WARE MALCOMB

architecture | planning | interiors | branding | civil

PRELIMINARY HYDROLOGY AND HYDRAULICS STUDY

FOR:
Ares Spec Industrial
Murrieta Rd. & Ethanac Rd.
Menifee, CA 92374

Prepared for:
IPT Menifee CC, LLC, A Delaware Limited Liability Company
4675 MacArthur Court, Suite 625
Newport Beach, CA 92660

Project No: IRV22-0086

Prepared by: _____ 09-13-2023

Signature Date

Engineer: Lucas Corsbie, RCE No. 72588

Ware Malcomb
10 Edelman
Irvine, CA 92618
Phone: (949) 660-9128

Prepare Date: May 27th, 2022
Revised: March 3rd, 2023
June 30th, 2023
September 13th, 2023

Table of Contents

I. Introduction

i. Background

The purpose of this Hydrology and Hydraulics study is to quantify the pre-and-post-project drainage conditions and support the grading and storm drain design of the project site by confirming post-developed runoff does not exceed pre-developed peak flows, and ensuring that there will be no negative impacts to surrounding and downstream properties. The subject site is located on vacant land between Geary Street and Murrieta Road, north of McLaughlin Road and south of Floyd Avenue in the City of Menifee, CA 92585. The site consists of Parcels 1 through 4 (APN 330-210-010, 330-210-011, 330-210-013, 330-210-062, 330-560-001 through 040, 330-570-001 through 033, and 330-571-001 through 005), totaling an area of approximately 26.579 acres after several right-of-way dedications to Geary Street to the west, a new southern truck corridor to the south, and Murrieta Road to the east. The site is bound to the north and south by neighboring properties, to the west by Geary Street, and to the east by Murrieta Road. Refer to the vicinity map in Appendix "A."

The project will be disturbing approximately 26.579 acres of currently vacant, barren land. A small portion of the land is currently comprised of several small impervious structures, which will be demolished in the proposed condition. The proposed project includes demolition/clearing and grubbing of existing barren land and structures to construct a new industrial warehouse building, appurtenant parking and loading areas, private storm drain improvements, and BMPs for stormwater pollutant control and mitigation of increases in runoff. The proposed hydrology will mimic the existing hydrology to the maximum extent practicable. Runoff from the site will ultimately be conveyed via a proposed gutter system to an underground storm drain pipe network. Runoff will be conveyed by the underground storm drain pipe network into an underground storage chamber system located beneath the northern trailer parking lot on-site. For preliminary design purposes, the underground storage chamber system has been sized to detain the increase in runoff volume in the proposed condition for the 5-year 24-hour storm event, which was the largest deficit following a hydrologic analysis of the site. In the final design, the underground storage chamber system will feature a metered release outlet to mitigate all design storm event variations per City of Menifee requirements. Runoff will then be discharged to two modular wetland linear systems located near the northeastern corner of the site, where it will be treated for water quality purposes. Finally, following treatment, runoff will be discharged out to a proposed storm drain main – Line A-12 – located in Murrieta Road. Eventually, runoff will be discharged into the San Jacinto River, Reach 3 from the proposed storm drain main Line A-12.

Per the Santa Ana River Watershed Technical Guidance Document, the site will require a fully executed WQMP during the plan check process.

II. Site Discussion & Methodology

i. Site Information and Properties

The existing site is located within the Santa Ana River Watershed, with runoff from the existing site traveling via overland flow into the public storm drain network – a series of road adjacent ditches to convey stormwater runoff – and eventually discharging into the San Jacinto River. The majority of the site is vacant and barren, with minimal vegetative cover and minimal impervious surfaces in the existing condition. Per the Riverside County Hydrology Manual, the site is composed of soils belonging to Hydrologic Soil Group (HSG) D according to the Romoland Map, which can be found in Appendix "B".

The site is relatively flat, with elevations ranging from just over 1442 feet in the southwestern corner of the site to just under 1421 feet in the northeastern corner of the site. The site naturally drains to the northeast, with slopes generally ranging from 1% to 3% throughout.

Three infiltration tests were performed on site at depths ranging from 6 feet to 10 feet. The infiltration testing was performed by Southern California Geotechnical Inc. Infiltration was determined to be infeasible for this site following an analysis of the results of the three infiltration tests that were performed. The Geotechnical Investigation Report can be found in Appendix "I".

The project development is a single development and is not part of a larger phased development.

In the proposed condition, the site will feature a 510,801 SF industrial warehouse building in the center of the site, with loading docks along its northern and southern faces, and access routes surrounding the building. Trailer spaces are proposed across from the northern and southern faces of the building, while parking spaces are proposed around the remainder of the building's perimeter. Two access driveways will be provided from Geary Street at the northwestern and southwestern corners of the site, with three additional access driveways provided from Murrieta Road along the eastern border of the site. The site is approximately 87.76% impervious surfaces and 12.24% pervious surfaces.

ii. Design Standards

The City of Menifee's "Interim Criteria for Sizing Increased Runoff Detention Facilities" was used to determine the preliminary design criteria for the proposed drainage design, and it was used as a guide for the hydrologic analyses that were performed as part of this study. The Riverside County Hydrology Manual was used as a guide for the design of drainage facilities and to establish criteria for flood protection levels within this project.

iii. Hydrology Software

The CivilCADD/Civil Design (CivilD) Engineering Software was used for the Unit Hydrograph Method Analysis hydrology calculations. The Unit Hydrograph Method Analysis was utilized to determine peak flows and volumes for the 2-year, 5-year, and 10-year storm event frequencies for the 1-hour, 3-hour, 6-hour, and 24-hour storm durations.

iv. Hydraulics Software

The Bentley Systems FlowMaster Hydraulic Calculator was used as a tool to preliminarily size the proposed storm drain pipe network to handle the 100-year storm event flows. In the final design, Bentley Systems FlowMaster Hydraulic Calculator will be used for inlet sizing calculations, while pipe hydraulic calculations will be performed using WSPG Hydraulic Analysis Model.

III. Hydrologic Analysis

i. Existing Condition

The existing project site mostly consists of undeveloped barren land with minimal vegetation. There are minimal impervious surfaces within the project limits in the existing condition. Stormwater from the site sheet flows northeasterly from the southwestern corner and eventually flows off site into the existing roadside drainage ditch along Murrieta Road. Runoff finally drains into an open channel north of the site, down Murrieta Road, and discharges into the San Jacinto River. The existing outfall is located at the northeastern corner of the site, where stormwater drains to via overland flow. In the existing condition, there is one drainage area: DA 1. DA 1 encompasses the entire site area in the proposed condition, taking into account the proposed right-of-way dedications to Geary Street to the west, a new southern truck corridor to the south, and Murrieta Road to the east. It largely consists of undeveloped barren areas that will be cleared and grubbed in the proposed condition. The total resulting study area is 26.579 acres.

Off-site runoff drains out into Geary Street and Murrieta Road, ultimately discharging into the same storm sewer network as on-site flow due to the existing topography of the region. The Existing Hydrology Exhibit can be found in Appendix "D".

ii. Proposed Condition

The proposed condition also has one drainage area: DA 1, which encompasses the same area as the existing condition DA 1, a total study area of 26.579 acres. DA 1 includes all of the on-site runoff that will be collected, conveyed, and treated by the proposed stormwater network on-site. Runoff from DA 1 flows into a proposed gutter system throughout the site, which channelizes the flow and conveys it into several catch basins located throughout the site. From the catch basins, runoff is conveyed by a proposed underground storm drain pipe network, which eventually discharges all of the on-site runoff into a proposed underground storage chamber system located beneath the northern trailer parking lot on-site. The proposed underground storage chamber system is an ADS MC-7200 StormTech Chamber System, and it was preliminarily sized to detain the increase in runoff volume in the proposed condition for the 5-year, 24-hour storm event. The increase in runoff from this storm event was determined to be the greatest deficit out of all the storm events that were studied, so the chamber system was sized accordingly to detain and store this volume, prior to discharging it for biotreatment by the proposed modular wetland linear systems located at the northeastern corner of the site, which are two Contech MWS Linear units – MWS-L-8-20-V. The modular wetland linear systems will treat all on-site runoff for water quality purposes. After being treated for pollutants, runoff will be discharged out to a proposed storm drain main – Line A-12 – located in Murrieta Road. Eventually, runoff will be discharged into the San Jacinto River, Reach 3 from the proposed storm drain main Line A-12. The underground storage chamber system serves as an upstream detention basin for all on-site runoff prior to biotreatment for water quality purposes, and mitigates for HCOCs while also storing the increase in the total runoff volume from the proposed development.

Off-site runoff will flow into the proposed off-site curb and gutter systems along Geary Street, the southern truck corridor, and Murrieta Road. In the interim condition, runoff from Geary Street will drain northerly into temporary rip-rap before dispersing into existing drainage patterns. Runoff from the southern truck corridor will drain easterly to a cross-gutter. From there, runoff will drain northerly along Murrieta Road to another off-site Contech MWS Linear unit – MWS-L-8-24-V – which intercepts low flows for water quality treatment purposes. Treated runoff will be discharged to the proposed storm drain main Line A-12 along with all on-site flow, while high flows will bypass the modular wetland linear system to an off-site curb inlet and subsequently discharge to Line A-12, as well. Any bypass flows will continue northerly into rip-rap before entering the existing roadside drainage ditch along Murrieta Road. More information regarding off-site flow can be found in the Preliminary WQMP. The Proposed Hydrology Exhibit can be found in Appendix "E".

iii. Unit Hydrograph Analysis

In the existing and proposed conditions, there is one drainage area – DA 1. The Unit Hydrograph Method of Riverside County was used via Civil Design Hydrologic software to calculate the peak flow rates and total runoff volumes. The variables taken into consideration in the computation include the 2-year and 100-year storm event rainfall depths for the 1-hour, 3-hour, 6-hour, and 24-hour storm durations, Antecedent Moisture Condition (AMC), Runoff Index (RI), soil type, loss rates, and land use conditions characteristics of flow conveyance.

Flow rates and volumes were determined for existing and proposed conditions for the 2-year, 5-year, and 10-year storm event frequencies for the 1-hour, 3-hour, 6-hour, and 24-hour storm durations. The site will be designed in such a way that the discharge from the site under the proposed conditions will be equal to or less than the existing conditions. In the preliminary design, the underground storage chamber

system will be used for detention of the increase in runoff from the 5-year 24-hour storm event in the proposed condition. Detention of the on-site runoff upstream of the modular wetland linear systems allows for progressive discharge of flow for water quality treatment. The modular wetland linear systems also feature internal weir structures which allow for bypass of runoff during high-flow storm events for the purpose of flood and clog prevention. The underground storage chamber system's size was determined by analyzing the flow rates and total runoff volumes from the storm events and durations that were calculated in the hydrologic analysis.

Rainfall depth data was obtained from the Riverside County Hydrology Manual Isohyetal Maps for the 2-year and 100-year storm events. Isohyetals identified in Plates D-4.3, D-4.4, and E-5.1 through E-5.6 were used to identify rainfall depths associated with 1-hour, 3-hour, 6-hour, and 24-hour precipitation durations for the 2-year and 100-year storm event frequencies. The standard intensity-duration curves data of Sun City was used. Sun City was incorporated into the City of Menifee in 2008. The CivilD software calculated the rainfall depths for the 5-year and 10-year storm event frequencies for each of the storm durations. The rainfall depths used for the unit hydrograph method are summarized in Table 1. The Riverside County Hydrology Manual Isohyetal Maps can be found in Appendix "C".

Table 1 – Summary of Rainfall Depths

Storm Event Frequency	Storm Duration	Rainfall Depth (inches)
2-year	1-hour	0.480
	3-hour	0.800
	6-hour	1.100
	24-hour	1.850
5-year	1-hour	0.663
	3-hour	1.069
	6-hour	1.451
	24-hour	2.529
10-year	1-hour	0.801
	3-hour	1.273
	6-hour	1.717
	24-hour	3.043
100-year	1-hour	1.260
	3-hour	1.950
	6-hour	2.600
	24-hour	4.750

In accordance with the Riverside County Hydrology Manual, AMC I was used for the 2-year and 5-year storm events. AMC II was used for the 10-year storm event. AMC III was used for the 100-year storm event for hydraulic calculations.

An RI of 93 was used for the existing condition and an RI of 57 was used for the proposed condition 2-year and 5-year storms, and a RI of 75 was used for the proposed condition 10-year storm.

The soil type was determined using the C1.42 Romoland Plate in the Riverside County Hydrology Manual, which is based on the United States Department of Agriculture (USDA), National Resource Conservation Service (NRCS) classification for soil runoff potential. The Hydrologic Soil Group was determined to be D.

A low loss rate of 90% (0.9) was used for the existing condition. The following equation was used to calculate the low loss rate for proposed condition:

0.9 – (0.8 x % impervious)

The Low Loss Rate was determined to be 0.19792 for the proposed condition with the proposed site being approximately 87.76% impervious.

The Unit Hydrograph Method calculations performed via the CivilD Hydrologic software determined the pre-development and post-development peak flow rates for the total site, which are summarized in Table 2. Table 3 summarizes the pre-development and post-development runoff volumes, respectively. Refer to Appendix F and Appendix G for the pre-development and post-development Unit Hydrograph Method Analysis calculation printouts.

Table 2 – Summary of Peak Flow Rates by Storm Event Frequency and Duration for Total Site DA 1

1-hour		3-hour		6-hour		24-hour	
Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-
2-Year Storm Event (Peak Flow Discharge in cfs)							
23.241	26.834	12.538	15.569	10.391	14.240	1.932	5.408
5-Year Storm Event (Peak Flow Discharge in cfs)							
34.180	38.349	18.611	21.902	15.466	19.516	4.387	7.394
10-Year Storm Event (Peak Flow Discharge in cfs)							
45.517	49.309	26.267	28.965	22.367	26.006	8.891	9.624

Table 3 – Summary of Runoff Volumes by Storm Event Frequency and Duration for Total Site DA 1

1-hour		3-hour		6-hour		24-hour	
Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-
2-Year Storm Event (Volume in cubic feet)							
26,733	38,712	27,644	61,978	29,904	85,117	21,306	143,156
5-Year Storm Event (Volume in cubic feet)							
48,043	54,342	47,559	83,793	50,874	112,803	48,888	195,720
10-Year Storm Event (Volume in cubic feet)							
68,472	71,112	96,547	106,601	113,692	140,542	149,411	239,032

iv. Flood Routing Analysis

After performing the Unit Hydrograph Method Analysis, it was determined that the 5-year 24-hour increase in stormwater runoff was approximately 146,832 CF. This volume served as the governing value for preliminarily sizing the proposed underground storage chamber system. Per the proposed Preliminary WQMP, the underground storage chamber system also serves as an upstream detention basin for the DCV prior to water quality treatment by the two modular wetland linear systems on-site. The DCV is equal to 46,436.5 CF. The total capacity of the proposed underground storage chamber system is approximately 154,075 CF, which comfortably stores the DCV for water quality purposes, as well as the 146,832 CF increase in stormwater runoff from the 5-year 24-hour storm event in the proposed condition. Details & specifications for the chamber system can be found in Appendix "J".

In the final design, the proposed underground storage chamber system will be sized using a flow-through basin and hydraulic analysis such that the peak flows discharging from the site do not exceed the pre-development peak flows for all design storm events in the proposed condition. The final design will feature a metered release outlet within the underground storage chamber system to mitigate all design storm event variations per City of Menifee requirements.

IV. Hydraulic Analysis

i. Design/Analyze Storm Drain Facilities

The project's storm drain system will be sized to convey the 100-year storm event peak flows. The following table provides a list of pipe sizes and their resulting full flow capacities with a roughness coefficient of 0.013 and a pipe slope of 0.5%. This table was used in preliminarily sizing pipes for the proposed storm drain network. In the final design, Rational Method Hydrology calculations will be performed to support the conveyance of the 100-year storm events flows in the proposed drainage system. Bentley Systems FlowMaster Hydraulic Calculator will be used for inlet sizing calculations, while pipe hydraulic calculations will be performed using WSPG Hydraulic Analysis Model. See Appendix "H" for preliminary hydraulic calculations performed using Bentley FlowMaster.

Pipe Size (inches)	Full Flow Capacity (cfs)
8	0.085
12	2.52
18	7.43
24	16.00
36	47.16
48	101.57

V. Conclusion

The results of this study show that the increase in the 5-year 24-hour storm event volume will be detained in the proposed condition. In the preliminary design, this volume deficit was used to size the proposed underground storage chamber system. Drainage facilities will be sized to convey storm flows for the 100-year storm peak flows in the final design. Stormwater runoff will be detained in the proposed underground storage chamber system before being discharged for water quality treatment by two modular wetland linear systems. Following treatment, on-site runoff will be discharged into the future storm main Line A-12 in Murrieta Road. Off-site flow will be conveyed into the proposed curb and gutter systems along the roadways surrounding the site, and even will combine with on-site flows to be discharged to the same future storm main Line A-12 in Murrieta Road.

Appendix A – Vicinity Map

VICINITY MAP

VICINITY MAP

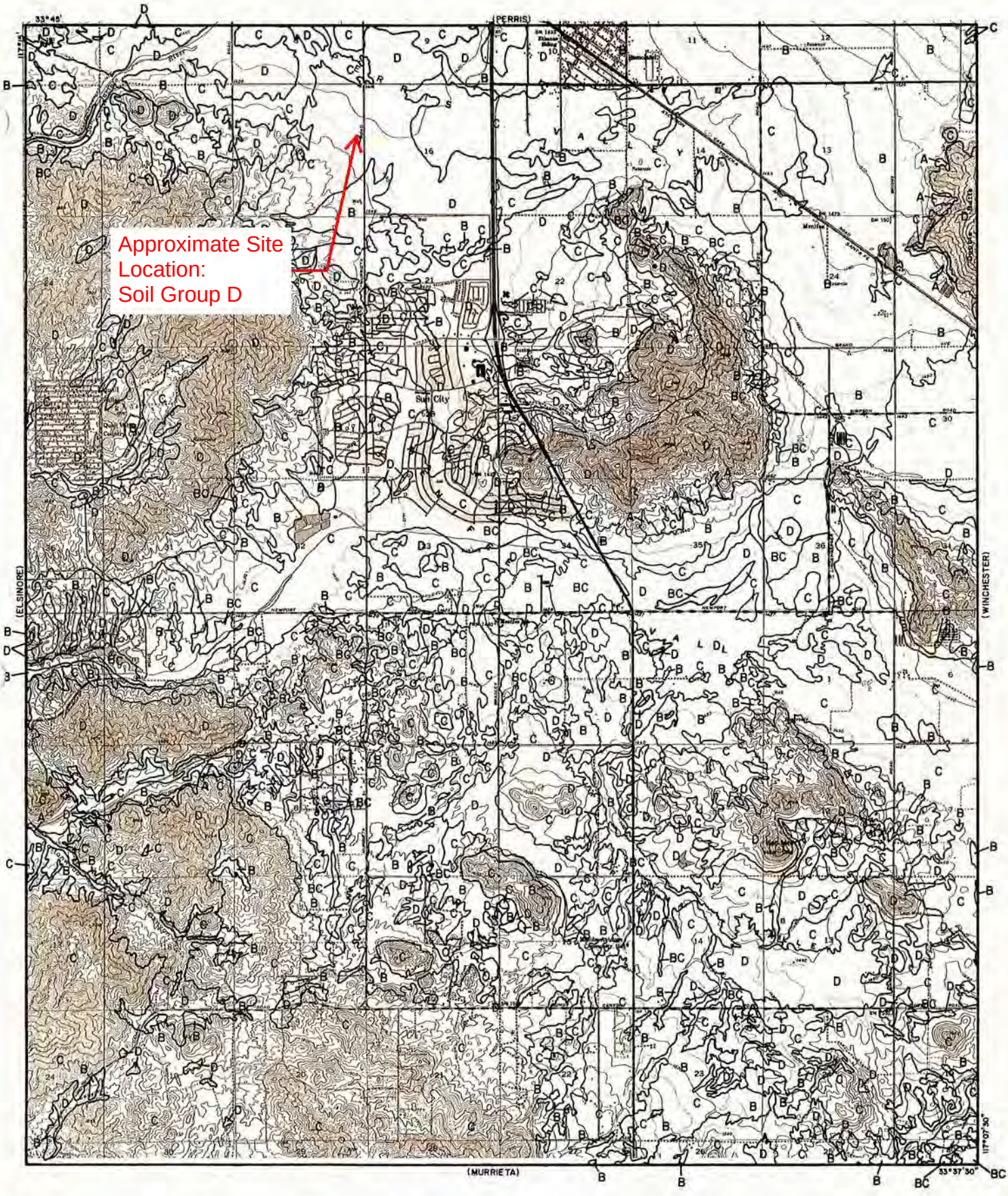
SCALE: NTS

REGISTERED PROFESSIONAL ENGINEER
LUCAS A. CORSBIE
No. 72588
CIVIL
STATE OF CALIFORNIA

10 edelman
irvine, ca 92618
p 949.660.9128
waremalcomb.com
WARE MALCOMB
CIVIL ENGINEERING & SURVEYING

PROJECT NAME: ARES MENIFEE			SHEET
JOB NO.: IRV22-0086	DATE : 6/30/2023		1 0F 1
DRAWN: AC	PA/PM: LC	SCALE: NTS	

Appendix B – Soil Map



LEGEND

SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC&WCD

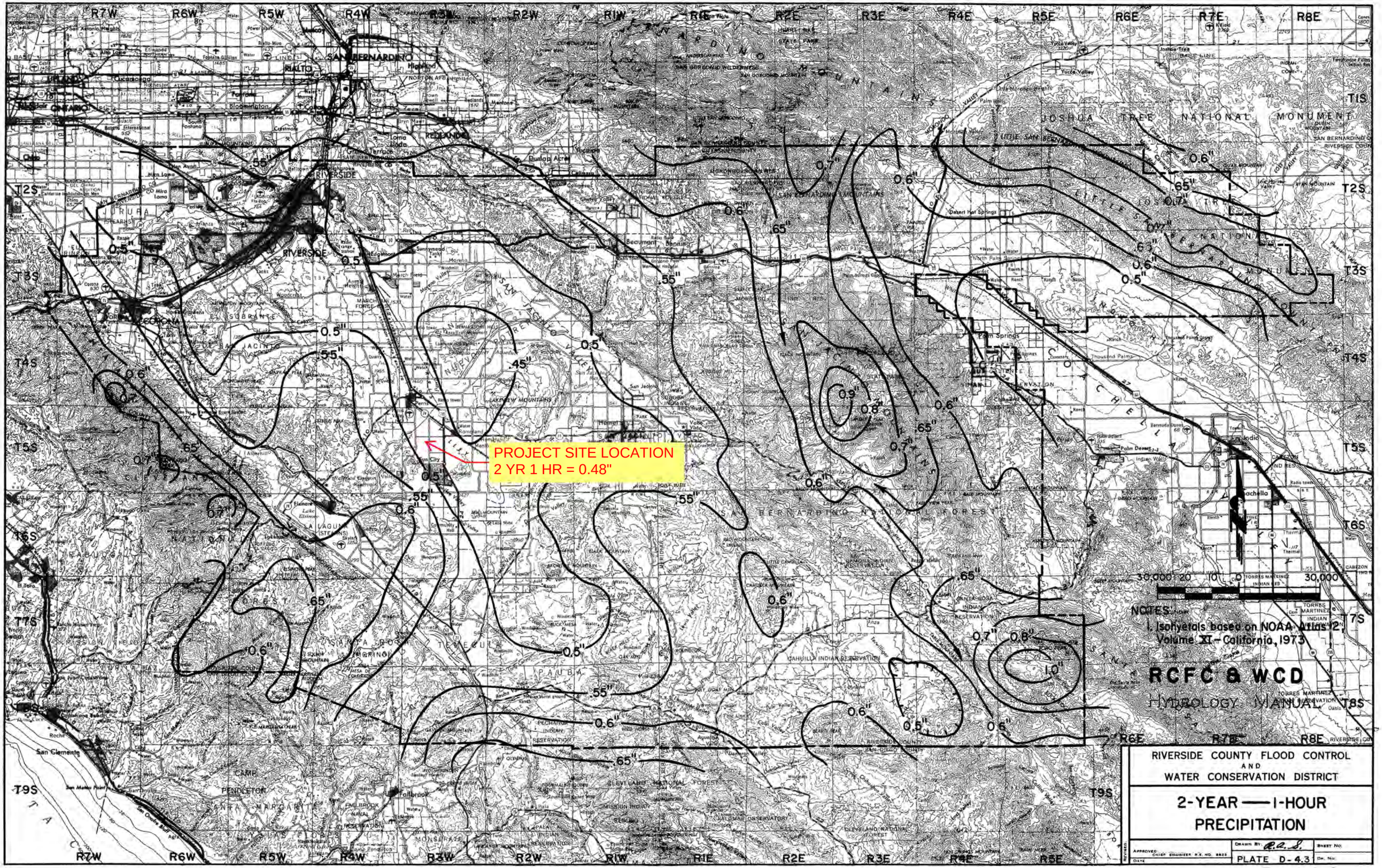
HYDROLOGY MANUAL

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR ROMOLAND

PLATE C-1.42

Appendix C – Riverside County Hydrology Manual Isohyetal Maps


PROJECT SITE LOCATION
2 YR 1 HR = 0.48"
NOTES
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR PRECIPITATION
PLATE D-4.3

PROJECT SITE LOCATION
100 YR 1 HR = 1.26"

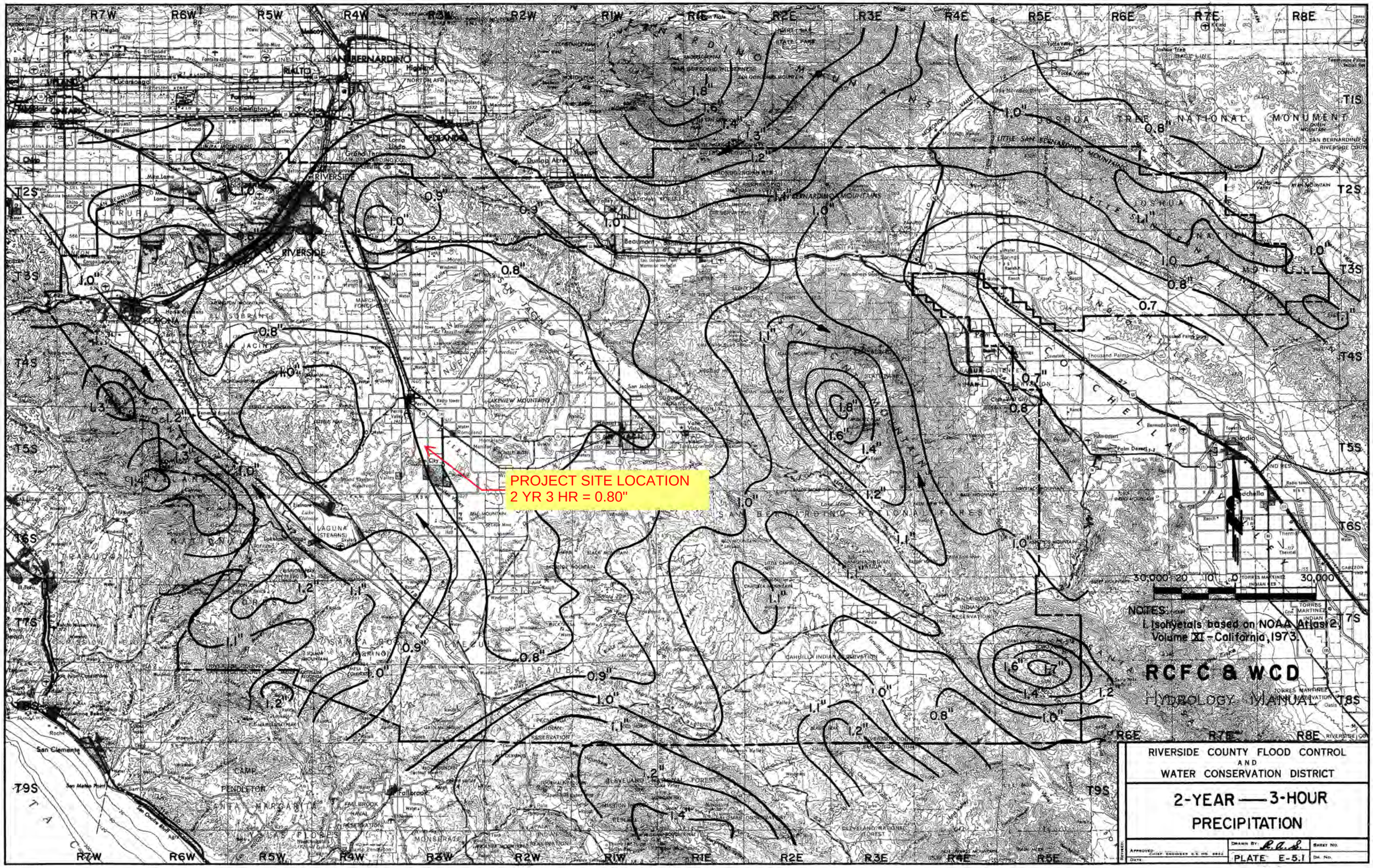
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973

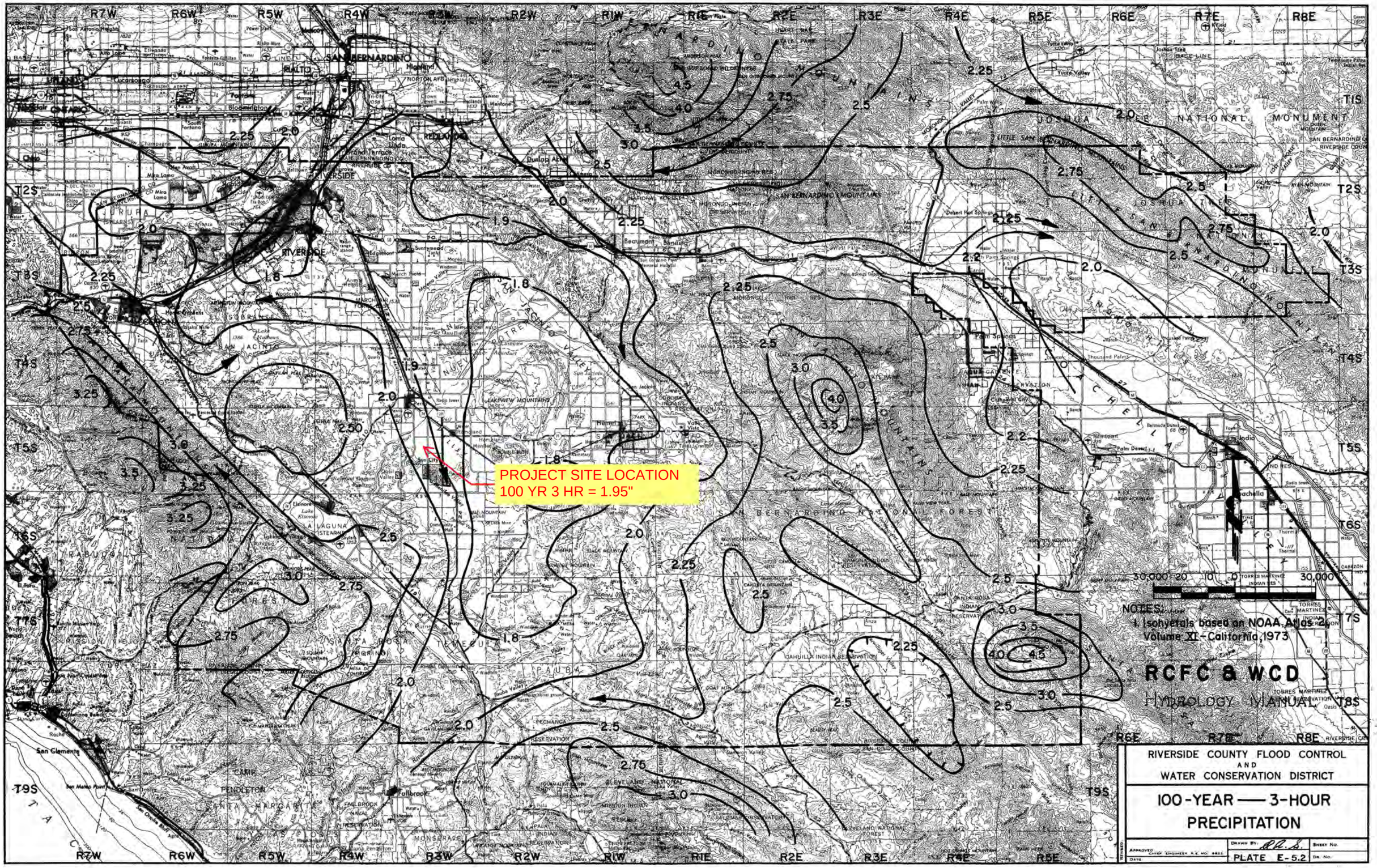
RCFC & WCD
HYDROLOGY MANUAL

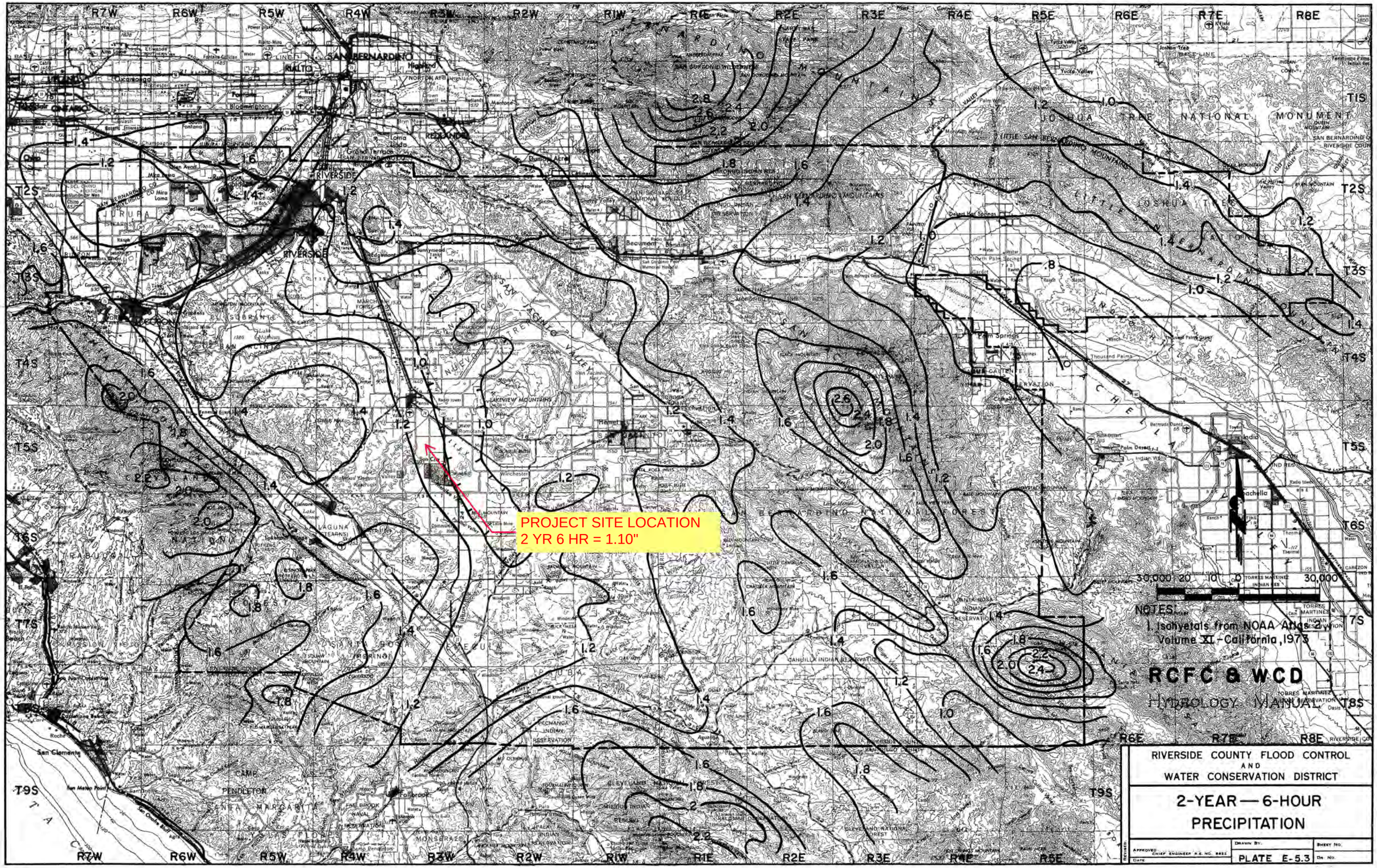
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

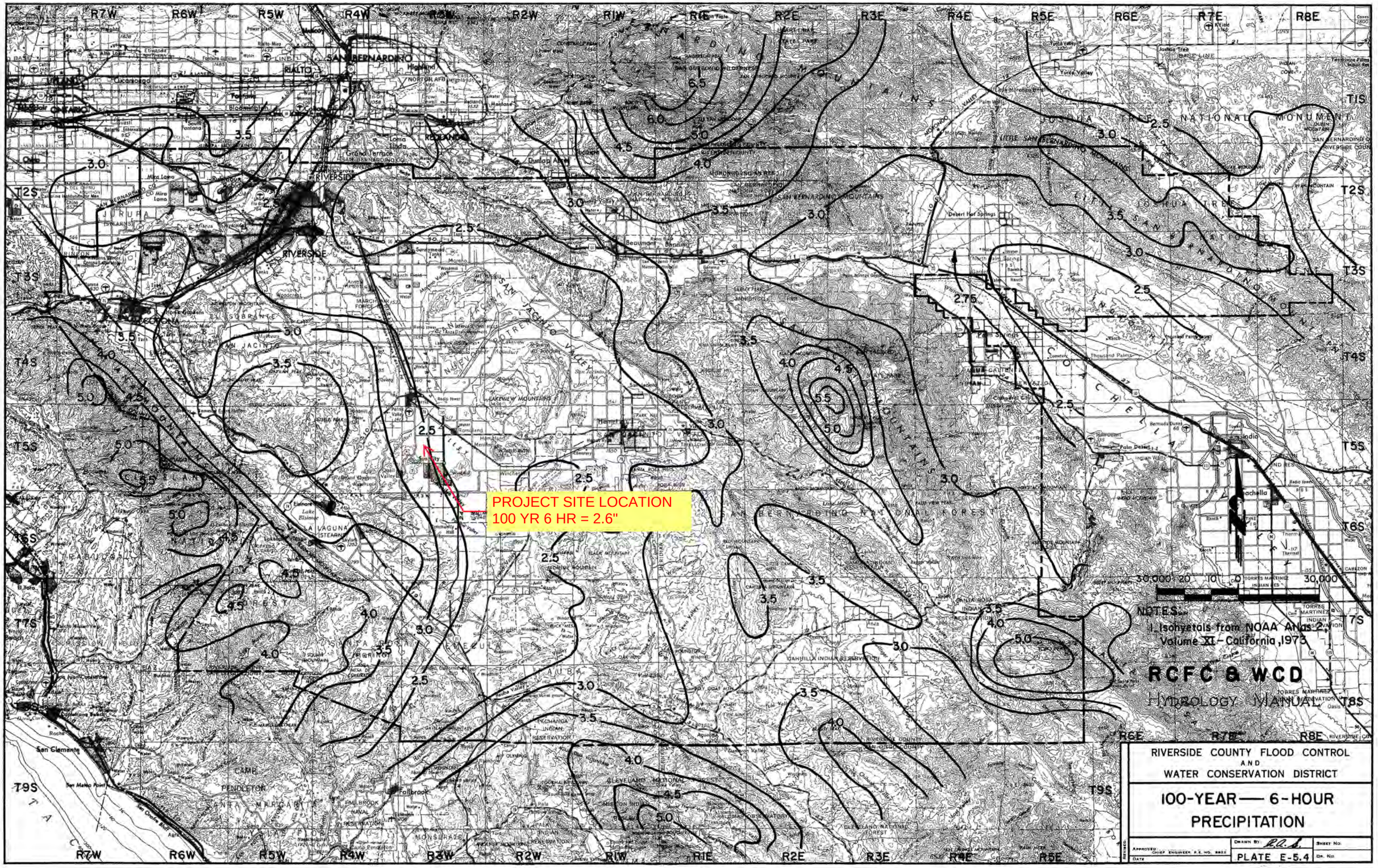
100-YEAR — 1-HOUR PRECIPITATION

PLATE D-4.4


PROJECT SITE LOCATION
2 YR 3 HR = 0.80"
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 3-HOUR PRECIPITATION
PLATE E-5.1


PROJECT SITE LOCATION
100 YR 3 HR = 1.95"
NOTES:
1. Isohyetals based on NOAA Atlas 2,
Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 3-HOUR
PRECIPITATION
PLATE E-5.2


PROJECT SITE LOCATION
2 YR 6 HR = 1.10"
NOTES:
1. Isohyetals from NOAA Atlas 2 Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 6-HOUR PRECIPITATION
PLATE E-5.3
SAN BERNARDINO
RIVERSIDE
RIALTO
SAN JACINTO MOUNTAINS
SAN GORGONIO WILDERNESS
JOSHUA TREE NATIONAL MONUMENT
PALM SPRINGS
LAKEVIEW MOUNTAINS
SAN JACINTO VALLEY
PERRIS
HEMET
SAN JACINTO
BANNING
BEAUMONT
CAHUILLA INDIAN RESERVATION
SANTA ROSA INDIAN RESERVATION
AGUANGA
TEMECULA
MURRIETA
SAN CLEMENTE
CAMP PENDLETON
SANTA MARGARITA
FALLBROOK
LAGUNA MOUNTAINS
CLEVELAND NATIONAL FOREST
SAN BERNARDINO NATIONAL FOREST
R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E
T1S T2S T3S T4S T5S T6S T7S T8S T9S


PROJECT SITE LOCATION
100 YR 6 HR = 2.6"
NOTES
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 6-HOUR PRECIPITATION
PLATE E-5.4

PROJECT SITE LOCATION
2 YR 24 HR = 1.85"

NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

2-YEAR — 24-HOUR
PRECIPITATION

APPROVED: CHIEF ENGINEER R.E. NO. 8882	DRAWN BY R.A.S.	SHEET NO.
DATE	PLATE E-5.5	DR. NO.

PROJECT SITE LOCATION
100 YR 24 HR = 4.75"

NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.

RCFC & WCD
HYDROLOGY MANUAL

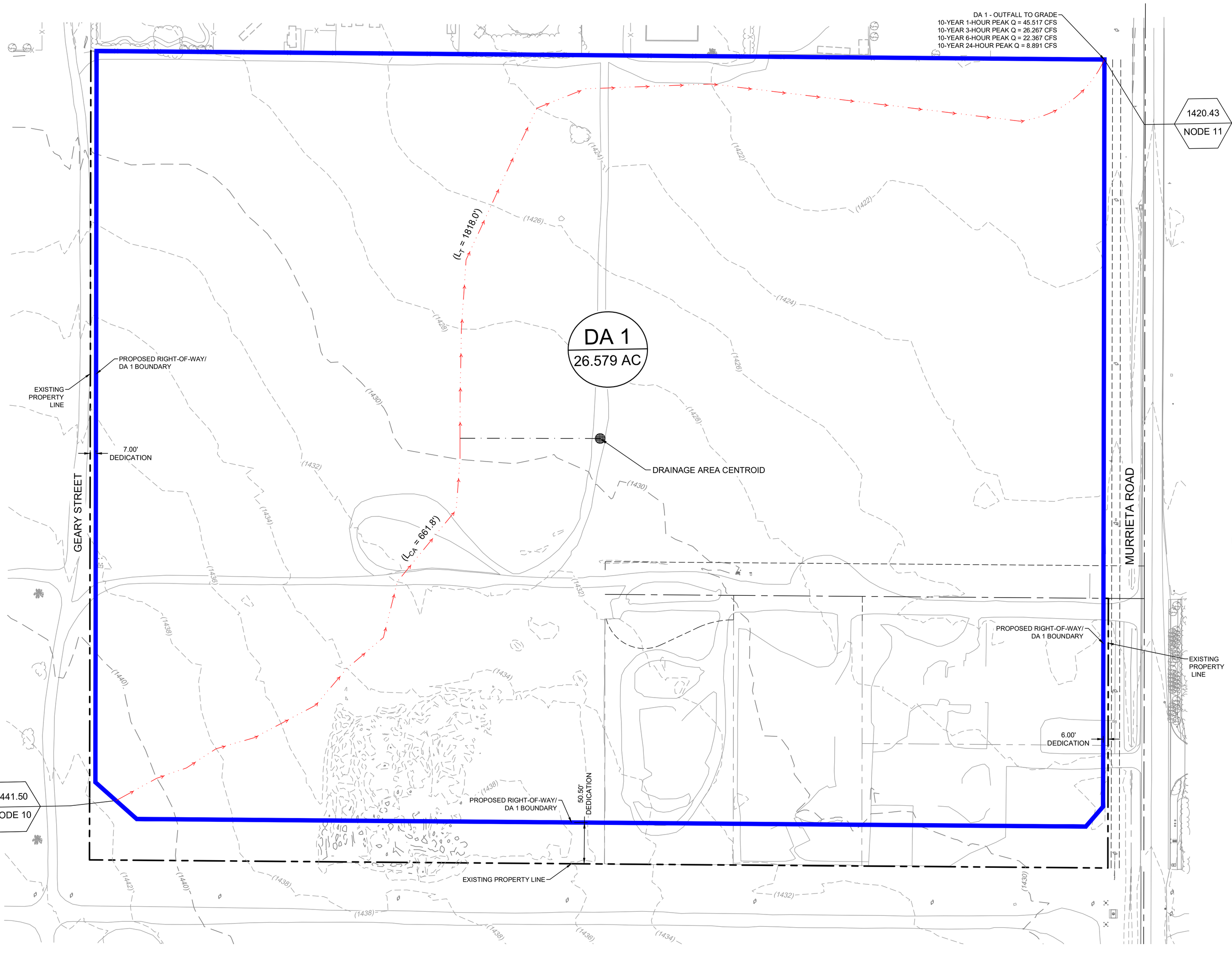
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

100-YEAR — 24-HOUR PRECIPITATION

APPROVED: CHIEF ENGINEER R.C. NO. 8625
DATE
DRAWN BY:
PLATE E-5.6
SHEET NO.
DR. NO.
REVISED

Appendix D – Existing Condition Hydrology Exhibit

CAUTION: IF THIS SHEET IS NOT 24"x36" IT IS A REDUCED PRINT



DA 1 - 1 HR EXISTING RUNOFF (NODE 11)

RETURN FREQUENCY	PEAK Q (CFS)	VOLUME (CF)
2 YEAR	23.241	26,733
5 YEAR	34.180	48,043
10 YEAR	45.517	68,472

DA 1 - 3 HR EXISTING RUNOFF (NODE 11)

RETURN FREQUENCY	PEAK Q (CFS)	VOLUME (CF)
2 YEAR	12.538	27,644
5 YEAR	18.611	47,559
10 YEAR	26.267	96,547

DA 1 - 6 HR EXISTING RUNOFF (NODE 11)

RETURN FREQUENCY	PEAK Q (CFS)	VOLUME (CF)
2 YEAR	10.391	29,904
5 YEAR	15.466	50,874
10 YEAR	22.367	113,692

DA 1 - 24 HR EXISTING RUNOFF (NODE 11)

RETURN FREQUENCY	PEAK Q (CFS)	VOLUME (CF)
2 YEAR	1.932	21,306
5 YEAR	4.387	48,888
10 YEAR	8.891	149,411

LEGEND

- DMA BOUNDARY
- DRAINAGE FLOW PATH
- (L = EX FLOW PATH LENGTH)
- (L_{CA} = EX FLOW PATH LENGTH TO CENTROID)
- (L_T = TOTAL EX FLOW PATH LENGTH; UNIT HYDROGRAPH)
- DMA / ACRES
- ELEV. / NODE #

WARE MALCOMB assumes no responsibility for utility locations. The utilities shown on this drawing have been plotted from the best available information. It is, however, the contractors responsibility to field verify the location of all utilities prior to the commencement of any construction.

