       |       |       |     4.53
17.417    0.07    0.07      0.029  |  O    |       |       |       |     4.54
17.500    0.07    0.07      0.029  |  O    |       |       |       |     4.54
17.583    0.07    0.07      0.029  |  O    |       |       |       |     4.54
17.667    0.07    0.07      0.029  |  O    |       |       |       |     4.54
17.750    0.07    0.07      0.029  |  O    |       |       |       |     4.54
17.833    0.06    0.06      0.029  |  O    |       |       |       |     4.53
17.917    0.06    0.06      0.029  | O     |       |       |       |     4.53
18.000    0.05    0.06      0.029  | O     |       |       |       |     4.53
18.083    0.05    0.05      0.029  | O     |       |       |       |     4.53
18.167    0.05    0.05      0.029  | O     |       |       |       |     4.53
18.250    0.05    0.05      0.029  | O     |       |       |       |     4.53
18.333    0.05    0.05      0.029  | O     |       |       |       |     4.53
18.417    0.05    0.05      0.029  | O     |       |       |       |     4.53
18.500    0.05    0.05      0.029  | O     |       |       |       |     4.53
18.583    0.05    0.05      0.029  | O     |       |       |       |     4.53
18.667    0.04    0.05      0.029  | O     |       |       |       |     4.52
18.750    0.04    0.04      0.029  | O     |       |       |       |     4.52
18.833    0.03    0.04      0.029  |O      |       |       |       |     4.52
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18.917    0.03    0.03      0.029   |O      |       |       |       |     4.52
19.000    0.03    0.03      0.029   |O      |       |       |       |     4.51
19.083    0.03    0.03      0.029   |O      |       |       |       |     4.52
19.167    0.04    0.04      0.029   |OI     |       |       |       |     4.52
19.250    0.04    0.04      0.029   | O     |       |       |       |     4.52
19.333    0.05    0.04      0.029   | O     |       |       |       |     4.52
19.417    0.05    0.05      0.029   | O     |       |       |       |     4.53
19.500    0.05    0.05      0.029   | O     |       |       |       |     4.53
19.583    0.05    0.05      0.029   | O     |       |       |       |     4.53
19.667    0.04    0.05      0.029   | O     |       |       |       |     4.52
19.750    0.04    0.04      0.029   | O     |       |       |       |     4.52
19.833    0.03    0.04      0.029   |O      |       |       |       |     4.52
19.917    0.03    0.03      0.029   |O      |       |       |       |     4.52
20.000    0.03    0.03      0.029   |O      |       |       |       |     4.51
20.083    0.03    0.03      0.029   |O      |       |       |       |     4.52
20.167    0.04    0.04      0.029   |OI     |       |       |       |     4.52
20.250    0.04    0.04      0.029   | O     |       |       |       |     4.52
20.333    0.04    0.04      0.029   | O     |       |       |       |     4.52
20.417    0.04    0.04      0.029   | O     |       |       |       |     4.52
20.500    0.04    0.04      0.029   | O     |       |       |       |     4.52
20.583    0.04    0.04      0.029   | O     |       |       |       |     4.52
20.667    0.04    0.04      0.029   | O     |       |       |       |     4.52
20.750    0.04    0.04      0.029   | O     |       |       |       |     4.52
20.833    0.03    0.04      0.029   |O      |       |       |       |     4.52
20.917    0.03    0.03      0.029   |O      |       |       |       |     4.52
21.000    0.03    0.03      0.029   |O      |       |       |       |     4.51
21.083    0.03    0.03      0.029   |O      |       |       |       |     4.52
21.167    0.04    0.04      0.029   |OI     |       |       |       |     4.52
21.250    0.04    0.04      0.029   | O     |       |       |       |     4.52
21.333    0.03    0.04      0.029   |O      |       |       |       |     4.52
21.417    0.03    0.03      0.029   |O      |       |       |       |     4.52
21.500    0.03    0.03      0.029   |O      |       |       |       |     4.51
21.583    0.03    0.03      0.029   |O      |       |       |       |     4.52
21.667    0.04    0.04      0.029   |OI     |       |       |       |     4.52
21.750    0.04    0.04      0.029   | O     |       |       |       |     4.52
21.833    0.03    0.04      0.029   |O      |       |       |       |     4.52
21.917    0.03    0.03      0.029   |O      |       |       |       |     4.52
22.000    0.03    0.03      0.029   |O      |       |       |       |     4.51
22.083    0.03    0.03      0.029   |O      |       |       |       |     4.52
22.167    0.04    0.04      0.029   |OI     |       |       |       |     4.52
22.250    0.04    0.04      0.029   | O     |       |       |       |     4.52
22.333    0.03    0.04      0.029   |O      |       |       |       |     4.52
22.417    0.03    0.03      0.029   |O      |       |       |       |     4.52
22.500    0.03    0.03      0.029   |O      |       |       |       |     4.51
22.583    0.03    0.03      0.029   |O      |       |       |       |     4.51
22.667    0.03    0.03      0.029   |O      |       |       |       |     4.51
22.750    0.03    0.03      0.029   |O      |       |       |       |     4.51
22.833    0.03    0.03      0.029   |O      |       |       |       |     4.51
22.917    0.03    0.03      0.029   |O      |       |       |       |     4.51
23.000    0.03    0.03      0.029   |O      |       |       |       |     4.51
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23.083    0.03    0.03      0.029  |O       |       |       |       |      4.51
23.167    0.03    0.03      0.029  |O       |       |       |       |      4.51
23.250    0.03    0.03      0.029  |O       |       |       |       |      4.51
23.333    0.03    0.03      0.029  |O       |       |       |       |      4.51
23.417    0.03    0.03      0.029  |O       |       |       |       |      4.51
23.500    0.03    0.03      0.029  |O       |       |       |       |      4.51
23.583    0.03    0.03      0.029  |O       |       |       |       |      4.51
23.667    0.03    0.03      0.029  |O       |       |       |       |      4.51
23.750    0.03    0.03      0.029  |O       |       |       |       |      4.51
23.833    0.03    0.03      0.029  |O       |       |       |       |      4.51
23.917    0.03    0.03      0.029  |O       |       |       |       |      4.51
24.000    0.03    0.03      0.029  |O       |       |       |       |      4.51
24.083    0.01    0.02      0.029  IO       |       |       |       |      4.51
24.167    0.00    0.01      0.029  O        |       |       |       |      4.50
24.250    0.00    0.00      0.029  O        |       |       |       |      4.50
24.333    0.00    0.00      0.029  O        |       |       |       |      4.50


       Remaining water in basin =    0.03 (Ac.Ft)


       ****************************HYDROGRAPH DATA****************************
                       Number of intervals =   292
                       Time interval =    5.0 (Min.)
                       Maximum/Peak flow rate =        0.628 (CFS)
                       Total volume =       0.310 (Ac.Ft)
               Status of hydrographs being held in storage
                          Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
               Peak (CFS)      0.000     0.000     0.000     0.000     0.000
               Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
       ***********************************************************************

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Appendix L

Sizing Calculations
(To be prepared in Final Engineering)