0 30 60 120
SCALE: 1" = 60'

WARE MALCOMB
LEADING DESIGN FOR COMMERCIAL REAL ESTATE
10 edelman
irvine, ca 92618
p 949.660.9128
waremalcomb.com

REGISTERED PROFESSIONAL ENGINEER
LUCAS A. CORBETE
No. 72588
CIVIL
STATE OF CALIFORNIA
September 13, 2023
FOR AND ON BEHALF OF WARE MALCOMB

ARES SPEC INDUSTRIAL
PRELIMINARY HYDROLOGY & HYDRAULICS STUDY
MURRIETA RD. & ETHANAC RD.
MENIFEE, CA 92585

EXISTING HYDROLOGY EXHIBIT

NO.	DATE	REMARKS

JOB NO.:	IRV22-0086
PA / PM:	LC
DESIGNED:	AC
DATE:	9/13/2023
PLOT DATE:	9/13/2023

SHEET 1
Sheet 1 of 2

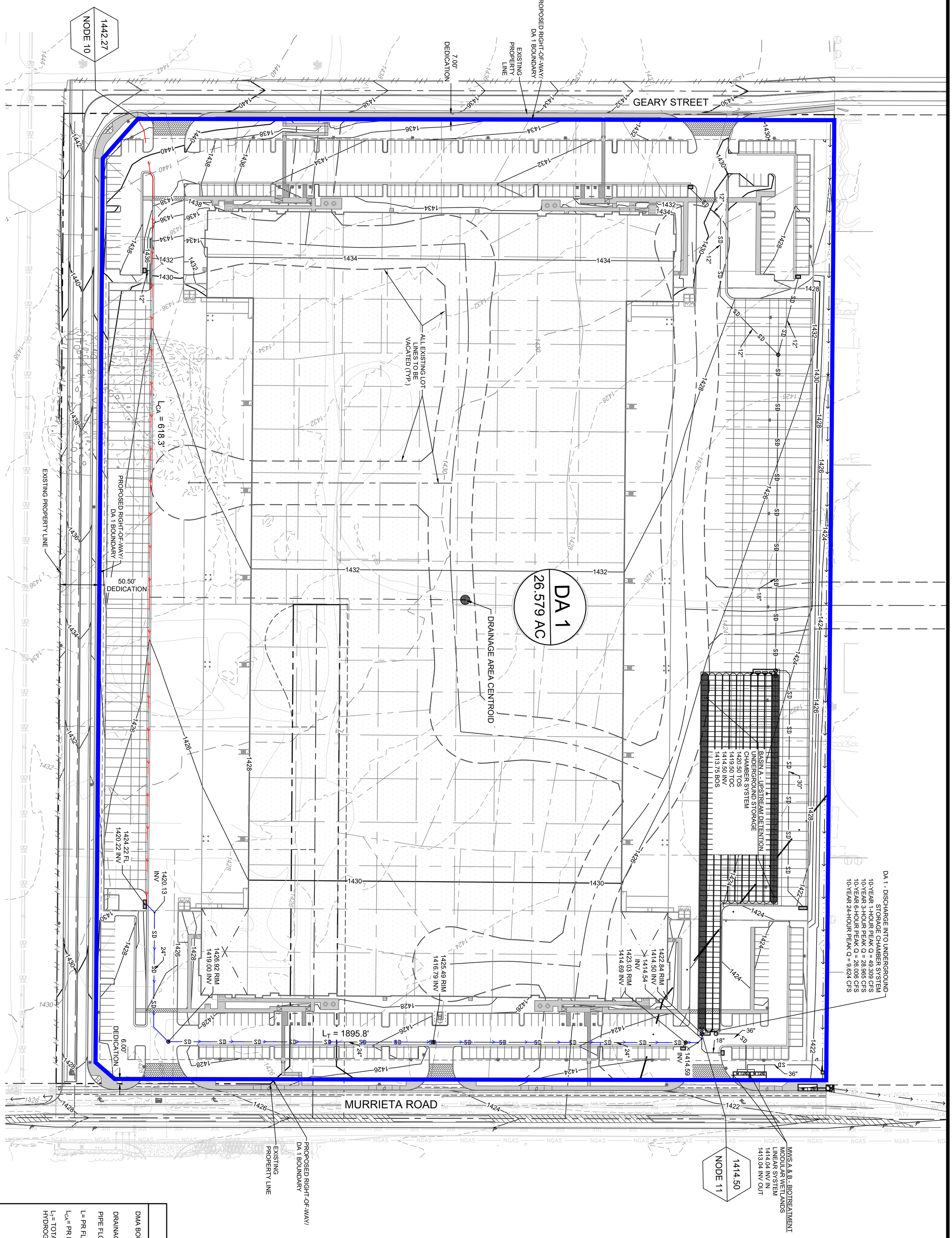
THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY AND COPYRIGHT OF WARE MALCOMB AND SHALL NOT BE USED ON ANY OTHER WORK EXCEPT BY AGREEMENT WITH WARE MALCOMB. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS AND SHALL BE VERIFIED ON THE JOB SITE. ANY DISCREPANCY SHALL BE BROUGHT TO THE NOTICE OF WARE MALCOMB PRIOR TO THE COMMENCEMENT OF ANY WORK.

NOT FOR CONSTRUCTION

M:\IRV\22\0086\00\Civil\CAD\Sheets\Exhibits\IRV22-0086_Existing Hydrology.dwg 9/13/2023 6:55 PM ACASTELO 1:50

Appendix E – Proposed Condition Hydrology Exhibit

W:\IRV\22\0086\00\Civil\CAD\Sheets\Exhibits\IRV22-0086_Proposed Hydrology.dwg 9/13/2023 6:54 PM ACASTELO 1:50



DA TOTAL - 1 HR PROPOSED RUNOFF (NODE 11)

RETURN FREQUENCY	PEAK Q (CFS)	VOLUME (CF)
2 YEAR	26.834	38,712
5 YEAR	38.349	54,342
10 YEAR	49.309	71,112

DA TOTAL - 3 HR PROPOSED RUNOFF (NODE 11)

RETURN FREQUENCY	PEAK Q (CFS)	VOLUME (CF)
2 YEAR	15.569	61,978
5 YEAR	21.902	83,793
10 YEAR	28.965	106,601

DA TOTAL - 6 HR PROPOSED RUNOFF (NODE 11)

RETURN FREQUENCY	PEAK Q (CFS)	VOLUME (CF)
2 YEAR	14.240	85,117
5 YEAR	19.516	112,803
10 YEAR	26.006	140,542

DA TOTAL - 24 HR PROPOSED RUNOFF (NODE 11)

RETURN FREQUENCY	PEAK Q (CFS)	VOLUME (CF)
2 YEAR	5.408	143,156
5 YEAR	7.394	195,720
10 YEAR	9.624	239,032

LEGEND

- DMA BOUNDARY
- DRAINAGE FLOW PATH
- PIPE FLOW PATH
- L= PR FLOW PATH LENGTH
- L_{CA}= PR FLOW PATH LENGTH TO CENTROID
- L_T= TOTAL PR FLOW PATH LENGTH (UNIT HYDROGRAPH)
- DMA ACRES
- ELEV. NODE #

SCALE: 1" = 50'

WARE MALCOMB assumes no responsibility for utility locations. The utilities shown on this drawing have been plotted from the best available information. It is, however, the contractors responsibility to field verify the location of all utilities prior to the commencement of any construction.

CAUTION: IF THIS SHEET IS NOT 24"x36" IT IS A REDUCED PRINT

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY AND COPYRIGHT OF WARE MALCOMB AND SHALL NOT BE USED ON ANY OTHER WORK EXCEPT BY AGREEMENT WITH WARE MALCOMB. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS AND SHALL BE VERIFIED ON THE JOB SITE. ANY DISCREPANCY SHALL BE BROUGHT TO THE NOTICE OF WARE MALCOMB PRIOR TO THE COMMENCEMENT OF ANY WORK.

SHEET 2 Sheet 2 of 2

JOB NO.:	IRV22-0086
PA / PM:	LC
DESIGNED:	AC
DATE:	9/13/2023
PLOT DATE:	9/13/2023

PROPOSED HYDROLOGY EXHIBIT

NO.	DATE	REMARKS

ARES SPEC INDUSTRIAL

PRELIMINARY HYDROLOGY & HYDRUALICS STUDY

MURRIETA RD. & ETHANAC RD.
MENIFEE, CA 92585

FOR AND ON BEHALF OF WARE MALCOMB

REGISTERED PROFESSIONAL ENGINEER
LUCAS A CORSBIE
No. 72588
CIVIL
STATE OF CALIFORNIA
September 13, 2023

10 edelman
irvine, ca 92618
p 949.660.9128
waremalcomb.com

WARE MALCOMB
LEADING DESIGN FOR COMMERCIAL REAL ESTATE

NOT FOR CONSTRUCTION

Appendix F – Existing Condition Unit Hydrograph Method Hydrologic Calculations

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 06/29/23 File: MenifeeExUH2YR1HR12.out

++

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

IRV22-0086 ARES MENIFEE - EXISTING 2 YEAR 1 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1818.00(Ft.)
Length along longest watercourse measured to centroid = 661.80(Ft.)
Length along longest watercourse = 0.344 Mi.
Length along longest watercourse measured to centroid = 0.125 Mi.
Difference in elevation = 21.07(Ft.)
Slope along watercourse = 61.1934 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.100 Hr.
Lag time = 5.99 Min.
25% of lag time = 1.50 Min.
40% of lag time = 2.40 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	0.48	12.76

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.26	33.49

STORM EVENT (YEAR) = 2.00

Area Averaged 2-Year Rainfall = 0.480(In)
Area Averaged 100-Year Rainfall = 1.260(In)

Point rain (area averaged) = 0.480(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 0.480(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	93.00	0.000

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
93.0	83.4	0.205	0.000	0.205	1.000	0.205
					Sum (F) =	0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205
Minimum soil loss rate ((In/Hr)) = 0.103
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5300

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.491	14.285	3.826
2	0.167	166.982	45.525	12.195
3	0.250	250.473	18.969	5.081
4	0.333	333.964	8.021	2.149
5	0.417	417.455	4.785	1.282
6	0.500	500.946	2.979	0.798
7	0.583	584.438	2.148	0.575
8	0.667	667.929	1.442	0.386
9	0.750	751.420	0.944	0.253
10	0.833	834.911	0.903	0.242
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	3.40	0.196	(0.205)	0.176	0.020
2	0.17	4.70	0.271	0.205	(0.244)	0.065
3	0.25	4.70	0.271	0.205	(0.244)	0.065
4	0.33	5.10	0.294	0.205	(0.264)	0.088
5	0.42	5.80	0.334	0.205	(0.301)	0.129
6	0.50	5.90	0.340	0.205	(0.306)	0.135
7	0.58	7.10	0.409	0.205	(0.368)	0.204
8	0.67	8.70	0.501	0.205	(0.451)	0.296
9	0.75	13.20	0.760	0.205	(0.684)	0.555
10	0.83	29.70	1.710	0.205	(1.539)	1.505
11	0.92	7.70	0.443	0.205	(0.399)	0.238
12	1.00	4.00	0.230	0.205	(0.207)	0.025

(Loss Rate Not Used)

Sum = 100.0 Sum = 3.3

Flood volume = Effective rainfall 0.28(In)
times area 26.6(Ac.)/[(In)/(Ft.)] = 0.6(Ac.Ft)
Total soil loss = 0.20(In)
Total soil loss = 0.449(Ac.Ft)
Total rainfall = 0.48(In)
Flood volume = 26731.6 Cubic Feet
Total soil loss = 19568.5 Cubic Feet

Peak flow rate of this hydrograph = 23.241(CFS)

++

1 - 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	7.5	15.0	22.5	30.0
0+ 5	0.0005	0.07	Q				
0+10	0.0039	0.49	Q				
0+15	0.0118	1.15	VQ				
0+20	0.0222	1.51	VQ				
0+25	0.0365	2.07	Q				
0+30	0.0556	2.78	Q				
0+35	0.0791	3.41	QV				
0+40	0.1121	4.79	QV				
0+45	0.1628	7.36	QV				
0+50	0.2650	14.85		V Q			
0+55	0.4251	23.24			V Q		
1+ 0	0.5115	12.55		Q		V	
1+ 5	0.5523	5.92	Q			V	
1+10	0.5752	3.33	Q			V	
1+15	0.5895	2.08	Q			V	

```
    1+20        0.5994      1.43  |Q        |         |         |        V|
    1+25        0.6059      0.95  |Q        |         |         |        V|
    1+30        0.6102      0.62  Q         |         |         |        V|
    1+35        0.6132      0.43  Q         |         |         |        V|
    1+40        0.6136      0.06  Q         |         |         |        V|
    1+45        0.6137      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 06/29/23 File: MenifeeExUH2YR3HR32.out

++

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

IRV22-0086 ARES MENIFEE - EXISTING 2 YEAR 3 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1818.00(Ft.)
Length along longest watercourse measured to centroid = 661.80(Ft.)
Length along longest watercourse = 0.344 Mi.
Length along longest watercourse measured to centroid = 0.125 Mi.
Difference in elevation = 21.07(Ft.)
Slope along watercourse = 61.1934 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.100 Hr.
Lag time = 5.99 Min.
25% of lag time = 1.50 Min.
40% of lag time = 2.40 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	0.80	21.26

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.95	51.83

STORM EVENT (YEAR) = 2.00

Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.950(In)

Point rain (area averaged) = 0.800(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.800(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	93.00	0.000

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
93.0	83.4	0.205	0.000	0.205	1.000	0.205
					Sum (F) =	0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205
Minimum soil loss rate ((In/Hr)) = 0.103
(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 (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.491	14.285	3.826
2	0.167	166.982	45.525	12.195
3	0.250	250.473	18.969	5.081
4	0.333	333.964	8.021	2.149
5	0.417	417.455	4.785	1.282
6	0.500	500.946	2.979	0.798
7	0.583	584.438	2.148	0.575
8	0.667	667.929	1.442	0.386
9	0.750	751.420	0.944	0.253
10	0.833	834.911	0.903	0.242
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)

1	0.08	1.30	0.125	(	0.205)		0.112		0.012
2	0.17	1.30	0.125	(	0.205)		0.112		0.012
3	0.25	1.10	0.106	(	0.205)		0.095		0.011
4	0.33	1.50	0.144	(	0.205)		0.130		0.014
5	0.42	1.50	0.144	(	0.205)		0.130		0.014
6	0.50	1.80	0.173	(	0.205)		0.156		0.017
7	0.58	1.50	0.144	(	0.205)		0.130		0.014
8	0.67	1.80	0.173	(	0.205)		0.156		0.017
9	0.75	1.80	0.173	(	0.205)		0.156		0.017
10	0.83	1.50	0.144	(	0.205)		0.130		0.014
11	0.92	1.60	0.154	(	0.205)		0.138		0.015
12	1.00	1.80	0.173	(	0.205)		0.156		0.017
13	1.08	2.20	0.211	(	0.205)		0.190		0.021
14	1.17	2.20	0.211	(	0.205)		0.190		0.021
15	1.25	2.20	0.211	(	0.205)		0.190		0.021
16	1.33	2.00	0.192	(	0.205)		0.173		0.019
17	1.42	2.60	0.250		0.205	(	0.225)		0.044
18	1.50	2.70	0.259		0.205	(	0.233)		0.054
19	1.58	2.40	0.230		0.205	(	0.207)		0.025
20	1.67	2.70	0.259		0.205	(	0.233)		0.054
21	1.75	3.30	0.317		0.205	(	0.285)		0.112
22	1.83	3.10	0.298		0.205	(	0.268)		0.092
23	1.92	2.90	0.278		0.205	(	0.251)		0.073
24	2.00	3.00	0.288		0.205	(	0.259)		0.083
25	2.08	3.10	0.298		0.205	(	0.268)		0.092
26	2.17	4.20	0.403		0.205	(	0.363)		0.198
27	2.25	5.00	0.480		0.205	(	0.432)		0.275
28	2.33	3.50	0.336		0.205	(	0.302)		0.131
29	2.42	6.80	0.653		0.205	(	0.587)		0.447
30	2.50	7.30	0.701		0.205	(	0.631)		0.495
31	2.58	8.20	0.787		0.205	(	0.708)		0.582
32	2.67	5.90	0.566		0.205	(	0.510)		0.361
33	2.75	2.00	0.192	(	0.205)		0.173		0.019
34	2.83	1.80	0.173	(	0.205)		0.156		0.017
35	2.92	1.80	0.173	(	0.205)		0.156		0.017
36	3.00	0.60	0.058	(	0.205)		0.052		0.006

(Loss Rate Not Used)

Sum = 100.0 Sum = 3.4

Flood volume = Effective rainfall 0.29(In)
times area 26.6(Ac.)/[(In)/(Ft.)] = 0.6(Ac.Ft)
Total soil loss = 0.51(In)
Total soil loss = 1.137(Ac.Ft)
Total rainfall = 0.80(In)
Flood volume = 27644.1 Cubic Feet
Total soil loss = 49532.3 Cubic Feet

Peak flow rate of this hydrograph = 12.538(CFS)

++

3 - 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	0.0003	0.05	Q
0+10	0.0017	0.20	Q
0+15	0.0035	0.26	Q
0+20	0.0054	0.27	Q
0+25	0.0076	0.33	Q
0+30	0.0101	0.36	Q
0+35	0.0129	0.40	Q
0+40	0.0156	0.40	Q
0+45	0.0186	0.43	QV
0+50	0.0216	0.44	QV
0+55	0.0244	0.41	QV
1+ 0	0.0273	0.42	QV
1+ 5	0.0305	0.46	QV
1+10	0.0340	0.51	QV
1+15	0.0377	0.54	QV
1+20	0.0415	0.54	QV
1+25	0.0457	0.62	QV
1+30	0.0523	0.96	Q V
1+35	0.0599	1.09	QV
1+40	0.0664	0.95	Q V
1+45	0.0763	1.43	Q V
1+50	0.0913	2.18	QV
1+55	0.1065	2.21	Q V
2+ 0	0.1207	2.07	Q V
2+ 5	0.1356	2.17	Q V
2+10	0.1545	2.73	Q V
2+15	0.1847	4.39	Q V
2+20	0.2214	5.34	Q V
2+25	0.2588	5.43	Q V
2+30	0.3213	9.07	Q V
2+35	0.4002	11.47	Q V
2+40	0.4866	12.54	Q V
2+45	0.5517	9.46	Q V
2+50	0.5836	4.63	Q V
2+55	0.6024	2.72	Q V
3+ 0	0.6151	1.85	Q V
3+ 5	0.6232	1.18	Q V
3+10	0.6285	0.77	Q V
3+15	0.6317	0.47	Q V
3+20	0.6336	0.27	Q V
3+25	0.6344	0.11	Q V
3+30	0.6345	0.02	Q V
3+35	0.6346	0.01	Q V

```
    3+40        0.6346      0.01  Q         |         |         |        V|
    3+45        0.6346      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 06/29/23 File: MenifeeExUH2YR6HR62.out

++

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

IRV22-0086 ARES MENIFEE - EXISTING 2 YEAR 6 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1818.00(Ft.)
Length along longest watercourse measured to centroid = 661.80(Ft.)
Length along longest watercourse = 0.344 Mi.
Length along longest watercourse measured to centroid = 0.125 Mi.
Difference in elevation = 21.07(Ft.)
Slope along watercourse = 61.1934 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.100 Hr.
Lag time = 5.99 Min.
25% of lag time = 1.50 Min.
40% of lag time = 2.40 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.10	29.24

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	2.60	69.11

STORM EVENT (YEAR) = 2.00

Area Averaged 2-Year Rainfall = 1.100(In)
Area Averaged 100-Year Rainfall = 2.600(In)

Point rain (area averaged) = 1.100(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	93.00	0.000

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
93.0	83.4	0.205	0.000	0.205	1.000	0.205
					Sum (F) =	0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205
Minimum soil loss rate ((In/Hr)) = 0.103
(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 (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.491	14.285	3.826
2	0.167	166.982	45.525	12.195
3	0.250	250.473	18.969	5.081
4	0.333	333.964	8.021	2.149
5	0.417	417.455	4.785	1.282
6	0.500	500.946	2.979	0.798
7	0.583	584.438	2.148	0.575
8	0.667	667.929	1.442	0.386
9	0.750	751.420	0.944	0.253
10	0.833	834.911	0.903	0.242
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)

1	0.08	0.50	0.066	(0.205)	0.059	0.007
2	0.17	0.60	0.079	(0.205)	0.071	0.008
3	0.25	0.60	0.079	(0.205)	0.071	0.008
4	0.33	0.60	0.079	(0.205)	0.071	0.008
5	0.42	0.60	0.079	(0.205)	0.071	0.008
6	0.50	0.70	0.092	(0.205)	0.083	0.009
7	0.58	0.70	0.092	(0.205)	0.083	0.009
8	0.67	0.70	0.092	(0.205)	0.083	0.009
9	0.75	0.70	0.092	(0.205)	0.083	0.009
10	0.83	0.70	0.092	(0.205)	0.083	0.009
11	0.92	0.70	0.092	(0.205)	0.083	0.009
12	1.00	0.80	0.106	(0.205)	0.095	0.011
13	1.08	0.80	0.106	(0.205)	0.095	0.011
14	1.17	0.80	0.106	(0.205)	0.095	0.011
15	1.25	0.80	0.106	(0.205)	0.095	0.011
16	1.33	0.80	0.106	(0.205)	0.095	0.011
17	1.42	0.80	0.106	(0.205)	0.095	0.011
18	1.50	0.80	0.106	(0.205)	0.095	0.011
19	1.58	0.80	0.106	(0.205)	0.095	0.011
20	1.67	0.80	0.106	(0.205)	0.095	0.011
21	1.75	0.80	0.106	(0.205)	0.095	0.011
22	1.83	0.80	0.106	(0.205)	0.095	0.011
23	1.92	0.80	0.106	(0.205)	0.095	0.011
24	2.00	0.90	0.119	(0.205)	0.107	0.012
25	2.08	0.80	0.106	(0.205)	0.095	0.011
26	2.17	0.90	0.119	(0.205)	0.107	0.012
27	2.25	0.90	0.119	(0.205)	0.107	0.012
28	2.33	0.90	0.119	(0.205)	0.107	0.012
29	2.42	0.90	0.119	(0.205)	0.107	0.012
30	2.50	0.90	0.119	(0.205)	0.107	0.012
31	2.58	0.90	0.119	(0.205)	0.107	0.012
32	2.67	0.90	0.119	(0.205)	0.107	0.012
33	2.75	1.00	0.132	(0.205)	0.119	0.013
34	2.83	1.00	0.132	(0.205)	0.119	0.013
35	2.92	1.00	0.132	(0.205)	0.119	0.013
36	3.00	1.00	0.132	(0.205)	0.119	0.013
37	3.08	1.00	0.132	(0.205)	0.119	0.013
38	3.17	1.10	0.145	(0.205)	0.131	0.015
39	3.25	1.10	0.145	(0.205)	0.131	0.015
40	3.33	1.10	0.145	(0.205)	0.131	0.015
41	3.42	1.20	0.158	(0.205)	0.143	0.016
42	3.50	1.30	0.172	(0.205)	0.154	0.017
43	3.58	1.40	0.185	(0.205)	0.166	0.018
44	3.67	1.40	0.185	(0.205)	0.166	0.018
45	3.75	1.50	0.198	(0.205)	0.178	0.020
46	3.83	1.50	0.198	(0.205)	0.178	0.020
47	3.92	1.60	0.211	(0.205)	0.190	0.021
48	4.00	1.60	0.211	(0.205)	0.190	0.021
49	4.08	1.70	0.224	(0.205)	0.202	0.022
50	4.17	1.80	0.238	0.205	(0.214)	0.032

```
51   4.25     1.90      0.251          0.205    (  0.226)        0.046
52   4.33     2.00      0.264          0.205    (  0.238)        0.059
53   4.42     2.10      0.277          0.205    (  0.249)        0.072
54   4.50     2.10      0.277          0.205    (  0.249)        0.072
55   4.58     2.20      0.290          0.205    (  0.261)        0.085
56   4.67     2.30      0.304          0.205    (  0.273)        0.098
57   4.75     2.40      0.317          0.205    (  0.285)        0.112
58   4.83     2.40      0.317          0.205    (  0.285)        0.112
59   4.92     2.50      0.330          0.205    (  0.297)        0.125
60   5.00     2.60      0.343          0.205    (  0.309)        0.138
61   5.08     3.10      0.409          0.205    (  0.368)        0.204
62   5.17     3.60      0.475          0.205    (  0.428)        0.270
63   5.25     3.90      0.515          0.205    (  0.463)        0.310
64   5.33     4.20      0.554          0.205    (  0.499)        0.349
65   5.42     4.70      0.620          0.205    (  0.558)        0.415
66   5.50     5.60      0.739          0.205    (  0.665)        0.534
67   5.58     1.90      0.251          0.205    (  0.226)        0.046
68   5.67     0.90      0.119       (  0.205)       0.107        0.012
69   5.75     0.60      0.079       (  0.205)       0.071        0.008
70   5.83     0.50      0.066       (  0.205)       0.059        0.007
71   5.92     0.30      0.040       (  0.205)       0.036        0.004
72   6.00     0.20      0.026       (  0.205)       0.024        0.003
               (Loss Rate Not Used)
   Sum =     100.0                                    Sum =     3.7
      Flood volume = Effective rainfall      0.31(In)
       times area      26.6(Ac.)/[(In)/(Ft.)] =       0.7(Ac.Ft)
      Total soil loss =      0.79(In)
      Total soil loss =     1.750(Ac.Ft)
      Total rainfall =      1.10(In)
      Flood volume =       29904.9 Cubic Feet
      Total soil loss =       76215.4 Cubic Feet
      ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     10.391(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          6 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      ---------------------------------------------------------------------
                   Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
-------------------------------------------------------------------------
  0+ 5       0.0002      0.03  Q         |         |         |         |
  0+10       0.0009      0.11  Q         |         |         |         |
  0+15       0.0020      0.16  Q         |         |         |         |
  0+20       0.0033      0.18  Q         |         |         |         |
  0+25       0.0046      0.19  Q         |         |         |         |
  0+30       0.0060      0.20  Q         |         |         |         |
  0+35       0.0076      0.23  Q         |         |         |         |
```

```
0+40       0.0092      0.24  Q          |          |          |          |
0+45       0.0109      0.24  Q          |          |          |          |
0+50       0.0125      0.24  Q          |          |          |          |
0+55       0.0142      0.25  Q          |          |          |          |
1+ 0       0.0160      0.25  Q          |          |          |          |
1+ 5       0.0178      0.27  QV         |          |          |          |
1+10       0.0197      0.28  QV         |          |          |          |
1+15       0.0216      0.28  QV         |          |          |          |
1+20       0.0236      0.28  QV         |          |          |          |
1+25       0.0255      0.28  QV         |          |          |          |
1+30       0.0274      0.28  QV         |          |          |          |
1+35       0.0294      0.28  QV         |          |          |          |
1+40       0.0313      0.28  QV         |          |          |          |
1+45       0.0333      0.28  QV         |          |          |          |
1+50       0.0352      0.28  Q V        |          |          |          |
1+55       0.0372      0.28  Q V        |          |          |          |
2+ 0       0.0392      0.29  Q V        |          |          |          |
2+ 5       0.0412      0.30  Q V        |          |          |          |
2+10       0.0432      0.29  Q V        |          |          |          |
2+15       0.0454      0.31  Q V        |          |          |          |
2+20       0.0475      0.31  Q V        |          |          |          |
2+25       0.0497      0.31  Q V        |          |          |          |
2+30       0.0519      0.32  Q  V       |          |          |          |
2+35       0.0540      0.32  Q  V       |          |          |          |
2+40       0.0562      0.32  Q  V       |          |          |          |
2+45       0.0585      0.32  Q  V       |          |          |          |
2+50       0.0608      0.34  Q  V       |          |          |          |
2+55       0.0632      0.35  Q  V       |          |          |          |
3+ 0       0.0656      0.35  Q  V       |          |          |          |
3+ 5       0.0680      0.35  Q  V       |          |          |          |
3+10       0.0704      0.36  Q   V      |          |          |          |
3+15       0.0730      0.37  Q   V      |          |          |          |
3+20       0.0756      0.38  Q   V      |          |          |          |
3+25       0.0783      0.39  Q   V      |          |          |          |
3+30       0.0812      0.41  Q   V      |          |          |          |
3+35       0.0842      0.44  Q   V      |          |          |          |
3+40       0.0874      0.47  Q    V     |          |          |          |
3+45       0.0908      0.48  Q    V     |          |          |          |
3+50       0.0943      0.51  |Q   V     |          |          |          |
3+55       0.0978      0.52  |Q   V     |          |          |          |
4+ 0       0.1016      0.54  |Q   V     |          |          |          |
4+ 5       0.1054      0.56  |Q    V    |          |          |          |
4+10       0.1097      0.62  |Q    V    |          |          |          |
4+15       0.1152      0.80  |Q    V    |          |          |          |
4+20       0.1225      1.07  | Q    V   |          |          |          |
4+25       0.1319      1.37  | Q    V   |          |          |          |
4+30       0.1432      1.64  |  Q    V  |          |          |          |
4+35       0.1557      1.81  |  Q     V|          |          |          |
4+40       0.1701      2.08  |   Q    V|          |          |          |
4+45       0.1866      2.40  |   Q     V          |          |          |
```

```
    4+50       0.2051      2.69  |    Q    |V        |         |         |
    4+55       0.2249      2.87  |    Q    |  V      |         |         |
    5+ 0       0.2465      3.15  |     Q   |   V     |         |         |
    5+ 5       0.2718      3.67  |      Q  |    V    |         |         |
    5+10       0.3052      4.85  |        Q|      V  |         |         |
    5+15       0.3479      6.20  |         | Q       V         |         |
    5+20       0.3985      7.35  |         |   Q     |  V      |         |
    5+25       0.4573      8.54  |         |      Q  |     V   |         |
    5+30       0.5279     10.24  |         |         Q         V         |
    5+35       0.5994     10.39  |         |         Q         |   V     |
    5+40       0.6352      5.20  |         Q         |         |      V  |
    5+45       0.6541      2.73  |    Q    |         |         |       V |
    5+50       0.6660      1.73  |  Q      |         |         |       V |
    5+55       0.6740      1.16  | Q       |         |         |         V|
    6+ 0       0.6795      0.79  |Q        |         |         |         V|
    6+ 5       0.6830      0.51  |Q        |         |         |         V|
    6+10       0.6850      0.30  Q         |         |         |         V|
    6+15       0.6862      0.17  Q         |         |         |         V|
    6+20       0.6864      0.03  Q         |         |         |         V|
    6+25       0.6864      0.01  Q         |         |         |         V|
    6+30       0.6865      0.01  Q         |         |         |         V|
    6+35       0.6865      0.00  Q         |         |         |         V|
    6+40       0.6865      0.00  Q         |         |         |         V|
    6+45       0.6865      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 06/29/23 File: MenifeeExUH2YR24HR242.out

++

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

IRV22-0086 ARES MENIFEE - EXISTING 2 YEAR 24 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1818.00(Ft.)
Length along longest watercourse measured to centroid = 661.80(Ft.)
Length along longest watercourse = 0.344 Mi.
Length along longest watercourse measured to centroid = 0.125 Mi.
Difference in elevation = 21.07(Ft.)
Slope along watercourse = 61.1934 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.100 Hr.
Lag time = 5.99 Min.
25% of lag time = 1.50 Min.
40% of lag time = 2.40 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]
26.58	1.85	49.17

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	4.75	126.25

STORM EVENT (YEAR) = 2.00

Area Averaged 2-Year Rainfall = 1.850(In)
Area Averaged 100-Year Rainfall = 4.750(In)

Point rain (area averaged) = 1.850(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.850(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	93.00	0.000

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
93.0	83.4	0.205	0.000	0.205	1.000	0.205
					Sum (F) =	0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205
Minimum soil loss rate ((In/Hr)) = 0.103
(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 (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.491	14.285	3.826
2	0.167	166.982	45.525	12.195
3	0.250	250.473	18.969	5.081
4	0.333	333.964	8.021	2.149
5	0.417	417.455	4.785	1.282
6	0.500	500.946	2.979	0.798
7	0.583	584.438	2.148	0.575
8	0.667	667.929	1.442	0.386
9	0.750	751.420	0.944	0.253
10	0.833	834.911	0.903	0.242
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)

1	0.08	0.07	0.015	(0.364)	0.013	0.001
2	0.17	0.07	0.015	(0.362)	0.013	0.001
3	0.25	0.07	0.015	(0.361)	0.013	0.001
4	0.33	0.10	0.022	(0.360)	0.020	0.002
5	0.42	0.10	0.022	(0.358)	0.020	0.002
6	0.50	0.10	0.022	(0.357)	0.020	0.002
7	0.58	0.10	0.022	(0.355)	0.020	0.002
8	0.67	0.10	0.022	(0.354)	0.020	0.002
9	0.75	0.10	0.022	(0.353)	0.020	0.002
10	0.83	0.13	0.030	(0.351)	0.027	0.003
11	0.92	0.13	0.030	(0.350)	0.027	0.003
12	1.00	0.13	0.030	(0.349)	0.027	0.003
13	1.08	0.10	0.022	(0.347)	0.020	0.002
14	1.17	0.10	0.022	(0.346)	0.020	0.002
15	1.25	0.10	0.022	(0.344)	0.020	0.002
16	1.33	0.10	0.022	(0.343)	0.020	0.002
17	1.42	0.10	0.022	(0.342)	0.020	0.002
18	1.50	0.10	0.022	(0.340)	0.020	0.002
19	1.58	0.10	0.022	(0.339)	0.020	0.002
20	1.67	0.10	0.022	(0.338)	0.020	0.002
21	1.75	0.10	0.022	(0.336)	0.020	0.002
22	1.83	0.13	0.030	(0.335)	0.027	0.003
23	1.92	0.13	0.030	(0.334)	0.027	0.003
24	2.00	0.13	0.030	(0.332)	0.027	0.003
25	2.08	0.13	0.030	(0.331)	0.027	0.003
26	2.17	0.13	0.030	(0.329)	0.027	0.003
27	2.25	0.13	0.030	(0.328)	0.027	0.003
28	2.33	0.13	0.030	(0.327)	0.027	0.003
29	2.42	0.13	0.030	(0.325)	0.027	0.003
30	2.50	0.13	0.030	(0.324)	0.027	0.003
31	2.58	0.17	0.037	(0.323)	0.033	0.004
32	2.67	0.17	0.037	(0.321)	0.033	0.004
33	2.75	0.17	0.037	(0.320)	0.033	0.004
34	2.83	0.17	0.037	(0.319)	0.033	0.004
35	2.92	0.17	0.037	(0.318)	0.033	0.004
36	3.00	0.17	0.037	(0.316)	0.033	0.004
37	3.08	0.17	0.037	(0.315)	0.033	0.004
38	3.17	0.17	0.037	(0.314)	0.033	0.004
39	3.25	0.17	0.037	(0.312)	0.033	0.004
40	3.33	0.17	0.037	(0.311)	0.033	0.004
41	3.42	0.17	0.037	(0.310)	0.033	0.004
42	3.50	0.17	0.037	(0.308)	0.033	0.004
43	3.58	0.17	0.037	(0.307)	0.033	0.004
44	3.67	0.17	0.037	(0.306)	0.033	0.004
45	3.75	0.17	0.037	(0.305)	0.033	0.004
46	3.83	0.20	0.044	(0.303)	0.040	0.004
47	3.92	0.20	0.044	(0.302)	0.040	0.004
48	4.00	0.20	0.044	(0.301)	0.040	0.004
49	4.08	0.20	0.044	(0.299)	0.040	0.004
50	4.17	0.20	0.044	(0.298)	0.040	0.004

51	4.25	0.20	0.044	(0.297)	0.040	0.004
52	4.33	0.23	0.052	(0.296)	0.047	0.005
53	4.42	0.23	0.052	(0.294)	0.047	0.005
54	4.50	0.23	0.052	(0.293)	0.047	0.005
55	4.58	0.23	0.052	(0.292)	0.047	0.005
56	4.67	0.23	0.052	(0.291)	0.047	0.005
57	4.75	0.23	0.052	(0.289)	0.047	0.005
58	4.83	0.27	0.059	(0.288)	0.053	0.006
59	4.92	0.27	0.059	(0.287)	0.053	0.006
60	5.00	0.27	0.059	(0.286)	0.053	0.006
61	5.08	0.20	0.044	(0.284)	0.040	0.004
62	5.17	0.20	0.044	(0.283)	0.040	0.004
63	5.25	0.20	0.044	(0.282)	0.040	0.004
64	5.33	0.23	0.052	(0.281)	0.047	0.005
65	5.42	0.23	0.052	(0.279)	0.047	0.005
66	5.50	0.23	0.052	(0.278)	0.047	0.005
67	5.58	0.27	0.059	(0.277)	0.053	0.006
68	5.67	0.27	0.059	(0.276)	0.053	0.006
69	5.75	0.27	0.059	(0.275)	0.053	0.006
70	5.83	0.27	0.059	(0.273)	0.053	0.006
71	5.92	0.27	0.059	(0.272)	0.053	0.006
72	6.00	0.27	0.059	(0.271)	0.053	0.006
73	6.08	0.30	0.067	(0.270)	0.060	0.007
74	6.17	0.30	0.067	(0.269)	0.060	0.007
75	6.25	0.30	0.067	(0.267)	0.060	0.007
76	6.33	0.30	0.067	(0.266)	0.060	0.007
77	6.42	0.30	0.067	(0.265)	0.060	0.007
78	6.50	0.30	0.067	(0.264)	0.060	0.007
79	6.58	0.33	0.074	(0.263)	0.067	0.007
80	6.67	0.33	0.074	(0.261)	0.067	0.007
81	6.75	0.33	0.074	(0.260)	0.067	0.007
82	6.83	0.33	0.074	(0.259)	0.067	0.007
83	6.92	0.33	0.074	(0.258)	0.067	0.007
84	7.00	0.33	0.074	(0.257)	0.067	0.007
85	7.08	0.33	0.074	(0.256)	0.067	0.007
86	7.17	0.33	0.074	(0.254)	0.067	0.007
87	7.25	0.33	0.074	(0.253)	0.067	0.007
88	7.33	0.37	0.081	(0.252)	0.073	0.008
89	7.42	0.37	0.081	(0.251)	0.073	0.008
90	7.50	0.37	0.081	(0.250)	0.073	0.008
91	7.58	0.40	0.089	(0.249)	0.080	0.009
92	7.67	0.40	0.089	(0.247)	0.080	0.009
93	7.75	0.40	0.089	(0.246)	0.080	0.009
94	7.83	0.43	0.096	(0.245)	0.087	0.010
95	7.92	0.43	0.096	(0.244)	0.087	0.010
96	8.00	0.43	0.096	(0.243)	0.087	0.010
97	8.08	0.50	0.111	(0.242)	0.100	0.011
98	8.17	0.50	0.111	(0.241)	0.100	0.011
99	8.25	0.50	0.111	(0.240)	0.100	0.011
100	8.33	0.50	0.111	(0.238)	0.100	0.011

101	8.42	0.50	0.111	(0.237)	0.100	0.011
102	8.50	0.50	0.111	(0.236)	0.100	0.011
103	8.58	0.53	0.118	(0.235)	0.107	0.012
104	8.67	0.53	0.118	(0.234)	0.107	0.012
105	8.75	0.53	0.118	(0.233)	0.107	0.012
106	8.83	0.57	0.126	(0.232)	0.113	0.013
107	8.92	0.57	0.126	(0.231)	0.113	0.013
108	9.00	0.57	0.126	(0.230)	0.113	0.013
109	9.08	0.63	0.141	(0.228)	0.127	0.014
110	9.17	0.63	0.141	(0.227)	0.127	0.014
111	9.25	0.63	0.141	(0.226)	0.127	0.014
112	9.33	0.67	0.148	(0.225)	0.133	0.015
113	9.42	0.67	0.148	(0.224)	0.133	0.015
114	9.50	0.67	0.148	(0.223)	0.133	0.015
115	9.58	0.70	0.155	(0.222)	0.140	0.016
116	9.67	0.70	0.155	(0.221)	0.140	0.016
117	9.75	0.70	0.155	(0.220)	0.140	0.016
118	9.83	0.73	0.163	(0.219)	0.147	0.016
119	9.92	0.73	0.163	(0.218)	0.147	0.016
120	10.00	0.73	0.163	(0.217)	0.147	0.016
121	10.08	0.50	0.111	(0.216)	0.100	0.011
122	10.17	0.50	0.111	(0.215)	0.100	0.011
123	10.25	0.50	0.111	(0.214)	0.100	0.011
124	10.33	0.50	0.111	(0.213)	0.100	0.011
125	10.42	0.50	0.111	(0.212)	0.100	0.011
126	10.50	0.50	0.111	(0.210)	0.100	0.011
127	10.58	0.67	0.148	(0.209)	0.133	0.015
128	10.67	0.67	0.148	(0.208)	0.133	0.015
129	10.75	0.67	0.148	(0.207)	0.133	0.015
130	10.83	0.67	0.148	(0.206)	0.133	0.015
131	10.92	0.67	0.148	(0.205)	0.133	0.015
132	11.00	0.67	0.148	(0.204)	0.133	0.015
133	11.08	0.63	0.141	(0.203)	0.127	0.014
134	11.17	0.63	0.141	(0.202)	0.127	0.014
135	11.25	0.63	0.141	(0.201)	0.127	0.014
136	11.33	0.63	0.141	(0.200)	0.127	0.014
137	11.42	0.63	0.141	(0.199)	0.127	0.014
138	11.50	0.63	0.141	(0.198)	0.127	0.014
139	11.58	0.57	0.126	(0.197)	0.113	0.013
140	11.67	0.57	0.126	(0.196)	0.113	0.013
141	11.75	0.57	0.126	(0.195)	0.113	0.013
142	11.83	0.60	0.133	(0.194)	0.120	0.013
143	11.92	0.60	0.133	(0.194)	0.120	0.013
144	12.00	0.60	0.133	(0.193)	0.120	0.013
145	12.08	0.83	0.185	(0.192)	0.166	0.018
146	12.17	0.83	0.185	(0.191)	0.166	0.018
147	12.25	0.83	0.185	(0.190)	0.166	0.018
148	12.33	0.87	0.192	(0.189)	0.173	0.019
149	12.42	0.87	0.192	(0.188)	0.173	0.019
150	12.50	0.87	0.192	(0.187)	0.173	0.019

151	12.58	0.93	0.207		0.186	(0.186)	0.021
152	12.67	0.93	0.207		0.185	(0.186)	0.022
153	12.75	0.93	0.207		0.184	(0.186)	0.023
154	12.83	0.97	0.215		0.183	(0.193)	0.032
155	12.92	0.97	0.215		0.182	(0.193)	0.032
156	13.00	0.97	0.215		0.181	(0.193)	0.033
157	13.08	1.13	0.252		0.180	(0.226)	0.071
158	13.17	1.13	0.252		0.179	(0.226)	0.072
159	13.25	1.13	0.252		0.178	(0.226)	0.073
160	13.33	1.13	0.252		0.178	(0.226)	0.074
161	13.42	1.13	0.252		0.177	(0.226)	0.075
162	13.50	1.13	0.252		0.176	(0.226)	0.076
163	13.58	0.77	0.170	(0.175)		0.153	0.017
164	13.67	0.77	0.170	(0.174)		0.153	0.017
165	13.75	0.77	0.170	(0.173)		0.153	0.017
166	13.83	0.77	0.170	(0.172)		0.153	0.017
167	13.92	0.77	0.170	(0.171)		0.153	0.017
168	14.00	0.77	0.170	(0.170)		0.153	0.017
169	14.08	0.90	0.200		0.170	(0.180)	0.030
170	14.17	0.90	0.200		0.169	(0.180)	0.031
171	14.25	0.90	0.200		0.168	(0.180)	0.032
172	14.33	0.87	0.192		0.167	(0.173)	0.025
173	14.42	0.87	0.192		0.166	(0.173)	0.026
174	14.50	0.87	0.192		0.165	(0.173)	0.027
175	14.58	0.87	0.192		0.164	(0.173)	0.028
176	14.67	0.87	0.192		0.164	(0.173)	0.029
177	14.75	0.87	0.192		0.163	(0.173)	0.030
178	14.83	0.83	0.185		0.162	(0.166)	0.023
179	14.92	0.83	0.185		0.161	(0.166)	0.024
180	15.00	0.83	0.185		0.160	(0.166)	0.025
181	15.08	0.80	0.178		0.159	(0.160)	0.018
182	15.17	0.80	0.178		0.159	(0.160)	0.019
183	15.25	0.80	0.178		0.158	(0.160)	0.020
184	15.33	0.77	0.170	(0.157)		0.153	0.017
185	15.42	0.77	0.170	(0.156)		0.153	0.017
186	15.50	0.77	0.170	(0.155)		0.153	0.017
187	15.58	0.63	0.141	(0.155)		0.127	0.014
188	15.67	0.63	0.141	(0.154)		0.127	0.014
189	15.75	0.63	0.141	(0.153)		0.127	0.014
190	15.83	0.63	0.141	(0.152)		0.127	0.014
191	15.92	0.63	0.141	(0.151)		0.127	0.014
192	16.00	0.63	0.141	(0.151)		0.127	0.014
193	16.08	0.13	0.030	(0.150)		0.027	0.003
194	16.17	0.13	0.030	(0.149)		0.027	0.003
195	16.25	0.13	0.030	(0.148)		0.027	0.003
196	16.33	0.13	0.030	(0.148)		0.027	0.003
197	16.42	0.13	0.030	(0.147)		0.027	0.003
198	16.50	0.13	0.030	(0.146)		0.027	0.003
199	16.58	0.10	0.022	(0.145)		0.020	0.002
200	16.67	0.10	0.022	(0.145)		0.020	0.002

201	16.75	0.10	0.022	(0.144)	0.020	0.002
202	16.83	0.10	0.022	(0.143)	0.020	0.002
203	16.92	0.10	0.022	(0.142)	0.020	0.002
204	17.00	0.10	0.022	(0.142)	0.020	0.002
205	17.08	0.17	0.037	(0.141)	0.033	0.004
206	17.17	0.17	0.037	(0.140)	0.033	0.004
207	17.25	0.17	0.037	(0.140)	0.033	0.004
208	17.33	0.17	0.037	(0.139)	0.033	0.004
209	17.42	0.17	0.037	(0.138)	0.033	0.004
210	17.50	0.17	0.037	(0.138)	0.033	0.004
211	17.58	0.17	0.037	(0.137)	0.033	0.004
212	17.67	0.17	0.037	(0.136)	0.033	0.004
213	17.75	0.17	0.037	(0.135)	0.033	0.004
214	17.83	0.13	0.030	(0.135)	0.027	0.003
215	17.92	0.13	0.030	(0.134)	0.027	0.003
216	18.00	0.13	0.030	(0.133)	0.027	0.003
217	18.08	0.13	0.030	(0.133)	0.027	0.003
218	18.17	0.13	0.030	(0.132)	0.027	0.003
219	18.25	0.13	0.030	(0.132)	0.027	0.003
220	18.33	0.13	0.030	(0.131)	0.027	0.003
221	18.42	0.13	0.030	(0.130)	0.027	0.003
222	18.50	0.13	0.030	(0.130)	0.027	0.003
223	18.58	0.10	0.022	(0.129)	0.020	0.002
224	18.67	0.10	0.022	(0.128)	0.020	0.002
225	18.75	0.10	0.022	(0.128)	0.020	0.002
226	18.83	0.07	0.015	(0.127)	0.013	0.001
227	18.92	0.07	0.015	(0.127)	0.013	0.001
228	19.00	0.07	0.015	(0.126)	0.013	0.001
229	19.08	0.10	0.022	(0.125)	0.020	0.002
230	19.17	0.10	0.022	(0.125)	0.020	0.002
231	19.25	0.10	0.022	(0.124)	0.020	0.002
232	19.33	0.13	0.030	(0.124)	0.027	0.003
233	19.42	0.13	0.030	(0.123)	0.027	0.003
234	19.50	0.13	0.030	(0.122)	0.027	0.003
235	19.58	0.10	0.022	(0.122)	0.020	0.002
236	19.67	0.10	0.022	(0.121)	0.020	0.002
237	19.75	0.10	0.022	(0.121)	0.020	0.002
238	19.83	0.07	0.015	(0.120)	0.013	0.001
239	19.92	0.07	0.015	(0.120)	0.013	0.001
240	20.00	0.07	0.015	(0.119)	0.013	0.001
241	20.08	0.10	0.022	(0.119)	0.020	0.002
242	20.17	0.10	0.022	(0.118)	0.020	0.002
243	20.25	0.10	0.022	(0.118)	0.020	0.002
244	20.33	0.10	0.022	(0.117)	0.020	0.002
245	20.42	0.10	0.022	(0.117)	0.020	0.002
246	20.50	0.10	0.022	(0.116)	0.020	0.002
247	20.58	0.10	0.022	(0.116)	0.020	0.002
248	20.67	0.10	0.022	(0.115)	0.020	0.002
249	20.75	0.10	0.022	(0.115)	0.020	0.002
250	20.83	0.07	0.015	(0.114)	0.013	0.001

251	20.92	0.07	0.015	(0.114)	0.013	0.001
252	21.00	0.07	0.015	(0.113)	0.013	0.001
253	21.08	0.10	0.022	(0.113)	0.020	0.002
254	21.17	0.10	0.022	(0.112)	0.020	0.002
255	21.25	0.10	0.022	(0.112)	0.020	0.002
256	21.33	0.07	0.015	(0.112)	0.013	0.001
257	21.42	0.07	0.015	(0.111)	0.013	0.001
258	21.50	0.07	0.015	(0.111)	0.013	0.001
259	21.58	0.10	0.022	(0.110)	0.020	0.002
260	21.67	0.10	0.022	(0.110)	0.020	0.002
261	21.75	0.10	0.022	(0.109)	0.020	0.002
262	21.83	0.07	0.015	(0.109)	0.013	0.001
263	21.92	0.07	0.015	(0.109)	0.013	0.001
264	22.00	0.07	0.015	(0.108)	0.013	0.001
265	22.08	0.10	0.022	(0.108)	0.020	0.002
266	22.17	0.10	0.022	(0.108)	0.020	0.002
267	22.25	0.10	0.022	(0.107)	0.020	0.002
268	22.33	0.07	0.015	(0.107)	0.013	0.001
269	22.42	0.07	0.015	(0.107)	0.013	0.001
270	22.50	0.07	0.015	(0.106)	0.013	0.001
271	22.58	0.07	0.015	(0.106)	0.013	0.001
272	22.67	0.07	0.015	(0.106)	0.013	0.001
273	22.75	0.07	0.015	(0.105)	0.013	0.001
274	22.83	0.07	0.015	(0.105)	0.013	0.001
275	22.92	0.07	0.015	(0.105)	0.013	0.001
276	23.00	0.07	0.015	(0.105)	0.013	0.001
277	23.08	0.07	0.015	(0.104)	0.013	0.001
278	23.17	0.07	0.015	(0.104)	0.013	0.001
279	23.25	0.07	0.015	(0.104)	0.013	0.001
280	23.33	0.07	0.015	(0.104)	0.013	0.001
281	23.42	0.07	0.015	(0.104)	0.013	0.001
282	23.50	0.07	0.015	(0.103)	0.013	0.001
283	23.58	0.07	0.015	(0.103)	0.013	0.001
284	23.67	0.07	0.015	(0.103)	0.013	0.001
285	23.75	0.07	0.015	(0.103)	0.013	0.001
286	23.83	0.07	0.015	(0.103)	0.013	0.001
287	23.92	0.07	0.015	(0.103)	0.013	0.001
288	24.00	0.07	0.015	(0.103)	0.013	0.001

(Loss Rate Not Used)

Sum = 100.0 Sum = 2.6

Flood volume = Effective rainfall 0.22(In)
times area 26.6(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)
Total soil loss = 1.63(In)
Total soil loss = 3.608(Ac.Ft)
Total rainfall = 1.85(In)
Flood volume = 21305.5 Cubic Feet
Total soil loss = 157176.5 Cubic Feet

Peak flow rate of this hydrograph = 1.932(CFS)

++

24 - H O U R S T O R M

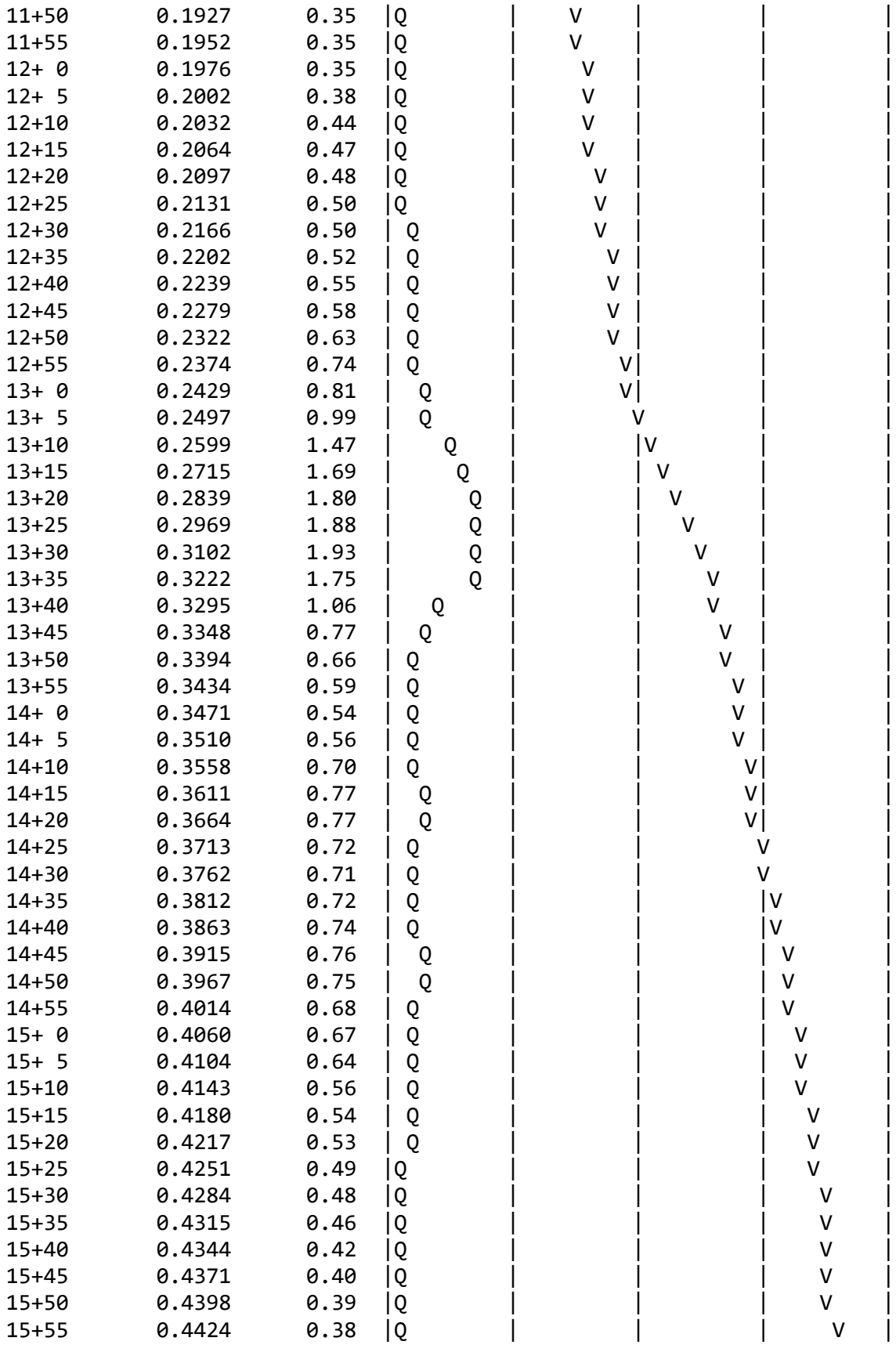
R u n o f f H y d r o g r a p h

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	0.0002	0.02	Q				
0+15	0.0004	0.03	Q				
0+20	0.0007	0.04	Q				
0+25	0.0010	0.05	Q				
0+30	0.0014	0.05	Q				
0+35	0.0018	0.06	Q				
0+40	0.0021	0.06	Q				
0+45	0.0025	0.06	Q				
0+50	0.0030	0.06	Q				
0+55	0.0035	0.07	Q				
1+ 0	0.0040	0.07	Q				
1+ 5	0.0045	0.07	Q				
1+10	0.0049	0.07	Q				
1+15	0.0054	0.06	Q				
1+20	0.0058	0.06	Q				
1+25	0.0062	0.06	Q				
1+30	0.0066	0.06	Q				
1+35	0.0070	0.06	Q				
1+40	0.0075	0.06	Q				
1+45	0.0079	0.06	Q				
1+50	0.0083	0.06	Q				
1+55	0.0088	0.07	Q				
2+ 0	0.0093	0.08	Q				
2+ 5	0.0098	0.08	Q				
2+10	0.0104	0.08	Q				
2+15	0.0109	0.08	Q				
2+20	0.0114	0.08	Q				
2+25	0.0120	0.08	Q				
2+30	0.0125	0.08	QV				
2+35	0.0131	0.08	QV				
2+40	0.0137	0.09	QV				
2+45	0.0144	0.09	QV				
2+50	0.0150	0.10	QV				
2+55	0.0157	0.10	QV				
3+ 0	0.0164	0.10	QV				
3+ 5	0.0171	0.10	QV				
3+10	0.0178	0.10	QV				
3+15	0.0184	0.10	QV				
3+20	0.0191	0.10	QV				
3+25	0.0198	0.10	QV				

3+30	0.0205	0.10	QV	|	|	|	|
3+35	0.0212	0.10	QV	|	|	|	|
3+40	0.0219	0.10	QV	|	|	|	|
3+45	0.0225	0.10	QV	|	|	|	|
3+50	0.0232	0.10	QV	|	|	|	|
3+55	0.0240	0.11	QV	|	|	|	|
4+ 0	0.0248	0.11	Q V	|	|	|	|
4+ 5	0.0256	0.12	Q V	|	|	|	|
4+10	0.0264	0.12	Q V	|	|	|	|
4+15	0.0272	0.12	Q V	|	|	|	|
4+20	0.0280	0.12	Q V	|	|	|	|
4+25	0.0289	0.13	Q V	|	|	|	|
4+30	0.0299	0.13	Q V	|	|	|	|
4+35	0.0308	0.14	Q V	|	|	|	|
4+40	0.0318	0.14	Q V	|	|	|	|
4+45	0.0327	0.14	Q V	|	|	|	|
4+50	0.0337	0.14	Q V	|	|	|	|
4+55	0.0347	0.15	Q V	|	|	|	|
5+ 0	0.0358	0.15	Q V	|	|	|	|
5+ 5	0.0368	0.15	Q V	|	|	|	|
5+10	0.0377	0.13	Q V	|	|	|	|
5+15	0.0386	0.13	Q V	|	|	|	|
5+20	0.0395	0.13	Q V	|	|	|	|
5+25	0.0404	0.13	Q V	|	|	|	|
5+30	0.0413	0.14	Q V	|	|	|	|
5+35	0.0423	0.14	Q V	|	|	|	|
5+40	0.0433	0.15	Q V	|	|	|	|
5+45	0.0444	0.15	Q V	|	|	|	|
5+50	0.0455	0.16	Q V	|	|	|	|
5+55	0.0465	0.16	Q V	|	|	|	|
6+ 0	0.0476	0.16	Q V	|	|	|	|
6+ 5	0.0487	0.16	Q V	|	|	|	|
6+10	0.0499	0.17	Q V	|	|	|	|
6+15	0.0511	0.17	Q V	|	|	|	|
6+20	0.0523	0.18	Q V	|	|	|	|
6+25	0.0535	0.18	Q V	|	|	|	|
6+30	0.0547	0.18	Q V	|	|	|	|
6+35	0.0560	0.18	Q V	|	|	|	|
6+40	0.0573	0.19	Q V	|	|	|	|
6+45	0.0586	0.19	Q V	|	|	|	|
6+50	0.0600	0.20	Q V	|	|	|	|
6+55	0.0613	0.20	Q V	|	|	|	|
7+ 0	0.0627	0.20	Q V	|	|	|	|
7+ 5	0.0641	0.20	Q V	|	|	|	|
7+10	0.0654	0.20	Q V	|	|	|	|
7+15	0.0668	0.20	Q V	|	|	|	|
7+20	0.0682	0.20	Q V	|	|	|	|
7+25	0.0696	0.21	Q V	|	|	|	|
7+30	0.0711	0.21	Q V	|	|	|	|
7+35	0.0726	0.22	Q V	|	|	|	|

```
 7+40       0.0742      0.23  Q     V   |           |           |           |
 7+45       0.0758      0.23  Q     V   |           |           |           |
 7+50       0.0774      0.24  Q     V   |           |           |           |
 7+55       0.0791      0.25  Q     V   |           |           |           |
 8+ 0       0.0808      0.25  |Q    V   |           |           |           |
 8+ 5       0.0826      0.26  |Q    V   |           |           |           |
 8+10       0.0846      0.28  |Q    V   |           |           |           |
 8+15       0.0865      0.29  |Q     V  |           |           |           |
 8+20       0.0886      0.29  |Q     V  |           |           |           |
 8+25       0.0906      0.29  |Q     V  |           |           |           |
 8+30       0.0926      0.30  |Q     V  |           |           |           |
 8+35       0.0947      0.30  |Q     V  |           |           |           |
 8+40       0.0968      0.31  |Q     V  |           |           |           |
 8+45       0.0990      0.31  |Q      V |           |           |           |
 8+50       0.1011      0.32  |Q      V |           |           |           |
 8+55       0.1034      0.33  |Q      V |           |           |           |
 9+ 0       0.1057      0.33  |Q      V |           |           |           |
 9+ 5       0.1080      0.34  |Q      V |           |           |           |
 9+10       0.1105      0.36  |Q       V|           |           |           |
 9+15       0.1130      0.37  |Q       V|           |           |           |
 9+20       0.1156      0.37  |Q       V|           |           |           |
 9+25       0.1182      0.38  |Q       V|           |           |           |
 9+30       0.1209      0.39  |Q       V|           |           |           |
 9+35       0.1237      0.40  |Q        V           |           |           |
 9+40       0.1264      0.41  |Q        V           |           |           |
 9+45       0.1293      0.41  |Q        V           |           |           |
 9+50       0.1321      0.42  |Q        V           |           |           |
 9+55       0.1351      0.43  |Q        |V          |           |           |
10+ 0       0.1380      0.43  |Q        |V          |           |           |
10+ 5       0.1409      0.41  |Q        |V          |           |           |
10+10       0.1433      0.35  |Q        |V          |           |           |
10+15       0.1456      0.33  |Q        |V          |           |           |
10+20       0.1477      0.32  |Q        | V         |           |           |
10+25       0.1499      0.31  |Q        | V         |           |           |
10+30       0.1520      0.30  |Q        | V         |           |           |
10+35       0.1541      0.32  |Q        | V         |           |           |
10+40       0.1566      0.36  |Q        | V         |           |           |
10+45       0.1592      0.38  |Q        |  V        |           |           |
10+50       0.1618      0.38  |Q        |  V        |           |           |
10+55       0.1645      0.39  |Q        |  V        |           |           |
11+ 0       0.1672      0.39  |Q        |  V        |           |           |
11+ 5       0.1699      0.39  |Q        |  V        |           |           |
11+10       0.1725      0.38  |Q        |   V       |           |           |
11+15       0.1752      0.38  |Q        |   V       |           |           |
11+20       0.1778      0.38  |Q        |   V       |           |           |
11+25       0.1804      0.38  |Q        |   V       |           |           |
11+30       0.1830      0.38  |Q        |   V       |           |           |
11+35       0.1855      0.37  |Q        |    V      |           |           |
11+40       0.1880      0.35  |Q        |    V      |           |           |
11+45       0.1904      0.35  |Q        |    V      |           |           |
```



16+ 0	0.4451	0.38	|Q	|	|	|	V |
16+ 5	0.4474	0.34	|Q	|	|	|	V |
16+10	0.4488	0.20	Q	|	|	|	V |
16+15	0.4497	0.14	Q	|	|	|	V |
16+20	0.4506	0.12	Q	|	|	|	V |
16+25	0.4513	0.10	Q	|	|	|	V |
16+30	0.4519	0.10	Q	|	|	|	V |
16+35	0.4525	0.09	Q	|	|	|	V |
16+40	0.4530	0.07	Q	|	|	|	V |
16+45	0.4535	0.07	Q	|	|	|	V |
16+50	0.4539	0.06	Q	|	|	|	V |
16+55	0.4543	0.06	Q	|	|	|	V |
17+ 0	0.4548	0.06	Q	|	|	|	V |
17+ 5	0.4552	0.07	Q	|	|	|	V |
17+10	0.4558	0.08	Q	|	|	|	V |
17+15	0.4564	0.09	Q	|	|	|	V |
17+20	0.4571	0.09	Q	|	|	|	V |
17+25	0.4577	0.10	Q	|	|	|	V |
17+30	0.4584	0.10	Q	|	|	|	V |
17+35	0.4591	0.10	Q	|	|	|	V |
17+40	0.4597	0.10	Q	|	|	|	V |
17+45	0.4604	0.10	Q	|	|	|	V |
17+50	0.4611	0.10	Q	|	|	|	V |
17+55	0.4617	0.09	Q	|	|	|	V |
18+ 0	0.4623	0.08	Q	|	|	|	V |
18+ 5	0.4628	0.08	Q	|	|	|	V |
18+10	0.4634	0.08	Q	|	|	|	V |
18+15	0.4639	0.08	Q	|	|	|	V |
18+20	0.4645	0.08	Q	|	|	|	V |
18+25	0.4650	0.08	Q	|	|	|	V |
18+30	0.4656	0.08	Q	|	|	|	V |
18+35	0.4661	0.08	Q	|	|	|	V |
18+40	0.4666	0.07	Q	|	|	|	V |
18+45	0.4670	0.06	Q	|	|	|	V |
18+50	0.4674	0.06	Q	|	|	|	V |
18+55	0.4678	0.05	Q	|	|	|	V |
19+ 0	0.4681	0.04	Q	|	|	|	V |
19+ 5	0.4684	0.05	Q	|	|	|	V |
19+10	0.4688	0.05	Q	|	|	|	V |
19+15	0.4691	0.06	Q	|	|	|	V |
19+20	0.4696	0.06	Q	|	|	|	V |
19+25	0.4700	0.07	Q	|	|	|	V |
19+30	0.4706	0.07	Q	|	|	|	V |
19+35	0.4711	0.07	Q	|	|	|	V |
19+40	0.4715	0.07	Q	|	|	|	V |
19+45	0.4719	0.06	Q	|	|	|	V |
19+50	0.4723	0.06	Q	|	|	|	V |
19+55	0.4727	0.05	Q	|	|	|	V |
20+ 0	0.4730	0.04	Q	|	|	|	V |
20+ 5	0.4733	0.05	Q	|	|	|	V |

20+10	0.4737	0.05	Q	|	|	|	V |
20+15	0.4741	0.06	Q	|	|	|	V |
20+20	0.4745	0.06	Q	|	|	|	V |
20+25	0.4749	0.06	Q	|	|	|	V |
20+30	0.4753	0.06	Q	|	|	|	V |
20+35	0.4757	0.06	Q	|	|	|	V |
20+40	0.4761	0.06	Q	|	|	|	V |
20+45	0.4765	0.06	Q	|	|	|	V |
20+50	0.4769	0.06	Q	|	|	|	V |
20+55	0.4772	0.05	Q	|	|	|	V|
21+ 0	0.4775	0.04	Q	|	|	|	V|
21+ 5	0.4778	0.05	Q	|	|	|	V|
21+10	0.4782	0.05	Q	|	|	|	V|
21+15	0.4786	0.06	Q	|	|	|	V|
21+20	0.4789	0.05	Q	|	|	|	V|
21+25	0.4793	0.05	Q	|	|	|	V|
21+30	0.4796	0.04	Q	|	|	|	V|
21+35	0.4799	0.04	Q	|	|	|	V|
21+40	0.4802	0.05	Q	|	|	|	V|
21+45	0.4806	0.06	Q	|	|	|	V|
21+50	0.4810	0.05	Q	|	|	|	V|
21+55	0.4813	0.05	Q	|	|	|	V|
22+ 0	0.4816	0.04	Q	|	|	|	V|
22+ 5	0.4819	0.04	Q	|	|	|	V|
22+10	0.4823	0.05	Q	|	|	|	V|
22+15	0.4827	0.06	Q	|	|	|	V|
22+20	0.4830	0.05	Q	|	|	|	V|
22+25	0.4834	0.05	Q	|	|	|	V|
22+30	0.4837	0.04	Q	|	|	|	V|
22+35	0.4839	0.04	Q	|	|	|	V|
22+40	0.4842	0.04	Q	|	|	|	V|
22+45	0.4845	0.04	Q	|	|	|	V|
22+50	0.4848	0.04	Q	|	|	|	V|
22+55	0.4851	0.04	Q	|	|	|	V|
23+ 0	0.4853	0.04	Q	|	|	|	V|
23+ 5	0.4856	0.04	Q	|	|	|	V|
23+10	0.4859	0.04	Q	|	|	|	V|
23+15	0.4862	0.04	Q	|	|	|	V|
23+20	0.4864	0.04	Q	|	|	|	V|
23+25	0.4867	0.04	Q	|	|	|	V|
23+30	0.4870	0.04	Q	|	|	|	V|
23+35	0.4872	0.04	Q	|	|	|	V|
23+40	0.4875	0.04	Q	|	|	|	V|
23+45	0.4878	0.04	Q	|	|	|	V|
23+50	0.4881	0.04	Q	|	|	|	V|
23+55	0.4883	0.04	Q	|	|	|	V|
24+ 0	0.4886	0.04	Q	|	|	|	V|
24+ 5	0.4888	0.03	Q	|	|	|	V|
24+10	0.4890	0.02	Q	|	|	|	V|
24+15	0.4890	0.01	Q	|	|	|	V|

```
   24+20        0.4891      0.01  Q          |          |          |         V|
   24+25        0.4891      0.00  Q          |          |          |         V|
   24+30        0.4891      0.00  Q          |          |          |         V|
   24+35        0.4891      0.00  Q          |          |          |         V|
   24+40        0.4891      0.00  Q          |          |          |         V|
   24+45        0.4891      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 06/29/23 File: MenifeeExUH5YR1HR15.out

++

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

IRV22-0086 ARES MENIFEE - EXISTING 5 YEAR 1 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1818.00(Ft.)
Length along longest watercourse measured to centroid = 661.80(Ft.)
Length along longest watercourse = 0.344 Mi.
Length along longest watercourse measured to centroid = 0.125 Mi.
Difference in elevation = 21.07(Ft.)
Slope along watercourse = 61.1934 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.100 Hr.
Lag time = 5.99 Min.
25% of lag time = 1.50 Min.
40% of lag time = 2.40 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	0.48	12.76

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.26	33.49

STORM EVENT (YEAR) = 5.00

Area Averaged 2-Year Rainfall = 0.480(In)
Area Averaged 100-Year Rainfall = 1.260(In)

Point rain (area averaged) = 0.663(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 0.663(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	93.00	0.000

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
93.0	83.4	0.205	0.000	0.205	1.000	0.205
					Sum (F) =	0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205
Minimum soil loss rate ((In/Hr)) = 0.103
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5300

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.491	14.285	3.826
2	0.167	166.982	45.525	12.195
3	0.250	250.473	18.969	5.081
4	0.333	333.964	8.021	2.149
5	0.417	417.455	4.785	1.282
6	0.500	500.946	2.979	0.798
7	0.583	584.438	2.148	0.575
8	0.667	667.929	1.442	0.386
9	0.750	751.420	0.944	0.253
10	0.833	834.911	0.903	0.242
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	3.40	0.270	0.205	(0.243)	0.065
2	0.17	4.70	0.374	0.205	(0.336)	0.168
3	0.25	4.70	0.374	0.205	(0.336)	0.168
4	0.33	5.10	0.405	0.205	(0.365)	0.200
5	0.42	5.80	0.461	0.205	(0.415)	0.256
6	0.50	5.90	0.469	0.205	(0.422)	0.264
7	0.58	7.10	0.564	0.205	(0.508)	0.359
8	0.67	8.70	0.692	0.205	(0.623)	0.486
9	0.75	13.20	1.049	0.205	(0.945)	0.844
10	0.83	29.70	2.361	0.205	(2.125)	2.156
11	0.92	7.70	0.612	0.205	(0.551)	0.407
12	1.00	4.00	0.318	0.205	(0.286)	0.113
		(Loss Rate Not Used)				
Sum =		100.0			Sum =	5.5

Flood volume = Effective rainfall 0.46(In)
times area 26.6(Ac.)/[(In)/(Ft.)] = 1.0(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.455(Ac.Ft)
Total rainfall = 0.66(In)
Flood volume = 44120.7 Cubic Feet
Total soil loss = 19801.9 Cubic Feet

Peak flow rate of this hydrograph = 34.180(CFS)

++

1 - 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	10.0	20.0	30.0	40.0
0+ 5	0.0017	0.25	Q				
0+10	0.0116	1.44	VQ				
0+15	0.0325	3.03	V Q				
0+20	0.0588	3.82	VQ				
0+25	0.0913	4.72	VQ				
0+30	0.1311	5.78	Q				
0+35	0.1774	6.71	QV				
0+40	0.2369	8.65	QV				
0+45	0.3212	12.23	Q				
0+50	0.4767	22.58	V	Q			
0+55	0.7121	34.18	V	Q			
1+ 0	0.8458	19.43	Q	V			
1+ 5	0.9145	9.97	Q	V			
1+10	0.9520	5.43	Q	V			
1+15	0.9748	3.31	Q	V			

```
    1+20        0.9903      2.25  | Q       |         |         |        V|
    1+25        1.0005      1.49  |Q        |         |         |        V|
    1+30        1.0072      0.97  Q         |         |         |        V|
    1+35        1.0118      0.67  Q         |         |         |        V|
    1+40        1.0127      0.13  Q         |         |         |        V|
    1+45        1.0129      0.03  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 06/29/23 File: MenifeeExUH5YR1HR35.out

++

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

IRV22-0086 ARES MENIFEE - EXISTING 5 YEAR 3 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1818.00(Ft.)
Length along longest watercourse measured to centroid = 661.80(Ft.)
Length along longest watercourse = 0.344 Mi.
Length along longest watercourse measured to centroid = 0.125 Mi.
Difference in elevation = 21.07(Ft.)
Slope along watercourse = 61.1934 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.100 Hr.
Lag time = 5.99 Min.
25% of lag time = 1.50 Min.
40% of lag time = 2.40 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	0.80	21.26

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.95	51.83

STORM EVENT (YEAR) = 5.00

Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.950(In)

Point rain (area averaged) = 1.069(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.069(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	93.00	0.000

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
93.0	83.4	0.205	0.000	0.205	1.000	0.205
					Sum (F) =	0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205
Minimum soil loss rate ((In/Hr)) = 0.103
(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 (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.491	14.285	3.826
2	0.167	166.982	45.525	12.195
3	0.250	250.473	18.969	5.081
4	0.333	333.964	8.021	2.149
5	0.417	417.455	4.785	1.282
6	0.500	500.946	2.979	0.798
7	0.583	584.438	2.148	0.575
8	0.667	667.929	1.442	0.386
9	0.750	751.420	0.944	0.253
10	0.833	834.911	0.903	0.242
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)

1	0.08	1.30	0.167	(	0.205)	0.150		0.017
2	0.17	1.30	0.167	(	0.205)	0.150		0.017
3	0.25	1.10	0.141	(	0.205)	0.127		0.014
4	0.33	1.50	0.192	(	0.205)	0.173		0.019
5	0.42	1.50	0.192	(	0.205)	0.173		0.019
6	0.50	1.80	0.231		0.205	(	0.208)	0.026
7	0.58	1.50	0.192	(	0.205)	0.173		0.019
8	0.67	1.80	0.231		0.205	(	0.208)	0.026
9	0.75	1.80	0.231		0.205	(	0.208)	0.026
10	0.83	1.50	0.192	(	0.205)	0.173		0.019
11	0.92	1.60	0.205	(	0.205)	0.185		0.021
12	1.00	1.80	0.231		0.205	(	0.208)	0.026
13	1.08	2.20	0.282		0.205	(	0.254)	0.077
14	1.17	2.20	0.282		0.205	(	0.254)	0.077
15	1.25	2.20	0.282		0.205	(	0.254)	0.077
16	1.33	2.00	0.257		0.205	(	0.231)	0.051
17	1.42	2.60	0.334		0.205	(	0.300)	0.128
18	1.50	2.70	0.346		0.205	(	0.312)	0.141
19	1.58	2.40	0.308		0.205	(	0.277)	0.103
20	1.67	2.70	0.346		0.205	(	0.312)	0.141
21	1.75	3.30	0.423		0.205	(	0.381)	0.218
22	1.83	3.10	0.398		0.205	(	0.358)	0.193
23	1.92	2.90	0.372		0.205	(	0.335)	0.167
24	2.00	3.00	0.385		0.205	(	0.346)	0.180
25	2.08	3.10	0.398		0.205	(	0.358)	0.193
26	2.17	4.20	0.539		0.205	(	0.485)	0.334
27	2.25	5.00	0.642		0.205	(	0.577)	0.436
28	2.33	3.50	0.449		0.205	(	0.404)	0.244
29	2.42	6.80	0.872		0.205	(	0.785)	0.667
30	2.50	7.30	0.937		0.205	(	0.843)	0.731
31	2.58	8.20	1.052		0.205	(	0.947)	0.847
32	2.67	5.90	0.757		0.205	(	0.681)	0.552
33	2.75	2.00	0.257		0.205	(	0.231)	0.051
34	2.83	1.80	0.231		0.205	(	0.208)	0.026
35	2.92	1.80	0.231		0.205	(	0.208)	0.026
36	3.00	0.60	0.077	(	0.205)	0.069		0.008

(Loss Rate Not Used)

Sum = 100.0 Sum = 5.9

Flood volume = Effective rainfall 0.49(In)
times area 26.6(Ac.)/[(In)/(Ft.)] = 1.1(Ac.Ft)
Total soil loss = 0.58(In)
Total soil loss = 1.276(Ac.Ft)
Total rainfall = 1.07(In)
Flood volume = 47558.6 Cubic Feet
Total soil loss = 55602.9 Cubic Feet

Peak flow rate of this hydrograph = 18.611(CFS)

++

3 - 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	0.0004	0.06	Q				
0+10	0.0023	0.27	Q				
0+15	0.0046	0.34	Q				
0+20	0.0072	0.37	Q				
0+25	0.0102	0.44	Q				
0+30	0.0136	0.50	Q				
0+35	0.0175	0.57	VQ				
0+40	0.0213	0.56	VQ				
0+45	0.0256	0.62	VQ				
0+50	0.0300	0.63	|Q				
0+55	0.0339	0.57	|Q				
1+ 0	0.0379	0.58	|Q				
1+ 5	0.0437	0.84	|Q				
1+10	0.0540	1.49	|VQ				
1+15	0.0661	1.76	| VQ				
1+20	0.0783	1.78	| VQ				
1+25	0.0909	1.83	| Q				
1+30	0.1097	2.73	| VQ				
1+35	0.1310	3.10	| V Q				
1+40	0.1517	3.00	| VQ				
1+45	0.1771	3.69	| VQ				
1+50	0.2096	4.72	| V Q|				
1+55	0.2425	4.78	| VQ|				
2+ 0	0.2742	4.60	| QV				
2+ 5	0.3068	4.74	| Q|V				
2+10	0.3447	5.51	| |QV				
2+15	0.3979	7.71	| | VQ				
2+20	0.4598	8.99	| | VQ				
2+25	0.5225	9.11	| | QV|			
2+30	0.6187	13.97	| | | V Q			
2+35	0.7370	17.18	| | | V | Q		
2+40	0.8652	18.61	| | | |V Q		
2+45	0.9639	14.33	| | | Q | V		
2+50	1.0139	7.26	| | Q | | V		
2+55	1.0428	4.20	| Q | | | V		
3+ 0	1.0622	2.81	| Q | | | V		
3+ 5	1.0745	1.78	| Q | | | V		
3+10	1.0825	1.16	| Q | | | V		
3+15	1.0873	0.70	|Q | | | V		
3+20	1.0902	0.41	Q | | | V		
3+25	1.0914	0.18	Q | | | V		
3+30	1.0916	0.03	Q | | | V		
3+35	1.0917	0.02	Q | | | V		

```
    3+40        1.0918      0.01  Q         |         |         |        V|
    3+45        1.0918      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 06/29/23 File: MenifeeExUH5YR3HR65.out

++

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

IRV22-0086 ARES MENIFEE - EXISTING 5 YEAR 6 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1818.00(Ft.)
Length along longest watercourse measured to centroid = 661.80(Ft.)
Length along longest watercourse = 0.344 Mi.
Length along longest watercourse measured to centroid = 0.125 Mi.
Difference in elevation = 21.07(Ft.)
Slope along watercourse = 61.1934 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.100 Hr.
Lag time = 5.99 Min.
25% of lag time = 1.50 Min.
40% of lag time = 2.40 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.10	29.24

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	2.60	69.11

STORM EVENT (YEAR) = 5.00

Area Averaged 2-Year Rainfall = 1.100(In)
Area Averaged 100-Year Rainfall = 2.600(In)

Point rain (area averaged) = 1.451(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.451(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	93.00	0.000

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
93.0	83.4	0.205	0.000	0.205	1.000	0.205
					Sum (F) =	0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205
Minimum soil loss rate ((In/Hr)) = 0.103
(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 (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.491	14.285	3.826
2	0.167	166.982	45.525	12.195
3	0.250	250.473	18.969	5.081
4	0.333	333.964	8.021	2.149
5	0.417	417.455	4.785	1.282
6	0.500	500.946	2.979	0.798
7	0.583	584.438	2.148	0.575
8	0.667	667.929	1.442	0.386
9	0.750	751.420	0.944	0.253
10	0.833	834.911	0.903	0.242
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)

1	0.08	0.50	0.087	(0.205)	0.078	0.009
2	0.17	0.60	0.104	(0.205)	0.094	0.010
3	0.25	0.60	0.104	(0.205)	0.094	0.010
4	0.33	0.60	0.104	(0.205)	0.094	0.010
5	0.42	0.60	0.104	(0.205)	0.094	0.010
6	0.50	0.70	0.122	(0.205)	0.110	0.012
7	0.58	0.70	0.122	(0.205)	0.110	0.012
8	0.67	0.70	0.122	(0.205)	0.110	0.012
9	0.75	0.70	0.122	(0.205)	0.110	0.012
10	0.83	0.70	0.122	(0.205)	0.110	0.012
11	0.92	0.70	0.122	(0.205)	0.110	0.012
12	1.00	0.80	0.139	(0.205)	0.125	0.014
13	1.08	0.80	0.139	(0.205)	0.125	0.014
14	1.17	0.80	0.139	(0.205)	0.125	0.014
15	1.25	0.80	0.139	(0.205)	0.125	0.014
16	1.33	0.80	0.139	(0.205)	0.125	0.014
17	1.42	0.80	0.139	(0.205)	0.125	0.014
18	1.50	0.80	0.139	(0.205)	0.125	0.014
19	1.58	0.80	0.139	(0.205)	0.125	0.014
20	1.67	0.80	0.139	(0.205)	0.125	0.014
21	1.75	0.80	0.139	(0.205)	0.125	0.014
22	1.83	0.80	0.139	(0.205)	0.125	0.014
23	1.92	0.80	0.139	(0.205)	0.125	0.014
24	2.00	0.90	0.157	(0.205)	0.141	0.016
25	2.08	0.80	0.139	(0.205)	0.125	0.014
26	2.17	0.90	0.157	(0.205)	0.141	0.016
27	2.25	0.90	0.157	(0.205)	0.141	0.016
28	2.33	0.90	0.157	(0.205)	0.141	0.016
29	2.42	0.90	0.157	(0.205)	0.141	0.016
30	2.50	0.90	0.157	(0.205)	0.141	0.016
31	2.58	0.90	0.157	(0.205)	0.141	0.016
32	2.67	0.90	0.157	(0.205)	0.141	0.016
33	2.75	1.00	0.174	(0.205)	0.157	0.017
34	2.83	1.00	0.174	(0.205)	0.157	0.017
35	2.92	1.00	0.174	(0.205)	0.157	0.017
36	3.00	1.00	0.174	(0.205)	0.157	0.017
37	3.08	1.00	0.174	(0.205)	0.157	0.017
38	3.17	1.10	0.192	(0.205)	0.172	0.019
39	3.25	1.10	0.192	(0.205)	0.172	0.019
40	3.33	1.10	0.192	(0.205)	0.172	0.019
41	3.42	1.20	0.209	(0.205)	0.188	0.021
42	3.50	1.30	0.226	(0.205)	0.204	0.023
43	3.58	1.40	0.244	0.205	(0.219)	0.039
44	3.67	1.40	0.244	0.205	(0.219)	0.039
45	3.75	1.50	0.261	0.205	(0.235)	0.056
46	3.83	1.50	0.261	0.205	(0.235)	0.056
47	3.92	1.60	0.279	0.205	(0.251)	0.073
48	4.00	1.60	0.279	0.205	(0.251)	0.073
49	4.08	1.70	0.296	0.205	(0.266)	0.091
50	4.17	1.80	0.313	0.205	(0.282)	0.108

```
51   4.25     1.90      0.331          0.205    (  0.298)        0.126
52   4.33     2.00      0.348          0.205    (  0.313)        0.143
53   4.42     2.10      0.366          0.205    (  0.329)        0.160
54   4.50     2.10      0.366          0.205    (  0.329)        0.160
55   4.58     2.20      0.383          0.205    (  0.345)        0.178
56   4.67     2.30      0.401          0.205    (  0.360)        0.195
57   4.75     2.40      0.418          0.205    (  0.376)        0.213
58   4.83     2.40      0.418          0.205    (  0.376)        0.213
59   4.92     2.50      0.435          0.205    (  0.392)        0.230
60   5.00     2.60      0.453          0.205    (  0.407)        0.248
61   5.08     3.10      0.540          0.205    (  0.486)        0.335
62   5.17     3.60      0.627          0.205    (  0.564)        0.422
63   5.25     3.90      0.679          0.205    (  0.611)        0.474
64   5.33     4.20      0.731          0.205    (  0.658)        0.526
65   5.42     4.70      0.818          0.205    (  0.737)        0.613
66   5.50     5.60      0.975          0.205    (  0.878)        0.770
67   5.58     1.90      0.331          0.205    (  0.298)        0.126
68   5.67     0.90      0.157       (  0.205)       0.141        0.016
69   5.75     0.60      0.104       (  0.205)       0.094        0.010
70   5.83     0.50      0.087       (  0.205)       0.078        0.009
71   5.92     0.30      0.052       (  0.205)       0.047        0.005
72   6.00     0.20      0.035       (  0.205)       0.031        0.003
               (Loss Rate Not Used)
   Sum =     100.0                                    Sum =     6.3
      Flood volume = Effective rainfall      0.53(In)
       times area      26.6(Ac.)/[(In)/(Ft.)] =       1.2(Ac.Ft)
      Total soil loss =      0.92(In)
      Total soil loss =     2.046(Ac.Ft)
      Total rainfall =      1.45(In)
      Flood volume =       50875.7 Cubic Feet
      Total soil loss =       89139.0 Cubic Feet
      ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     15.466(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          6 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      ---------------------------------------------------------------------
                   Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
-------------------------------------------------------------------------
  0+ 5       0.0002      0.03  Q         |         |         |         |
  0+10       0.0012      0.15  Q         |         |         |         |
  0+15       0.0027      0.21  Q         |         |         |         |
  0+20       0.0043      0.24  Q         |         |         |         |
  0+25       0.0061      0.25  Q         |         |         |         |
  0+30       0.0080      0.27  Q         |         |         |         |
  0+35       0.0100      0.30  Q         |         |         |         |
```

```
0+40       0.0121      0.31  Q          |          |          |          |
0+45       0.0143      0.32  Q          |          |          |          |
0+50       0.0166      0.32  Q          |          |          |          |
0+55       0.0188      0.32  Q          |          |          |          |
1+ 0       0.0211      0.33  Q          |          |          |          |
1+ 5       0.0235      0.35  Q          |          |          |          |
1+10       0.0260      0.36  Q          |          |          |          |
1+15       0.0285      0.37  Q          |          |          |          |
1+20       0.0311      0.37  QV         |          |          |          |
1+25       0.0336      0.37  QV         |          |          |          |
1+30       0.0362      0.37  QV         |          |          |          |
1+35       0.0388      0.37  QV         |          |          |          |
1+40       0.0413      0.37  QV         |          |          |          |
1+45       0.0439      0.37  QV         |          |          |          |
1+50       0.0465      0.37  QV         |          |          |          |
1+55       0.0490      0.37  QV         |          |          |          |
2+ 0       0.0517      0.38  QV         |          |          |          |
2+ 5       0.0544      0.39  QV         |          |          |          |
2+10       0.0571      0.39  QV         |          |          |          |
2+15       0.0598      0.41  Q V        |          |          |          |
2+20       0.0627      0.41  Q V        |          |          |          |
2+25       0.0655      0.42  Q V        |          |          |          |
2+30       0.0684      0.42  Q V        |          |          |          |
2+35       0.0713      0.42  Q V        |          |          |          |
2+40       0.0742      0.42  Q V        |          |          |          |
2+45       0.0771      0.43  Q V        |          |          |          |
2+50       0.0802      0.45  Q V        |          |          |          |
2+55       0.0833      0.46  Q V        |          |          |          |
3+ 0       0.0865      0.46  Q V        |          |          |          |
3+ 5       0.0897      0.46  Q  V       |          |          |          |
3+10       0.0930      0.47  Q  V       |          |          |          |
3+15       0.0963      0.49  Q  V       |          |          |          |
3+20       0.0998      0.50  |Q V       |          |          |          |
3+25       0.1033      0.51  |Q V       |          |          |          |
3+30       0.1071      0.54  |Q V       |          |          |          |
3+35       0.1115      0.64  |Q V       |          |          |          |
3+40       0.1173      0.84  |Q  V      |          |          |          |
3+45       0.1242      1.00  |Q  V      |          |          |          |
3+50       0.1328      1.25  | Q V      |          |          |          |
3+55       0.1426      1.43  | Q V      |          |          |          |
4+ 0       0.1543      1.69  |  Q V     |          |          |          |
4+ 5       0.1672      1.88  |  Q V     |          |          |          |
4+10       0.1825      2.22  |   Q V    |          |          |          |
4+15       0.2005      2.62  |    QV    |          |          |          |
4+20       0.2216      3.05  |     QV   |          |          |          |
4+25       0.2456      3.49  |     Q V  |          |          |          |
4+30       0.2723      3.88  |      Q V |          |          |          |
4+35       0.3007      4.12  |       Q V          |          |          |
4+40       0.3317      4.50  |       Q  |V        |          |          |
4+45       0.3656      4.92  |        Q| V        |          |          |
```

```
4+50       0.4021      5.30  |         Q  V      |         |         |
4+55       0.4402      5.54  |         |Q   V    |         |         |
5+ 0       0.4809      5.91  |         |Q    V   |         |         |
5+ 5       0.5263      6.60  |         |  Q    V |         |         |
5+10       0.5825      8.15  |         |     Q  V|         |         |
5+15       0.6509      9.94  |         |        Q| V       |         |
5+20       0.7298     11.46  |         |         | Q V     |         |
5+25       0.8196     13.03  |         |         |     Q V |         |
5+30       0.9247     15.27  |         |         |         QV        |
5+35       1.0312     15.47  |         |         |         Q    V    |
5+40       1.0889      8.37  |         |     Q   |         |      V  |
5+45       1.1186      4.31  |       Q |         |         |       V |
5+50       1.1369      2.66  |    Q    |         |         |       V |
5+55       1.1491      1.77  |  Q      |         |         |        V|
6+ 0       1.1573      1.19  | Q       |         |         |        V|
6+ 5       1.1625      0.77  |Q        |         |         |        V|
6+10       1.1656      0.45  Q         |         |         |        V|
6+15       1.1674      0.25  Q         |         |         |        V|
6+20       1.1677      0.05  Q         |         |         |        V|
6+25       1.1678      0.02  Q         |         |         |        V|
6+30       1.1679      0.01  Q         |         |         |        V|
6+35       1.1679      0.00  Q         |         |         |        V|
6+40       1.1679      0.00  Q         |         |         |        V|
6+45       1.1679      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 06/29/23 File: MenifeeExUH5YR6HR245.out

++

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

IRV22-0086 ARES MENIFEE - EXISTING 5 YEAR 24 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1818.00(Ft.)
Length along longest watercourse measured to centroid = 661.80(Ft.)
Length along longest watercourse = 0.344 Mi.
Length along longest watercourse measured to centroid = 0.125 Mi.
Difference in elevation = 21.07(Ft.)
Slope along watercourse = 61.1934 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.100 Hr.
Lag time = 5.99 Min.
25% of lag time = 1.50 Min.
40% of lag time = 2.40 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]
26.58	1.85	49.17

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	4.75	126.25

STORM EVENT (YEAR) = 5.00

Area Averaged 2-Year Rainfall = 1.850(In)
Area Averaged 100-Year Rainfall = 4.750(In)

Point rain (area averaged) = 2.529(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.529(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	93.00	0.000

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
93.0	83.4	0.205	0.000	0.205	1.000	0.205
					Sum (F) =	0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205
Minimum soil loss rate ((In/Hr)) = 0.103
(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 (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.491	14.285	3.826
2	0.167	166.982	45.525	12.195
3	0.250	250.473	18.969	5.081
4	0.333	333.964	8.021	2.149
5	0.417	417.455	4.785	1.282
6	0.500	500.946	2.979	0.798
7	0.583	584.438	2.148	0.575
8	0.667	667.929	1.442	0.386
9	0.750	751.420	0.944	0.253
10	0.833	834.911	0.903	0.242
		Sum =	100.000 Sum=	26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)

1	0.08	0.07	0.020	(0.364)	0.018	0.002
2	0.17	0.07	0.020	(0.362)	0.018	0.002
3	0.25	0.07	0.020	(0.361)	0.018	0.002
4	0.33	0.10	0.030	(0.360)	0.027	0.003
5	0.42	0.10	0.030	(0.358)	0.027	0.003
6	0.50	0.10	0.030	(0.357)	0.027	0.003
7	0.58	0.10	0.030	(0.355)	0.027	0.003
8	0.67	0.10	0.030	(0.354)	0.027	0.003
9	0.75	0.10	0.030	(0.353)	0.027	0.003
10	0.83	0.13	0.040	(0.351)	0.036	0.004
11	0.92	0.13	0.040	(0.350)	0.036	0.004
12	1.00	0.13	0.040	(0.349)	0.036	0.004
13	1.08	0.10	0.030	(0.347)	0.027	0.003
14	1.17	0.10	0.030	(0.346)	0.027	0.003
15	1.25	0.10	0.030	(0.344)	0.027	0.003
16	1.33	0.10	0.030	(0.343)	0.027	0.003
17	1.42	0.10	0.030	(0.342)	0.027	0.003
18	1.50	0.10	0.030	(0.340)	0.027	0.003
19	1.58	0.10	0.030	(0.339)	0.027	0.003
20	1.67	0.10	0.030	(0.338)	0.027	0.003
21	1.75	0.10	0.030	(0.336)	0.027	0.003
22	1.83	0.13	0.040	(0.335)	0.036	0.004
23	1.92	0.13	0.040	(0.334)	0.036	0.004
24	2.00	0.13	0.040	(0.332)	0.036	0.004
25	2.08	0.13	0.040	(0.331)	0.036	0.004
26	2.17	0.13	0.040	(0.329)	0.036	0.004
27	2.25	0.13	0.040	(0.328)	0.036	0.004
28	2.33	0.13	0.040	(0.327)	0.036	0.004
29	2.42	0.13	0.040	(0.325)	0.036	0.004
30	2.50	0.13	0.040	(0.324)	0.036	0.004
31	2.58	0.17	0.051	(0.323)	0.046	0.005
32	2.67	0.17	0.051	(0.321)	0.046	0.005
33	2.75	0.17	0.051	(0.320)	0.046	0.005
34	2.83	0.17	0.051	(0.319)	0.046	0.005
35	2.92	0.17	0.051	(0.318)	0.046	0.005
36	3.00	0.17	0.051	(0.316)	0.046	0.005
37	3.08	0.17	0.051	(0.315)	0.046	0.005
38	3.17	0.17	0.051	(0.314)	0.046	0.005
39	3.25	0.17	0.051	(0.312)	0.046	0.005
40	3.33	0.17	0.051	(0.311)	0.046	0.005
41	3.42	0.17	0.051	(0.310)	0.046	0.005
42	3.50	0.17	0.051	(0.308)	0.046	0.005
43	3.58	0.17	0.051	(0.307)	0.046	0.005
44	3.67	0.17	0.051	(0.306)	0.046	0.005
45	3.75	0.17	0.051	(0.305)	0.046	0.005
46	3.83	0.20	0.061	(0.303)	0.055	0.006
47	3.92	0.20	0.061	(0.302)	0.055	0.006
48	4.00	0.20	0.061	(0.301)	0.055	0.006
49	4.08	0.20	0.061	(0.299)	0.055	0.006
50	4.17	0.20	0.061	(0.298)	0.055	0.006

51	4.25	0.20	0.061	(0.297)	0.055	0.006
52	4.33	0.23	0.071	(0.296)	0.064	0.007
53	4.42	0.23	0.071	(0.294)	0.064	0.007
54	4.50	0.23	0.071	(0.293)	0.064	0.007
55	4.58	0.23	0.071	(0.292)	0.064	0.007
56	4.67	0.23	0.071	(0.291)	0.064	0.007
57	4.75	0.23	0.071	(0.289)	0.064	0.007
58	4.83	0.27	0.081	(0.288)	0.073	0.008
59	4.92	0.27	0.081	(0.287)	0.073	0.008
60	5.00	0.27	0.081	(0.286)	0.073	0.008
61	5.08	0.20	0.061	(0.284)	0.055	0.006
62	5.17	0.20	0.061	(0.283)	0.055	0.006
63	5.25	0.20	0.061	(0.282)	0.055	0.006
64	5.33	0.23	0.071	(0.281)	0.064	0.007
65	5.42	0.23	0.071	(0.279)	0.064	0.007
66	5.50	0.23	0.071	(0.278)	0.064	0.007
67	5.58	0.27	0.081	(0.277)	0.073	0.008
68	5.67	0.27	0.081	(0.276)	0.073	0.008
69	5.75	0.27	0.081	(0.275)	0.073	0.008
70	5.83	0.27	0.081	(0.273)	0.073	0.008
71	5.92	0.27	0.081	(0.272)	0.073	0.008
72	6.00	0.27	0.081	(0.271)	0.073	0.008
73	6.08	0.30	0.091	(0.270)	0.082	0.009
74	6.17	0.30	0.091	(0.269)	0.082	0.009
75	6.25	0.30	0.091	(0.267)	0.082	0.009
76	6.33	0.30	0.091	(0.266)	0.082	0.009
77	6.42	0.30	0.091	(0.265)	0.082	0.009
78	6.50	0.30	0.091	(0.264)	0.082	0.009
79	6.58	0.33	0.101	(0.263)	0.091	0.010
80	6.67	0.33	0.101	(0.261)	0.091	0.010
81	6.75	0.33	0.101	(0.260)	0.091	0.010
82	6.83	0.33	0.101	(0.259)	0.091	0.010
83	6.92	0.33	0.101	(0.258)	0.091	0.010
84	7.00	0.33	0.101	(0.257)	0.091	0.010
85	7.08	0.33	0.101	(0.256)	0.091	0.010
86	7.17	0.33	0.101	(0.254)	0.091	0.010
87	7.25	0.33	0.101	(0.253)	0.091	0.010
88	7.33	0.37	0.111	(0.252)	0.100	0.011
89	7.42	0.37	0.111	(0.251)	0.100	0.011
90	7.50	0.37	0.111	(0.250)	0.100	0.011
91	7.58	0.40	0.121	(0.249)	0.109	0.012
92	7.67	0.40	0.121	(0.247)	0.109	0.012
93	7.75	0.40	0.121	(0.246)	0.109	0.012
94	7.83	0.43	0.132	(0.245)	0.118	0.013
95	7.92	0.43	0.132	(0.244)	0.118	0.013
96	8.00	0.43	0.132	(0.243)	0.118	0.013
97	8.08	0.50	0.152	(0.242)	0.137	0.015
98	8.17	0.50	0.152	(0.241)	0.137	0.015
99	8.25	0.50	0.152	(0.240)	0.137	0.015
100	8.33	0.50	0.152	(0.238)	0.137	0.015

101	8.42	0.50	0.152	(0.237)	0.137	0.015
102	8.50	0.50	0.152	(0.236)	0.137	0.015
103	8.58	0.53	0.162	(0.235)	0.146	0.016
104	8.67	0.53	0.162	(0.234)	0.146	0.016
105	8.75	0.53	0.162	(0.233)	0.146	0.016
106	8.83	0.57	0.172	(0.232)	0.155	0.017
107	8.92	0.57	0.172	(0.231)	0.155	0.017
108	9.00	0.57	0.172	(0.230)	0.155	0.017
109	9.08	0.63	0.192	(0.228)	0.173	0.019
110	9.17	0.63	0.192	(0.227)	0.173	0.019
111	9.25	0.63	0.192	(0.226)	0.173	0.019
112	9.33	0.67	0.202	(0.225)	0.182	0.020
113	9.42	0.67	0.202	(0.224)	0.182	0.020
114	9.50	0.67	0.202	(0.223)	0.182	0.020
115	9.58	0.70	0.212	(0.222)	0.191	0.021
116	9.67	0.70	0.212	(0.221)	0.191	0.021
117	9.75	0.70	0.212	(0.220)	0.191	0.021
118	9.83	0.73	0.223	(0.219)	0.200	0.022
119	9.92	0.73	0.223	(0.218)	0.200	0.022
120	10.00	0.73	0.223	(0.217)	0.200	0.022
121	10.08	0.50	0.152	(0.216)	0.137	0.015
122	10.17	0.50	0.152	(0.215)	0.137	0.015
123	10.25	0.50	0.152	(0.214)	0.137	0.015
124	10.33	0.50	0.152	(0.213)	0.137	0.015
125	10.42	0.50	0.152	(0.212)	0.137	0.015
126	10.50	0.50	0.152	(0.210)	0.137	0.015
127	10.58	0.67	0.202	(0.209)	0.182	0.020
128	10.67	0.67	0.202	(0.208)	0.182	0.020
129	10.75	0.67	0.202	(0.207)	0.182	0.020
130	10.83	0.67	0.202	(0.206)	0.182	0.020
131	10.92	0.67	0.202	(0.205)	0.182	0.020
132	11.00	0.67	0.202	(0.204)	0.182	0.020
133	11.08	0.63	0.192	(0.203)	0.173	0.019
134	11.17	0.63	0.192	(0.202)	0.173	0.019
135	11.25	0.63	0.192	(0.201)	0.173	0.019
136	11.33	0.63	0.192	(0.200)	0.173	0.019
137	11.42	0.63	0.192	(0.199)	0.173	0.019
138	11.50	0.63	0.192	(0.198)	0.173	0.019
139	11.58	0.57	0.172	(0.197)	0.155	0.017
140	11.67	0.57	0.172	(0.196)	0.155	0.017
141	11.75	0.57	0.172	(0.195)	0.155	0.017
142	11.83	0.60	0.182	(0.194)	0.164	0.018
143	11.92	0.60	0.182	(0.194)	0.164	0.018
144	12.00	0.60	0.182	(0.193)	0.164	0.018
145	12.08	0.83	0.253	0.192	(0.228)	0.061
146	12.17	0.83	0.253	0.191	(0.228)	0.062
147	12.25	0.83	0.253	0.190	(0.228)	0.063
148	12.33	0.87	0.263	0.189	(0.237)	0.074
149	12.42	0.87	0.263	0.188	(0.237)	0.075
150	12.50	0.87	0.263	0.187	(0.237)	0.076

151	12.58	0.93	0.283	0.186	(0.255)	0.097
152	12.67	0.93	0.283	0.185	(0.255)	0.098
153	12.75	0.93	0.283	0.184	(0.255)	0.099
154	12.83	0.97	0.293	0.183	(0.264)	0.110
155	12.92	0.97	0.293	0.182	(0.264)	0.111
156	13.00	0.97	0.293	0.181	(0.264)	0.112
157	13.08	1.13	0.344	0.180	(0.310)	0.164
158	13.17	1.13	0.344	0.179	(0.310)	0.165
159	13.25	1.13	0.344	0.178	(0.310)	0.165
160	13.33	1.13	0.344	0.178	(0.310)	0.166
161	13.42	1.13	0.344	0.177	(0.310)	0.167
162	13.50	1.13	0.344	0.176	(0.310)	0.168
163	13.58	0.77	0.233	0.175	(0.209)	0.058
164	13.67	0.77	0.233	0.174	(0.209)	0.059
165	13.75	0.77	0.233	0.173	(0.209)	0.060
166	13.83	0.77	0.233	0.172	(0.209)	0.060
167	13.92	0.77	0.233	0.171	(0.209)	0.061
168	14.00	0.77	0.233	0.170	(0.209)	0.062
169	14.08	0.90	0.273	0.170	(0.246)	0.104
170	14.17	0.90	0.273	0.169	(0.246)	0.104
171	14.25	0.90	0.273	0.168	(0.246)	0.105
172	14.33	0.87	0.263	0.167	(0.237)	0.096
173	14.42	0.87	0.263	0.166	(0.237)	0.097
174	14.50	0.87	0.263	0.165	(0.237)	0.098
175	14.58	0.87	0.263	0.164	(0.237)	0.099
176	14.67	0.87	0.263	0.164	(0.237)	0.099
177	14.75	0.87	0.263	0.163	(0.237)	0.100
178	14.83	0.83	0.253	0.162	(0.228)	0.091
179	14.92	0.83	0.253	0.161	(0.228)	0.092
180	15.00	0.83	0.253	0.160	(0.228)	0.093
181	15.08	0.80	0.243	0.159	(0.219)	0.083
182	15.17	0.80	0.243	0.159	(0.219)	0.084
183	15.25	0.80	0.243	0.158	(0.219)	0.085
184	15.33	0.77	0.233	0.157	(0.209)	0.076
185	15.42	0.77	0.233	0.156	(0.209)	0.076
186	15.50	0.77	0.233	0.155	(0.209)	0.077
187	15.58	0.63	0.192	0.155	(0.173)	0.038
188	15.67	0.63	0.192	0.154	(0.173)	0.038
189	15.75	0.63	0.192	0.153	(0.173)	0.039
190	15.83	0.63	0.192	0.152	(0.173)	0.040
191	15.92	0.63	0.192	0.151	(0.173)	0.041
192	16.00	0.63	0.192	0.151	(0.173)	0.041
193	16.08	0.13	0.040	(0.150)	0.036	0.004
194	16.17	0.13	0.040	(0.149)	0.036	0.004
195	16.25	0.13	0.040	(0.148)	0.036	0.004
196	16.33	0.13	0.040	(0.148)	0.036	0.004
197	16.42	0.13	0.040	(0.147)	0.036	0.004
198	16.50	0.13	0.040	(0.146)	0.036	0.004
199	16.58	0.10	0.030	(0.145)	0.027	0.003
200	16.67	0.10	0.030	(0.145)	0.027	0.003

201	16.75	0.10	0.030	(0.144)	0.027	0.003
202	16.83	0.10	0.030	(0.143)	0.027	0.003
203	16.92	0.10	0.030	(0.142)	0.027	0.003
204	17.00	0.10	0.030	(0.142)	0.027	0.003
205	17.08	0.17	0.051	(0.141)	0.046	0.005
206	17.17	0.17	0.051	(0.140)	0.046	0.005
207	17.25	0.17	0.051	(0.140)	0.046	0.005
208	17.33	0.17	0.051	(0.139)	0.046	0.005
209	17.42	0.17	0.051	(0.138)	0.046	0.005
210	17.50	0.17	0.051	(0.138)	0.046	0.005
211	17.58	0.17	0.051	(0.137)	0.046	0.005
212	17.67	0.17	0.051	(0.136)	0.046	0.005
213	17.75	0.17	0.051	(0.135)	0.046	0.005
214	17.83	0.13	0.040	(0.135)	0.036	0.004
215	17.92	0.13	0.040	(0.134)	0.036	0.004
216	18.00	0.13	0.040	(0.133)	0.036	0.004
217	18.08	0.13	0.040	(0.133)	0.036	0.004
218	18.17	0.13	0.040	(0.132)	0.036	0.004
219	18.25	0.13	0.040	(0.132)	0.036	0.004
220	18.33	0.13	0.040	(0.131)	0.036	0.004
221	18.42	0.13	0.040	(0.130)	0.036	0.004
222	18.50	0.13	0.040	(0.130)	0.036	0.004
223	18.58	0.10	0.030	(0.129)	0.027	0.003
224	18.67	0.10	0.030	(0.128)	0.027	0.003
225	18.75	0.10	0.030	(0.128)	0.027	0.003
226	18.83	0.07	0.020	(0.127)	0.018	0.002
227	18.92	0.07	0.020	(0.127)	0.018	0.002
228	19.00	0.07	0.020	(0.126)	0.018	0.002
229	19.08	0.10	0.030	(0.125)	0.027	0.003
230	19.17	0.10	0.030	(0.125)	0.027	0.003
231	19.25	0.10	0.030	(0.124)	0.027	0.003
232	19.33	0.13	0.040	(0.124)	0.036	0.004
233	19.42	0.13	0.040	(0.123)	0.036	0.004
234	19.50	0.13	0.040	(0.122)	0.036	0.004
235	19.58	0.10	0.030	(0.122)	0.027	0.003
236	19.67	0.10	0.030	(0.121)	0.027	0.003
237	19.75	0.10	0.030	(0.121)	0.027	0.003
238	19.83	0.07	0.020	(0.120)	0.018	0.002
239	19.92	0.07	0.020	(0.120)	0.018	0.002
240	20.00	0.07	0.020	(0.119)	0.018	0.002
241	20.08	0.10	0.030	(0.119)	0.027	0.003
242	20.17	0.10	0.030	(0.118)	0.027	0.003
243	20.25	0.10	0.030	(0.118)	0.027	0.003
244	20.33	0.10	0.030	(0.117)	0.027	0.003
245	20.42	0.10	0.030	(0.117)	0.027	0.003
246	20.50	0.10	0.030	(0.116)	0.027	0.003
247	20.58	0.10	0.030	(0.116)	0.027	0.003
248	20.67	0.10	0.030	(0.115)	0.027	0.003
249	20.75	0.10	0.030	(0.115)	0.027	0.003
250	20.83	0.07	0.020	(0.114)	0.018	0.002

251	20.92	0.07	0.020	(0.114)	0.018	0.002
252	21.00	0.07	0.020	(0.113)	0.018	0.002
253	21.08	0.10	0.030	(0.113)	0.027	0.003
254	21.17	0.10	0.030	(0.112)	0.027	0.003
255	21.25	0.10	0.030	(0.112)	0.027	0.003
256	21.33	0.07	0.020	(0.112)	0.018	0.002
257	21.42	0.07	0.020	(0.111)	0.018	0.002
258	21.50	0.07	0.020	(0.111)	0.018	0.002
259	21.58	0.10	0.030	(0.110)	0.027	0.003
260	21.67	0.10	0.030	(0.110)	0.027	0.003
261	21.75	0.10	0.030	(0.109)	0.027	0.003
262	21.83	0.07	0.020	(0.109)	0.018	0.002
263	21.92	0.07	0.020	(0.109)	0.018	0.002
264	22.00	0.07	0.020	(0.108)	0.018	0.002
265	22.08	0.10	0.030	(0.108)	0.027	0.003
266	22.17	0.10	0.030	(0.108)	0.027	0.003
267	22.25	0.10	0.030	(0.107)	0.027	0.003
268	22.33	0.07	0.020	(0.107)	0.018	0.002
269	22.42	0.07	0.020	(0.107)	0.018	0.002
270	22.50	0.07	0.020	(0.106)	0.018	0.002
271	22.58	0.07	0.020	(0.106)	0.018	0.002
272	22.67	0.07	0.020	(0.106)	0.018	0.002
273	22.75	0.07	0.020	(0.105)	0.018	0.002
274	22.83	0.07	0.020	(0.105)	0.018	0.002
275	22.92	0.07	0.020	(0.105)	0.018	0.002
276	23.00	0.07	0.020	(0.105)	0.018	0.002
277	23.08	0.07	0.020	(0.104)	0.018	0.002
278	23.17	0.07	0.020	(0.104)	0.018	0.002
279	23.25	0.07	0.020	(0.104)	0.018	0.002
280	23.33	0.07	0.020	(0.104)	0.018	0.002
281	23.42	0.07	0.020	(0.104)	0.018	0.002
282	23.50	0.07	0.020	(0.103)	0.018	0.002
283	23.58	0.07	0.020	(0.103)	0.018	0.002
284	23.67	0.07	0.020	(0.103)	0.018	0.002
285	23.75	0.07	0.020	(0.103)	0.018	0.002
286	23.83	0.07	0.020	(0.103)	0.018	0.002
287	23.92	0.07	0.020	(0.103)	0.018	0.002
288	24.00	0.07	0.020	(0.103)	0.018	0.002

(Loss Rate Not Used)

Sum = 100.0 Sum = 6.1

Flood volume = Effective rainfall 0.51(In)
times area 26.6(Ac.)/[(In)/(Ft.)] = 1.1(Ac.Ft)
Total soil loss = 2.02(In)
Total soil loss = 4.479(Ac.Ft)
Total rainfall = 2.53(In)
Flood volume = 48888.1 Cubic Feet
Total soil loss = 195125.8 Cubic Feet

Peak flow rate of this hydrograph = 4.387(CFS)

++

24 - H O U R S T O R M

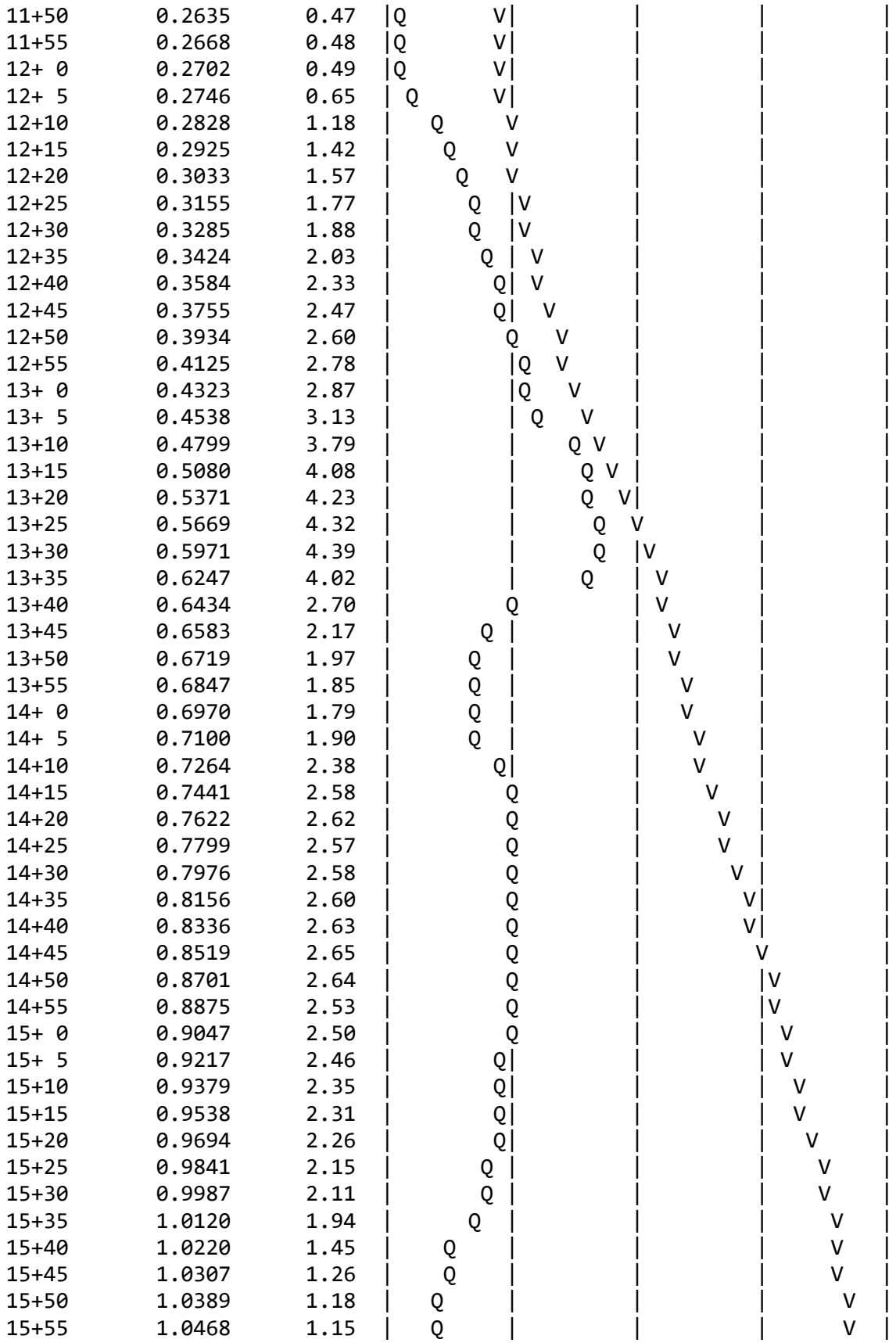
R u n o f f H y d r o g r a p h

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	0.0014	0.07	Q				
0+30	0.0019	0.07	Q				
0+35	0.0024	0.08	Q				
0+40	0.0029	0.08	Q				
0+45	0.0035	0.08	Q				
0+50	0.0041	0.08	Q				
0+55	0.0047	0.10	Q				
1+ 0	0.0054	0.10	Q				
1+ 5	0.0061	0.10	Q				
1+10	0.0068	0.09	Q				
1+15	0.0073	0.09	Q				
1+20	0.0079	0.08	Q				
1+25	0.0085	0.08	Q				
1+30	0.0091	0.08	Q				
1+35	0.0096	0.08	Q				
1+40	0.0102	0.08	Q				
1+45	0.0108	0.08	Q				
1+50	0.0113	0.09	Q				
1+55	0.0120	0.10	Q				
2+ 0	0.0127	0.10	Q				
2+ 5	0.0134	0.10	Q				
2+10	0.0142	0.11	Q				
2+15	0.0149	0.11	Q				
2+20	0.0157	0.11	Q				
2+25	0.0164	0.11	Q				
2+30	0.0171	0.11	Q				
2+35	0.0179	0.11	Q				
2+40	0.0188	0.12	Q				
2+45	0.0197	0.13	Q				
2+50	0.0206	0.13	Q				
2+55	0.0215	0.13	Q				
3+ 0	0.0224	0.13	Q				
3+ 5	0.0233	0.13	Q				
3+10	0.0243	0.14	Q				
3+15	0.0252	0.14	Q				
3+20	0.0261	0.14	Q				
3+25	0.0271	0.14	Q				

3+30	0.0280	0.14	Q	|	|	|	|
3+35	0.0289	0.14	QV	|	|	|	|
3+40	0.0299	0.14	QV	|	|	|	|
3+45	0.0308	0.14	QV	|	|	|	|
3+50	0.0318	0.14	QV	|	|	|	|
3+55	0.0328	0.15	QV	|	|	|	|
4+ 0	0.0339	0.16	QV	|	|	|	|
4+ 5	0.0350	0.16	QV	|	|	|	|
4+10	0.0361	0.16	QV	|	|	|	|
4+15	0.0372	0.16	QV	|	|	|	|
4+20	0.0383	0.17	QV	|	|	|	|
4+25	0.0396	0.18	QV	|	|	|	|
4+30	0.0408	0.18	QV	|	|	|	|
4+35	0.0421	0.19	QV	|	|	|	|
4+40	0.0434	0.19	QV	|	|	|	|
4+45	0.0447	0.19	QV	|	|	|	|
4+50	0.0460	0.19	QV	|	|	|	|
4+55	0.0475	0.21	QV	|	|	|	|
5+ 0	0.0489	0.21	QV	|	|	|	|
5+ 5	0.0503	0.21	QV	|	|	|	|
5+10	0.0516	0.18	QV	|	|	|	|
5+15	0.0528	0.17	QV	|	|	|	|
5+20	0.0540	0.17	QV	|	|	|	|
5+25	0.0552	0.18	QV	|	|	|	|
5+30	0.0565	0.19	Q V	|	|	|	|
5+35	0.0578	0.19	Q V	|	|	|	|
5+40	0.0592	0.20	Q V	|	|	|	|
5+45	0.0607	0.21	Q V	|	|	|	|
5+50	0.0621	0.21	Q V	|	|	|	|
5+55	0.0636	0.21	Q V	|	|	|	|
6+ 0	0.0651	0.22	Q V	|	|	|	|
6+ 5	0.0666	0.22	Q V	|	|	|	|
6+10	0.0682	0.23	Q V	|	|	|	|
6+15	0.0699	0.24	Q V	|	|	|	|
6+20	0.0715	0.24	Q V	|	|	|	|
6+25	0.0732	0.24	Q V	|	|	|	|
6+30	0.0748	0.24	Q V	|	|	|	|
6+35	0.0765	0.25	Q V	|	|	|	|
6+40	0.0783	0.26	|QV	|	|	|	|
6+45	0.0802	0.27	|QV	|	|	|	|
6+50	0.0820	0.27	|QV	|	|	|	|
6+55	0.0839	0.27	|QV	|	|	|	|
7+ 0	0.0857	0.27	|Q V	|	|	|	|
7+ 5	0.0876	0.27	|Q V	|	|	|	|
7+10	0.0894	0.27	|Q V	|	|	|	|
7+15	0.0913	0.27	|Q V	|	|	|	|
7+20	0.0932	0.27	|Q V	|	|	|	|
7+25	0.0952	0.29	|Q V	|	|	|	|
7+30	0.0972	0.29	|Q V	|	|	|	|
7+35	0.0992	0.30	|Q V	|	|	|	|

7+40	0.1014	0.31	Q V			
7+45	0.1036	0.32	Q V			
7+50	0.1058	0.32	Q V			
7+55	0.1082	0.34	Q V			
8+ 0	0.1105	0.34	Q V			
8+ 5	0.1130	0.36	Q V			
8+10	0.1156	0.38	Q V			
8+15	0.1183	0.39	Q V			
8+20	0.1211	0.40	Q V			
8+25	0.1238	0.40	Q V			
8+30	0.1266	0.40	Q V			
8+35	0.1294	0.41	Q V			
8+40	0.1323	0.42	Q V			
8+45	0.1353	0.43	Q V			
8+50	0.1383	0.43	Q V			
8+55	0.1414	0.45	Q V			
9+ 0	0.1445	0.45	Q V			
9+ 5	0.1477	0.46	Q V			
9+10	0.1511	0.49	Q V			
9+15	0.1545	0.50	Q V			
9+20	0.1580	0.51	Q V			
9+25	0.1617	0.53	Q V			
9+30	0.1653	0.53	Q V			
9+35	0.1691	0.54	Q V			
9+40	0.1729	0.56	Q V			
9+45	0.1767	0.56	Q V			
9+50	0.1807	0.57	Q V			
9+55	0.1847	0.58	Q V			
10+ 0	0.1887	0.59	Q V			
10+ 5	0.1926	0.56	Q V			
10+10	0.1959	0.48	Q V			
10+15	0.1990	0.45	Q V			
10+20	0.2020	0.43	Q V			
10+25	0.2049	0.42	Q V			
10+30	0.2077	0.42	Q V			
10+35	0.2107	0.43	Q V			
10+40	0.2141	0.49	Q V			
10+45	0.2177	0.52	Q V			
10+50	0.2213	0.52	Q V			
10+55	0.2249	0.53	Q V			
11+ 0	0.2286	0.53	Q V			
11+ 5	0.2323	0.53	Q V			
11+10	0.2359	0.52	Q V			
11+15	0.2395	0.52	Q V			
11+20	0.2430	0.52	Q V			
11+25	0.2466	0.52	Q V			
11+30	0.2502	0.52	Q V			
11+35	0.2537	0.51	Q V			
11+40	0.2570	0.48	Q V			
11+45	0.2602	0.47	Q V			


11+50 0.2635 0.47
11+55 0.2668 0.48
12+ 0 0.2702 0.49
12+ 5 0.2746 0.65
12+10 0.2828 1.18
12+15 0.2925 1.42
12+20 0.3033 1.57
12+25 0.3155 1.77
12+30 0.3285 1.88
12+35 0.3424 2.03
12+40 0.3584 2.33
12+45 0.3755 2.47
12+50 0.3934 2.60
12+55 0.4125 2.78
13+ 0 0.4323 2.87
13+ 5 0.4538 3.13
13+10 0.4799 3.79
13+15 0.5080 4.08
13+20 0.5371 4.23
13+25 0.5669 4.32
13+30 0.5971 4.39
13+35 0.6247 4.02
13+40 0.6434 2.70
13+45 0.6583 2.17
13+50 0.6719 1.97
13+55 0.6847 1.85
14+ 0 0.6970 1.79
14+ 5 0.7100 1.90
14+10 0.7264 2.38
14+15 0.7441 2.58
14+20 0.7622 2.62
14+25 0.7799 2.57
14+30 0.7976 2.58
14+35 0.8156 2.60
14+40 0.8336 2.63
14+45 0.8519 2.65
14+50 0.8701 2.64
14+55 0.8875 2.53
15+ 0 0.9047 2.50
15+ 5 0.9217 2.46
15+10 0.9379 2.35
15+15 0.9538 2.31
15+20 0.9694 2.26
15+25 0.9841 2.15
15+30 0.9987 2.11
15+35 1.0120 1.94
15+40 1.0220 1.45
15+45 1.0307 1.26
15+50 1.0389 1.18
15+55 1.0468 1.15

```
16+ 0       1.0546      1.14  |   Q     |         |         |       V  |
16+ 5       1.0614      0.98  |  Q      |         |         |       V  |
16+10       1.0650      0.52  | Q       |         |         |       V  |
16+15       1.0672      0.32  |Q        |         |         |        V |
16+20       1.0688      0.24  Q         |         |         |        V |
16+25       1.0701      0.19  Q         |         |         |        V |
16+30       1.0713      0.16  Q         |         |         |        V |
16+35       1.0722      0.14  Q         |         |         |        V |
16+40       1.0730      0.11  Q         |         |         |        V |
16+45       1.0736      0.10  Q         |         |         |        V |
16+50       1.0742      0.08  Q         |         |         |        V |
16+55       1.0748      0.08  Q         |         |         |        V |
17+ 0       1.0754      0.08  Q         |         |         |        V |
17+ 5       1.0760      0.09  Q         |         |         |        V |
17+10       1.0768      0.11  Q         |         |         |        V |
17+15       1.0776      0.12  Q         |         |         |        V |
17+20       1.0785      0.13  Q         |         |         |        V |
17+25       1.0794      0.13  Q         |         |         |        V |
17+30       1.0803      0.13  Q         |         |         |        V |
17+35       1.0812      0.13  Q         |         |         |        V |
17+40       1.0822      0.13  Q         |         |         |        V |
17+45       1.0831      0.14  Q         |         |         |        V |
17+50       1.0840      0.13  Q         |         |         |        V |
17+55       1.0848      0.12  Q         |         |         |        V |
18+ 0       1.0856      0.11  Q         |         |         |        V |
18+ 5       1.0864      0.11  Q         |         |         |        V |
18+10       1.0872      0.11  Q         |         |         |        V |
18+15       1.0879      0.11  Q         |         |         |        V |
18+20       1.0887      0.11  Q         |         |         |        V |
18+25       1.0894      0.11  Q         |         |         |        V |
18+30       1.0902      0.11  Q         |         |         |        V |
18+35       1.0909      0.10  Q         |         |         |        V |
18+40       1.0915      0.09  Q         |         |         |        V |
18+45       1.0921      0.09  Q         |         |         |        V |
18+50       1.0927      0.08  Q         |         |         |        V |
18+55       1.0931      0.07  Q         |         |         |        V |
19+ 0       1.0936      0.06  Q         |         |         |        V |
19+ 5       1.0940      0.06  Q         |         |         |        V |
19+10       1.0945      0.07  Q         |         |         |         V|
19+15       1.0950      0.08  Q         |         |         |         V|
19+20       1.0956      0.08  Q         |         |         |         V|
19+25       1.0963      0.10  Q         |         |         |         V|
19+30       1.0970      0.10  Q         |         |         |         V|
19+35       1.0976      0.10  Q         |         |         |         V|
19+40       1.0983      0.09  Q         |         |         |         V|
19+45       1.0988      0.09  Q         |         |         |         V|
19+50       1.0994      0.08  Q         |         |         |         V|
19+55       1.0999      0.07  Q         |         |         |         V|
20+ 0       1.1003      0.06  Q         |         |         |         V|
20+ 5       1.1007      0.06  Q         |         |         |         V|
```

20+10	1.1012	0.07	Q	|	|	|	V|
20+15	1.1018	0.08	Q	|	|	|	V|
20+20	1.1023	0.08	Q	|	|	|	V|
20+25	1.1028	0.08	Q	|	|	|	V|
20+30	1.1034	0.08	Q	|	|	|	V|
20+35	1.1039	0.08	Q	|	|	|	V|
20+40	1.1045	0.08	Q	|	|	|	V|
20+45	1.1051	0.08	Q	|	|	|	V|
20+50	1.1056	0.08	Q	|	|	|	V|
20+55	1.1060	0.07	Q	|	|	|	V|
21+ 0	1.1065	0.06	Q	|	|	|	V|
21+ 5	1.1069	0.06	Q	|	|	|	V|
21+10	1.1074	0.07	Q	|	|	|	V|
21+15	1.1079	0.08	Q	|	|	|	V|
21+20	1.1084	0.07	Q	|	|	|	V|
21+25	1.1089	0.06	Q	|	|	|	V|
21+30	1.1093	0.06	Q	|	|	|	V|
21+35	1.1097	0.06	Q	|	|	|	V|
21+40	1.1102	0.07	Q	|	|	|	V|
21+45	1.1107	0.08	Q	|	|	|	V|
21+50	1.1112	0.07	Q	|	|	|	V|
21+55	1.1117	0.06	Q	|	|	|	V|
22+ 0	1.1121	0.06	Q	|	|	|	V|
22+ 5	1.1125	0.06	Q	|	|	|	V|
22+10	1.1130	0.07	Q	|	|	|	V|
22+15	1.1135	0.08	Q	|	|	|	V|
22+20	1.1140	0.07	Q	|	|	|	V|
22+25	1.1145	0.06	Q	|	|	|	V|
22+30	1.1149	0.06	Q	|	|	|	V|
22+35	1.1153	0.06	Q	|	|	|	V|
22+40	1.1156	0.06	Q	|	|	|	V|
22+45	1.1160	0.06	Q	|	|	|	V|
22+50	1.1164	0.06	Q	|	|	|	V|
22+55	1.1168	0.05	Q	|	|	|	V|
23+ 0	1.1172	0.05	Q	|	|	|	V|
23+ 5	1.1175	0.05	Q	|	|	|	V|
23+10	1.1179	0.05	Q	|	|	|	V|
23+15	1.1183	0.05	Q	|	|	|	V|
23+20	1.1187	0.05	Q	|	|	|	V|
23+25	1.1190	0.05	Q	|	|	|	V|
23+30	1.1194	0.05	Q	|	|	|	V|
23+35	1.1198	0.05	Q	|	|	|	V|
23+40	1.1201	0.05	Q	|	|	|	V|
23+45	1.1205	0.05	Q	|	|	|	V|
23+50	1.1209	0.05	Q	|	|	|	V|
23+55	1.1213	0.05	Q	|	|	|	V|
24+ 0	1.1216	0.05	Q	|	|	|	V|
24+ 5	1.1220	0.05	Q	|	|	|	V|
24+10	1.1221	0.02	Q	|	|	|	V|
24+15	1.1222	0.01	Q	|	|	|	V|

```
   24+20       1.1222      0.01  Q          |          |          |         V|
   24+25       1.1223      0.00  Q          |          |          |         V|
   24+30       1.1223      0.00  Q          |          |          |         V|
   24+35       1.1223      0.00  Q          |          |          |         V|
   24+40       1.1223      0.00  Q          |          |          |         V|
   24+45       1.1223      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 06/29/23 File: MenifeeExUH10YR1HR110.out

++

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

IRV22-0086 ARES MENIFEE - EXISTING 10 YEAR 1 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1818.00(Ft.)
Length along longest watercourse measured to centroid = 661.80(Ft.)
Length along longest watercourse = 0.344 Mi.
Length along longest watercourse measured to centroid = 0.125 Mi.
Difference in elevation = 21.07(Ft.)
Slope along watercourse = 61.1934 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.100 Hr.
Lag time = 5.99 Min.
25% of lag time = 1.50 Min.
40% of lag time = 2.40 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	0.48	12.76

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.26	33.49

STORM EVENT (YEAR) = 10.00

Area Averaged 2-Year Rainfall = 0.480(In)
Area Averaged 100-Year Rainfall = 1.260(In)

Point rain (area averaged) = 0.801(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 0.801(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	93.00	0.000

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
93.0	93.0	0.091	0.000	0.091	1.000	0.091
					Sum (F) =	0.091

Area averaged mean soil loss (F) (In/Hr) = 0.091
Minimum soil loss rate ((In/Hr)) = 0.045
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5300

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.491	14.285	3.826
2	0.167	166.982	45.525	12.195
3	0.250	250.473	18.969	5.081
4	0.333	333.964	8.021	2.149
5	0.417	417.455	4.785	1.282
6	0.500	500.946	2.979	0.798
7	0.583	584.438	2.148	0.575
8	0.667	667.929	1.442	0.386
9	0.750	751.420	0.944	0.253
10	0.833	834.911	0.903	0.242
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	3.40	0.327	0.091	(0.294)	0.236
2	0.17	4.70	0.452	0.091	(0.406)	0.361
3	0.25	4.70	0.452	0.091	(0.406)	0.361
4	0.33	5.10	0.490	0.091	(0.441)	0.399
5	0.42	5.80	0.557	0.091	(0.502)	0.466
6	0.50	5.90	0.567	0.091	(0.510)	0.476
7	0.58	7.10	0.682	0.091	(0.614)	0.591
8	0.67	8.70	0.836	0.091	(0.752)	0.745
9	0.75	13.20	1.268	0.091	(1.141)	1.177
10	0.83	29.70	2.854	0.091	(2.568)	2.763
11	0.92	7.70	0.740	0.091	(0.666)	0.649
12	1.00	4.00	0.384	0.091	(0.346)	0.293
		(Loss Rate Not Used)				
Sum =		100.0			Sum =	8.5

Flood volume = Effective rainfall 0.71(In)
times area 26.6(Ac.)/[(In)/(Ft.)] = 1.6(Ac.Ft)
Total soil loss = 0.09(In)
Total soil loss = 0.202(Ac.Ft)
Total rainfall = 0.80(In)
Flood volume = 68473.6 Cubic Feet
Total soil loss = 8779.8 Cubic Feet

Peak flow rate of this hydrograph = 45.517(CFS)

++

1 - 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	12.5	25.0	37.5	50.0
0+ 5	0.0062	0.90	Q	|	|	|	|
0+10	0.0355	4.26	V Q	|	|	|	|
0+15	0.0836	6.98	| V Q	|	|	|	|
0+20	0.1405	8.27	| V Q	|	|	|	|
0+25	0.2064	9.56	| V Q	|	|	|	|
0+30	0.2819	10.97	| VQ	|	|	|	|
0+35	0.3658	12.18	| Q	|	|	|	|
0+40	0.4663	14.59	| Q	|	|	|	|
0+45	0.5968	18.95	| | Q	|	|	|	|
0+50	0.8137	31.50	| | V Q	|	|	|	|
0+55	1.1272	45.52	| | | V	Q |	|	|	|
1+ 0	1.3178	27.68	| | | Q	| V |	|	|	|
1+ 5	1.4257	15.66	| | Q |	|	| V |	|	|
1+10	1.4826	8.26	| Q |	|	|	| V |	|
1+15	1.5163	4.90	| Q |	|	|	|	| V |

```
    1+20        1.5388      3.27  | Q       |         |         |        V|
    1+25        1.5537      2.15  |Q        |         |         |        V|
    1+30        1.5633      1.40  |Q        |         |         |        V|
    1+35        1.5699      0.95  Q         |         |         |        V|
    1+40        1.5714      0.23  Q         |         |         |        V|
    1+45        1.5719      0.07  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 06/29/23 File: MenifeeExUH10YR1HR310.out

++

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

IRV22-0086 ARES MENIFEE - EXISTING 10 YEAR 3 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1818.00(Ft.)
Length along longest watercourse measured to centroid = 661.80(Ft.)
Length along longest watercourse = 0.344 Mi.
Length along longest watercourse measured to centroid = 0.125 Mi.
Difference in elevation = 21.07(Ft.)
Slope along watercourse = 61.1934 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.100 Hr.
Lag time = 5.99 Min.
25% of lag time = 1.50 Min.
40% of lag time = 2.40 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	0.80	21.26

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.95	51.83

STORM EVENT (YEAR) = 10.00

Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.950(In)

Point rain (area averaged) = 1.273(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.273(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	93.00	0.000

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
93.0	93.0	0.091	0.000	0.091	1.000	0.091
					Sum (F) =	0.091

Area averaged mean soil loss (F) (In/Hr) = 0.091
Minimum soil loss rate ((In/Hr)) = 0.045
(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 (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.491	14.285	3.826
2	0.167	166.982	45.525	12.195
3	0.250	250.473	18.969	5.081
4	0.333	333.964	8.021	2.149
5	0.417	417.455	4.785	1.282
6	0.500	500.946	2.979	0.798
7	0.583	584.438	2.148	0.575
8	0.667	667.929	1.442	0.386
9	0.750	751.420	0.944	0.253
10	0.833	834.911	0.903	0.242
		Sum =	100.000 Sum=	26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)

1	0.08	1.30	0.199	0.091	(0.179)	0.108
2	0.17	1.30	0.199	0.091	(0.179)	0.108
3	0.25	1.10	0.168	0.091	(0.151)	0.077
4	0.33	1.50	0.229	0.091	(0.206)	0.138
5	0.42	1.50	0.229	0.091	(0.206)	0.138
6	0.50	1.80	0.275	0.091	(0.247)	0.184
7	0.58	1.50	0.229	0.091	(0.206)	0.138
8	0.67	1.80	0.275	0.091	(0.247)	0.184
9	0.75	1.80	0.275	0.091	(0.247)	0.184
10	0.83	1.50	0.229	0.091	(0.206)	0.138
11	0.92	1.60	0.244	0.091	(0.220)	0.153
12	1.00	1.80	0.275	0.091	(0.247)	0.184
13	1.08	2.20	0.336	0.091	(0.302)	0.245
14	1.17	2.20	0.336	0.091	(0.302)	0.245
15	1.25	2.20	0.336	0.091	(0.302)	0.245
16	1.33	2.00	0.306	0.091	(0.275)	0.215
17	1.42	2.60	0.397	0.091	(0.357)	0.306
18	1.50	2.70	0.412	0.091	(0.371)	0.321
19	1.58	2.40	0.367	0.091	(0.330)	0.276
20	1.67	2.70	0.412	0.091	(0.371)	0.321
21	1.75	3.30	0.504	0.091	(0.454)	0.413
22	1.83	3.10	0.474	0.091	(0.426)	0.383
23	1.92	2.90	0.443	0.091	(0.399)	0.352
24	2.00	3.00	0.458	0.091	(0.412)	0.367
25	2.08	3.10	0.474	0.091	(0.426)	0.383
26	2.17	4.20	0.642	0.091	(0.577)	0.551
27	2.25	5.00	0.764	0.091	(0.687)	0.673
28	2.33	3.50	0.535	0.091	(0.481)	0.444
29	2.42	6.80	1.039	0.091	(0.935)	0.948
30	2.50	7.30	1.115	0.091	(1.004)	1.024
31	2.58	8.20	1.253	0.091	(1.127)	1.162
32	2.67	5.90	0.901	0.091	(0.811)	0.810
33	2.75	2.00	0.306	0.091	(0.275)	0.215
34	2.83	1.80	0.275	0.091	(0.247)	0.184
35	2.92	1.80	0.275	0.091	(0.247)	0.184
36	3.00	0.60	0.092	(0.091)	0.082	0.009

(Loss Rate Not Used)

Sum = 100.0 Sum = 12.0

Flood volume = Effective rainfall 1.00(In)
times area 26.6(Ac.)/[(In)/(Ft.)] = 2.2(Ac.Ft)
Total soil loss = 0.27(In)
Total soil loss = 0.603(Ac.Ft)
Total rainfall = 1.27(In)
Flood volume = 96547.4 Cubic Feet
Total soil loss = 26271.1 Cubic Feet

Peak flow rate of this hydrograph = 26.267(CFS)

++

3 - 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	7.5	15.0	22.5	30.0
0+ 5	0.0028	0.41	Q				
0+10	0.0147	1.72	V Q				
0+15	0.0296	2.15	V Q				
0+20	0.0450	2.25	V Q				
0+25	0.0655	2.98	V Q				
0+30	0.0895	3.48	V Q				
0+35	0.1172	4.02	V Q				
0+40	0.1445	3.96	V Q				
0+45	0.1751	4.45	V Q				
0+50	0.2062	4.51	V Q				
0+55	0.2345	4.11	VQ				
1+ 0	0.2636	4.23	VQ				
1+ 5	0.2971	4.86	VQ				
1+10	0.3367	5.76	VQ				
1+15	0.3790	6.13	V Q				
1+20	0.4215	6.17	VQ				
1+25	0.4646	6.26	Q				
1+30	0.5151	7.34	Q				
1+35	0.5688	7.79	Q				
1+40	0.6216	7.68	QV				
1+45	0.6802	8.50	QV				
1+50	0.7472	9.73	QV				
1+55	0.8146	9.80	QV				
2+ 0	0.8806	9.58	Q V				
2+ 5	0.9478	9.76	Q V				
2+10	1.0213	10.67	Q V				
2+15	1.1128	13.29	Q V				
2+20	1.2148	14.81	Q V				
2+25	1.3179	14.96	Q V				
2+30	1.4607	20.74	VQ				
2+35	1.6299	24.56	V Q				
2+40	1.8108	26.27	V Q				
2+45	1.9566	21.17	Q V				
2+50	2.0444	12.75	Q V				
2+55	2.1071	9.11	Q V				
3+ 0	2.1545	6.87	Q V				
3+ 5	2.1805	3.78	Q V				
3+10	2.1960	2.25	Q V				
3+15	2.2055	1.38	Q V				
3+20	2.2112	0.83	Q V				
3+25	2.2142	0.43	Q V				
3+30	2.2154	0.17	Q V				
3+35	2.2161	0.09	Q V				

```
    3+40        2.2164      0.05  Q         |         |         |        V|
    3+45        2.2164      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 06/29/23 File: MenifeeExUH10YR3HR610.out

++

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

IRV22-0086 ARES MENIFEE - EXISTING 10 YEAR 6 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1818.00(Ft.)
Length along longest watercourse measured to centroid = 661.80(Ft.)
Length along longest watercourse = 0.344 Mi.
Length along longest watercourse measured to centroid = 0.125 Mi.
Difference in elevation = 21.07(Ft.)
Slope along watercourse = 61.1934 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.100 Hr.
Lag time = 5.99 Min.
25% of lag time = 1.50 Min.
40% of lag time = 2.40 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.10	29.24

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	2.60	69.11

STORM EVENT (YEAR) = 10.00

Area Averaged 2-Year Rainfall = 1.100(In)
Area Averaged 100-Year Rainfall = 2.600(In)

Point rain (area averaged) = 1.717(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.717(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	93.00	0.000

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
93.0	93.0	0.091	0.000	0.091	1.000	0.091
					Sum (F) =	0.091

Area averaged mean soil loss (F) (In/Hr) = 0.091
Minimum soil loss rate ((In/Hr)) = 0.045
(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 (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.491	14.285	3.826
2	0.167	166.982	45.525	12.195
3	0.250	250.473	18.969	5.081
4	0.333	333.964	8.021	2.149
5	0.417	417.455	4.785	1.282
6	0.500	500.946	2.979	0.798
7	0.583	584.438	2.148	0.575
8	0.667	667.929	1.442	0.386
9	0.750	751.420	0.944	0.253
10	0.833	834.911	0.903	0.242
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)

1	0.08	0.50	0.103	0.091	(	0.093)	0.012
2	0.17	0.60	0.124	0.091	(	0.111)	0.033
3	0.25	0.60	0.124	0.091	(	0.111)	0.033
4	0.33	0.60	0.124	0.091	(	0.111)	0.033
5	0.42	0.60	0.124	0.091	(	0.111)	0.033
6	0.50	0.70	0.144	0.091	(	0.130)	0.053
7	0.58	0.70	0.144	0.091	(	0.130)	0.053
8	0.67	0.70	0.144	0.091	(	0.130)	0.053
9	0.75	0.70	0.144	0.091	(	0.130)	0.053
10	0.83	0.70	0.144	0.091	(	0.130)	0.053
11	0.92	0.70	0.144	0.091	(	0.130)	0.053
12	1.00	0.80	0.165	0.091	(	0.148)	0.074
13	1.08	0.80	0.165	0.091	(	0.148)	0.074
14	1.17	0.80	0.165	0.091	(	0.148)	0.074
15	1.25	0.80	0.165	0.091	(	0.148)	0.074
16	1.33	0.80	0.165	0.091	(	0.148)	0.074
17	1.42	0.80	0.165	0.091	(	0.148)	0.074
18	1.50	0.80	0.165	0.091	(	0.148)	0.074
19	1.58	0.80	0.165	0.091	(	0.148)	0.074
20	1.67	0.80	0.165	0.091	(	0.148)	0.074
21	1.75	0.80	0.165	0.091	(	0.148)	0.074
22	1.83	0.80	0.165	0.091	(	0.148)	0.074
23	1.92	0.80	0.165	0.091	(	0.148)	0.074
24	2.00	0.90	0.185	0.091	(	0.167)	0.094
25	2.08	0.80	0.165	0.091	(	0.148)	0.074
26	2.17	0.90	0.185	0.091	(	0.167)	0.094
27	2.25	0.90	0.185	0.091	(	0.167)	0.094
28	2.33	0.90	0.185	0.091	(	0.167)	0.094
29	2.42	0.90	0.185	0.091	(	0.167)	0.094
30	2.50	0.90	0.185	0.091	(	0.167)	0.094
31	2.58	0.90	0.185	0.091	(	0.167)	0.094
32	2.67	0.90	0.185	0.091	(	0.167)	0.094
33	2.75	1.00	0.206	0.091	(	0.185)	0.115
34	2.83	1.00	0.206	0.091	(	0.185)	0.115
35	2.92	1.00	0.206	0.091	(	0.185)	0.115
36	3.00	1.00	0.206	0.091	(	0.185)	0.115
37	3.08	1.00	0.206	0.091	(	0.185)	0.115
38	3.17	1.10	0.227	0.091	(	0.204)	0.136
39	3.25	1.10	0.227	0.091	(	0.204)	0.136
40	3.33	1.10	0.227	0.091	(	0.204)	0.136
41	3.42	1.20	0.247	0.091	(	0.223)	0.156
42	3.50	1.30	0.268	0.091	(	0.241)	0.177
43	3.58	1.40	0.288	0.091	(	0.260)	0.197
44	3.67	1.40	0.288	0.091	(	0.260)	0.197
45	3.75	1.50	0.309	0.091	(	0.278)	0.218
46	3.83	1.50	0.309	0.091	(	0.278)	0.218
47	3.92	1.60	0.330	0.091	(	0.297)	0.239
48	4.00	1.60	0.330	0.091	(	0.297)	0.239
49	4.08	1.70	0.350	0.091	(	0.315)	0.259
50	4.17	1.80	0.371	0.091	(	0.334)	0.280

```
51   4.25     1.90      0.391          0.091    (  0.352)        0.300
52   4.33     2.00      0.412          0.091    (  0.371)        0.321
53   4.42     2.10      0.433          0.091    (  0.389)        0.342
54   4.50     2.10      0.433          0.091    (  0.389)        0.342
55   4.58     2.20      0.453          0.091    (  0.408)        0.362
56   4.67     2.30      0.474          0.091    (  0.426)        0.383
57   4.75     2.40      0.494          0.091    (  0.445)        0.403
58   4.83     2.40      0.494          0.091    (  0.445)        0.403
59   4.92     2.50      0.515          0.091    (  0.464)        0.424
60   5.00     2.60      0.536          0.091    (  0.482)        0.445
61   5.08     3.10      0.639          0.091    (  0.575)        0.548
62   5.17     3.60      0.742          0.091    (  0.668)        0.651
63   5.25     3.90      0.804          0.091    (  0.723)        0.713
64   5.33     4.20      0.865          0.091    (  0.779)        0.774
65   5.42     4.70      0.968          0.091    (  0.872)        0.877
66   5.50     5.60      1.154          0.091    (  1.038)        1.063
67   5.58     1.90      0.391          0.091    (  0.352)        0.300
68   5.67     0.90      0.185          0.091    (  0.167)        0.094
69   5.75     0.60      0.124          0.091    (  0.111)        0.033
70   5.83     0.50      0.103          0.091    (  0.093)        0.012
71   5.92     0.30      0.062       (  0.091)       0.056        0.006
72   6.00     0.20      0.041       (  0.091)       0.037        0.004
               (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    14.1
      Flood volume = Effective rainfall      1.18(In)
       times area      26.6(Ac.)/[(In)/(Ft.)] =       2.6(Ac.Ft)
      Total soil loss =      0.54(In)
      Total soil loss =     1.193(Ac.Ft)
      Total rainfall =      1.72(In)
      Flood volume =      113693.7 Cubic Feet
      Total soil loss =       51961.2 Cubic Feet
      ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     22.367(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          6 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      ---------------------------------------------------------------------
                   Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5      30.0
-------------------------------------------------------------------------
  0+ 5       0.0003      0.05  Q         |         |         |         |
  0+10       0.0022      0.27  Q         |         |         |         |
  0+15       0.0062      0.58  Q         |         |         |         |
  0+20       0.0111      0.71  Q         |         |         |         |
  0+25       0.0165      0.77  VQ        |         |         |         |
  0+30       0.0226      0.89  VQ        |         |         |         |
  0+35       0.0306      1.16  VQ        |         |         |         |
```

```
0+40       0.0395      1.29  VQ        |         |         |         |
0+45       0.0487      1.34  VQ        |         |         |         |
0+50       0.0582      1.37  VQ        |         |         |         |
0+55       0.0678      1.40  |Q        |         |         |         |
1+ 0       0.0780      1.49  |Q        |         |         |         |
1+ 5       0.0900      1.75  |VQ       |         |         |         |
1+10       0.1028      1.86  |VQ       |         |         |         |
1+15       0.1160      1.91  |VQ       |         |         |         |
1+20       0.1293      1.93  |VQ       |         |         |         |
1+25       0.1427      1.95  | Q       |         |         |         |
1+30       0.1562      1.96  | Q       |         |         |         |
1+35       0.1697      1.97  | Q       |         |         |         |
1+40       0.1833      1.97  | Q       |         |         |         |
1+45       0.1970      1.98  | QV      |         |         |         |
1+50       0.2106      1.98  | QV      |         |         |         |
1+55       0.2242      1.98  | QV      |         |         |         |
2+ 0       0.2384      2.06  | QV      |         |         |         |
2+ 5       0.2537      2.23  | QV      |         |         |         |
2+10       0.2686      2.16  | Q V     |         |         |         |
2+15       0.2848      2.35  |  QV     |         |         |         |
2+20       0.3016      2.44  |  QV     |         |         |         |
2+25       0.3187      2.47  |  QV     |         |         |         |
2+30       0.3359      2.50  |  Q V    |         |         |         |
2+35       0.3532      2.51  |  Q V    |         |         |         |
2+40       0.3705      2.52  |  Q V    |         |         |         |
2+45       0.3884      2.60  |  Q V    |         |         |         |
2+50       0.4081      2.86  |  Q  V   |         |         |         |
2+55       0.4285      2.97  |  Q  V   |         |         |         |
3+ 0       0.4493      3.01  |   Q V   |         |         |         |
3+ 5       0.4702      3.04  |   Q  V  |         |         |         |
3+10       0.4917      3.13  |   Q  V  |         |         |         |
3+15       0.5151      3.40  |   Q  V  |         |         |         |
3+20       0.5393      3.51  |   Q   V |         |         |         |
3+25       0.5643      3.64  |   Q   V |         |         |         |
3+30       0.5919      4.00  |    Q   V|         |         |         |
3+35       0.6225      4.45  |    Q   V|         |         |         |
3+40       0.6560      4.86  |     Q   V         |         |         |
3+45       0.6913      5.12  |     Q   V         |         |         |
3+50       0.7289      5.47  |      Q  |V        |         |         |
3+55       0.7683      5.71  |      Q  |V        |         |         |
4+ 0       0.8099      6.04  |       Q | V       |         |         |
4+ 5       0.8531      6.28  |       Q |  V      |         |         |
4+10       0.8992      6.69  |       Q |  V      |         |         |
4+15       0.9485      7.17  |        Q|   V     |         |         |
4+20       1.0014      7.68  |         Q    V    |         |         |
4+25       1.0579      8.20  |         Q     V   |         |         |
4+30       1.1176      8.66  |         |Q     V  |         |         |
4+35       1.1792      8.95  |         |Q      V |         |         |
4+40       1.2438      9.39  |         | Q      V|         |         |
4+45       1.3119      9.89  |         |  Q      V         |         |
```

```
    4+50       1.3831     10.34  |          |  Q       |V         |          |
    4+55       1.4563     10.62  |          |   Q      | V        |          |
    5+ 0       1.5325     11.06  |          |   Q      |  V       |          |
    5+ 5       1.6142     11.87  |          |    Q     |   V      |          |
    5+10       1.7087     13.72  |          |       Q  |     V    |          |
    5+15       1.8177     15.83  |          |          |Q     V   |          |
    5+20       1.9391     17.63  |          |          |  Q     V |          |
    5+25       2.0732     19.48  |          |          |    Q     |V         |
    5+30       2.2257     22.13  |          |          |         Q|   V      |
    5+35       2.3797     22.37  |          |          |         Q|     V    |
    5+40       2.4739     13.68  |          |       Q  |          |      V   |
    5+45       2.5272      7.74  |          Q          |          |       V  |
    5+50       2.5593      4.65  |     Q    |          |          |        V |
    5+55       2.5794      2.91  |  Q       |          |          |        V |
    6+ 0       2.5925      1.90  | Q        |          |          |        V |
    6+ 5       2.6008      1.22  |Q         |          |          |        V |
    6+10       2.6059      0.73  Q          |          |          |        V |
    6+15       2.6087      0.41  Q          |          |          |        V |
    6+20       2.6096      0.13  Q          |          |          |        V |
    6+25       2.6099      0.04  Q          |          |          |        V |
    6+30       2.6100      0.02  Q          |          |          |        V |
    6+35       2.6100      0.01  Q          |          |          |        V |
    6+40       2.6100      0.00  Q          |          |          |        V |
    6+45       2.6100      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 06/29/23 File: MenifeeExUH10YR6HR2410.out

++

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

IRV22-0086 ARES MENIFEE - EXISTING 10 YEAR 24 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1818.00(Ft.)
Length along longest watercourse measured to centroid = 661.80(Ft.)
Length along longest watercourse = 0.344 Mi.
Length along longest watercourse measured to centroid = 0.125 Mi.
Difference in elevation = 21.07(Ft.)
Slope along watercourse = 61.1934 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.100 Hr.
Lag time = 5.99 Min.
25% of lag time = 1.50 Min.
40% of lag time = 2.40 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]
26.58	1.85	49.17

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	4.75	126.25

STORM EVENT (YEAR) = 10.00

Area Averaged 2-Year Rainfall = 1.850(In)
Area Averaged 100-Year Rainfall = 4.750(In)

Point rain (area averaged) = 3.043(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 3.043(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	93.00	0.000

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
93.0	93.0	0.091	0.000	0.091	1.000	0.091
					Sum (F) =	0.091

Area averaged mean soil loss (F) (In/Hr) = 0.091
Minimum soil loss rate ((In/Hr)) = 0.045
(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 (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.491	14.285	3.826
2	0.167	166.982	45.525	12.195
3	0.250	250.473	18.969	5.081
4	0.333	333.964	8.021	2.149
5	0.417	417.455	4.785	1.282
6	0.500	500.946	2.979	0.798
7	0.583	584.438	2.148	0.575
8	0.667	667.929	1.442	0.386
9	0.750	751.420	0.944	0.253
10	0.833	834.911	0.903	0.242
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)

1	0.08	0.07	0.024	(0.161)	0.022	0.002
2	0.17	0.07	0.024	(0.161)	0.022	0.002
3	0.25	0.07	0.024	(0.160)	0.022	0.002
4	0.33	0.10	0.037	(0.159)	0.033	0.004
5	0.42	0.10	0.037	(0.159)	0.033	0.004
6	0.50	0.10	0.037	(0.158)	0.033	0.004
7	0.58	0.10	0.037	(0.158)	0.033	0.004
8	0.67	0.10	0.037	(0.157)	0.033	0.004
9	0.75	0.10	0.037	(0.156)	0.033	0.004
10	0.83	0.13	0.049	(0.156)	0.044	0.005
11	0.92	0.13	0.049	(0.155)	0.044	0.005
12	1.00	0.13	0.049	(0.155)	0.044	0.005
13	1.08	0.10	0.037	(0.154)	0.033	0.004
14	1.17	0.10	0.037	(0.153)	0.033	0.004
15	1.25	0.10	0.037	(0.153)	0.033	0.004
16	1.33	0.10	0.037	(0.152)	0.033	0.004
17	1.42	0.10	0.037	(0.151)	0.033	0.004
18	1.50	0.10	0.037	(0.151)	0.033	0.004
19	1.58	0.10	0.037	(0.150)	0.033	0.004
20	1.67	0.10	0.037	(0.150)	0.033	0.004
21	1.75	0.10	0.037	(0.149)	0.033	0.004
22	1.83	0.13	0.049	(0.148)	0.044	0.005
23	1.92	0.13	0.049	(0.148)	0.044	0.005
24	2.00	0.13	0.049	(0.147)	0.044	0.005
25	2.08	0.13	0.049	(0.147)	0.044	0.005
26	2.17	0.13	0.049	(0.146)	0.044	0.005
27	2.25	0.13	0.049	(0.145)	0.044	0.005
28	2.33	0.13	0.049	(0.145)	0.044	0.005
29	2.42	0.13	0.049	(0.144)	0.044	0.005
30	2.50	0.13	0.049	(0.144)	0.044	0.005
31	2.58	0.17	0.061	(0.143)	0.055	0.006
32	2.67	0.17	0.061	(0.143)	0.055	0.006
33	2.75	0.17	0.061	(0.142)	0.055	0.006
34	2.83	0.17	0.061	(0.141)	0.055	0.006
35	2.92	0.17	0.061	(0.141)	0.055	0.006
36	3.00	0.17	0.061	(0.140)	0.055	0.006
37	3.08	0.17	0.061	(0.140)	0.055	0.006
38	3.17	0.17	0.061	(0.139)	0.055	0.006
39	3.25	0.17	0.061	(0.138)	0.055	0.006
40	3.33	0.17	0.061	(0.138)	0.055	0.006
41	3.42	0.17	0.061	(0.137)	0.055	0.006
42	3.50	0.17	0.061	(0.137)	0.055	0.006
43	3.58	0.17	0.061	(0.136)	0.055	0.006
44	3.67	0.17	0.061	(0.136)	0.055	0.006
45	3.75	0.17	0.061	(0.135)	0.055	0.006
46	3.83	0.20	0.073	(0.134)	0.066	0.007
47	3.92	0.20	0.073	(0.134)	0.066	0.007
48	4.00	0.20	0.073	(0.133)	0.066	0.007
49	4.08	0.20	0.073	(0.133)	0.066	0.007
50	4.17	0.20	0.073	(0.132)	0.066	0.007

51	4.25	0.20	0.073	(0.132)	0.066	0.007
52	4.33	0.23	0.085	(0.131)	0.077	0.009
53	4.42	0.23	0.085	(0.131)	0.077	0.009
54	4.50	0.23	0.085	(0.130)	0.077	0.009
55	4.58	0.23	0.085	(0.129)	0.077	0.009
56	4.67	0.23	0.085	(0.129)	0.077	0.009
57	4.75	0.23	0.085	(0.128)	0.077	0.009
58	4.83	0.27	0.097	(0.128)	0.088	0.010
59	4.92	0.27	0.097	(0.127)	0.088	0.010
60	5.00	0.27	0.097	(0.127)	0.088	0.010
61	5.08	0.20	0.073	(0.126)	0.066	0.007
62	5.17	0.20	0.073	(0.126)	0.066	0.007
63	5.25	0.20	0.073	(0.125)	0.066	0.007
64	5.33	0.23	0.085	(0.124)	0.077	0.009
65	5.42	0.23	0.085	(0.124)	0.077	0.009
66	5.50	0.23	0.085	(0.123)	0.077	0.009
67	5.58	0.27	0.097	(0.123)	0.088	0.010
68	5.67	0.27	0.097	(0.122)	0.088	0.010
69	5.75	0.27	0.097	(0.122)	0.088	0.010
70	5.83	0.27	0.097	(0.121)	0.088	0.010
71	5.92	0.27	0.097	(0.121)	0.088	0.010
72	6.00	0.27	0.097	(0.120)	0.088	0.010
73	6.08	0.30	0.110	(0.120)	0.099	0.011
74	6.17	0.30	0.110	(0.119)	0.099	0.011
75	6.25	0.30	0.110	(0.119)	0.099	0.011
76	6.33	0.30	0.110	(0.118)	0.099	0.011
77	6.42	0.30	0.110	(0.117)	0.099	0.011
78	6.50	0.30	0.110	(0.117)	0.099	0.011
79	6.58	0.33	0.122	(0.116)	0.110	0.012
80	6.67	0.33	0.122	(0.116)	0.110	0.012
81	6.75	0.33	0.122	(0.115)	0.110	0.012
82	6.83	0.33	0.122	(0.115)	0.110	0.012
83	6.92	0.33	0.122	(0.114)	0.110	0.012
84	7.00	0.33	0.122	(0.114)	0.110	0.012
85	7.08	0.33	0.122	(0.113)	0.110	0.012
86	7.17	0.33	0.122	(0.113)	0.110	0.012
87	7.25	0.33	0.122	(0.112)	0.110	0.012
88	7.33	0.37	0.134	0.112	(0.120)	0.022
89	7.42	0.37	0.134	0.111	(0.120)	0.023
90	7.50	0.37	0.134	0.111	(0.120)	0.023
91	7.58	0.40	0.146	0.110	(0.131)	0.036
92	7.67	0.40	0.146	0.110	(0.131)	0.036
93	7.75	0.40	0.146	0.109	(0.131)	0.037
94	7.83	0.43	0.158	0.109	(0.142)	0.050
95	7.92	0.43	0.158	0.108	(0.142)	0.050
96	8.00	0.43	0.158	0.108	(0.142)	0.051
97	8.08	0.50	0.183	0.107	(0.164)	0.075
98	8.17	0.50	0.183	0.107	(0.164)	0.076
99	8.25	0.50	0.183	0.106	(0.164)	0.076
100	8.33	0.50	0.183	0.106	(0.164)	0.077

101	8.42	0.50	0.183	0.105	(	0.164)	0.077
102	8.50	0.50	0.183	0.105	(	0.164)	0.078
103	8.58	0.53	0.195	0.104	(	0.175)	0.091
104	8.67	0.53	0.195	0.104	(	0.175)	0.091
105	8.75	0.53	0.195	0.103	(	0.175)	0.092
106	8.83	0.57	0.207	0.103	(	0.186)	0.104
107	8.92	0.57	0.207	0.102	(	0.186)	0.105
108	9.00	0.57	0.207	0.102	(	0.186)	0.105
109	9.08	0.63	0.231	0.101	(	0.208)	0.130
110	9.17	0.63	0.231	0.101	(	0.208)	0.130
111	9.25	0.63	0.231	0.100	(	0.208)	0.131
112	9.33	0.67	0.243	0.100	(	0.219)	0.144
113	9.42	0.67	0.243	0.099	(	0.219)	0.144
114	9.50	0.67	0.243	0.099	(	0.219)	0.145
115	9.58	0.70	0.256	0.098	(	0.230)	0.157
116	9.67	0.70	0.256	0.098	(	0.230)	0.158
117	9.75	0.70	0.256	0.097	(	0.230)	0.158
118	9.83	0.73	0.268	0.097	(	0.241)	0.171
119	9.92	0.73	0.268	0.097	(	0.241)	0.171
120	10.00	0.73	0.268	0.096	(	0.241)	0.172
121	10.08	0.50	0.183	0.096	(	0.164)	0.087
122	10.17	0.50	0.183	0.095	(	0.164)	0.087
123	10.25	0.50	0.183	0.095	(	0.164)	0.088
124	10.33	0.50	0.183	0.094	(	0.164)	0.088
125	10.42	0.50	0.183	0.094	(	0.164)	0.089
126	10.50	0.50	0.183	0.093	(	0.164)	0.089
127	10.58	0.67	0.243	0.093	(	0.219)	0.151
128	10.67	0.67	0.243	0.092	(	0.219)	0.151
129	10.75	0.67	0.243	0.092	(	0.219)	0.151
130	10.83	0.67	0.243	0.092	(	0.219)	0.152
131	10.92	0.67	0.243	0.091	(	0.219)	0.152
132	11.00	0.67	0.243	0.091	(	0.219)	0.153
133	11.08	0.63	0.231	0.090	(	0.208)	0.141
134	11.17	0.63	0.231	0.090	(	0.208)	0.142
135	11.25	0.63	0.231	0.089	(	0.208)	0.142
136	11.33	0.63	0.231	0.089	(	0.208)	0.142
137	11.42	0.63	0.231	0.088	(	0.208)	0.143
138	11.50	0.63	0.231	0.088	(	0.208)	0.143
139	11.58	0.57	0.207	0.088	(	0.186)	0.119
140	11.67	0.57	0.207	0.087	(	0.186)	0.120
141	11.75	0.57	0.207	0.087	(	0.186)	0.120
142	11.83	0.60	0.219	0.086	(	0.197)	0.133
143	11.92	0.60	0.219	0.086	(	0.197)	0.133
144	12.00	0.60	0.219	0.085	(	0.197)	0.134
145	12.08	0.83	0.304	0.085	(	0.274)	0.219
146	12.17	0.83	0.304	0.085	(	0.274)	0.220
147	12.25	0.83	0.304	0.084	(	0.274)	0.220
148	12.33	0.87	0.316	0.084	(	0.285)	0.233
149	12.42	0.87	0.316	0.083	(	0.285)	0.233
150	12.50	0.87	0.316	0.083	(	0.285)	0.234

151	12.58	0.93	0.341	0.082	(0.307)	0.258
152	12.67	0.93	0.341	0.082	(0.307)	0.259
153	12.75	0.93	0.341	0.082	(0.307)	0.259
154	12.83	0.97	0.353	0.081	(0.318)	0.272
155	12.92	0.97	0.353	0.081	(0.318)	0.272
156	13.00	0.97	0.353	0.080	(0.318)	0.273
157	13.08	1.13	0.414	0.080	(0.372)	0.334
158	13.17	1.13	0.414	0.080	(0.372)	0.334
159	13.25	1.13	0.414	0.079	(0.372)	0.335
160	13.33	1.13	0.414	0.079	(0.372)	0.335
161	13.42	1.13	0.414	0.078	(0.372)	0.335
162	13.50	1.13	0.414	0.078	(0.372)	0.336
163	13.58	0.77	0.280	0.078	(0.252)	0.202
164	13.67	0.77	0.280	0.077	(0.252)	0.203
165	13.75	0.77	0.280	0.077	(0.252)	0.203
166	13.83	0.77	0.280	0.076	(0.252)	0.204
167	13.92	0.77	0.280	0.076	(0.252)	0.204
168	14.00	0.77	0.280	0.076	(0.252)	0.204
169	14.08	0.90	0.329	0.075	(0.296)	0.253
170	14.17	0.90	0.329	0.075	(0.296)	0.254
171	14.25	0.90	0.329	0.074	(0.296)	0.254
172	14.33	0.87	0.316	0.074	(0.285)	0.242
173	14.42	0.87	0.316	0.074	(0.285)	0.243
174	14.50	0.87	0.316	0.073	(0.285)	0.243
175	14.58	0.87	0.316	0.073	(0.285)	0.244
176	14.67	0.87	0.316	0.073	(0.285)	0.244
177	14.75	0.87	0.316	0.072	(0.285)	0.244
178	14.83	0.83	0.304	0.072	(0.274)	0.232
179	14.92	0.83	0.304	0.071	(0.274)	0.233
180	15.00	0.83	0.304	0.071	(0.274)	0.233
181	15.08	0.80	0.292	0.071	(0.263)	0.221
182	15.17	0.80	0.292	0.070	(0.263)	0.222
183	15.25	0.80	0.292	0.070	(0.263)	0.222
184	15.33	0.77	0.280	0.070	(0.252)	0.210
185	15.42	0.77	0.280	0.069	(0.252)	0.211
186	15.50	0.77	0.280	0.069	(0.252)	0.211
187	15.58	0.63	0.231	0.069	(0.208)	0.163
188	15.67	0.63	0.231	0.068	(0.208)	0.163
189	15.75	0.63	0.231	0.068	(0.208)	0.163
190	15.83	0.63	0.231	0.068	(0.208)	0.164
191	15.92	0.63	0.231	0.067	(0.208)	0.164
192	16.00	0.63	0.231	0.067	(0.208)	0.164
193	16.08	0.13	0.049	(0.066)	0.044	0.005
194	16.17	0.13	0.049	(0.066)	0.044	0.005
195	16.25	0.13	0.049	(0.066)	0.044	0.005
196	16.33	0.13	0.049	(0.065)	0.044	0.005
197	16.42	0.13	0.049	(0.065)	0.044	0.005
198	16.50	0.13	0.049	(0.065)	0.044	0.005
199	16.58	0.10	0.037	(0.064)	0.033	0.004
200	16.67	0.10	0.037	(0.064)	0.033	0.004

201	16.75	0.10	0.037	(0.064)	0.033	0.004
202	16.83	0.10	0.037	(0.063)	0.033	0.004
203	16.92	0.10	0.037	(0.063)	0.033	0.004
204	17.00	0.10	0.037	(0.063)	0.033	0.004
205	17.08	0.17	0.061	(0.063)	0.055	0.006
206	17.17	0.17	0.061	(0.062)	0.055	0.006
207	17.25	0.17	0.061	(0.062)	0.055	0.006
208	17.33	0.17	0.061	(0.062)	0.055	0.006
209	17.42	0.17	0.061	(0.061)	0.055	0.006
210	17.50	0.17	0.061	(0.061)	0.055	0.006
211	17.58	0.17	0.061	(0.061)	0.055	0.006
212	17.67	0.17	0.061	(0.060)	0.055	0.006
213	17.75	0.17	0.061	(0.060)	0.055	0.006
214	17.83	0.13	0.049	(0.060)	0.044	0.005
215	17.92	0.13	0.049	(0.059)	0.044	0.005
216	18.00	0.13	0.049	(0.059)	0.044	0.005
217	18.08	0.13	0.049	(0.059)	0.044	0.005
218	18.17	0.13	0.049	(0.059)	0.044	0.005
219	18.25	0.13	0.049	(0.058)	0.044	0.005
220	18.33	0.13	0.049	(0.058)	0.044	0.005
221	18.42	0.13	0.049	(0.058)	0.044	0.005
222	18.50	0.13	0.049	(0.057)	0.044	0.005
223	18.58	0.10	0.037	(0.057)	0.033	0.004
224	18.67	0.10	0.037	(0.057)	0.033	0.004
225	18.75	0.10	0.037	(0.057)	0.033	0.004
226	18.83	0.07	0.024	(0.056)	0.022	0.002
227	18.92	0.07	0.024	(0.056)	0.022	0.002
228	19.00	0.07	0.024	(0.056)	0.022	0.002
229	19.08	0.10	0.037	(0.056)	0.033	0.004
230	19.17	0.10	0.037	(0.055)	0.033	0.004
231	19.25	0.10	0.037	(0.055)	0.033	0.004
232	19.33	0.13	0.049	(0.055)	0.044	0.005
233	19.42	0.13	0.049	(0.055)	0.044	0.005
234	19.50	0.13	0.049	(0.054)	0.044	0.005
235	19.58	0.10	0.037	(0.054)	0.033	0.004
236	19.67	0.10	0.037	(0.054)	0.033	0.004
237	19.75	0.10	0.037	(0.054)	0.033	0.004
238	19.83	0.07	0.024	(0.053)	0.022	0.002
239	19.92	0.07	0.024	(0.053)	0.022	0.002
240	20.00	0.07	0.024	(0.053)	0.022	0.002
241	20.08	0.10	0.037	(0.053)	0.033	0.004
242	20.17	0.10	0.037	(0.052)	0.033	0.004
243	20.25	0.10	0.037	(0.052)	0.033	0.004
244	20.33	0.10	0.037	(0.052)	0.033	0.004
245	20.42	0.10	0.037	(0.052)	0.033	0.004
246	20.50	0.10	0.037	(0.051)	0.033	0.004
247	20.58	0.10	0.037	(0.051)	0.033	0.004
248	20.67	0.10	0.037	(0.051)	0.033	0.004
249	20.75	0.10	0.037	(0.051)	0.033	0.004
250	20.83	0.07	0.024	(0.051)	0.022	0.002

```
251  20.92     0.07      0.024       (  0.050)       0.022        0.002
252  21.00     0.07      0.024       (  0.050)       0.022        0.002
253  21.08     0.10      0.037       (  0.050)       0.033        0.004
254  21.17     0.10      0.037       (  0.050)       0.033        0.004
255  21.25     0.10      0.037       (  0.050)       0.033        0.004
256  21.33     0.07      0.024       (  0.049)       0.022        0.002
257  21.42     0.07      0.024       (  0.049)       0.022        0.002
258  21.50     0.07      0.024       (  0.049)       0.022        0.002
259  21.58     0.10      0.037       (  0.049)       0.033        0.004
260  21.67     0.10      0.037       (  0.049)       0.033        0.004
261  21.75     0.10      0.037       (  0.049)       0.033        0.004
262  21.83     0.07      0.024       (  0.048)       0.022        0.002
263  21.92     0.07      0.024       (  0.048)       0.022        0.002
264  22.00     0.07      0.024       (  0.048)       0.022        0.002
265  22.08     0.10      0.037       (  0.048)       0.033        0.004
266  22.17     0.10      0.037       (  0.048)       0.033        0.004
267  22.25     0.10      0.037       (  0.048)       0.033        0.004
268  22.33     0.07      0.024       (  0.047)       0.022        0.002
269  22.42     0.07      0.024       (  0.047)       0.022        0.002
270  22.50     0.07      0.024       (  0.047)       0.022        0.002
271  22.58     0.07      0.024       (  0.047)       0.022        0.002
272  22.67     0.07      0.024       (  0.047)       0.022        0.002
273  22.75     0.07      0.024       (  0.047)       0.022        0.002
274  22.83     0.07      0.024       (  0.047)       0.022        0.002
275  22.92     0.07      0.024       (  0.047)       0.022        0.002
276  23.00     0.07      0.024       (  0.046)       0.022        0.002
277  23.08     0.07      0.024       (  0.046)       0.022        0.002
278  23.17     0.07      0.024       (  0.046)       0.022        0.002
279  23.25     0.07      0.024       (  0.046)       0.022        0.002
280  23.33     0.07      0.024       (  0.046)       0.022        0.002
281  23.42     0.07      0.024       (  0.046)       0.022        0.002
282  23.50     0.07      0.024       (  0.046)       0.022        0.002
283  23.58     0.07      0.024       (  0.046)       0.022        0.002
284  23.67     0.07      0.024       (  0.046)       0.022        0.002
285  23.75     0.07      0.024       (  0.046)       0.022        0.002
286  23.83     0.07      0.024       (  0.046)       0.022        0.002
287  23.92     0.07      0.024       (  0.046)       0.022        0.002
288  24.00     0.07      0.024       (  0.046)       0.022        0.002
               (Loss Rate Not Used)
    Sum =     100.0                                  Sum =    18.6
       Flood volume = Effective rainfall      1.55(In)
        times area      26.6(Ac.)/[(In)/(Ft.)] =       3.4(Ac.Ft)
       Total soil loss =      1.49(In)
       Total soil loss =     3.310(Ac.Ft)
       Total rainfall =      3.04(In)
       Flood volume =      149411.5 Cubic Feet
       Total soil loss =      144175.3 Cubic Feet
       ---------------------------------------------------------------
        Peak flow rate of this hydrograph =      8.891(CFS)
       ---------------------------------------------------------------
```

++

24 - H O U R S T O R M

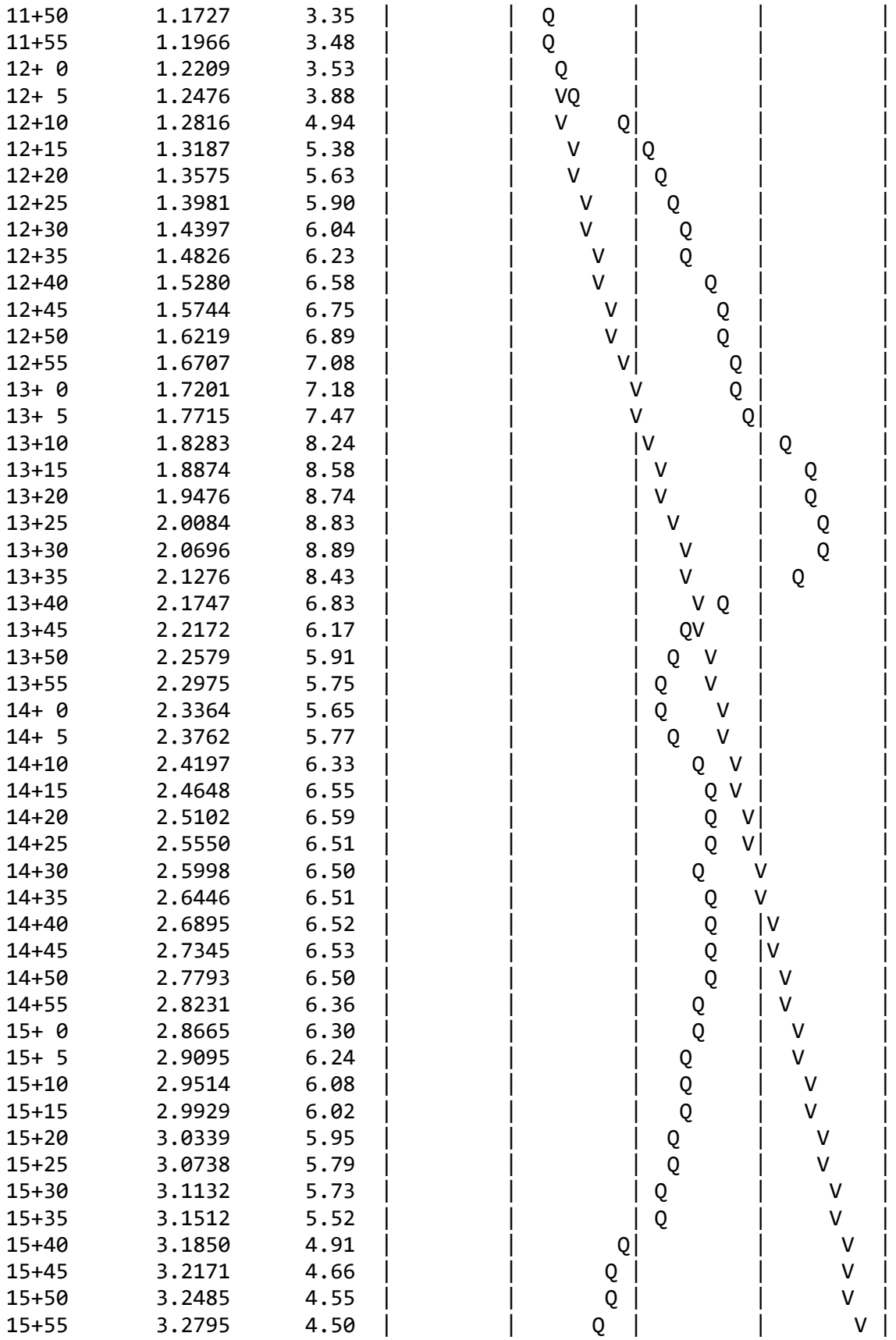
R u n o f f H y d r o g r a p h

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	0.04	Q				
0+15	0.0007	0.05	Q				
0+20	0.0011	0.06	Q				
0+25	0.0017	0.08	Q				
0+30	0.0023	0.09	Q				
0+35	0.0029	0.09	Q				
0+40	0.0035	0.09	Q				
0+45	0.0042	0.10	Q				
0+50	0.0049	0.10	Q				
0+55	0.0057	0.12	Q				
1+ 0	0.0065	0.12	Q				
1+ 5	0.0074	0.12	Q				
1+10	0.0081	0.11	Q				
1+15	0.0088	0.10	Q				
1+20	0.0095	0.10	Q				
1+25	0.0102	0.10	Q				
1+30	0.0109	0.10	Q				
1+35	0.0116	0.10	Q				
1+40	0.0123	0.10	Q				
1+45	0.0129	0.10	Q				
1+50	0.0136	0.10	Q				
1+55	0.0145	0.12	Q				
2+ 0	0.0153	0.12	Q				
2+ 5	0.0162	0.13	Q				
2+10	0.0171	0.13	Q				
2+15	0.0179	0.13	Q				
2+20	0.0188	0.13	Q				
2+25	0.0197	0.13	Q				
2+30	0.0206	0.13	Q				
2+35	0.0216	0.14	Q				
2+40	0.0226	0.15	Q				
2+45	0.0237	0.16	Q				
2+50	0.0248	0.16	Q				
2+55	0.0259	0.16	Q				
3+ 0	0.0270	0.16	Q				
3+ 5	0.0281	0.16	Q				
3+10	0.0292	0.16	Q				
3+15	0.0303	0.16	Q				
3+20	0.0315	0.16	Q				
3+25	0.0326	0.16	Q				

3+30	0.0337	0.16	Q				
3+35	0.0348	0.16	Q				
3+40	0.0359	0.16	Q				
3+45	0.0371	0.16	Q				
3+50	0.0382	0.17	Q				
3+55	0.0395	0.18	Q				
4+ 0	0.0408	0.19	Q				
4+ 5	0.0421	0.19	Q				
4+10	0.0434	0.19	Q				
4+15	0.0448	0.19	Q				
4+20	0.0461	0.20	Q				
4+25	0.0476	0.21	Q				
4+30	0.0491	0.22	Q				
4+35	0.0507	0.22	Q				
4+40	0.0522	0.23	Q				
4+45	0.0538	0.23	Q				
4+50	0.0554	0.23	Q				
4+55	0.0571	0.25	Q				
5+ 0	0.0588	0.25	VQ				
5+ 5	0.0605	0.25	Q				
5+10	0.0621	0.22	Q				
5+15	0.0635	0.21	Q				
5+20	0.0649	0.21	Q				
5+25	0.0664	0.22	Q				
5+30	0.0680	0.22	Q				
5+35	0.0696	0.23	Q				
5+40	0.0713	0.25	Q				
5+45	0.0730	0.25	VQ				
5+50	0.0748	0.26	VQ				
5+55	0.0765	0.26	VQ				
6+ 0	0.0783	0.26	VQ				
6+ 5	0.0801	0.26	VQ				
6+10	0.0821	0.28	VQ				
6+15	0.0840	0.29	VQ				
6+20	0.0860	0.29	|Q				
6+25	0.0880	0.29	|Q				
6+30	0.0901	0.29	|Q				
6+35	0.0921	0.30	|Q				
6+40	0.0943	0.31	|Q				
6+45	0.0964	0.32	|Q				
6+50	0.0987	0.32	|Q				
6+55	0.1009	0.32	|Q				
7+ 0	0.1031	0.32	|Q				
7+ 5	0.1054	0.33	|Q				
7+10	0.1076	0.33	|Q				
7+15	0.1099	0.33	|Q				
7+20	0.1124	0.36	|Q				
7+25	0.1157	0.49	|Q				
7+30	0.1195	0.55	|VQ				
7+35	0.1238	0.63	|VQ				

7+40	0.1293	0.80	V Q			
7+45	0.1354	0.88	V Q			
7+50	0.1421	0.97	V Q			
7+55	0.1500	1.15	V Q			
8+ 0	0.1586	1.24	V Q			
8+ 5	0.1681	1.38	V Q			
8+10	0.1799	1.71	V Q			
8+15	0.1927	1.86	V Q			
8+20	0.2061	1.94	V Q			
8+25	0.2198	1.99	V Q			
8+30	0.2337	2.02	V Q			
8+35	0.2482	2.10	V Q			
8+40	0.2638	2.27	V Q			
8+45	0.2800	2.35	V Q			
8+50	0.2969	2.45	V Q			
8+55	0.3149	2.62	V Q			
9+ 0	0.3336	2.71	V Q			
9+ 5	0.3532	2.85	V Q			
9+10	0.3751	3.18	V Q			
9+15	0.3980	3.33	V Q			
9+20	0.4217	3.45	V Q			
9+25	0.4468	3.65	V Q			
9+30	0.4726	3.74	V Q			
9+35	0.4991	3.84	V Q			
9+40	0.5268	4.03	V Q			
9+45	0.5552	4.12	V Q			
9+50	0.5843	4.22	V Q			
9+55	0.6146	4.40	V Q			
10+ 0	0.6455	4.49	V Q			
10+ 5	0.6745	4.21	V Q			
10+10	0.6966	3.20	V Q			
10+15	0.7159	2.80	V Q			
10+20	0.7340	2.64	V Q			
10+25	0.7515	2.54	V Q			
10+30	0.7687	2.49	VQ			
10+35	0.7872	2.69	VQ			
10+40	0.8107	3.41	V Q			
10+45	0.8363	3.71	V Q			
10+50	0.8627	3.83	V Q			
10+55	0.8897	3.92	V Q			
11+ 0	0.9171	3.99	V Q			
11+ 5	0.9446	3.99	V Q			
11+10	0.9713	3.87	V Q			
11+15	0.9977	3.84	V Q			
11+20	1.0241	3.84	V Q			
11+25	1.0505	3.83	V Q			
11+30	1.0770	3.84	V Q			
11+35	1.1028	3.75	V Q			
11+40	1.1266	3.46	Q			
11+45	1.1496	3.34	Q			



16+ 0	3.3102	4.46	|	| Q	|	| V |
16+ 5	3.3366	3.83	|	| Q	|	| V |
16+10	3.3495	1.87	| Q	|	|	| V|
16+15	3.3567	1.05	| Q	|	|	| V|
16+20	3.3614	0.69	| Q	|	|	| V|
16+25	3.3648	0.49	|Q	|	|	| V|
16+30	3.3673	0.36	|Q	|	|	| V|
16+35	3.3691	0.27	|Q	|	|	| V|
16+40	3.3705	0.19	Q	|	|	| V|
16+45	3.3714	0.14	Q	|	|	| V|
16+50	3.3721	0.10	Q	|	|	| V|
16+55	3.3728	0.10	Q	|	|	| V|
17+ 0	3.3735	0.10	Q	|	|	| V|
17+ 5	3.3743	0.11	Q	|	|	| V|
17+10	3.3752	0.14	Q	|	|	| V|
17+15	3.3762	0.15	Q	|	|	| V|
17+20	3.3773	0.15	Q	|	|	| V|
17+25	3.3784	0.16	Q	|	|	| V|
17+30	3.3795	0.16	Q	|	|	| V|
17+35	3.3806	0.16	Q	|	|	| V|
17+40	3.3817	0.16	Q	|	|	| V|
17+45	3.3828	0.16	Q	|	|	| V|
17+50	3.3839	0.16	Q	|	|	| V|
17+55	3.3849	0.14	Q	|	|	| V|
18+ 0	3.3859	0.14	Q	|	|	| V|
18+ 5	3.3868	0.13	Q	|	|	| V|
18+10	3.3877	0.13	Q	|	|	| V|
18+15	3.3886	0.13	Q	|	|	| V|
18+20	3.3895	0.13	Q	|	|	| V|
18+25	3.3904	0.13	Q	|	|	| V|
18+30	3.3913	0.13	Q	|	|	| V|
18+35	3.3922	0.13	Q	|	|	| V|
18+40	3.3930	0.11	Q	|	|	| V|
18+45	3.3937	0.10	Q	|	|	| V|
18+50	3.3944	0.10	Q	|	|	| V|
18+55	3.3949	0.08	Q	|	|	| V|
19+ 0	3.3954	0.07	Q	|	|	| V|
19+ 5	3.3959	0.08	Q	|	|	| V|
19+10	3.3965	0.09	Q	|	|	| V|
19+15	3.3972	0.09	Q	|	|	| V|
19+20	3.3979	0.10	Q	|	|	| V|
19+25	3.3987	0.12	Q	|	|	| V|
19+30	3.3995	0.12	Q	|	|	| V|
19+35	3.4003	0.12	Q	|	|	| V|
19+40	3.4011	0.11	Q	|	|	| V|
19+45	3.4018	0.10	Q	|	|	| V|
19+50	3.4024	0.10	Q	|	|	| V|
19+55	3.4030	0.08	Q	|	|	| V|
20+ 0	3.4035	0.07	Q	|	|	| V|
20+ 5	3.4040	0.08	Q	|	|	| V|

20+10	3.4046	0.09	Q	|	|	|	V|
20+15	3.4053	0.09	Q	|	|	|	V|
20+20	3.4059	0.09	Q	|	|	|	V|
20+25	3.4066	0.10	Q	|	|	|	V|
20+30	3.4072	0.10	Q	|	|	|	V|
20+35	3.4079	0.10	Q	|	|	|	V|
20+40	3.4086	0.10	Q	|	|	|	V|
20+45	3.4093	0.10	Q	|	|	|	V|
20+50	3.4099	0.09	Q	|	|	|	V|
20+55	3.4104	0.08	Q	|	|	|	V|
21+ 0	3.4109	0.07	Q	|	|	|	V|
21+ 5	3.4114	0.07	Q	|	|	|	V|
21+10	3.4120	0.09	Q	|	|	|	V|
21+15	3.4127	0.09	Q	|	|	|	V|
21+20	3.4133	0.09	Q	|	|	|	V|
21+25	3.4138	0.08	Q	|	|	|	V|
21+30	3.4143	0.07	Q	|	|	|	V|
21+35	3.4148	0.07	Q	|	|	|	V|
21+40	3.4154	0.09	Q	|	|	|	V|
21+45	3.4161	0.09	Q	|	|	|	V|
21+50	3.4167	0.09	Q	|	|	|	V|
21+55	3.4172	0.08	Q	|	|	|	V|
22+ 0	3.4177	0.07	Q	|	|	|	V|
22+ 5	3.4182	0.07	Q	|	|	|	V|
22+10	3.4188	0.09	Q	|	|	|	V|
22+15	3.4194	0.09	Q	|	|	|	V|
22+20	3.4200	0.09	Q	|	|	|	V|
22+25	3.4206	0.08	Q	|	|	|	V|
22+30	3.4211	0.07	Q	|	|	|	V|
22+35	3.4215	0.07	Q	|	|	|	V|
22+40	3.4220	0.07	Q	|	|	|	V|
22+45	3.4225	0.07	Q	|	|	|	V|
22+50	3.4229	0.07	Q	|	|	|	V|
22+55	3.4234	0.07	Q	|	|	|	V|
23+ 0	3.4238	0.07	Q	|	|	|	V|
23+ 5	3.4243	0.07	Q	|	|	|	V|
23+10	3.4247	0.07	Q	|	|	|	V|
23+15	3.4252	0.07	Q	|	|	|	V|
23+20	3.4256	0.07	Q	|	|	|	V|
23+25	3.4261	0.07	Q	|	|	|	V|
23+30	3.4265	0.07	Q	|	|	|	V|
23+35	3.4270	0.07	Q	|	|	|	V|
23+40	3.4274	0.07	Q	|	|	|	V|
23+45	3.4279	0.07	Q	|	|	|	V|
23+50	3.4283	0.07	Q	|	|	|	V|
23+55	3.4288	0.07	Q	|	|	|	V|
24+ 0	3.4292	0.07	Q	|	|	|	V|
24+ 5	3.4296	0.06	Q	|	|	|	V|
24+10	3.4298	0.03	Q	|	|	|	V|
24+15	3.4299	0.01	Q	|	|	|	V|

24+20	3.4299	0.01	Q	|	|	|	V|
24+25	3.4300	0.01	Q	|	|	|	V|
24+30	3.4300	0.00	Q	|	|	|	V|
24+35	3.4300	0.00	Q	|	|	|	V|
24+40	3.4300	0.00	Q	|	|	|	V|
24+45	3.4300	0.00	Q	|	|	|	V

Appendix G – Proposed Condition Unit Hydrograph Method Hydrologic Calculations

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 06/29/23 File: MenifeePrUH2YR1HR12.out

++

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

IRV22-0086 ARES MENIFEE - PROPOSED 2 YEAR 1 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1895.80(Ft.)
Length along longest watercourse measured to centroid = 618.30(Ft.)
Length along longest watercourse = 0.359 Mi.
Length along longest watercourse measured to centroid = 0.117 Mi.
Difference in elevation = 27.77(Ft.)
Slope along watercourse = 77.3423 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.041 Hr.
Lag time = 2.46 Min.
25% of lag time = 0.61 Min.
40% of lag time = 0.98 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	0.48	12.76

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.26	33.49

STORM EVENT (YEAR) = 2.00

Area Averaged 2-Year Rainfall = 0.480(In)
Area Averaged 100-Year Rainfall = 1.260(In)

Point rain (area averaged) = 0.480(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 0.480(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	57.00	0.878

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.0	37.0	0.697	0.878	0.146	1.000	0.146
					Sum (F) =	0.146

Area averaged mean soil loss (F) (In/Hr) = 0.146
Minimum soil loss rate ((In/Hr)) = 0.073
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.198

Slope of intensity-duration curve for a 1 hour storm =0.5300

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	203.446	43.991	11.784
2	0.167	406.891	43.128	11.552
3	0.250	610.337	8.655	2.318
4	0.333	813.782	4.227	1.132
		Sum = 100.000	Sum=	26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max		Low	Effective (In/Hr)
1	0.08	3.40	0.196	(0.146)	0.039	0.157
2	0.17	4.70	0.271	(0.146)	0.054	0.217
3	0.25	4.70	0.271	(0.146)	0.054	0.217
4	0.33	5.10	0.294	(0.146)	0.058	0.236

```
 5   0.42     5.80      0.334       (  0.146)       0.066        0.268
 6   0.50     5.90      0.340       (  0.146)       0.067        0.273
 7   0.58     7.10      0.409       (  0.146)       0.081        0.328
 8   0.67     8.70      0.501       (  0.146)       0.099        0.402
 9   0.75    13.20      0.760          0.146    (  0.150)        0.614
10   0.83    29.70      1.710          0.146    (  0.339)        1.564
11   0.92     7.70      0.443       (  0.146)       0.088        0.356
12   1.00     4.00      0.230       (  0.146)       0.046        0.185
              (Loss Rate Not Used)
   Sum =     100.0                                    Sum =     4.8
      Flood volume = Effective rainfall      0.40(In)
       times area      26.6(Ac.)/[(In)/(Ft.)] =       0.9(Ac.Ft)
      Total soil loss =      0.08(In)
      Total soil loss =     0.174(Ac.Ft)
      Total rainfall =      0.48(In)
      Flood volume =       38712.1 Cubic Feet
      Total soil loss =        7587.9 Cubic Feet
      ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     26.834(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         1 - 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        7.5      15.0      22.5      30.0
-------------------------------------------------------------------------
  0+ 5       0.0128      1.85  V Q       |         |         |         |
  0+10       0.0429      4.37  |V   Q     |         |         |         |
  0+15       0.0803      5.43  |  V   Q   |         |         |         |
  0+20       0.1214      5.97  |    V Q   |         |         |         |
  0+25       0.1671      6.63  |      VQ  |         |         |         |
  0+30       0.2160      7.10  |        Q |         |         |         |
  0+35       0.2704      7.90  |          Q V       |         |         |
  0+40       0.3356      9.46  |          | Q  V    |         |         |
  0+45       0.4248     12.95  |          |      Q V|         |         |
  0+50       0.6096     26.83  |          |          |      V  |    Q    |
  0+55       0.7759     24.15  |          |          |         | Q V     |
  1+ 0       0.8490     10.61  |          |   Q      |         |       V |
  1+ 5       0.8815      4.73  |     Q    |          |         |        V|
  1+10       0.8873      0.83  |Q         |          |         |        V|
  1+15       0.8887      0.21  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 06/29/23 File: MenifeePrUH2YR1HR32.out

++

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

IRV22-0086 ARES MENIFEE - PROPOSED 2 YEAR 3 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1895.80(Ft.)
Length along longest watercourse measured to centroid = 618.30(Ft.)
Length along longest watercourse = 0.359 Mi.
Length along longest watercourse measured to centroid = 0.117 Mi.
Difference in elevation = 27.77(Ft.)
Slope along watercourse = 77.3423 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.041 Hr.
Lag time = 2.46 Min.
25% of lag time = 0.61 Min.
40% of lag time = 0.98 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	0.80	21.26

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.95	51.83

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.950(In)

Point rain (area averaged) = 0.800(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.800(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	57.00	0.878

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.0	37.0	0.697	0.878	0.146	1.000	0.146
					Sum (F) =	0.146

Area averaged mean soil loss (F) (In/Hr) = 0.146
Minimum soil loss rate ((In/Hr)) = 0.073
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.198

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	203.446	43.991	11.784
2	0.167	406.891	43.128	11.552
3	0.250	610.337	8.655	2.318
4	0.333	813.782	4.227	1.132
		Sum = 100.000	Sum=	26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.125	(0.146)	0.025	0.100
2	0.17	1.30	0.125	(0.146)	0.025	0.100
3	0.25	1.10	0.106	(0.146)	0.021	0.085
4	0.33	1.50	0.144	(0.146)	0.028	0.115
5	0.42	1.50	0.144	(0.146)	0.028	0.115

6	0.50	1.80	0.173	(0.146)	0.034	0.139
7	0.58	1.50	0.144	(0.146)	0.028	0.115
8	0.67	1.80	0.173	(0.146)	0.034	0.139
9	0.75	1.80	0.173	(0.146)	0.034	0.139
10	0.83	1.50	0.144	(0.146)	0.028	0.115
11	0.92	1.60	0.154	(0.146)	0.030	0.123
12	1.00	1.80	0.173	(0.146)	0.034	0.139
13	1.08	2.20	0.211	(0.146)	0.042	0.169
14	1.17	2.20	0.211	(0.146)	0.042	0.169
15	1.25	2.20	0.211	(0.146)	0.042	0.169
16	1.33	2.00	0.192	(0.146)	0.038	0.154
17	1.42	2.60	0.250	(0.146)	0.049	0.200
18	1.50	2.70	0.259	(0.146)	0.051	0.208
19	1.58	2.40	0.230	(0.146)	0.046	0.185
20	1.67	2.70	0.259	(0.146)	0.051	0.208
21	1.75	3.30	0.317	(0.146)	0.063	0.254
22	1.83	3.10	0.298	(0.146)	0.059	0.239
23	1.92	2.90	0.278	(0.146)	0.055	0.223
24	2.00	3.00	0.288	(0.146)	0.057	0.231
25	2.08	3.10	0.298	(0.146)	0.059	0.239
26	2.17	4.20	0.403	(0.146)	0.080	0.323
27	2.25	5.00	0.480	(0.146)	0.095	0.385
28	2.33	3.50	0.336	(0.146)	0.066	0.269
29	2.42	6.80	0.653	(0.146)	0.129	0.524
30	2.50	7.30	0.701	(0.146)	0.139	0.562
31	2.58	8.20	0.787	0.146	(0.156)	0.641
32	2.67	5.90	0.566	(0.146)	0.112	0.454
33	2.75	2.00	0.192	(0.146)	0.038	0.154
34	2.83	1.80	0.173	(0.146)	0.034	0.139
35	2.92	1.80	0.173	(0.146)	0.034	0.139
36	3.00	0.60	0.058	(0.146)	0.011	0.046

(Loss Rate Not Used)

Sum = 100.0 Sum = 7.7

Flood volume = Effective rainfall 0.64(In)
times area 26.6(Ac.)/[(In)/(Ft.)] = 1.4(Ac.Ft)
Total soil loss = 0.16(In)
Total soil loss = 0.349(Ac.Ft)
Total rainfall = 0.80(In)
Flood volume = 61976.5 Cubic Feet
Total soil loss = 15200.0 Cubic Feet

Peak flow rate of this hydrograph = 15.569(CFS)

++

3 - 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	0.0081	1.18	V Q				
0+10	0.0242	2.34	V Q				
0+15	0.0407	2.39	V Q				
0+20	0.0592	2.69	V Q				
0+25	0.0799	3.01	V Q				
0+30	0.1028	3.33	V Q				
0+35	0.1260	3.36	V Q				
0+40	0.1495	3.42	V Q				
0+45	0.1747	3.66	V Q				
0+50	0.1983	3.42	VQ				
0+55	0.2208	3.27	Q				
1+ 0	0.2447	3.48	Q				
1+ 5	0.2724	4.02	VQ				
1+10	0.3028	4.42	Q				
1+15	0.3338	4.50	Q				
1+20	0.3638	4.36	Q V				
1+25	0.3964	4.72	Q V				
1+30	0.4330	5.31	Q V				
1+35	0.4689	5.22	Q V				
1+40	0.5054	5.30	Q V				
1+45	0.5471	6.06	Q V				
1+50	0.5915	6.44	Q V				
1+55	0.6343	6.22	Q V				
2+ 0	0.6766	6.15	Q V				
2+ 5	0.7198	6.27	Q V				
2+10	0.7705	7.36	Q V				
2+15	0.8331	9.09	Q V				
2+20	0.8927	8.65	Q V				
2+25	0.9653	10.55	Q V				
2+30	1.0599	13.74	Q V				
2+35	1.1672	15.57	QV				
2+40	1.2681	14.66	Q V				
2+45	1.3314	9.19	Q V				
2+50	1.3671	5.19	Q V				
2+55	1.3954	4.11	Q V				
3+ 0	1.4136	2.64	Q V				
3+ 5	1.4206	1.01	Q V				
3+10	1.4224	0.26	Q V				
3+15	1.4228	0.05	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 06/29/23 File: MenifeePrUH2YR3HR62.out

++

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

IRV22-0086 ARES MENIFEE - PROPOSED 2 YEAR 6 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1895.80(Ft.)
Length along longest watercourse measured to centroid = 618.30(Ft.)
Length along longest watercourse = 0.359 Mi.
Length along longest watercourse measured to centroid = 0.117 Mi.
Difference in elevation = 27.77(Ft.)
Slope along watercourse = 77.3423 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.041 Hr.
Lag time = 2.46 Min.
25% of lag time = 0.61 Min.
40% of lag time = 0.98 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.10	29.24

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	2.60	69.11

STORM EVENT (YEAR) = 2.00

Area Averaged 2-Year Rainfall = 1.100(In)
Area Averaged 100-Year Rainfall = 2.600(In)

Point rain (area averaged) = 1.100(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	57.00	0.878

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.0	37.0	0.697	0.878	0.146	1.000	0.146
					Sum (F) =	0.146

Area averaged mean soil loss (F) (In/Hr) = 0.146
Minimum soil loss rate ((In/Hr)) = 0.073
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.198

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	203.446	43.991	11.784
2	0.167	406.891	43.128	11.552
3	0.250	610.337	8.655	2.318
4	0.333	813.782	4.227	1.132
			Sum = 100.000	Sum= 26.787

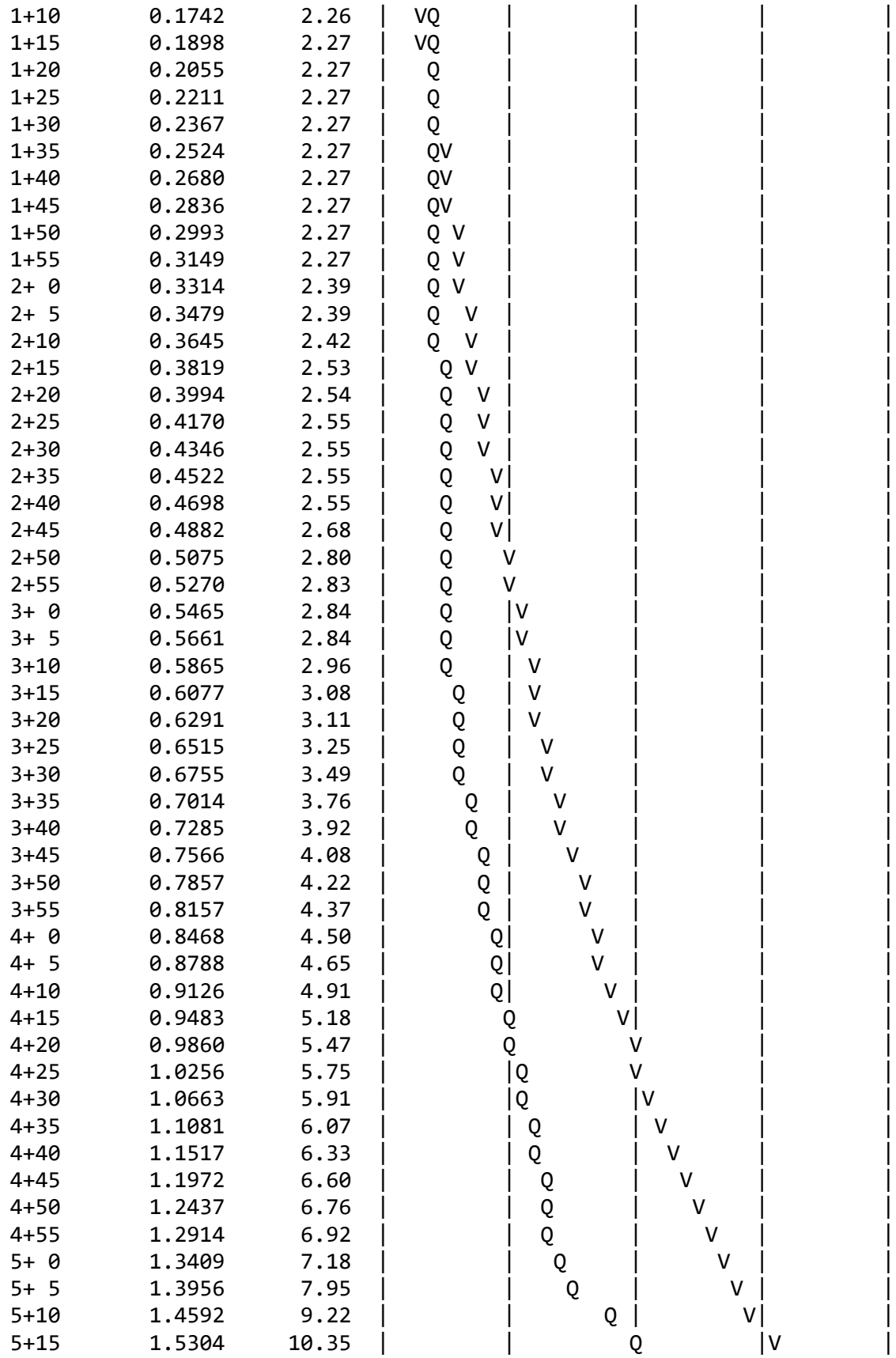
The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max		Low	Effective (In/Hr)
1	0.08	0.50	0.066	(0.146)		0.013	0.053
2	0.17	0.60	0.079	(0.146)		0.016	0.064
3	0.25	0.60	0.079	(0.146)		0.016	0.064
4	0.33	0.60	0.079	(0.146)		0.016	0.064
5	0.42	0.60	0.079	(0.146)		0.016	0.064
6	0.50	0.70	0.092	(0.146)		0.018	0.074

7	0.58	0.70	0.092	(0.146)	0.018	0.074
8	0.67	0.70	0.092	(0.146)	0.018	0.074
9	0.75	0.70	0.092	(0.146)	0.018	0.074
10	0.83	0.70	0.092	(0.146)	0.018	0.074
11	0.92	0.70	0.092	(0.146)	0.018	0.074
12	1.00	0.80	0.106	(0.146)	0.021	0.085
13	1.08	0.80	0.106	(0.146)	0.021	0.085
14	1.17	0.80	0.106	(0.146)	0.021	0.085
15	1.25	0.80	0.106	(0.146)	0.021	0.085
16	1.33	0.80	0.106	(0.146)	0.021	0.085
17	1.42	0.80	0.106	(0.146)	0.021	0.085
18	1.50	0.80	0.106	(0.146)	0.021	0.085
19	1.58	0.80	0.106	(0.146)	0.021	0.085
20	1.67	0.80	0.106	(0.146)	0.021	0.085
21	1.75	0.80	0.106	(0.146)	0.021	0.085
22	1.83	0.80	0.106	(0.146)	0.021	0.085
23	1.92	0.80	0.106	(0.146)	0.021	0.085
24	2.00	0.90	0.119	(0.146)	0.024	0.095
25	2.08	0.80	0.106	(0.146)	0.021	0.085
26	2.17	0.90	0.119	(0.146)	0.024	0.095
27	2.25	0.90	0.119	(0.146)	0.024	0.095
28	2.33	0.90	0.119	(0.146)	0.024	0.095
29	2.42	0.90	0.119	(0.146)	0.024	0.095
30	2.50	0.90	0.119	(0.146)	0.024	0.095
31	2.58	0.90	0.119	(0.146)	0.024	0.095
32	2.67	0.90	0.119	(0.146)	0.024	0.095
33	2.75	1.00	0.132	(0.146)	0.026	0.106
34	2.83	1.00	0.132	(0.146)	0.026	0.106
35	2.92	1.00	0.132	(0.146)	0.026	0.106
36	3.00	1.00	0.132	(0.146)	0.026	0.106
37	3.08	1.00	0.132	(0.146)	0.026	0.106
38	3.17	1.10	0.145	(0.146)	0.029	0.116
39	3.25	1.10	0.145	(0.146)	0.029	0.116
40	3.33	1.10	0.145	(0.146)	0.029	0.116
41	3.42	1.20	0.158	(0.146)	0.031	0.127
42	3.50	1.30	0.172	(0.146)	0.034	0.138
43	3.58	1.40	0.185	(0.146)	0.037	0.148
44	3.67	1.40	0.185	(0.146)	0.037	0.148
45	3.75	1.50	0.198	(0.146)	0.039	0.159
46	3.83	1.50	0.198	(0.146)	0.039	0.159
47	3.92	1.60	0.211	(0.146)	0.042	0.169
48	4.00	1.60	0.211	(0.146)	0.042	0.169
49	4.08	1.70	0.224	(0.146)	0.044	0.180
50	4.17	1.80	0.238	(0.146)	0.047	0.191
51	4.25	1.90	0.251	(0.146)	0.050	0.201
52	4.33	2.00	0.264	(0.146)	0.052	0.212
53	4.42	2.10	0.277	(0.146)	0.055	0.222
54	4.50	2.10	0.277	(0.146)	0.055	0.222
55	4.58	2.20	0.290	(0.146)	0.057	0.233
56	4.67	2.30	0.304	(0.146)	0.060	0.243

```
57   4.75     2.40      0.317       (  0.146)       0.063        0.254
58   4.83     2.40      0.317       (  0.146)       0.063        0.254
59   4.92     2.50      0.330       (  0.146)       0.065        0.265
60   5.00     2.60      0.343       (  0.146)       0.068        0.275
61   5.08     3.10      0.409       (  0.146)       0.081        0.328
62   5.17     3.60      0.475       (  0.146)       0.094        0.381
63   5.25     3.90      0.515       (  0.146)       0.102        0.413
64   5.33     4.20      0.554       (  0.146)       0.110        0.445
65   5.42     4.70      0.620       (  0.146)       0.123        0.498
66   5.50     5.60      0.739       (  0.146)       0.146        0.593
67   5.58     1.90      0.251       (  0.146)       0.050        0.201
68   5.67     0.90      0.119       (  0.146)       0.024        0.095
69   5.75     0.60      0.079       (  0.146)       0.016        0.064
70   5.83     0.50      0.066       (  0.146)       0.013        0.053
71   5.92     0.30      0.040       (  0.146)       0.008        0.032
72   6.00     0.20      0.026       (  0.146)       0.005        0.021
               (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    10.6
      Flood volume = Effective rainfall      0.88(In)
       times area      26.6(Ac.)/[(In)/(Ft.)] =       2.0(Ac.Ft)
      Total soil loss =      0.22(In)
      Total soil loss =     0.482(Ac.Ft)
      Total rainfall =      1.10(In)
      Flood volume =       85116.9 Cubic Feet
      Total soil loss =       21003.3 Cubic Feet
      ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     14.240(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          6 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      ---------------------------------------------------------------------
                   Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
-------------------------------------------------------------------------
  0+ 5       0.0043      0.62  VQ        |         |         |         |
  0+10       0.0137      1.36  V Q       |         |         |         |
  0+15       0.0247      1.61  V  Q      |         |         |         |
  0+20       0.0364      1.69  V  Q      |         |         |         |
  0+25       0.0481      1.70  V  Q      |         |         |         |
  0+30       0.0607      1.83  |V Q      |         |         |         |
  0+35       0.0741      1.95  |V Q      |         |         |         |
  0+40       0.0877      1.97  |V Q      |         |         |         |
  0+45       0.1014      1.99  | VQ      |         |         |         |
  0+50       0.1151      1.99  | VQ      |         |         |         |
  0+55       0.1287      1.99  | VQ      |         |         |         |
  1+ 0       0.1433      2.11  | V Q     |         |         |         |
  1+ 5       0.1587      2.23  |  VQ     |         |         |         |
```



```
    5+20       1.6080     11.27  |          |          | Q        | V        |
    5+25       1.6934     12.39  |          |          |   Q      |   V      |
    5+30       1.7915     14.24  |          |          |        Q |     V    |
    5+35       1.8664     10.88  |          |          |Q         |       V  |
    5+40       1.9035      5.39  |          Q          |          |       V  |
    5+45       1.9241      2.99  |    Q     |          |          |        V |
    5+50       1.9365      1.81  |  Q       |          |          |        V |
    5+55       1.9451      1.24  | Q        |          |          |        V |
    6+ 0       1.9507      0.81  |Q         |          |          |        V |
    6+ 5       1.9533      0.38  Q          |          |          |        V |
    6+10       1.9539      0.09  Q          |          |          |        V |
    6+15       1.9540      0.02  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 06/29/23 File: MenifeePrUH2YR6HR242.out

++

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

IRV22-0086 ARES MENIFEE - PROPOSED 2 YEAR 24 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1895.80(Ft.)
Length along longest watercourse measured to centroid = 618.30(Ft.)
Length along longest watercourse = 0.359 Mi.
Length along longest watercourse measured to centroid = 0.117 Mi.
Difference in elevation = 27.77(Ft.)
Slope along watercourse = 77.3423 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.041 Hr.
Lag time = 2.46 Min.
25% of lag time = 0.61 Min.
40% of lag time = 0.98 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]
26.58	1.85	49.17

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	4.75	126.25

STORM EVENT (YEAR) = 2.00

Area Averaged 2-Year Rainfall = 1.850(In)
Area Averaged 100-Year Rainfall = 4.750(In)

Point rain (area averaged) = 1.850(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.850(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	57.00	0.878

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.0	37.0	0.697	0.878	0.146	1.000	0.146
					Sum (F) =	0.146

Area averaged mean soil loss (F) (In/Hr) = 0.146
Minimum soil loss rate ((In/Hr)) = 0.073
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.198

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	203.446	43.991	11.784
2	0.167	406.891	43.128	11.552
3	0.250	610.337	8.655	2.318
4	0.333	813.782	4.227	1.132
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.015	(0.260)	0.003	0.012
2	0.17	0.07	0.015	(0.259)	0.003	0.012
3	0.25	0.07	0.015	(0.258)	0.003	0.012
4	0.33	0.10	0.022	(0.257)	0.004	0.018
5	0.42	0.10	0.022	(0.256)	0.004	0.018
6	0.50	0.10	0.022	(0.255)	0.004	0.018

7	0.58	0.10	0.022	(0.254)	0.004	0.018
8	0.67	0.10	0.022	(0.253)	0.004	0.018
9	0.75	0.10	0.022	(0.252)	0.004	0.018
10	0.83	0.13	0.030	(0.251)	0.006	0.024
11	0.92	0.13	0.030	(0.250)	0.006	0.024
12	1.00	0.13	0.030	(0.249)	0.006	0.024
13	1.08	0.10	0.022	(0.248)	0.004	0.018
14	1.17	0.10	0.022	(0.247)	0.004	0.018
15	1.25	0.10	0.022	(0.246)	0.004	0.018
16	1.33	0.10	0.022	(0.245)	0.004	0.018
17	1.42	0.10	0.022	(0.244)	0.004	0.018
18	1.50	0.10	0.022	(0.243)	0.004	0.018
19	1.58	0.10	0.022	(0.242)	0.004	0.018
20	1.67	0.10	0.022	(0.241)	0.004	0.018
21	1.75	0.10	0.022	(0.240)	0.004	0.018
22	1.83	0.13	0.030	(0.239)	0.006	0.024
23	1.92	0.13	0.030	(0.238)	0.006	0.024
24	2.00	0.13	0.030	(0.237)	0.006	0.024
25	2.08	0.13	0.030	(0.236)	0.006	0.024
26	2.17	0.13	0.030	(0.235)	0.006	0.024
27	2.25	0.13	0.030	(0.234)	0.006	0.024
28	2.33	0.13	0.030	(0.233)	0.006	0.024
29	2.42	0.13	0.030	(0.232)	0.006	0.024
30	2.50	0.13	0.030	(0.231)	0.006	0.024
31	2.58	0.17	0.037	(0.230)	0.007	0.030
32	2.67	0.17	0.037	(0.229)	0.007	0.030
33	2.75	0.17	0.037	(0.229)	0.007	0.030
34	2.83	0.17	0.037	(0.228)	0.007	0.030
35	2.92	0.17	0.037	(0.227)	0.007	0.030
36	3.00	0.17	0.037	(0.226)	0.007	0.030
37	3.08	0.17	0.037	(0.225)	0.007	0.030
38	3.17	0.17	0.037	(0.224)	0.007	0.030
39	3.25	0.17	0.037	(0.223)	0.007	0.030
40	3.33	0.17	0.037	(0.222)	0.007	0.030
41	3.42	0.17	0.037	(0.221)	0.007	0.030
42	3.50	0.17	0.037	(0.220)	0.007	0.030
43	3.58	0.17	0.037	(0.219)	0.007	0.030
44	3.67	0.17	0.037	(0.218)	0.007	0.030
45	3.75	0.17	0.037	(0.217)	0.007	0.030
46	3.83	0.20	0.044	(0.216)	0.009	0.036
47	3.92	0.20	0.044	(0.216)	0.009	0.036
48	4.00	0.20	0.044	(0.215)	0.009	0.036
49	4.08	0.20	0.044	(0.214)	0.009	0.036
50	4.17	0.20	0.044	(0.213)	0.009	0.036
51	4.25	0.20	0.044	(0.212)	0.009	0.036
52	4.33	0.23	0.052	(0.211)	0.010	0.042
53	4.42	0.23	0.052	(0.210)	0.010	0.042
54	4.50	0.23	0.052	(0.209)	0.010	0.042
55	4.58	0.23	0.052	(0.208)	0.010	0.042
56	4.67	0.23	0.052	(0.207)	0.010	0.042

57	4.75	0.23	0.052	(0.206)	0.010	0.042
58	4.83	0.27	0.059	(0.206)	0.012	0.047
59	4.92	0.27	0.059	(0.205)	0.012	0.047
60	5.00	0.27	0.059	(0.204)	0.012	0.047
61	5.08	0.20	0.044	(0.203)	0.009	0.036
62	5.17	0.20	0.044	(0.202)	0.009	0.036
63	5.25	0.20	0.044	(0.201)	0.009	0.036
64	5.33	0.23	0.052	(0.200)	0.010	0.042
65	5.42	0.23	0.052	(0.199)	0.010	0.042
66	5.50	0.23	0.052	(0.199)	0.010	0.042
67	5.58	0.27	0.059	(0.198)	0.012	0.047
68	5.67	0.27	0.059	(0.197)	0.012	0.047
69	5.75	0.27	0.059	(0.196)	0.012	0.047
70	5.83	0.27	0.059	(0.195)	0.012	0.047
71	5.92	0.27	0.059	(0.194)	0.012	0.047
72	6.00	0.27	0.059	(0.193)	0.012	0.047
73	6.08	0.30	0.067	(0.192)	0.013	0.053
74	6.17	0.30	0.067	(0.192)	0.013	0.053
75	6.25	0.30	0.067	(0.191)	0.013	0.053
76	6.33	0.30	0.067	(0.190)	0.013	0.053
77	6.42	0.30	0.067	(0.189)	0.013	0.053
78	6.50	0.30	0.067	(0.188)	0.013	0.053
79	6.58	0.33	0.074	(0.187)	0.015	0.059
80	6.67	0.33	0.074	(0.187)	0.015	0.059
81	6.75	0.33	0.074	(0.186)	0.015	0.059
82	6.83	0.33	0.074	(0.185)	0.015	0.059
83	6.92	0.33	0.074	(0.184)	0.015	0.059
84	7.00	0.33	0.074	(0.183)	0.015	0.059
85	7.08	0.33	0.074	(0.182)	0.015	0.059
86	7.17	0.33	0.074	(0.182)	0.015	0.059
87	7.25	0.33	0.074	(0.181)	0.015	0.059
88	7.33	0.37	0.081	(0.180)	0.016	0.065
89	7.42	0.37	0.081	(0.179)	0.016	0.065
90	7.50	0.37	0.081	(0.178)	0.016	0.065
91	7.58	0.40	0.089	(0.177)	0.018	0.071
92	7.67	0.40	0.089	(0.177)	0.018	0.071
93	7.75	0.40	0.089	(0.176)	0.018	0.071
94	7.83	0.43	0.096	(0.175)	0.019	0.077
95	7.92	0.43	0.096	(0.174)	0.019	0.077
96	8.00	0.43	0.096	(0.173)	0.019	0.077
97	8.08	0.50	0.111	(0.173)	0.022	0.089
98	8.17	0.50	0.111	(0.172)	0.022	0.089
99	8.25	0.50	0.111	(0.171)	0.022	0.089
100	8.33	0.50	0.111	(0.170)	0.022	0.089
101	8.42	0.50	0.111	(0.169)	0.022	0.089
102	8.50	0.50	0.111	(0.169)	0.022	0.089
103	8.58	0.53	0.118	(0.168)	0.023	0.095
104	8.67	0.53	0.118	(0.167)	0.023	0.095
105	8.75	0.53	0.118	(0.166)	0.023	0.095
106	8.83	0.57	0.126	(0.165)	0.025	0.101

107	8.92	0.57	0.126	(0.165)	0.025	0.101
108	9.00	0.57	0.126	(0.164)	0.025	0.101
109	9.08	0.63	0.141	(0.163)	0.028	0.113
110	9.17	0.63	0.141	(0.162)	0.028	0.113
111	9.25	0.63	0.141	(0.162)	0.028	0.113
112	9.33	0.67	0.148	(0.161)	0.029	0.119
113	9.42	0.67	0.148	(0.160)	0.029	0.119
114	9.50	0.67	0.148	(0.159)	0.029	0.119
115	9.58	0.70	0.155	(0.158)	0.031	0.125
116	9.67	0.70	0.155	(0.158)	0.031	0.125
117	9.75	0.70	0.155	(0.157)	0.031	0.125
118	9.83	0.73	0.163	(0.156)	0.032	0.131
119	9.92	0.73	0.163	(0.155)	0.032	0.131
120	10.00	0.73	0.163	(0.155)	0.032	0.131
121	10.08	0.50	0.111	(0.154)	0.022	0.089
122	10.17	0.50	0.111	(0.153)	0.022	0.089
123	10.25	0.50	0.111	(0.152)	0.022	0.089
124	10.33	0.50	0.111	(0.152)	0.022	0.089
125	10.42	0.50	0.111	(0.151)	0.022	0.089
126	10.50	0.50	0.111	(0.150)	0.022	0.089
127	10.58	0.67	0.148	(0.150)	0.029	0.119
128	10.67	0.67	0.148	(0.149)	0.029	0.119
129	10.75	0.67	0.148	(0.148)	0.029	0.119
130	10.83	0.67	0.148	(0.147)	0.029	0.119
131	10.92	0.67	0.148	(0.147)	0.029	0.119
132	11.00	0.67	0.148	(0.146)	0.029	0.119
133	11.08	0.63	0.141	(0.145)	0.028	0.113
134	11.17	0.63	0.141	(0.144)	0.028	0.113
135	11.25	0.63	0.141	(0.144)	0.028	0.113
136	11.33	0.63	0.141	(0.143)	0.028	0.113
137	11.42	0.63	0.141	(0.142)	0.028	0.113
138	11.50	0.63	0.141	(0.142)	0.028	0.113
139	11.58	0.57	0.126	(0.141)	0.025	0.101
140	11.67	0.57	0.126	(0.140)	0.025	0.101
141	11.75	0.57	0.126	(0.140)	0.025	0.101
142	11.83	0.60	0.133	(0.139)	0.026	0.107
143	11.92	0.60	0.133	(0.138)	0.026	0.107
144	12.00	0.60	0.133	(0.137)	0.026	0.107
145	12.08	0.83	0.185	(0.137)	0.037	0.148
146	12.17	0.83	0.185	(0.136)	0.037	0.148
147	12.25	0.83	0.185	(0.135)	0.037	0.148
148	12.33	0.87	0.192	(0.135)	0.038	0.154
149	12.42	0.87	0.192	(0.134)	0.038	0.154
150	12.50	0.87	0.192	(0.133)	0.038	0.154
151	12.58	0.93	0.207	(0.133)	0.041	0.166
152	12.67	0.93	0.207	(0.132)	0.041	0.166
153	12.75	0.93	0.207	(0.131)	0.041	0.166
154	12.83	0.97	0.215	(0.131)	0.042	0.172
155	12.92	0.97	0.215	(0.130)	0.042	0.172
156	13.00	0.97	0.215	(0.129)	0.042	0.172

157	13.08	1.13	0.252	(0.129)	0.050	0.202
158	13.17	1.13	0.252	(0.128)	0.050	0.202
159	13.25	1.13	0.252	(0.127)	0.050	0.202
160	13.33	1.13	0.252	(0.127)	0.050	0.202
161	13.42	1.13	0.252	(0.126)	0.050	0.202
162	13.50	1.13	0.252	(0.125)	0.050	0.202
163	13.58	0.77	0.170	(0.125)	0.034	0.137
164	13.67	0.77	0.170	(0.124)	0.034	0.137
165	13.75	0.77	0.170	(0.124)	0.034	0.137
166	13.83	0.77	0.170	(0.123)	0.034	0.137
167	13.92	0.77	0.170	(0.122)	0.034	0.137
168	14.00	0.77	0.170	(0.122)	0.034	0.137
169	14.08	0.90	0.200	(0.121)	0.040	0.160
170	14.17	0.90	0.200	(0.120)	0.040	0.160
171	14.25	0.90	0.200	(0.120)	0.040	0.160
172	14.33	0.87	0.192	(0.119)	0.038	0.154
173	14.42	0.87	0.192	(0.119)	0.038	0.154
174	14.50	0.87	0.192	(0.118)	0.038	0.154
175	14.58	0.87	0.192	(0.117)	0.038	0.154
176	14.67	0.87	0.192	(0.117)	0.038	0.154
177	14.75	0.87	0.192	(0.116)	0.038	0.154
178	14.83	0.83	0.185	(0.116)	0.037	0.148
179	14.92	0.83	0.185	(0.115)	0.037	0.148
180	15.00	0.83	0.185	(0.114)	0.037	0.148
181	15.08	0.80	0.178	(0.114)	0.035	0.142
182	15.17	0.80	0.178	(0.113)	0.035	0.142
183	15.25	0.80	0.178	(0.113)	0.035	0.142
184	15.33	0.77	0.170	(0.112)	0.034	0.137
185	15.42	0.77	0.170	(0.112)	0.034	0.137
186	15.50	0.77	0.170	(0.111)	0.034	0.137
187	15.58	0.63	0.141	(0.110)	0.028	0.113
188	15.67	0.63	0.141	(0.110)	0.028	0.113
189	15.75	0.63	0.141	(0.109)	0.028	0.113
190	15.83	0.63	0.141	(0.109)	0.028	0.113
191	15.92	0.63	0.141	(0.108)	0.028	0.113
192	16.00	0.63	0.141	(0.108)	0.028	0.113
193	16.08	0.13	0.030	(0.107)	0.006	0.024
194	16.17	0.13	0.030	(0.106)	0.006	0.024
195	16.25	0.13	0.030	(0.106)	0.006	0.024
196	16.33	0.13	0.030	(0.105)	0.006	0.024
197	16.42	0.13	0.030	(0.105)	0.006	0.024
198	16.50	0.13	0.030	(0.104)	0.006	0.024
199	16.58	0.10	0.022	(0.104)	0.004	0.018
200	16.67	0.10	0.022	(0.103)	0.004	0.018
201	16.75	0.10	0.022	(0.103)	0.004	0.018
202	16.83	0.10	0.022	(0.102)	0.004	0.018
203	16.92	0.10	0.022	(0.102)	0.004	0.018
204	17.00	0.10	0.022	(0.101)	0.004	0.018
205	17.08	0.17	0.037	(0.101)	0.007	0.030
206	17.17	0.17	0.037	(0.100)	0.007	0.030

207	17.25	0.17	0.037	(0.100)	0.007	0.030
208	17.33	0.17	0.037	(0.099)	0.007	0.030
209	17.42	0.17	0.037	(0.099)	0.007	0.030
210	17.50	0.17	0.037	(0.098)	0.007	0.030
211	17.58	0.17	0.037	(0.098)	0.007	0.030
212	17.67	0.17	0.037	(0.097)	0.007	0.030
213	17.75	0.17	0.037	(0.097)	0.007	0.030
214	17.83	0.13	0.030	(0.096)	0.006	0.024
215	17.92	0.13	0.030	(0.096)	0.006	0.024
216	18.00	0.13	0.030	(0.095)	0.006	0.024
217	18.08	0.13	0.030	(0.095)	0.006	0.024
218	18.17	0.13	0.030	(0.094)	0.006	0.024
219	18.25	0.13	0.030	(0.094)	0.006	0.024
220	18.33	0.13	0.030	(0.093)	0.006	0.024
221	18.42	0.13	0.030	(0.093)	0.006	0.024
222	18.50	0.13	0.030	(0.093)	0.006	0.024
223	18.58	0.10	0.022	(0.092)	0.004	0.018
224	18.67	0.10	0.022	(0.092)	0.004	0.018
225	18.75	0.10	0.022	(0.091)	0.004	0.018
226	18.83	0.07	0.015	(0.091)	0.003	0.012
227	18.92	0.07	0.015	(0.090)	0.003	0.012
228	19.00	0.07	0.015	(0.090)	0.003	0.012
229	19.08	0.10	0.022	(0.089)	0.004	0.018
230	19.17	0.10	0.022	(0.089)	0.004	0.018
231	19.25	0.10	0.022	(0.089)	0.004	0.018
232	19.33	0.13	0.030	(0.088)	0.006	0.024
233	19.42	0.13	0.030	(0.088)	0.006	0.024
234	19.50	0.13	0.030	(0.087)	0.006	0.024
235	19.58	0.10	0.022	(0.087)	0.004	0.018
236	19.67	0.10	0.022	(0.087)	0.004	0.018
237	19.75	0.10	0.022	(0.086)	0.004	0.018
238	19.83	0.07	0.015	(0.086)	0.003	0.012
239	19.92	0.07	0.015	(0.085)	0.003	0.012
240	20.00	0.07	0.015	(0.085)	0.003	0.012
241	20.08	0.10	0.022	(0.085)	0.004	0.018
242	20.17	0.10	0.022	(0.084)	0.004	0.018
243	20.25	0.10	0.022	(0.084)	0.004	0.018
244	20.33	0.10	0.022	(0.084)	0.004	0.018
245	20.42	0.10	0.022	(0.083)	0.004	0.018
246	20.50	0.10	0.022	(0.083)	0.004	0.018
247	20.58	0.10	0.022	(0.083)	0.004	0.018
248	20.67	0.10	0.022	(0.082)	0.004	0.018
249	20.75	0.10	0.022	(0.082)	0.004	0.018
250	20.83	0.07	0.015	(0.082)	0.003	0.012
251	20.92	0.07	0.015	(0.081)	0.003	0.012
252	21.00	0.07	0.015	(0.081)	0.003	0.012
253	21.08	0.10	0.022	(0.081)	0.004	0.018
254	21.17	0.10	0.022	(0.080)	0.004	0.018
255	21.25	0.10	0.022	(0.080)	0.004	0.018
256	21.33	0.07	0.015	(0.080)	0.003	0.012

257	21.42	0.07	0.015	(0.079)	0.003	0.012
258	21.50	0.07	0.015	(0.079)	0.003	0.012
259	21.58	0.10	0.022	(0.079)	0.004	0.018
260	21.67	0.10	0.022	(0.078)	0.004	0.018
261	21.75	0.10	0.022	(0.078)	0.004	0.018
262	21.83	0.07	0.015	(0.078)	0.003	0.012
263	21.92	0.07	0.015	(0.078)	0.003	0.012
264	22.00	0.07	0.015	(0.077)	0.003	0.012
265	22.08	0.10	0.022	(0.077)	0.004	0.018
266	22.17	0.10	0.022	(0.077)	0.004	0.018
267	22.25	0.10	0.022	(0.077)	0.004	0.018
268	22.33	0.07	0.015	(0.076)	0.003	0.012
269	22.42	0.07	0.015	(0.076)	0.003	0.012
270	22.50	0.07	0.015	(0.076)	0.003	0.012
271	22.58	0.07	0.015	(0.076)	0.003	0.012
272	22.67	0.07	0.015	(0.075)	0.003	0.012
273	22.75	0.07	0.015	(0.075)	0.003	0.012
274	22.83	0.07	0.015	(0.075)	0.003	0.012
275	22.92	0.07	0.015	(0.075)	0.003	0.012
276	23.00	0.07	0.015	(0.075)	0.003	0.012
277	23.08	0.07	0.015	(0.075)	0.003	0.012
278	23.17	0.07	0.015	(0.074)	0.003	0.012
279	23.25	0.07	0.015	(0.074)	0.003	0.012
280	23.33	0.07	0.015	(0.074)	0.003	0.012
281	23.42	0.07	0.015	(0.074)	0.003	0.012
282	23.50	0.07	0.015	(0.074)	0.003	0.012
283	23.58	0.07	0.015	(0.074)	0.003	0.012
284	23.67	0.07	0.015	(0.074)	0.003	0.012
285	23.75	0.07	0.015	(0.073)	0.003	0.012
286	23.83	0.07	0.015	(0.073)	0.003	0.012
287	23.92	0.07	0.015	(0.073)	0.003	0.012
288	24.00	0.07	0.015	(0.073)	0.003	0.012

(Loss Rate Not Used)

Sum = 100.0 Sum = 17.8

Flood volume = Effective rainfall 1.48(In)
times area 26.6(Ac.)/[(In)/(Ft.)] = 3.3(Ac.Ft)
Total soil loss = 0.37(In)
Total soil loss = 0.811(Ac.Ft)
Total rainfall = 1.85(In)
Flood volume = 143156.8 Cubic Feet
Total soil loss = 35325.2 Cubic Feet

Peak flow rate of this hydrograph = 5.408(CFS)

++

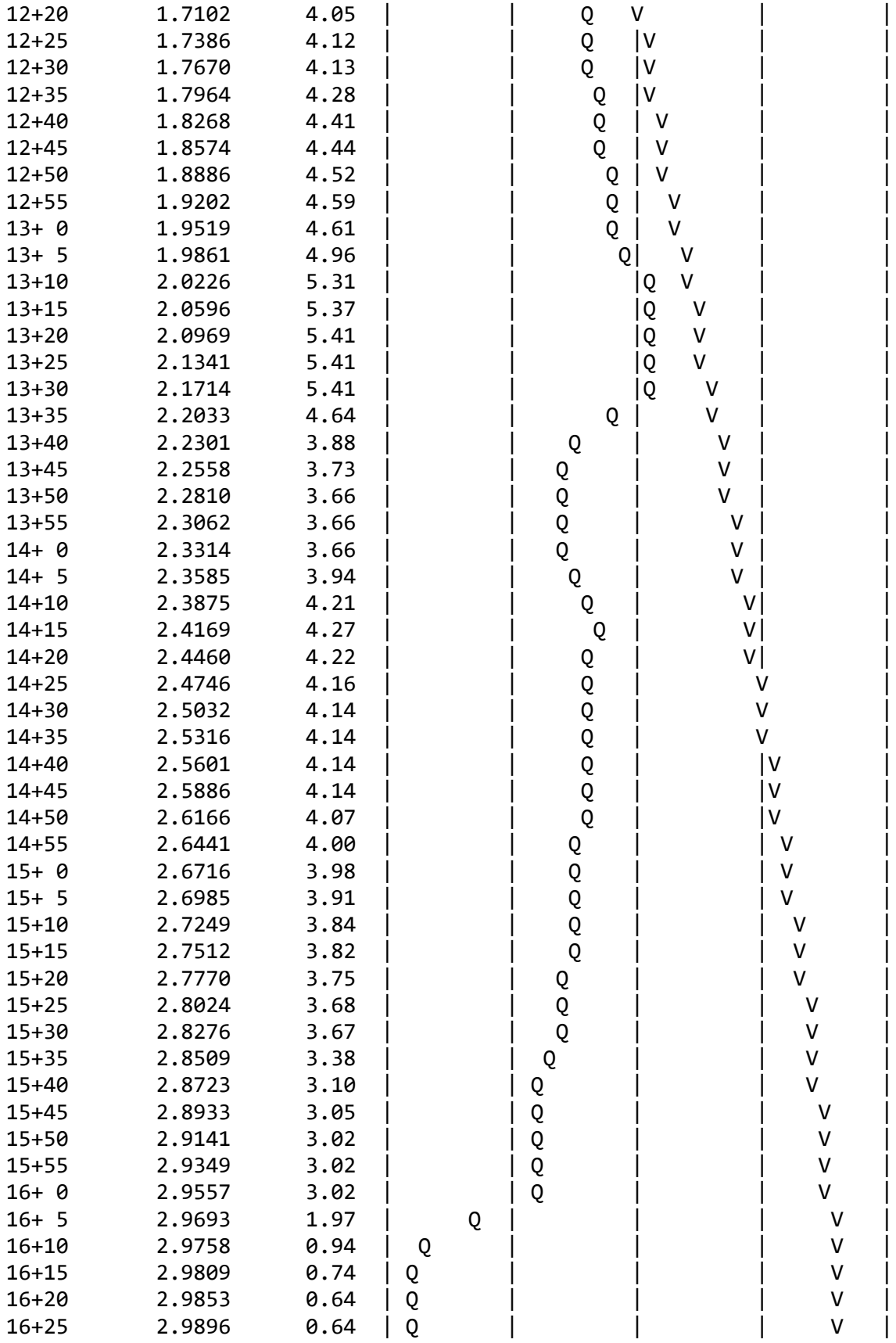
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

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	0.0010	0.14	Q				
0+10	0.0029	0.28	VQ				
0+15	0.0050	0.30	VQ				
0+20	0.0076	0.39	VQ				
0+25	0.0108	0.46	VQ				
0+30	0.0140	0.47	VQ				
0+35	0.0173	0.48	VQ				
0+40	0.0206	0.48	VQ				
0+45	0.0239	0.48	VQ				
0+50	0.0277	0.55	V Q				
0+55	0.0319	0.62	V Q				
1+ 0	0.0362	0.63	V Q				
1+ 5	0.0401	0.57	V Q				
1+10	0.0436	0.50	VQ				
1+15	0.0469	0.48	VQ				
1+20	0.0502	0.48	VQ				
1+25	0.0535	0.48	VQ				
1+30	0.0568	0.48	VQ				
1+35	0.0600	0.48	VQ				
1+40	0.0633	0.48	VQ				
1+45	0.0666	0.48	VQ				
1+50	0.0704	0.55	V Q				
1+55	0.0746	0.62	V Q				
2+ 0	0.0790	0.63	V Q				
2+ 5	0.0833	0.64	|VQ				
2+10	0.0877	0.64	|VQ				
2+15	0.0921	0.64	|VQ				
2+20	0.0965	0.64	|VQ				
2+25	0.1009	0.64	|VQ				
2+30	0.1052	0.64	|VQ				
2+35	0.1101	0.71	|VQ				
2+40	0.1154	0.77	|V Q				
2+45	0.1209	0.79	|V Q				
2+50	0.1264	0.80	|V Q				
2+55	0.1318	0.80	|V Q				
3+ 0	0.1373	0.80	|V Q				
3+ 5	0.1428	0.80	|V Q				
3+10	0.1483	0.80	|V Q				
3+15	0.1537	0.80	|V Q				
3+20	0.1592	0.80	|V Q				
3+25	0.1647	0.80	| VQ				
3+30	0.1702	0.80	| VQ				
3+35	0.1757	0.80	| VQ				
3+40	0.1811	0.80	| VQ				
3+45	0.1866	0.80	| VQ				
3+50	0.1926	0.87	| VQ				
3+55	0.1990	0.93	| VQ				

4+ 0	0.2055	0.95	VQ				
4+ 5	0.2121	0.95	VQ				
4+10	0.2187	0.95	VQ				
4+15	0.2252	0.95	VQ				
4+20	0.2323	1.02	V Q				
4+25	0.2398	1.09	V Q				
4+30	0.2474	1.11	VQ				
4+35	0.2551	1.11	VQ				
4+40	0.2628	1.11	VQ				
4+45	0.2705	1.11	VQ				
4+50	0.2786	1.18	VQ				
4+55	0.2872	1.25	V Q				
5+ 0	0.2959	1.27	V Q				
5+ 5	0.3037	1.13	VQ				
5+10	0.3106	1.00	Q				
5+15	0.3173	0.97	Q				
5+20	0.3243	1.02	VQ				
5+25	0.3318	1.09	Q				
5+30	0.3395	1.11	Q				
5+35	0.3476	1.18	Q				
5+40	0.3562	1.25	VQ				
5+45	0.3650	1.27	VQ				
5+50	0.3737	1.27	VQ				
5+55	0.3825	1.27	VQ				
6+ 0	0.3913	1.27	VQ				
6+ 5	0.4005	1.34	VQ				
6+10	0.4102	1.41	VQ				
6+15	0.4200	1.42	Q				
6+20	0.4299	1.43	Q				
6+25	0.4397	1.43	Q				
6+30	0.4496	1.43	Q				
6+35	0.4599	1.50	VQ				
6+40	0.4708	1.57	VQ				
6+45	0.4817	1.58	VQ				
6+50	0.4926	1.59	VQ				
6+55	0.5036	1.59	Q				
7+ 0	0.5145	1.59	Q				
7+ 5	0.5255	1.59	Q				
7+10	0.5364	1.59	Q				
7+15	0.5474	1.59	Q				
7+20	0.5588	1.66	Q				
7+25	0.5707	1.73	Q				
7+30	0.5827	1.74	QV				
7+35	0.5953	1.82	Q				
7+40	0.6083	1.89	Q				
7+45	0.6214	1.90	Q				
7+50	0.6350	1.98	Q				
7+55	0.6491	2.05	VQ				
8+ 0	0.6633	2.06	Q				
8+ 5	0.6785	2.21	Q				

8+10	0.6947	2.34	VQ|			
8+15	0.7110	2.37	VQ|			
8+20	0.7274	2.39	VQ|			
8+25	0.7439	2.39	Q|			
8+30	0.7603	2.39	Q|			
8+35	0.7772	2.46	Q|			
8+40	0.7946	2.52	VQ			
8+45	0.8121	2.54	VQ			
8+50	0.8301	2.61	Q			
8+55	0.8486	2.68	Q			
9+ 0	0.8671	2.70	Q			
9+ 5	0.8867	2.84	VQ			
9+10	0.9073	2.98	|Q			
9+15	0.9280	3.01	|VQ			
9+20	0.9493	3.09	|VQ			
9+25	0.9711	3.16	|VQ			
9+30	0.9929	3.17	| Q			
9+35	1.0153	3.25	| VQ			
9+40	1.0382	3.32	| VQ			
9+45	1.0611	3.33	| VQ			
9+50	1.0846	3.41	| Q			
9+55	1.1086	3.48	| Q			
10+ 0	1.1326	3.49	| Q			
10+ 5	1.1534	3.01	| Q V			
10+10	1.1708	2.53	Q V			
10+15	1.1875	2.43	Q| V			
10+20	1.2040	2.39	Q| V			
10+25	1.2204	2.39	Q| V			
10+30	1.2368	2.39	Q| V			
10+35	1.2557	2.74	Q V			
10+40	1.2769	3.08	| Q V			
10+45	1.2986	3.15	| Q V			
10+50	1.3205	3.18	| Q V			
10+55	1.3424	3.18	| Q V			
11+ 0	1.3643	3.18	| Q V			
11+ 5	1.3857	3.11	| Q V			
11+10	1.4067	3.04	| Q V			
11+15	1.4275	3.03	| Q V			
11+20	1.4483	3.02	| Q V			
11+25	1.4692	3.02	| Q V			
11+30	1.4900	3.02	| Q V			
11+35	1.5098	2.88	|Q V			
11+40	1.5287	2.75	Q V			
11+45	1.5474	2.72	Q V			
11+50	1.5665	2.77	|Q V|			
11+55	1.5861	2.84	|Q V|			
12+ 0	1.6058	2.86	|Q V|			
12+ 5	1.6289	3.35	| Q V|			
12+10	1.6553	3.83	| Q V			
12+15	1.6823	3.93	| Q V			



```
16+30       2.9940      0.64  | Q       |         |         |      V   |
16+35       2.9979      0.57  | Q       |         |         |      V   |
16+40       3.0013      0.50  |Q        |         |         |      V   |
16+45       3.0047      0.48  |Q        |         |         |      V   |
16+50       3.0080      0.48  |Q        |         |         |      V   |
16+55       3.0113      0.48  |Q        |         |         |      V   |
17+ 0       3.0145      0.48  |Q        |         |         |      V   |
17+ 5       3.0188      0.62  | Q       |         |         |      V   |
17+10       3.0240      0.75  |  Q      |         |         |      V   |
17+15       3.0294      0.78  |  Q      |         |         |      V   |
17+20       3.0348      0.80  |  Q      |         |         |      V   |
17+25       3.0403      0.80  |  Q      |         |         |       V  |
17+30       3.0458      0.80  |  Q      |         |         |       V  |
17+35       3.0513      0.80  |  Q      |         |         |       V  |
17+40       3.0568      0.80  |  Q      |         |         |       V  |
17+45       3.0622      0.80  |  Q      |         |         |       V  |
17+50       3.0672      0.73  | Q       |         |         |       V  |
17+55       3.0718      0.66  | Q       |         |         |       V  |
18+ 0       3.0762      0.64  | Q       |         |         |       V  |
18+ 5       3.0806      0.64  | Q       |         |         |       V  |
18+10       3.0849      0.64  | Q       |         |         |       V  |
18+15       3.0893      0.64  | Q       |         |         |       V  |
18+20       3.0937      0.64  | Q       |         |         |       V  |
18+25       3.0981      0.64  | Q       |         |         |       V  |
18+30       3.1025      0.64  | Q       |         |         |       V  |
18+35       3.1064      0.57  | Q       |         |         |       V  |
18+40       3.1098      0.50  |Q        |         |         |       V  |
18+45       3.1131      0.48  |Q        |         |         |       V  |
18+50       3.1159      0.41  |Q        |         |         |       V  |
18+55       3.1183      0.34  |Q        |         |         |       V  |
19+ 0       3.1205      0.32  |Q        |         |         |       V  |
19+ 5       3.1232      0.39  |Q        |         |         |        V |
19+10       3.1263      0.46  |Q        |         |         |        V |
19+15       3.1296      0.47  |Q        |         |         |        V |
19+20       3.1333      0.55  | Q       |         |         |        V |
19+25       3.1376      0.62  | Q       |         |         |        V |
19+30       3.1419      0.63  | Q       |         |         |        V |
19+35       3.1458      0.57  | Q       |         |         |        V |
19+40       3.1492      0.50  |Q        |         |         |        V |
19+45       3.1526      0.48  |Q        |         |         |        V |
19+50       3.1554      0.41  |Q        |         |         |        V |
19+55       3.1577      0.34  |Q        |         |         |        V |
20+ 0       3.1599      0.32  |Q        |         |         |        V |
20+ 5       3.1626      0.39  |Q        |         |         |        V |
20+10       3.1658      0.46  |Q        |         |         |        V |
20+15       3.1690      0.47  |Q        |         |         |        V |
20+20       3.1723      0.48  |Q        |         |         |        V |
20+25       3.1756      0.48  |Q        |         |         |        V |
20+30       3.1789      0.48  |Q        |         |         |        V |
20+35       3.1821      0.48  |Q        |         |         |        V |
```

20+40	3.1854	0.48	Q				V
20+45	3.1887	0.48	Q				V
20+50	3.1915	0.41	Q				V
20+55	3.1939	0.34	Q				V
21+ 0	3.1961	0.32	Q				V
21+ 5	3.1988	0.39	Q				V
21+10	3.2019	0.46	Q				V
21+15	3.2052	0.47	Q				V
21+20	3.2080	0.41	Q				V
21+25	3.2103	0.34	Q				V
21+30	3.2125	0.32	Q				V
21+35	3.2152	0.39	Q				V
21+40	3.2183	0.46	Q				V
21+45	3.2216	0.47	Q				V
21+50	3.2244	0.41	Q				V
21+55	3.2267	0.34	Q				V
22+ 0	3.2290	0.32	Q				V
22+ 5	3.2316	0.39	Q				V
22+10	3.2348	0.46	Q				V
22+15	3.2380	0.47	Q				V
22+20	3.2408	0.41	Q				V
22+25	3.2432	0.34	Q				V
22+30	3.2454	0.32	Q				V
22+35	3.2476	0.32	Q				V
22+40	3.2498	0.32	Q				V
22+45	3.2520	0.32	Q				V
22+50	3.2542	0.32	Q				V
22+55	3.2563	0.32	Q				V
23+ 0	3.2585	0.32	Q				V
23+ 5	3.2607	0.32	Q				V
23+10	3.2629	0.32	Q				V
23+15	3.2651	0.32	Q				V
23+20	3.2673	0.32	Q				V
23+25	3.2695	0.32	Q				V
23+30	3.2717	0.32	Q				V
23+35	3.2739	0.32	Q				V
23+40	3.2761	0.32	Q				V
23+45	3.2783	0.32	Q				V
23+50	3.2804	0.32	Q				V
23+55	3.2826	0.32	Q				V
24+ 0	3.2848	0.32	Q				V
24+ 5	3.2861	0.18	Q				V
24+10	3.2863	0.04	Q				V
24+15	3.2864	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 06/29/23 File: MenifeePrUH2YR24HR15.out

++

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

IRV22-0086 ARES MENIFEE - PROPOSED 5 YEAR 1 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1895.80(Ft.)
Length along longest watercourse measured to centroid = 618.30(Ft.)
Length along longest watercourse = 0.359 Mi.
Length along longest watercourse measured to centroid = 0.117 Mi.
Difference in elevation = 27.77(Ft.)
Slope along watercourse = 77.3423 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.041 Hr.
Lag time = 2.46 Min.
25% of lag time = 0.61 Min.
40% of lag time = 0.98 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	0.48	12.76

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.26	33.49

STORM EVENT (YEAR) = 5.00

Area Averaged 2-Year Rainfall = 0.480(In)
Area Averaged 100-Year Rainfall = 1.260(In)

Point rain (area averaged) = 0.663(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 0.663(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	57.00	0.878

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.0	37.0	0.697	0.878	0.146	1.000	0.146
					Sum (F) =	0.146

Area averaged mean soil loss (F) (In/Hr) = 0.146
Minimum soil loss rate ((In/Hr)) = 0.073
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.198

Slope of intensity-duration curve for a 1 hour storm =0.5300

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	203.446	43.991	11.784
2	0.167	406.891	43.128	11.552
3	0.250	610.337	8.655	2.318
4	0.333	813.782	4.227	1.132
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max		Low	Effective (In/Hr)
1	0.08	3.40	0.270	(0.146)		0.054	0.217
2	0.17	4.70	0.374	(0.146)		0.074	0.300
3	0.25	4.70	0.374	(0.146)		0.074	0.300
4	0.33	5.10	0.405	(0.146)		0.080	0.325

```
 5   0.42     5.80      0.461       (  0.146)       0.091        0.370
 6   0.50     5.90      0.469       (  0.146)       0.093        0.376
 7   0.58     7.10      0.564       (  0.146)       0.112        0.453
 8   0.67     8.70      0.692       (  0.146)       0.137        0.555
 9   0.75    13.20      1.049          0.146    (  0.208)        0.903
10   0.83    29.70      2.361          0.146    (  0.467)        2.215
11   0.92     7.70      0.612       (  0.146)       0.121        0.491
12   1.00     4.00      0.318       (  0.146)       0.063        0.255
              (Loss Rate Not Used)
   Sum =     100.0                                    Sum =     6.8
      Flood volume = Effective rainfall      0.56(In)
       times area      26.6(Ac.)/[(In)/(Ft.)] =       1.2(Ac.Ft)
      Total soil loss =      0.10(In)
      Total soil loss =     0.220(Ac.Ft)
      Total rainfall =      0.66(In)
      Flood volume =       54343.1 Cubic Feet
      Total soil loss =        9579.5 Cubic Feet
      ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     38.349(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         1 - 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       10.0      20.0      30.0      40.0
-------------------------------------------------------------------------
  0+ 5       0.0176      2.56  V Q       |         |         |         |
  0+10       0.0592      6.04  |V    Q   |         |         |         |
  0+15       0.1109      7.50  |  V   Q  |         |         |         |
  0+20       0.1676      8.24  |    V  Q |         |         |         |
  0+25       0.2306      9.15  |      V Q|         |         |         |
  0+30       0.2982      9.80  |        Q|         |         |         |
  0+35       0.3733     10.91  |         QV        |         |         |
  0+40       0.4633     13.07  |         |  QV     |         |         |
  0+45       0.5910     18.53  |         |       Q |         |         |
  0+50       0.8551     38.35  |         |         |      V  |       Q |
  0+55       1.0900     34.11  |         |         |         |   Q     |
  1+ 0       1.1922     14.84  |         |   Q     |         |       V |
  1+ 5       1.2376      6.60  |     Q   |         |         |        V|
  1+10       1.2456      1.15  |Q        |         |         |        V|
  1+15       1.2475      0.29  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 06/29/23 File: MenifeePrUH5YR1HR35.out

++

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

IRV22-0086 ARES MENIFEE - PROPOSED 5 YEAR 3 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1895.80(Ft.)
Length along longest watercourse measured to centroid = 618.30(Ft.)
Length along longest watercourse = 0.359 Mi.
Length along longest watercourse measured to centroid = 0.117 Mi.
Difference in elevation = 27.77(Ft.)
Slope along watercourse = 77.3423 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.041 Hr.
Lag time = 2.46 Min.
25% of lag time = 0.61 Min.
40% of lag time = 0.98 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	0.80	21.26

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.95	51.83

STORM EVENT (YEAR) = 5.00

Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.950(In)

Point rain (area averaged) = 1.069(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.069(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	57.00	0.878

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.0	37.0	0.697	0.878	0.146	1.000	0.146
					Sum (F) =	0.146

Area averaged mean soil loss (F) (In/Hr) = 0.146
Minimum soil loss rate ((In/Hr)) = 0.073
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.198

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	203.446	43.991	11.784
2	0.167	406.891	43.128	11.552
3	0.250	610.337	8.655	2.318
4	0.333	813.782	4.227	1.132
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.167	(0.146)	0.033	0.134
2	0.17	1.30	0.167	(0.146)	0.033	0.134
3	0.25	1.10	0.141	(0.146)	0.028	0.113
4	0.33	1.50	0.192	(0.146)	0.038	0.154
5	0.42	1.50	0.192	(0.146)	0.038	0.154
6	0.50	1.80	0.231	(0.146)	0.046	0.185

```
 7   0.58     1.50      0.192       (  0.146)       0.038        0.154
 8   0.67     1.80      0.231       (  0.146)       0.046        0.185
 9   0.75     1.80      0.231       (  0.146)       0.046        0.185
10   0.83     1.50      0.192       (  0.146)       0.038        0.154
11   0.92     1.60      0.205       (  0.146)       0.041        0.165
12   1.00     1.80      0.231       (  0.146)       0.046        0.185
13   1.08     2.20      0.282       (  0.146)       0.056        0.226
14   1.17     2.20      0.282       (  0.146)       0.056        0.226
15   1.25     2.20      0.282       (  0.146)       0.056        0.226
16   1.33     2.00      0.257       (  0.146)       0.051        0.206
17   1.42     2.60      0.334       (  0.146)       0.066        0.268
18   1.50     2.70      0.346       (  0.146)       0.069        0.278
19   1.58     2.40      0.308       (  0.146)       0.061        0.247
20   1.67     2.70      0.346       (  0.146)       0.069        0.278
21   1.75     3.30      0.423       (  0.146)       0.084        0.340
22   1.83     3.10      0.398       (  0.146)       0.079        0.319
23   1.92     2.90      0.372       (  0.146)       0.074        0.298
24   2.00     3.00      0.385       (  0.146)       0.076        0.309
25   2.08     3.10      0.398       (  0.146)       0.079        0.319
26   2.17     4.20      0.539       (  0.146)       0.107        0.432
27   2.25     5.00      0.642       (  0.146)       0.127        0.515
28   2.33     3.50      0.449       (  0.146)       0.089        0.360
29   2.42     6.80      0.872          0.146    (  0.173)        0.726
30   2.50     7.30      0.937          0.146    (  0.185)        0.790
31   2.58     8.20      1.052          0.146    (  0.208)        0.906
32   2.67     5.90      0.757          0.146    (  0.150)        0.611
33   2.75     2.00      0.257       (  0.146)       0.051        0.206
34   2.83     1.80      0.231       (  0.146)       0.046        0.185
35   2.92     1.80      0.231       (  0.146)       0.046        0.185
36   3.00     0.60      0.077       (  0.146)       0.015        0.062
               (Loss Rate Not Used)
   Sum =     100.0                                  Sum =    10.4
      Flood volume = Effective rainfall      0.87(In)
       times area      26.6(Ac.)/[(In)/(Ft.)] =       1.9(Ac.Ft)
      Total soil loss =      0.20(In)
      Total soil loss =     0.445(Ac.Ft)
      Total rainfall =      1.07(In)
      Flood volume =       83790.7 Cubic Feet
      Total soil loss =       19370.9 Cubic Feet
      ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     21.902(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - 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        7.5      15.0      22.5      30.0
```

0+ 5	0.0109	1.58	V Q	|	|	|	|
0+10	0.0324	3.12	V Q	|	|	|	|
0+15	0.0544	3.19	|V Q	|	|	|	|
0+20	0.0791	3.59	|V Q	|	|	|	|
0+25	0.1068	4.02	| V Q	|	|	|	|
0+30	0.1374	4.45	| V Q	|	|	|	|
0+35	0.1684	4.49	| V Q	|	|	|	|
0+40	0.1999	4.57	| V Q	|	|	|	|
0+45	0.2336	4.89	| V Q	|	|	|	|
0+50	0.2650	4.57	| VQ	|	|	|	|
0+55	0.2951	4.37	| QV	|	|	|	|
1+ 0	0.3271	4.66	| Q	|	|	|	|
1+ 5	0.3641	5.37	| Q	|	|	|	|
1+10	0.4048	5.90	| QV	|	|	|	|
1+15	0.4462	6.02	| QV|	|	|	|	|
1+20	0.4863	5.83	| Q V	|	|	|	|
1+25	0.5298	6.32	| Q |V	|	|	|	|
1+30	0.5788	7.10	| Q| V	|	|	|	|
1+35	0.6268	6.98	| Q| V	|	|	|	|
1+40	0.6756	7.08	| Q| V	|	|	|	|
1+45	0.7314	8.10	| Q V	|	|	|	|
1+50	0.7907	8.61	| |Q V	|	|	|	|
1+55	0.8479	8.31	| |Q V	|	|	|	|
2+ 0	0.9045	8.21	| Q V	|	|	|	|
2+ 5	0.9622	8.38	| |Q V	|	|	|	|
2+10	1.0300	9.84	| | Q |V	|	|	|	|
2+15	1.1137	12.15	| | Q | V	|	|	|	|
2+20	1.1933	11.56	| | Q | V	|	|	|	|
2+25	1.2925	14.41	| | Q| V	|	|	|	|
2+30	1.4242	19.13	| | | Q V|	|	|	|	|
2+35	1.5750	21.90	| | | Q| V	|	|	|	|
2+40	1.7150	20.32	| | | Q | V	|	|	|	|
2+45	1.8009	12.48	| | Q |	|	|	| V	|
2+50	1.8492	7.01	| Q|	|	|	|	| V |
2+55	1.8870	5.49	| Q |	|	|	|	| V|
3+ 0	1.9113	3.53	| Q	|	|	|	| V|
3+ 5	1.9207	1.35	|Q	|	|	|	| V|
3+10	1.9231	0.35	Q	|	|	|	| V|
3+15	1.9236	0.07	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 06/29/23 File: MenifeePrUH5YR3HR65.out

++

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

IRV22-0086 ARES MENIFEE - PROPOSED 5 YEAR 6 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1895.80(Ft.)
Length along longest watercourse measured to centroid = 618.30(Ft.)
Length along longest watercourse = 0.359 Mi.
Length along longest watercourse measured to centroid = 0.117 Mi.
Difference in elevation = 27.77(Ft.)
Slope along watercourse = 77.3423 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.041 Hr.
Lag time = 2.46 Min.
25% of lag time = 0.61 Min.
40% of lag time = 0.98 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.10	29.24

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	2.60	69.11

STORM EVENT (YEAR) = 5.00

Area Averaged 2-Year Rainfall = 1.100(In)
Area Averaged 100-Year Rainfall = 2.600(In)

Point rain (area averaged) = 1.451(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.451(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	57.00	0.878

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.0	37.0	0.697	0.878	0.146	1.000	0.146
					Sum (F) =	0.146

Area averaged mean soil loss (F) (In/Hr) = 0.146
Minimum soil loss rate ((In/Hr)) = 0.073
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.198

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	203.446	43.991	11.784
2	0.167	406.891	43.128	11.552
3	0.250	610.337	8.655	2.318
4	0.333	813.782	4.227	1.132
			Sum = 100.000	Sum= 26.787

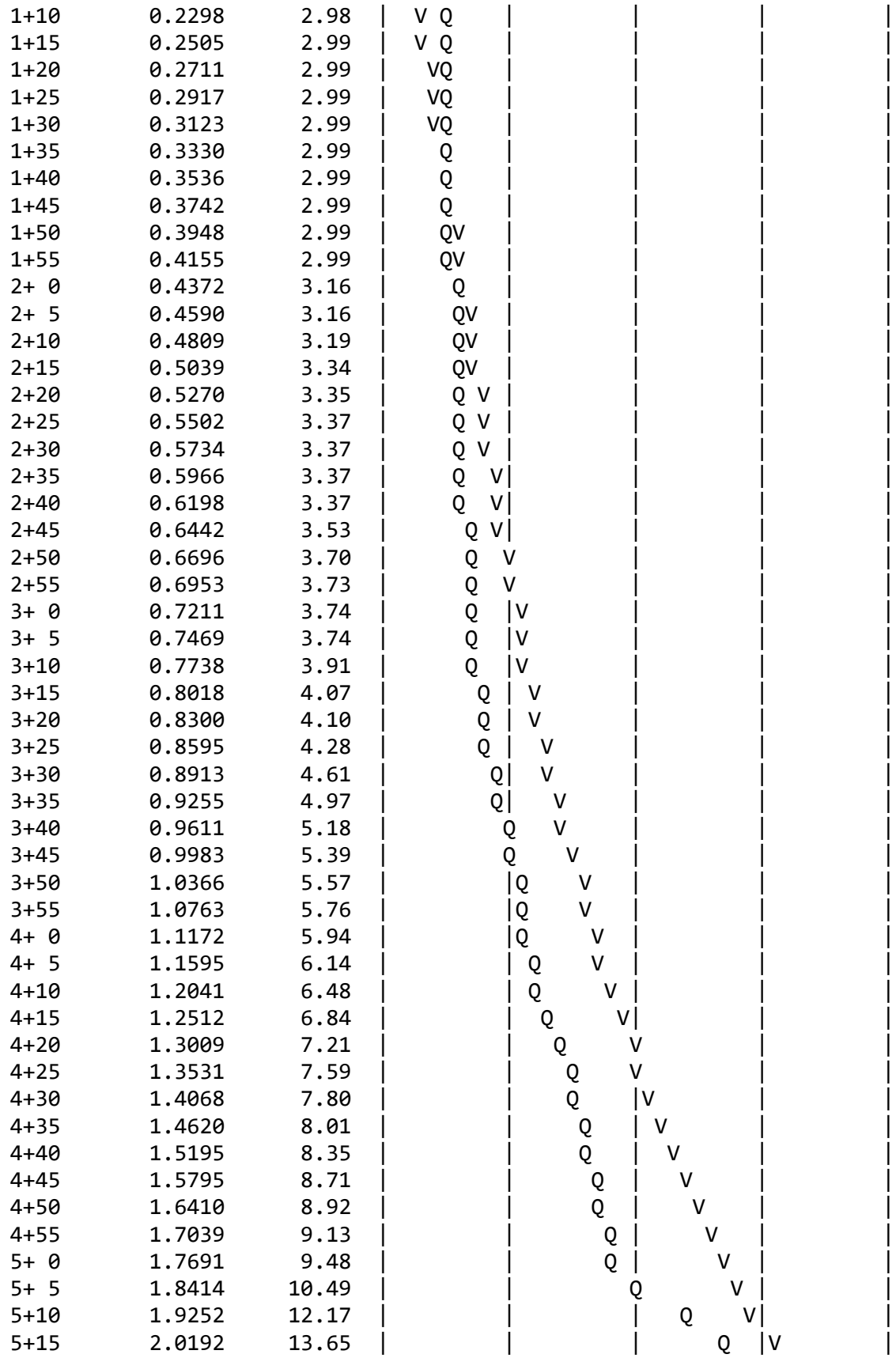
The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max		Low	Effective (In/Hr)
1	0.08	0.50	0.087	(0.146)		0.017	0.070
2	0.17	0.60	0.104	(0.146)		0.021	0.084
3	0.25	0.60	0.104	(0.146)		0.021	0.084
4	0.33	0.60	0.104	(0.146)		0.021	0.084
5	0.42	0.60	0.104	(0.146)		0.021	0.084
6	0.50	0.70	0.122	(0.146)		0.024	0.098

7	0.58	0.70	0.122	(0.146)	0.024	0.098
8	0.67	0.70	0.122	(0.146)	0.024	0.098
9	0.75	0.70	0.122	(0.146)	0.024	0.098
10	0.83	0.70	0.122	(0.146)	0.024	0.098
11	0.92	0.70	0.122	(0.146)	0.024	0.098
12	1.00	0.80	0.139	(0.146)	0.028	0.112
13	1.08	0.80	0.139	(0.146)	0.028	0.112
14	1.17	0.80	0.139	(0.146)	0.028	0.112
15	1.25	0.80	0.139	(0.146)	0.028	0.112
16	1.33	0.80	0.139	(0.146)	0.028	0.112
17	1.42	0.80	0.139	(0.146)	0.028	0.112
18	1.50	0.80	0.139	(0.146)	0.028	0.112
19	1.58	0.80	0.139	(0.146)	0.028	0.112
20	1.67	0.80	0.139	(0.146)	0.028	0.112
21	1.75	0.80	0.139	(0.146)	0.028	0.112
22	1.83	0.80	0.139	(0.146)	0.028	0.112
23	1.92	0.80	0.139	(0.146)	0.028	0.112
24	2.00	0.90	0.157	(0.146)	0.031	0.126
25	2.08	0.80	0.139	(0.146)	0.028	0.112
26	2.17	0.90	0.157	(0.146)	0.031	0.126
27	2.25	0.90	0.157	(0.146)	0.031	0.126
28	2.33	0.90	0.157	(0.146)	0.031	0.126
29	2.42	0.90	0.157	(0.146)	0.031	0.126
30	2.50	0.90	0.157	(0.146)	0.031	0.126
31	2.58	0.90	0.157	(0.146)	0.031	0.126
32	2.67	0.90	0.157	(0.146)	0.031	0.126
33	2.75	1.00	0.174	(0.146)	0.034	0.140
34	2.83	1.00	0.174	(0.146)	0.034	0.140
35	2.92	1.00	0.174	(0.146)	0.034	0.140
36	3.00	1.00	0.174	(0.146)	0.034	0.140
37	3.08	1.00	0.174	(0.146)	0.034	0.140
38	3.17	1.10	0.192	(0.146)	0.038	0.154
39	3.25	1.10	0.192	(0.146)	0.038	0.154
40	3.33	1.10	0.192	(0.146)	0.038	0.154
41	3.42	1.20	0.209	(0.146)	0.041	0.168
42	3.50	1.30	0.226	(0.146)	0.045	0.182
43	3.58	1.40	0.244	(0.146)	0.048	0.196
44	3.67	1.40	0.244	(0.146)	0.048	0.196
45	3.75	1.50	0.261	(0.146)	0.052	0.210
46	3.83	1.50	0.261	(0.146)	0.052	0.210
47	3.92	1.60	0.279	(0.146)	0.055	0.223
48	4.00	1.60	0.279	(0.146)	0.055	0.223
49	4.08	1.70	0.296	(0.146)	0.059	0.237
50	4.17	1.80	0.313	(0.146)	0.062	0.251
51	4.25	1.90	0.331	(0.146)	0.065	0.265
52	4.33	2.00	0.348	(0.146)	0.069	0.279
53	4.42	2.10	0.366	(0.146)	0.072	0.293
54	4.50	2.10	0.366	(0.146)	0.072	0.293
55	4.58	2.20	0.383	(0.146)	0.076	0.307
56	4.67	2.30	0.401	(0.146)	0.079	0.321

```
57   4.75     2.40      0.418       (  0.146)       0.083        0.335
58   4.83     2.40      0.418       (  0.146)       0.083        0.335
59   4.92     2.50      0.435       (  0.146)       0.086        0.349
60   5.00     2.60      0.453       (  0.146)       0.090        0.363
61   5.08     3.10      0.540       (  0.146)       0.107        0.433
62   5.17     3.60      0.627       (  0.146)       0.124        0.503
63   5.25     3.90      0.679       (  0.146)       0.134        0.545
64   5.33     4.20      0.731       (  0.146)       0.145        0.587
65   5.42     4.70      0.818          0.146    (  0.162)        0.672
66   5.50     5.60      0.975          0.146    (  0.193)        0.829
67   5.58     1.90      0.331       (  0.146)       0.065        0.265
68   5.67     0.90      0.157       (  0.146)       0.031        0.126
69   5.75     0.60      0.104       (  0.146)       0.021        0.084
70   5.83     0.50      0.087       (  0.146)       0.017        0.070
71   5.92     0.30      0.052       (  0.146)       0.010        0.042
72   6.00     0.20      0.035       (  0.146)       0.007        0.028
               (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    14.0
      Flood volume = Effective rainfall      1.17(In)
       times area      26.6(Ac.)/[(In)/(Ft.)] =       2.6(Ac.Ft)
      Total soil loss =      0.28(In)
      Total soil loss =     0.625(Ac.Ft)
      Total rainfall =      1.45(In)
      Flood volume =      112801.8 Cubic Feet
      Total soil loss =       27212.9 Cubic Feet
      ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     19.516(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          6 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      ---------------------------------------------------------------------
                   Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
-------------------------------------------------------------------------
  0+ 5       0.0057      0.82  VQ        |         |         |         |
  0+10       0.0180      1.80  V  Q      |         |         |         |
  0+15       0.0326      2.12  V   Q     |         |         |         |
  0+20       0.0480      2.23  V   Q     |         |         |         |
  0+25       0.0635      2.25  V   Q     |         |         |         |
  0+30       0.0801      2.41  |V  Q     |         |         |         |
  0+35       0.0978      2.57  |V   Q    |         |         |         |
  0+40       0.1157      2.60  |V   Q    |         |         |         |
  0+45       0.1338      2.62  | V  Q    |         |         |         |
  0+50       0.1518      2.62  | V  Q    |         |         |         |
  0+55       0.1699      2.62  | V  Q    |         |         |         |
  1+ 0       0.1890      2.79  | V  Q    |         |         |         |
  1+ 5       0.2093      2.95  |  V Q    |         |         |         |
```



```
    5+20       2.1216     14.87  |          |          |         Q| V        |
    5+25       2.2355     16.54  |          |          |          |  QV      |
    5+30       2.3699     19.52  |          |          |          |     V  Q|
    5+35       2.4727     14.93  |          |          |         Q|        V |
    5+40       2.5226      7.23  |          |    Q     |          |        V |
    5+45       2.5501      4.00  |       Q  |          |          |         V|
    5+50       2.5665      2.38  |    Q     |          |          |         V|
    5+55       2.5778      1.64  |  Q       |          |          |         V|
    6+ 0       2.5851      1.07  | Q        |          |          |         V|
    6+ 5       2.5886      0.50  Q          |          |          |         V|
    6+10       2.5894      0.11  Q          |          |          |         V|
    6+15       2.5896      0.03  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 06/29/23 File: MenifeePrUH5YR6HR245.out

++

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

IRV22-0086 ARES MENIFEE - PROPOSED 5 YEAR 24 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1895.80(Ft.)
Length along longest watercourse measured to centroid = 618.30(Ft.)
Length along longest watercourse = 0.359 Mi.
Length along longest watercourse measured to centroid = 0.117 Mi.
Difference in elevation = 27.77(Ft.)
Slope along watercourse = 77.3423 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.041 Hr.
Lag time = 2.46 Min.
25% of lag time = 0.61 Min.
40% of lag time = 0.98 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]
26.58	1.85	49.17

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	4.75	126.25

STORM EVENT (YEAR) = 5.00

Area Averaged 2-Year Rainfall = 1.850(In)
Area Averaged 100-Year Rainfall = 4.750(In)

Point rain (area averaged) = 2.529(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.529(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	57.00	0.878

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.0	37.0	0.697	0.878	0.146	1.000	0.146
					Sum (F) =	0.146

Area averaged mean soil loss (F) (In/Hr) = 0.146
Minimum soil loss rate ((In/Hr)) = 0.073
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.198

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	203.446	43.991	11.784
2	0.167	406.891	43.128	11.552
3	0.250	610.337	8.655	2.318
4	0.333	813.782	4.227	1.132
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.020	(0.260)	0.004	0.016
2	0.17	0.07	0.020	(0.259)	0.004	0.016
3	0.25	0.07	0.020	(0.258)	0.004	0.016
4	0.33	0.10	0.030	(0.257)	0.006	0.024
5	0.42	0.10	0.030	(0.256)	0.006	0.024
6	0.50	0.10	0.030	(0.255)	0.006	0.024

7	0.58	0.10	0.030	(0.254)	0.006	0.024
8	0.67	0.10	0.030	(0.253)	0.006	0.024
9	0.75	0.10	0.030	(0.252)	0.006	0.024
10	0.83	0.13	0.040	(0.251)	0.008	0.032
11	0.92	0.13	0.040	(0.250)	0.008	0.032
12	1.00	0.13	0.040	(0.249)	0.008	0.032
13	1.08	0.10	0.030	(0.248)	0.006	0.024
14	1.17	0.10	0.030	(0.247)	0.006	0.024
15	1.25	0.10	0.030	(0.246)	0.006	0.024
16	1.33	0.10	0.030	(0.245)	0.006	0.024
17	1.42	0.10	0.030	(0.244)	0.006	0.024
18	1.50	0.10	0.030	(0.243)	0.006	0.024
19	1.58	0.10	0.030	(0.242)	0.006	0.024
20	1.67	0.10	0.030	(0.241)	0.006	0.024
21	1.75	0.10	0.030	(0.240)	0.006	0.024
22	1.83	0.13	0.040	(0.239)	0.008	0.032
23	1.92	0.13	0.040	(0.238)	0.008	0.032
24	2.00	0.13	0.040	(0.237)	0.008	0.032
25	2.08	0.13	0.040	(0.236)	0.008	0.032
26	2.17	0.13	0.040	(0.235)	0.008	0.032
27	2.25	0.13	0.040	(0.234)	0.008	0.032
28	2.33	0.13	0.040	(0.233)	0.008	0.032
29	2.42	0.13	0.040	(0.232)	0.008	0.032
30	2.50	0.13	0.040	(0.231)	0.008	0.032
31	2.58	0.17	0.051	(0.230)	0.010	0.041
32	2.67	0.17	0.051	(0.229)	0.010	0.041
33	2.75	0.17	0.051	(0.229)	0.010	0.041
34	2.83	0.17	0.051	(0.228)	0.010	0.041
35	2.92	0.17	0.051	(0.227)	0.010	0.041
36	3.00	0.17	0.051	(0.226)	0.010	0.041
37	3.08	0.17	0.051	(0.225)	0.010	0.041
38	3.17	0.17	0.051	(0.224)	0.010	0.041
39	3.25	0.17	0.051	(0.223)	0.010	0.041
40	3.33	0.17	0.051	(0.222)	0.010	0.041
41	3.42	0.17	0.051	(0.221)	0.010	0.041
42	3.50	0.17	0.051	(0.220)	0.010	0.041
43	3.58	0.17	0.051	(0.219)	0.010	0.041
44	3.67	0.17	0.051	(0.218)	0.010	0.041
45	3.75	0.17	0.051	(0.217)	0.010	0.041
46	3.83	0.20	0.061	(0.216)	0.012	0.049
47	3.92	0.20	0.061	(0.216)	0.012	0.049
48	4.00	0.20	0.061	(0.215)	0.012	0.049
49	4.08	0.20	0.061	(0.214)	0.012	0.049
50	4.17	0.20	0.061	(0.213)	0.012	0.049
51	4.25	0.20	0.061	(0.212)	0.012	0.049
52	4.33	0.23	0.071	(0.211)	0.014	0.057
53	4.42	0.23	0.071	(0.210)	0.014	0.057
54	4.50	0.23	0.071	(0.209)	0.014	0.057
55	4.58	0.23	0.071	(0.208)	0.014	0.057
56	4.67	0.23	0.071	(0.207)	0.014	0.057

57	4.75	0.23	0.071	(0.206)	0.014	0.057
58	4.83	0.27	0.081	(0.206)	0.016	0.065
59	4.92	0.27	0.081	(0.205)	0.016	0.065
60	5.00	0.27	0.081	(0.204)	0.016	0.065
61	5.08	0.20	0.061	(0.203)	0.012	0.049
62	5.17	0.20	0.061	(0.202)	0.012	0.049
63	5.25	0.20	0.061	(0.201)	0.012	0.049
64	5.33	0.23	0.071	(0.200)	0.014	0.057
65	5.42	0.23	0.071	(0.199)	0.014	0.057
66	5.50	0.23	0.071	(0.199)	0.014	0.057
67	5.58	0.27	0.081	(0.198)	0.016	0.065
68	5.67	0.27	0.081	(0.197)	0.016	0.065
69	5.75	0.27	0.081	(0.196)	0.016	0.065
70	5.83	0.27	0.081	(0.195)	0.016	0.065
71	5.92	0.27	0.081	(0.194)	0.016	0.065
72	6.00	0.27	0.081	(0.193)	0.016	0.065
73	6.08	0.30	0.091	(0.192)	0.018	0.073
74	6.17	0.30	0.091	(0.192)	0.018	0.073
75	6.25	0.30	0.091	(0.191)	0.018	0.073
76	6.33	0.30	0.091	(0.190)	0.018	0.073
77	6.42	0.30	0.091	(0.189)	0.018	0.073
78	6.50	0.30	0.091	(0.188)	0.018	0.073
79	6.58	0.33	0.101	(0.187)	0.020	0.081
80	6.67	0.33	0.101	(0.187)	0.020	0.081
81	6.75	0.33	0.101	(0.186)	0.020	0.081
82	6.83	0.33	0.101	(0.185)	0.020	0.081
83	6.92	0.33	0.101	(0.184)	0.020	0.081
84	7.00	0.33	0.101	(0.183)	0.020	0.081
85	7.08	0.33	0.101	(0.182)	0.020	0.081
86	7.17	0.33	0.101	(0.182)	0.020	0.081
87	7.25	0.33	0.101	(0.181)	0.020	0.081
88	7.33	0.37	0.111	(0.180)	0.022	0.089
89	7.42	0.37	0.111	(0.179)	0.022	0.089
90	7.50	0.37	0.111	(0.178)	0.022	0.089
91	7.58	0.40	0.121	(0.177)	0.024	0.097
92	7.67	0.40	0.121	(0.177)	0.024	0.097
93	7.75	0.40	0.121	(0.176)	0.024	0.097
94	7.83	0.43	0.132	(0.175)	0.026	0.105
95	7.92	0.43	0.132	(0.174)	0.026	0.105
96	8.00	0.43	0.132	(0.173)	0.026	0.105
97	8.08	0.50	0.152	(0.173)	0.030	0.122
98	8.17	0.50	0.152	(0.172)	0.030	0.122
99	8.25	0.50	0.152	(0.171)	0.030	0.122
100	8.33	0.50	0.152	(0.170)	0.030	0.122
101	8.42	0.50	0.152	(0.169)	0.030	0.122
102	8.50	0.50	0.152	(0.169)	0.030	0.122
103	8.58	0.53	0.162	(0.168)	0.032	0.130
104	8.67	0.53	0.162	(0.167)	0.032	0.130
105	8.75	0.53	0.162	(0.166)	0.032	0.130
106	8.83	0.57	0.172	(0.165)	0.034	0.138

107	8.92	0.57	0.172	(0.165)	0.034	0.138
108	9.00	0.57	0.172	(0.164)	0.034	0.138
109	9.08	0.63	0.192	(0.163)	0.038	0.154
110	9.17	0.63	0.192	(0.162)	0.038	0.154
111	9.25	0.63	0.192	(0.162)	0.038	0.154
112	9.33	0.67	0.202	(0.161)	0.040	0.162
113	9.42	0.67	0.202	(0.160)	0.040	0.162
114	9.50	0.67	0.202	(0.159)	0.040	0.162
115	9.58	0.70	0.212	(0.158)	0.042	0.170
116	9.67	0.70	0.212	(0.158)	0.042	0.170
117	9.75	0.70	0.212	(0.157)	0.042	0.170
118	9.83	0.73	0.223	(0.156)	0.044	0.179
119	9.92	0.73	0.223	(0.155)	0.044	0.179
120	10.00	0.73	0.223	(0.155)	0.044	0.179
121	10.08	0.50	0.152	(0.154)	0.030	0.122
122	10.17	0.50	0.152	(0.153)	0.030	0.122
123	10.25	0.50	0.152	(0.152)	0.030	0.122
124	10.33	0.50	0.152	(0.152)	0.030	0.122
125	10.42	0.50	0.152	(0.151)	0.030	0.122
126	10.50	0.50	0.152	(0.150)	0.030	0.122
127	10.58	0.67	0.202	(0.150)	0.040	0.162
128	10.67	0.67	0.202	(0.149)	0.040	0.162
129	10.75	0.67	0.202	(0.148)	0.040	0.162
130	10.83	0.67	0.202	(0.147)	0.040	0.162
131	10.92	0.67	0.202	(0.147)	0.040	0.162
132	11.00	0.67	0.202	(0.146)	0.040	0.162
133	11.08	0.63	0.192	(0.145)	0.038	0.154
134	11.17	0.63	0.192	(0.144)	0.038	0.154
135	11.25	0.63	0.192	(0.144)	0.038	0.154
136	11.33	0.63	0.192	(0.143)	0.038	0.154
137	11.42	0.63	0.192	(0.142)	0.038	0.154
138	11.50	0.63	0.192	(0.142)	0.038	0.154
139	11.58	0.57	0.172	(0.141)	0.034	0.138
140	11.67	0.57	0.172	(0.140)	0.034	0.138
141	11.75	0.57	0.172	(0.140)	0.034	0.138
142	11.83	0.60	0.182	(0.139)	0.036	0.146
143	11.92	0.60	0.182	(0.138)	0.036	0.146
144	12.00	0.60	0.182	(0.137)	0.036	0.146
145	12.08	0.83	0.253	(0.137)	0.050	0.203
146	12.17	0.83	0.253	(0.136)	0.050	0.203
147	12.25	0.83	0.253	(0.135)	0.050	0.203
148	12.33	0.87	0.263	(0.135)	0.052	0.211
149	12.42	0.87	0.263	(0.134)	0.052	0.211
150	12.50	0.87	0.263	(0.133)	0.052	0.211
151	12.58	0.93	0.283	(0.133)	0.056	0.227
152	12.67	0.93	0.283	(0.132)	0.056	0.227
153	12.75	0.93	0.283	(0.131)	0.056	0.227
154	12.83	0.97	0.293	(0.131)	0.058	0.235
155	12.92	0.97	0.293	(0.130)	0.058	0.235
156	13.00	0.97	0.293	(0.129)	0.058	0.235

157	13.08	1.13	0.344	(0.129)	0.068	0.276
158	13.17	1.13	0.344	(0.128)	0.068	0.276
159	13.25	1.13	0.344	(0.127)	0.068	0.276
160	13.33	1.13	0.344	(0.127)	0.068	0.276
161	13.42	1.13	0.344	(0.126)	0.068	0.276
162	13.50	1.13	0.344	(0.125)	0.068	0.276
163	13.58	0.77	0.233	(0.125)	0.046	0.187
164	13.67	0.77	0.233	(0.124)	0.046	0.187
165	13.75	0.77	0.233	(0.124)	0.046	0.187
166	13.83	0.77	0.233	(0.123)	0.046	0.187
167	13.92	0.77	0.233	(0.122)	0.046	0.187
168	14.00	0.77	0.233	(0.122)	0.046	0.187
169	14.08	0.90	0.273	(0.121)	0.054	0.219
170	14.17	0.90	0.273	(0.120)	0.054	0.219
171	14.25	0.90	0.273	(0.120)	0.054	0.219
172	14.33	0.87	0.263	(0.119)	0.052	0.211
173	14.42	0.87	0.263	(0.119)	0.052	0.211
174	14.50	0.87	0.263	(0.118)	0.052	0.211
175	14.58	0.87	0.263	(0.117)	0.052	0.211
176	14.67	0.87	0.263	(0.117)	0.052	0.211
177	14.75	0.87	0.263	(0.116)	0.052	0.211
178	14.83	0.83	0.253	(0.116)	0.050	0.203
179	14.92	0.83	0.253	(0.115)	0.050	0.203
180	15.00	0.83	0.253	(0.114)	0.050	0.203
181	15.08	0.80	0.243	(0.114)	0.048	0.195
182	15.17	0.80	0.243	(0.113)	0.048	0.195
183	15.25	0.80	0.243	(0.113)	0.048	0.195
184	15.33	0.77	0.233	(0.112)	0.046	0.187
185	15.42	0.77	0.233	(0.112)	0.046	0.187
186	15.50	0.77	0.233	(0.111)	0.046	0.187
187	15.58	0.63	0.192	(0.110)	0.038	0.154
188	15.67	0.63	0.192	(0.110)	0.038	0.154
189	15.75	0.63	0.192	(0.109)	0.038	0.154
190	15.83	0.63	0.192	(0.109)	0.038	0.154
191	15.92	0.63	0.192	(0.108)	0.038	0.154
192	16.00	0.63	0.192	(0.108)	0.038	0.154
193	16.08	0.13	0.040	(0.107)	0.008	0.032
194	16.17	0.13	0.040	(0.106)	0.008	0.032
195	16.25	0.13	0.040	(0.106)	0.008	0.032
196	16.33	0.13	0.040	(0.105)	0.008	0.032
197	16.42	0.13	0.040	(0.105)	0.008	0.032
198	16.50	0.13	0.040	(0.104)	0.008	0.032
199	16.58	0.10	0.030	(0.104)	0.006	0.024
200	16.67	0.10	0.030	(0.103)	0.006	0.024
201	16.75	0.10	0.030	(0.103)	0.006	0.024
202	16.83	0.10	0.030	(0.102)	0.006	0.024
203	16.92	0.10	0.030	(0.102)	0.006	0.024
204	17.00	0.10	0.030	(0.101)	0.006	0.024
205	17.08	0.17	0.051	(0.101)	0.010	0.041
206	17.17	0.17	0.051	(0.100)	0.010	0.041

207	17.25	0.17	0.051	(0.100)	0.010	0.041
208	17.33	0.17	0.051	(0.099)	0.010	0.041
209	17.42	0.17	0.051	(0.099)	0.010	0.041
210	17.50	0.17	0.051	(0.098)	0.010	0.041
211	17.58	0.17	0.051	(0.098)	0.010	0.041
212	17.67	0.17	0.051	(0.097)	0.010	0.041
213	17.75	0.17	0.051	(0.097)	0.010	0.041
214	17.83	0.13	0.040	(0.096)	0.008	0.032
215	17.92	0.13	0.040	(0.096)	0.008	0.032
216	18.00	0.13	0.040	(0.095)	0.008	0.032
217	18.08	0.13	0.040	(0.095)	0.008	0.032
218	18.17	0.13	0.040	(0.094)	0.008	0.032
219	18.25	0.13	0.040	(0.094)	0.008	0.032
220	18.33	0.13	0.040	(0.093)	0.008	0.032
221	18.42	0.13	0.040	(0.093)	0.008	0.032
222	18.50	0.13	0.040	(0.093)	0.008	0.032
223	18.58	0.10	0.030	(0.092)	0.006	0.024
224	18.67	0.10	0.030	(0.092)	0.006	0.024
225	18.75	0.10	0.030	(0.091)	0.006	0.024
226	18.83	0.07	0.020	(0.091)	0.004	0.016
227	18.92	0.07	0.020	(0.090)	0.004	0.016
228	19.00	0.07	0.020	(0.090)	0.004	0.016
229	19.08	0.10	0.030	(0.089)	0.006	0.024
230	19.17	0.10	0.030	(0.089)	0.006	0.024
231	19.25	0.10	0.030	(0.089)	0.006	0.024
232	19.33	0.13	0.040	(0.088)	0.008	0.032
233	19.42	0.13	0.040	(0.088)	0.008	0.032
234	19.50	0.13	0.040	(0.087)	0.008	0.032
235	19.58	0.10	0.030	(0.087)	0.006	0.024
236	19.67	0.10	0.030	(0.087)	0.006	0.024
237	19.75	0.10	0.030	(0.086)	0.006	0.024
238	19.83	0.07	0.020	(0.086)	0.004	0.016
239	19.92	0.07	0.020	(0.085)	0.004	0.016
240	20.00	0.07	0.020	(0.085)	0.004	0.016
241	20.08	0.10	0.030	(0.085)	0.006	0.024
242	20.17	0.10	0.030	(0.084)	0.006	0.024
243	20.25	0.10	0.030	(0.084)	0.006	0.024
244	20.33	0.10	0.030	(0.084)	0.006	0.024
245	20.42	0.10	0.030	(0.083)	0.006	0.024
246	20.50	0.10	0.030	(0.083)	0.006	0.024
247	20.58	0.10	0.030	(0.083)	0.006	0.024
248	20.67	0.10	0.030	(0.082)	0.006	0.024
249	20.75	0.10	0.030	(0.082)	0.006	0.024
250	20.83	0.07	0.020	(0.082)	0.004	0.016
251	20.92	0.07	0.020	(0.081)	0.004	0.016
252	21.00	0.07	0.020	(0.081)	0.004	0.016
253	21.08	0.10	0.030	(0.081)	0.006	0.024
254	21.17	0.10	0.030	(0.080)	0.006	0.024
255	21.25	0.10	0.030	(0.080)	0.006	0.024
256	21.33	0.07	0.020	(0.080)	0.004	0.016

257	21.42	0.07	0.020	(0.079)	0.004	0.016
258	21.50	0.07	0.020	(0.079)	0.004	0.016
259	21.58	0.10	0.030	(0.079)	0.006	0.024
260	21.67	0.10	0.030	(0.078)	0.006	0.024
261	21.75	0.10	0.030	(0.078)	0.006	0.024
262	21.83	0.07	0.020	(0.078)	0.004	0.016
263	21.92	0.07	0.020	(0.078)	0.004	0.016
264	22.00	0.07	0.020	(0.077)	0.004	0.016
265	22.08	0.10	0.030	(0.077)	0.006	0.024
266	22.17	0.10	0.030	(0.077)	0.006	0.024
267	22.25	0.10	0.030	(0.077)	0.006	0.024
268	22.33	0.07	0.020	(0.076)	0.004	0.016
269	22.42	0.07	0.020	(0.076)	0.004	0.016
270	22.50	0.07	0.020	(0.076)	0.004	0.016
271	22.58	0.07	0.020	(0.076)	0.004	0.016
272	22.67	0.07	0.020	(0.075)	0.004	0.016
273	22.75	0.07	0.020	(0.075)	0.004	0.016
274	22.83	0.07	0.020	(0.075)	0.004	0.016
275	22.92	0.07	0.020	(0.075)	0.004	0.016
276	23.00	0.07	0.020	(0.075)	0.004	0.016
277	23.08	0.07	0.020	(0.075)	0.004	0.016
278	23.17	0.07	0.020	(0.074)	0.004	0.016
279	23.25	0.07	0.020	(0.074)	0.004	0.016
280	23.33	0.07	0.020	(0.074)	0.004	0.016
281	23.42	0.07	0.020	(0.074)	0.004	0.016
282	23.50	0.07	0.020	(0.074)	0.004	0.016
283	23.58	0.07	0.020	(0.074)	0.004	0.016
284	23.67	0.07	0.020	(0.074)	0.004	0.016
285	23.75	0.07	0.020	(0.073)	0.004	0.016
286	23.83	0.07	0.020	(0.073)	0.004	0.016
287	23.92	0.07	0.020	(0.073)	0.004	0.016
288	24.00	0.07	0.020	(0.073)	0.004	0.016

(Loss Rate Not Used)

Sum = 100.0 Sum = 24.3

Flood volume = Effective rainfall 2.03(In)
times area 26.6(Ac.)/[(In)/(Ft.)] = 4.5(Ac.Ft)
Total soil loss = 0.50(In)
Total soil loss = 1.109(Ac.Ft)
Total rainfall = 2.53(In)
Flood volume = 195718.7 Cubic Feet
Total soil loss = 48295.2 Cubic Feet

Peak flow rate of this hydrograph = 7.394(CFS)

++

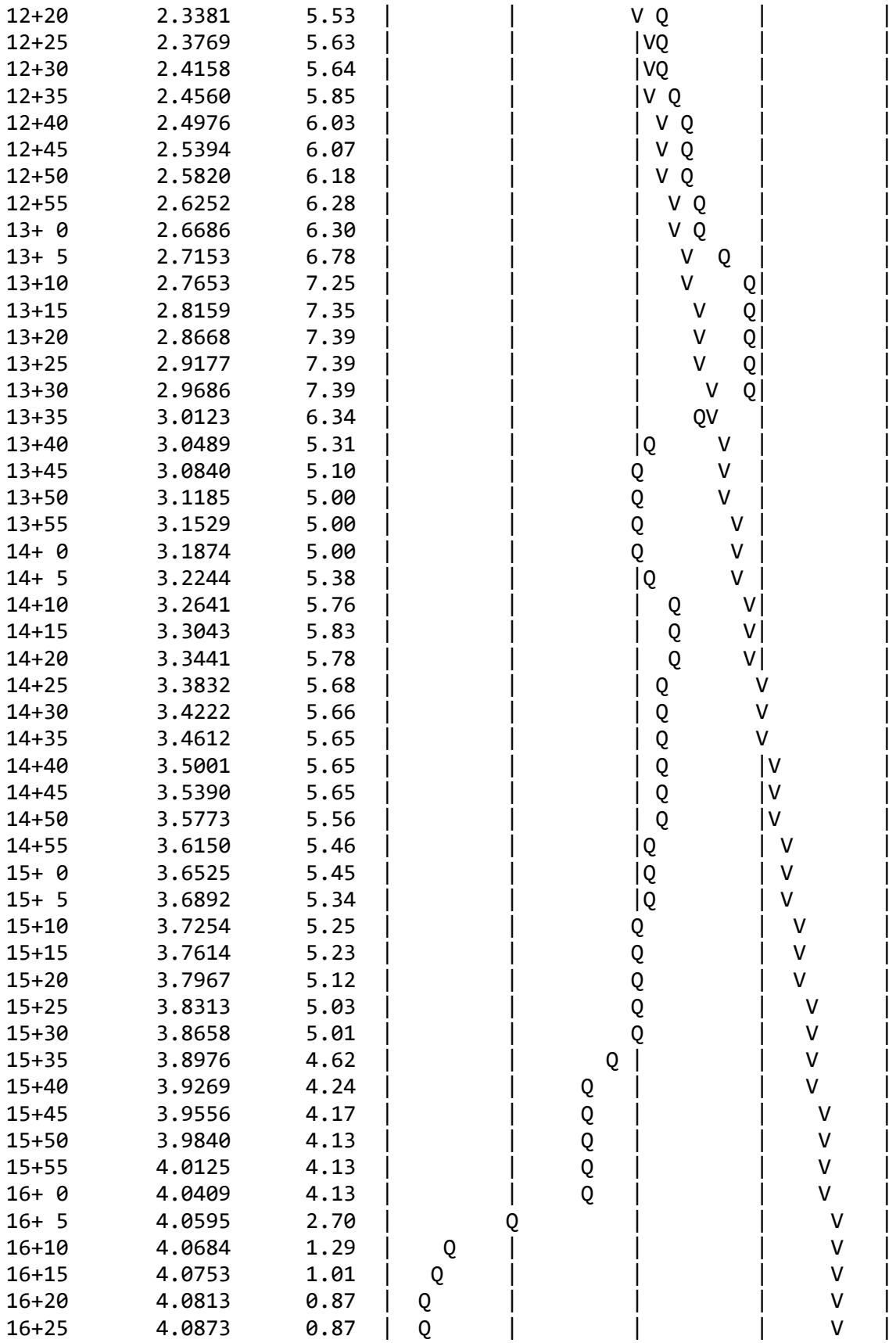
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

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	0.0013	0.19	Q				
0+10	0.0039	0.38	VQ				
0+15	0.0068	0.42	VQ				
0+20	0.0105	0.53	V Q				
0+25	0.0148	0.62	V Q				
0+30	0.0192	0.64	V Q				
0+35	0.0237	0.65	V Q				
0+40	0.0282	0.65	V Q				
0+45	0.0327	0.65	V Q				
0+50	0.0378	0.75	V Q				
0+55	0.0436	0.84	V Q				
1+ 0	0.0495	0.86	V Q				
1+ 5	0.0549	0.77	V Q				
1+10	0.0596	0.68	V Q				
1+15	0.0641	0.66	V Q				
1+20	0.0686	0.65	V Q				
1+25	0.0731	0.65	V Q				
1+30	0.0776	0.65	V Q				
1+35	0.0821	0.65	V Q				
1+40	0.0866	0.65	V Q				
1+45	0.0911	0.65	V Q				
1+50	0.0962	0.75	V Q				
1+55	0.1020	0.84	V Q				
2+ 0	0.1079	0.86	V Q				
2+ 5	0.1139	0.87	|V Q				
2+10	0.1199	0.87	|V Q				
2+15	0.1259	0.87	|V Q				
2+20	0.1319	0.87	|V Q				
2+25	0.1379	0.87	|V Q				
2+30	0.1439	0.87	|V Q				
2+35	0.1505	0.97	|V Q				
2+40	0.1578	1.06	|V Q				
2+45	0.1653	1.08	|V Q				
2+50	0.1728	1.09	|V Q				
2+55	0.1802	1.09	|V Q				
3+ 0	0.1877	1.09	|V Q				
3+ 5	0.1952	1.09	|V Q				
3+10	0.2027	1.09	|V Q				
3+15	0.2102	1.09	|V Q				
3+20	0.2177	1.09	|V Q				
3+25	0.2252	1.09	| V Q				
3+30	0.2327	1.09	| V Q				
3+35	0.2401	1.09	| V Q				
3+40	0.2476	1.09	| V Q				
3+45	0.2551	1.09	| V Q				
3+50	0.2633	1.18	| V Q				
3+55	0.2721	1.28	| V Q				

```
4+ 0       0.2810      1.30  | V  Q    |         |         |         |
4+ 5       0.2900      1.30  | V  Q    |         |         |         |
4+10       0.2990      1.30  | V  Q    |         |         |         |
4+15       0.3079      1.30  | V  Q    |         |         |         |
4+20       0.3176      1.40  | V  Q    |         |         |         |
4+25       0.3279      1.49  | V  Q    |         |         |         |
4+30       0.3383      1.51  |  V  Q   |         |         |         |
4+35       0.3488      1.52  |  V  Q   |         |         |         |
4+40       0.3593      1.52  |  V  Q   |         |         |         |
4+45       0.3698      1.52  |  V  Q   |         |         |         |
4+50       0.3809      1.62  |  V  Q   |         |         |         |
4+55       0.3927      1.71  |  V  Q   |         |         |         |
5+ 0       0.4046      1.73  |  V  Q   |         |         |         |
5+ 5       0.4153      1.55  |  V  Q   |         |         |         |
5+10       0.4246      1.36  |  V Q    |         |         |         |
5+15       0.4338      1.32  |  V Q    |         |         |         |
5+20       0.4434      1.40  |  V Q    |         |         |         |
5+25       0.4537      1.49  |   VQ    |         |         |         |
5+30       0.4641      1.51  |   V Q   |         |         |         |
5+35       0.4753      1.62  |   V Q   |         |         |         |
5+40       0.4870      1.71  |   V Q   |         |         |         |
5+45       0.4990      1.73  |   V Q   |         |         |         |
5+50       0.5109      1.74  |   V Q   |         |         |         |
5+55       0.5229      1.74  |   V Q   |         |         |         |
6+ 0       0.5349      1.74  |   V Q   |         |         |         |
6+ 5       0.5475      1.84  |   V  Q  |         |         |         |
6+10       0.5608      1.93  |   V  Q  |         |         |         |
6+15       0.5742      1.95  |    V Q  |         |         |         |
6+20       0.5877      1.96  |    V Q  |         |         |         |
6+25       0.6012      1.96  |    V Q  |         |         |         |
6+30       0.6147      1.96  |    V Q  |         |         |         |
6+35       0.6288      2.05  |    V  Q |         |         |         |
6+40       0.6436      2.15  |    V  Q |         |         |         |
6+45       0.6585      2.17  |    V  Q |         |         |         |
6+50       0.6735      2.17  |    V  Q |         |         |         |
6+55       0.6885      2.17  |     V Q |         |         |         |
7+ 0       0.7034      2.17  |     V Q |         |         |         |
7+ 5       0.7184      2.17  |     V Q |         |         |         |
7+10       0.7334      2.17  |     V Q |         |         |         |
7+15       0.7484      2.17  |     V Q |         |         |         |
7+20       0.7640      2.27  |     V  Q|         |         |         |
7+25       0.7803      2.36  |     V  Q|         |         |         |
7+30       0.7967      2.38  |      V Q|         |         |         |
7+35       0.8138      2.49  |      V Q|         |         |         |
7+40       0.8316      2.58  |      V  Q       |         |         |
7+45       0.8495      2.60  |      V  Q       |         |         |
7+50       0.8682      2.71  |      V  Q       |         |         |
7+55       0.8874      2.80  |      V  |Q      |         |         |
8+ 0       0.9068      2.82  |       V |Q      |         |         |
8+ 5       0.9276      3.02  |       V | Q     |         |         |
```

8+10	0.9497	3.21	V | Q			
8+15	0.9721	3.24	V | Q			
8+20	0.9945	3.26	V | Q			
8+25	1.0170	3.26	V| Q			
8+30	1.0394	3.26	V| Q			
8+35	1.0626	3.36	V| Q			
8+40	1.0863	3.45	V| Q			
8+45	1.1102	3.47	V| Q			
8+50	1.1349	3.58	V Q			
8+55	1.1601	3.67	V Q			
9+ 0	1.1855	3.69	V Q			
9+ 5	1.2123	3.89	V Q			
9+10	1.2404	4.08	|V Q			
9+15	1.2687	4.11	|V Q			
9+20	1.2978	4.23	|V Q			
9+25	1.3276	4.32	|V Q			
9+30	1.3575	4.34	| V Q			
9+35	1.3881	4.44	| V Q			
9+40	1.4193	4.54	| V Q			
9+45	1.4507	4.56	| V Q			
9+50	1.4828	4.66	| V Q			
9+55	1.5156	4.76	| V Q|			
10+ 0	1.5485	4.78	| V Q|			
10+ 5	1.5768	4.11	| V Q			
10+10	1.6006	3.46	| QV			
10+15	1.6235	3.33	| QV			
10+20	1.6460	3.26	| QV			
10+25	1.6685	3.26	| QV			
10+30	1.6909	3.26	| Q V			
10+35	1.7167	3.74	| QV			
10+40	1.7457	4.21	| VQ			
10+45	1.7753	4.30	| V Q			
10+50	1.8053	4.35	| VQ			
10+55	1.8352	4.35	| VQ			
11+ 0	1.8652	4.35	| VQ			
11+ 5	1.8945	4.25	| VQ			
11+10	1.9231	4.16	| QV			
11+15	1.9517	4.14	| QV			
11+20	1.9801	4.13	| QV			
11+25	2.0086	4.13	| QV			
11+30	2.0370	4.13	| Q V			
11+35	2.0642	3.94	| Q V			
11+40	2.0900	3.75	| Q V			
11+45	2.1156	3.72	| Q V			
11+50	2.1417	3.79	| Q V|			
11+55	2.1685	3.89	| Q V|			
12+ 0	2.1954	3.91	| Q V|			
12+ 5	2.2269	4.58	| QV|			
12+10	2.2630	5.24	| Q			
12+15	2.3000	5.37	| VQ			



```
16+30       4.0933      0.87  |  Q      |         |         |     V   |
16+35       4.0986      0.77  |  Q      |         |         |     V   |
16+40       4.1033      0.68  | Q       |         |         |     V   |
16+45       4.1079      0.66  | Q       |         |         |     V   |
16+50       4.1124      0.65  | Q       |         |         |     V   |
16+55       4.1169      0.65  | Q       |         |         |     V   |
17+ 0       4.1214      0.65  | Q       |         |         |     V   |
17+ 5       4.1272      0.84  |  Q      |         |         |     V   |
17+10       4.1343      1.03  |   Q     |         |         |     V   |
17+15       4.1416      1.07  |   Q     |         |         |     V   |
17+20       4.1491      1.09  |   Q     |         |         |     V   |
17+25       4.1566      1.09  |   Q     |         |         |      V  |
17+30       4.1641      1.09  |   Q     |         |         |      V  |
17+35       4.1716      1.09  |   Q     |         |         |      V  |
17+40       4.1791      1.09  |   Q     |         |         |      V  |
17+45       4.1866      1.09  |   Q     |         |         |      V  |
17+50       4.1934      0.99  |  Q      |         |         |      V  |
17+55       4.1996      0.90  |  Q      |         |         |      V  |
18+ 0       4.2056      0.88  |  Q      |         |         |      V  |
18+ 5       4.2116      0.87  |  Q      |         |         |      V  |
18+10       4.2176      0.87  |  Q      |         |         |      V  |
18+15       4.2236      0.87  |  Q      |         |         |      V  |
18+20       4.2296      0.87  |  Q      |         |         |      V  |
18+25       4.2356      0.87  |  Q      |         |         |      V  |
18+30       4.2416      0.87  |  Q      |         |         |      V  |
18+35       4.2469      0.77  |  Q      |         |         |      V  |
18+40       4.2516      0.68  | Q       |         |         |      V  |
18+45       4.2562      0.66  | Q       |         |         |      V  |
18+50       4.2600      0.56  | Q       |         |         |      V  |
18+55       4.2632      0.46  |Q        |         |         |      V  |
19+ 0       4.2662      0.44  |Q        |         |         |      V  |
19+ 5       4.2699      0.53  | Q       |         |         |       V |
19+10       4.2742      0.62  | Q       |         |         |       V |
19+15       4.2786      0.64  | Q       |         |         |       V |
19+20       4.2838      0.75  | Q       |         |         |       V |
19+25       4.2896      0.84  |  Q      |         |         |       V |
19+30       4.2955      0.86  |  Q      |         |         |       V |
19+35       4.3008      0.77  |  Q      |         |         |       V |
19+40       4.3055      0.68  | Q       |         |         |       V |
19+45       4.3101      0.66  | Q       |         |         |       V |
19+50       4.3139      0.56  | Q       |         |         |       V |
19+55       4.3171      0.46  |Q        |         |         |       V |
20+ 0       4.3202      0.44  |Q        |         |         |       V |
20+ 5       4.3238      0.53  | Q       |         |         |       V |
20+10       4.3281      0.62  | Q       |         |         |       V |
20+15       4.3325      0.64  | Q       |         |         |       V |
20+20       4.3370      0.65  | Q       |         |         |       V |
20+25       4.3415      0.65  | Q       |         |         |       V |
20+30       4.3460      0.65  | Q       |         |         |       V |
20+35       4.3505      0.65  | Q       |         |         |       V |
```

20+40	4.3550	0.65	| Q	|	|	|	V |
20+45	4.3595	0.65	| Q	|	|	|	V |
20+50	4.3633	0.56	| Q	|	|	|	V |
20+55	4.3665	0.46	|Q	|	|	|	V |
21+ 0	4.3696	0.44	|Q	|	|	|	V |
21+ 5	4.3732	0.53	| Q	|	|	|	V |
21+10	4.3775	0.62	| Q	|	|	|	V |
21+15	4.3820	0.64	| Q	|	|	|	V|
21+20	4.3858	0.56	| Q	|	|	|	V|
21+25	4.3890	0.46	|Q	|	|	|	V|
21+30	4.3920	0.44	|Q	|	|	|	V|
21+35	4.3957	0.53	| Q	|	|	|	V|
21+40	4.4000	0.62	| Q	|	|	|	V|
21+45	4.4044	0.64	| Q	|	|	|	V|
21+50	4.4083	0.56	| Q	|	|	|	V|
21+55	4.4115	0.46	|Q	|	|	|	V|
22+ 0	4.4145	0.44	|Q	|	|	|	V|
22+ 5	4.4182	0.53	| Q	|	|	|	V|
22+10	4.4225	0.62	| Q	|	|	|	V|
22+15	4.4269	0.64	| Q	|	|	|	V|
22+20	4.4307	0.56	| Q	|	|	|	V|
22+25	4.4339	0.46	|Q	|	|	|	V|
22+30	4.4370	0.44	|Q	|	|	|	V|
22+35	4.4400	0.43	|Q	|	|	|	V|
22+40	4.4430	0.43	|Q	|	|	|	V|
22+45	4.4460	0.43	|Q	|	|	|	V|
22+50	4.4490	0.43	|Q	|	|	|	V|
22+55	4.4520	0.43	|Q	|	|	|	V|
23+ 0	4.4549	0.43	|Q	|	|	|	V|
23+ 5	4.4579	0.43	|Q	|	|	|	V|
23+10	4.4609	0.43	|Q	|	|	|	V|
23+15	4.4639	0.43	|Q	|	|	|	V|
23+20	4.4669	0.43	|Q	|	|	|	V|
23+25	4.4699	0.43	|Q	|	|	|	V|
23+30	4.4729	0.43	|Q	|	|	|	V|
23+35	4.4759	0.43	|Q	|	|	|	V|
23+40	4.4789	0.43	|Q	|	|	|	V|
23+45	4.4819	0.43	|Q	|	|	|	V|
23+50	4.4849	0.43	|Q	|	|	|	V|
23+55	4.4879	0.43	|Q	|	|	|	V|
24+ 0	4.4909	0.43	|Q	|	|	|	V|
24+ 5	4.4926	0.24	Q	|	|	|	V|
24+10	4.4930	0.06	Q	|	|	|	V|
24+15	4.4931	0.02	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 06/29/23 File: MenifeePrUH10YR3HR110.out

++

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

IRV22-0086 ARES MENIFEE - PROPOSED 10 YEAR 1 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1895.80(Ft.)
Length along longest watercourse measured to centroid = 618.30(Ft.)
Length along longest watercourse = 0.359 Mi.
Length along longest watercourse measured to centroid = 0.117 Mi.
Difference in elevation = 27.77(Ft.)
Slope along watercourse = 77.3423 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.041 Hr.
Lag time = 2.46 Min.
25% of lag time = 0.61 Min.
40% of lag time = 0.98 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	0.48	12.76

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.26	33.49

STORM EVENT (YEAR) = 10.00

Area Averaged 2-Year Rainfall = 0.480(In)
Area Averaged 100-Year Rainfall = 1.260(In)

Point rain (area averaged) = 0.801(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 0.801(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	75.00	0.878

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
75.0	75.0	0.303	0.878	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.198

Slope of intensity-duration curve for a 1 hour storm =0.5300

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	203.446	43.991	11.784
2	0.167	406.891	43.128	11.552
3	0.250	610.337	8.655	2.318
4	0.333	813.782	4.227	1.132
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max		Low	Effective (In/Hr)
1	0.08	3.40	0.327	0.064	(	0.065)	0.263
2	0.17	4.70	0.452	0.064	(	0.089)	0.388
3	0.25	4.70	0.452	0.064	(	0.089)	0.388
4	0.33	5.10	0.490	0.064	(	0.097)	0.426

```
 5   0.42     5.80      0.557          0.064    (  0.110)        0.494
 6   0.50     5.90      0.567          0.064    (  0.112)        0.503
 7   0.58     7.10      0.682          0.064    (  0.135)        0.619
 8   0.67     8.70      0.836          0.064    (  0.165)        0.772
 9   0.75    13.20      1.268          0.064    (  0.251)        1.205
10   0.83    29.70      2.854          0.064    (  0.565)        2.790
11   0.92     7.70      0.740          0.064    (  0.146)        0.676
12   1.00     4.00      0.384          0.064    (  0.076)        0.321
              (Loss Rate Not Used)
   Sum =     100.0                                    Sum =     8.8
      Flood volume = Effective rainfall      0.74(In)
       times area      26.6(Ac.)/[(In)/(Ft.)] =       1.6(Ac.Ft)
      Total soil loss =      0.06(In)
      Total soil loss =     0.141(Ac.Ft)
      Total rainfall =      0.80(In)
      Flood volume =       71109.7 Cubic Feet
      Total soil loss =        6143.8 Cubic Feet
      ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     49.309(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         1 - 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       12.5      25.0      37.5      50.0
-------------------------------------------------------------------------
  0+ 5       0.0214      3.10  V Q       |         |         |         |
  0+10       0.0738      7.61  |V    Q   |         |         |         |
  0+15       0.1404      9.67  |  V   Q  |         |         |         |
  0+20       0.2141     10.71  |    V  Q |         |         |         |
  0+25       0.2974     12.09  |      V Q|         |         |         |
  0+30       0.3873     13.07  |        VQ         |         |         |
  0+35       0.4888     14.74  |         |Q        |         |         |
  0+40       0.6127     17.98  |         |   QV    |         |         |
  0+45       0.7858     25.13  |         |        VQ         |         |
  0+50       1.1254     49.31  |         |         |      V  |        Q|
  0+55       1.4276     43.89  |         |         |         |   VQ    |
  1+ 0       1.5615     19.43  |         |    Q    |         |       V |
  1+ 5       1.6196      8.44  |     Q   |         |         |        V|
  1+10       1.6300      1.51  |Q        |         |         |        V|
  1+15       1.6325      0.36  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 06/29/23 File: MenifeePrUH10YR1HR310.out

++

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

IRV22-0086 ARES MENIFEE - PROPOSED 10 YEAR 3 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1895.80(Ft.)
Length along longest watercourse measured to centroid = 618.30(Ft.)
Length along longest watercourse = 0.359 Mi.
Length along longest watercourse measured to centroid = 0.117 Mi.
Difference in elevation = 27.77(Ft.)
Slope along watercourse = 77.3423 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.041 Hr.
Lag time = 2.46 Min.
25% of lag time = 0.61 Min.
40% of lag time = 0.98 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	0.80	21.26

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.95	51.83

STORM EVENT (YEAR) = 10.00

Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.950(In)

Point rain (area averaged) = 1.273(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.273(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	75.00	0.878

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
75.0	75.0	0.303	0.878	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.198

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

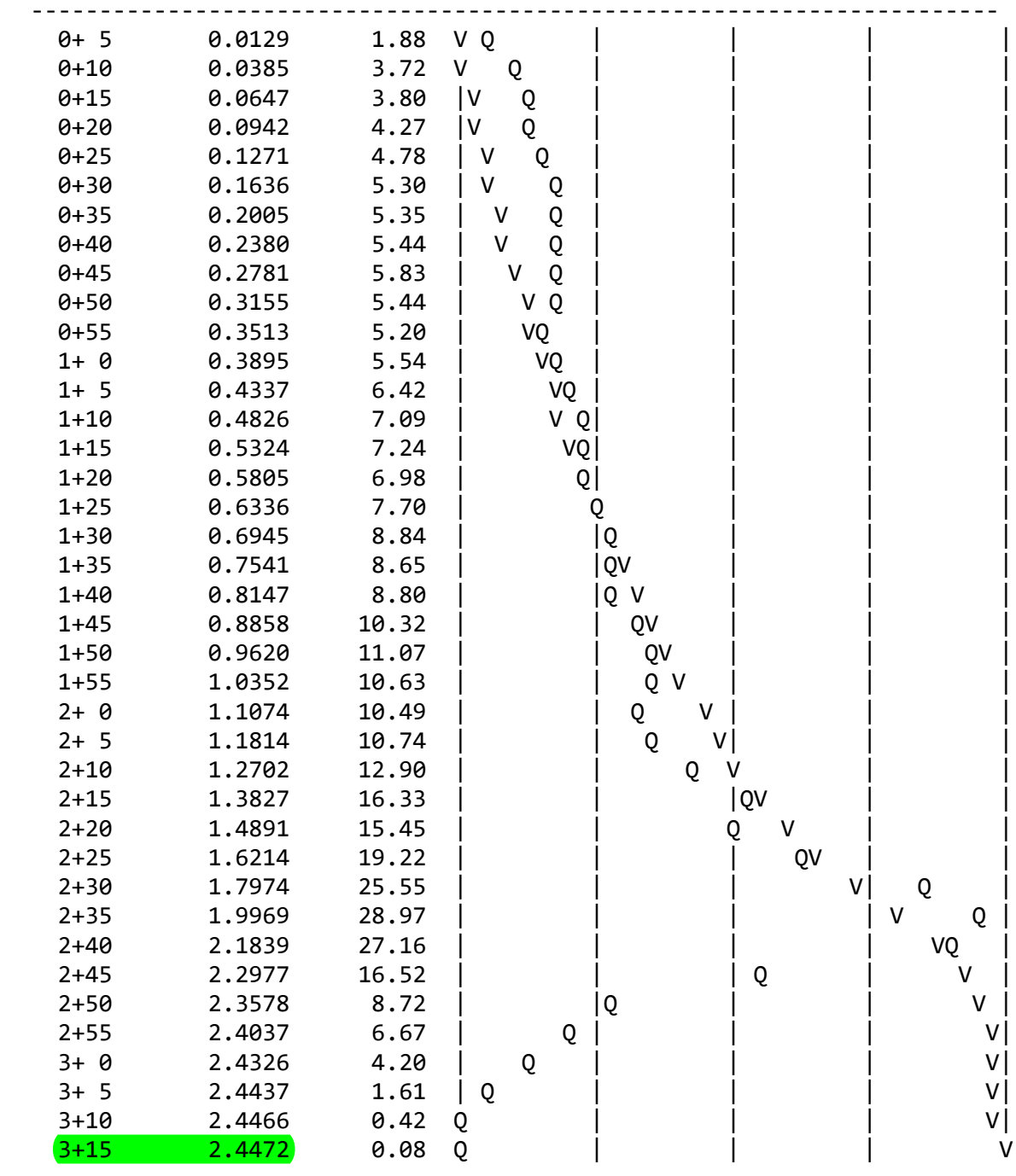
Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	203.446	43.991	11.784
2	0.167	406.891	43.128	11.552
3	0.250	610.337	8.655	2.318
4	0.333	813.782	4.227	1.132
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.199	(0.064)	0.039	0.159
2	0.17	1.30	0.199	(0.064)	0.039	0.159
3	0.25	1.10	0.168	(0.064)	0.033	0.135
4	0.33	1.50	0.229	(0.064)	0.045	0.184
5	0.42	1.50	0.229	(0.064)	0.045	0.184
6	0.50	1.80	0.275	(0.064)	0.054	0.221

```
 7   0.58     1.50      0.229       (  0.064)       0.045        0.184
 8   0.67     1.80      0.275       (  0.064)       0.054        0.221
 9   0.75     1.80      0.275       (  0.064)       0.054        0.221
10   0.83     1.50      0.229       (  0.064)       0.045        0.184
11   0.92     1.60      0.244       (  0.064)       0.048        0.196
12   1.00     1.80      0.275       (  0.064)       0.054        0.221
13   1.08     2.20      0.336          0.064    (  0.067)        0.272
14   1.17     2.20      0.336          0.064    (  0.067)        0.272
15   1.25     2.20      0.336          0.064    (  0.067)        0.272
16   1.33     2.00      0.306       (  0.064)       0.060        0.245
17   1.42     2.60      0.397          0.064    (  0.079)        0.333
18   1.50     2.70      0.412          0.064    (  0.082)        0.349
19   1.58     2.40      0.367          0.064    (  0.073)        0.303
20   1.67     2.70      0.412          0.064    (  0.082)        0.349
21   1.75     3.30      0.504          0.064    (  0.100)        0.440
22   1.83     3.10      0.474          0.064    (  0.094)        0.410
23   1.92     2.90      0.443          0.064    (  0.088)        0.379
24   2.00     3.00      0.458          0.064    (  0.091)        0.395
25   2.08     3.10      0.474          0.064    (  0.094)        0.410
26   2.17     4.20      0.642          0.064    (  0.127)        0.578
27   2.25     5.00      0.764          0.064    (  0.151)        0.700
28   2.33     3.50      0.535          0.064    (  0.106)        0.471
29   2.42     6.80      1.039          0.064    (  0.206)        0.975
30   2.50     7.30      1.115          0.064    (  0.221)        1.051
31   2.58     8.20      1.253          0.064    (  0.248)        1.189
32   2.67     5.90      0.901          0.064    (  0.178)        0.838
33   2.75     2.00      0.306       (  0.064)       0.060        0.245
34   2.83     1.80      0.275       (  0.064)       0.054        0.221
35   2.92     1.80      0.275       (  0.064)       0.054        0.221
36   3.00     0.60      0.092       (  0.064)       0.018        0.074
               (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    13.3
      Flood volume = Effective rainfall      1.10(In)
       times area      26.6(Ac.)/[(In)/(Ft.)] =       2.4(Ac.Ft)
      Total soil loss =      0.17(In)
      Total soil loss =     0.372(Ac.Ft)
      Total rainfall =      1.27(In)
      Flood volume =      106600.5 Cubic Feet
      Total soil loss =       16218.0 Cubic Feet
      ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     28.965(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - 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        7.5      15.0      22.5      30.0
```



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 06/29/23 File: MenifeePrUH10YR3HR610.out

++

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

IRV22-0086 ARES MENIFEE - PROPOSED 10 YEAR 6 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1895.80(Ft.)
Length along longest watercourse measured to centroid = 618.30(Ft.)
Length along longest watercourse = 0.359 Mi.
Length along longest watercourse measured to centroid = 0.117 Mi.
Difference in elevation = 27.77(Ft.)
Slope along watercourse = 77.3423 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.041 Hr.
Lag time = 2.46 Min.
25% of lag time = 0.61 Min.
40% of lag time = 0.98 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	1.10	29.24

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	2.60	69.11

STORM EVENT (YEAR) = 10.00

Area Averaged 2-Year Rainfall = 1.100(In)
Area Averaged 100-Year Rainfall = 2.600(In)

Point rain (area averaged) = 1.717(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.717(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	75.00	0.878

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
75.0	75.0	0.303	0.878	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.198

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	203.446	43.991	11.784
2	0.167	406.891	43.128	11.552
3	0.250	610.337	8.655	2.318
4	0.333	813.782	4.227	1.132
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.103	(0.064)	0.020	0.083
2	0.17	0.60	0.124	(0.064)	0.024	0.099
3	0.25	0.60	0.124	(0.064)	0.024	0.099
4	0.33	0.60	0.124	(0.064)	0.024	0.099
5	0.42	0.60	0.124	(0.064)	0.024	0.099
6	0.50	0.70	0.144	(0.064)	0.029	0.116

7	0.58	0.70	0.144	(0.064)	0.029	0.116
8	0.67	0.70	0.144	(0.064)	0.029	0.116
9	0.75	0.70	0.144	(0.064)	0.029	0.116
10	0.83	0.70	0.144	(0.064)	0.029	0.116
11	0.92	0.70	0.144	(0.064)	0.029	0.116
12	1.00	0.80	0.165	(0.064)	0.033	0.132
13	1.08	0.80	0.165	(0.064)	0.033	0.132
14	1.17	0.80	0.165	(0.064)	0.033	0.132
15	1.25	0.80	0.165	(0.064)	0.033	0.132
16	1.33	0.80	0.165	(0.064)	0.033	0.132
17	1.42	0.80	0.165	(0.064)	0.033	0.132
18	1.50	0.80	0.165	(0.064)	0.033	0.132
19	1.58	0.80	0.165	(0.064)	0.033	0.132
20	1.67	0.80	0.165	(0.064)	0.033	0.132
21	1.75	0.80	0.165	(0.064)	0.033	0.132
22	1.83	0.80	0.165	(0.064)	0.033	0.132
23	1.92	0.80	0.165	(0.064)	0.033	0.132
24	2.00	0.90	0.185	(0.064)	0.037	0.149
25	2.08	0.80	0.165	(0.064)	0.033	0.132
26	2.17	0.90	0.185	(0.064)	0.037	0.149
27	2.25	0.90	0.185	(0.064)	0.037	0.149
28	2.33	0.90	0.185	(0.064)	0.037	0.149
29	2.42	0.90	0.185	(0.064)	0.037	0.149
30	2.50	0.90	0.185	(0.064)	0.037	0.149
31	2.58	0.90	0.185	(0.064)	0.037	0.149
32	2.67	0.90	0.185	(0.064)	0.037	0.149
33	2.75	1.00	0.206	(0.064)	0.041	0.165
34	2.83	1.00	0.206	(0.064)	0.041	0.165
35	2.92	1.00	0.206	(0.064)	0.041	0.165
36	3.00	1.00	0.206	(0.064)	0.041	0.165
37	3.08	1.00	0.206	(0.064)	0.041	0.165
38	3.17	1.10	0.227	(0.064)	0.045	0.182
39	3.25	1.10	0.227	(0.064)	0.045	0.182
40	3.33	1.10	0.227	(0.064)	0.045	0.182
41	3.42	1.20	0.247	(0.064)	0.049	0.198
42	3.50	1.30	0.268	(0.064)	0.053	0.215
43	3.58	1.40	0.288	(0.064)	0.057	0.231
44	3.67	1.40	0.288	(0.064)	0.057	0.231
45	3.75	1.50	0.309	(0.064)	0.061	0.248
46	3.83	1.50	0.309	(0.064)	0.061	0.248
47	3.92	1.60	0.330	0.064	(0.065)	0.266
48	4.00	1.60	0.330	0.064	(0.065)	0.266
49	4.08	1.70	0.350	0.064	(0.069)	0.287
50	4.17	1.80	0.371	0.064	(0.073)	0.307
51	4.25	1.90	0.391	0.064	(0.077)	0.328
52	4.33	2.00	0.412	0.064	(0.082)	0.348
53	4.42	2.10	0.433	0.064	(0.086)	0.369
54	4.50	2.10	0.433	0.064	(0.086)	0.369
55	4.58	2.20	0.453	0.064	(0.090)	0.390
56	4.67	2.30	0.474	0.064	(0.094)	0.410

```
57   4.75     2.40      0.494          0.064    (  0.098)        0.431
58   4.83     2.40      0.494          0.064    (  0.098)        0.431
59   4.92     2.50      0.515          0.064    (  0.102)        0.451
60   5.00     2.60      0.536          0.064    (  0.106)        0.472
61   5.08     3.10      0.639          0.064    (  0.126)        0.575
62   5.17     3.60      0.742          0.064    (  0.147)        0.678
63   5.25     3.90      0.804          0.064    (  0.159)        0.740
64   5.33     4.20      0.865          0.064    (  0.171)        0.802
65   5.42     4.70      0.968          0.064    (  0.192)        0.905
66   5.50     5.60      1.154          0.064    (  0.228)        1.090
67   5.58     1.90      0.391          0.064    (  0.077)        0.328
68   5.67     0.90      0.185       (  0.064)       0.037        0.149
69   5.75     0.60      0.124       (  0.064)       0.024        0.099
70   5.83     0.50      0.103       (  0.064)       0.020        0.083
71   5.92     0.30      0.062       (  0.064)       0.012        0.050
72   6.00     0.20      0.041       (  0.064)       0.008        0.033
               (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    17.5
      Flood volume = Effective rainfall      1.46(In)
       times area      26.6(Ac.)/[(In)/(Ft.)] =       3.2(Ac.Ft)
      Total soil loss =      0.26(In)
      Total soil loss =     0.576(Ac.Ft)
      Total rainfall =      1.72(In)
      Flood volume =      140542.8 Cubic Feet
      Total soil loss =       25112.1 Cubic Feet
      ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =     26.006(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          6 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      ---------------------------------------------------------------------
                   Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5      30.0
-------------------------------------------------------------------------
  0+ 5       0.0067      0.97  VQ        |         |         |         |
  0+10       0.0213      2.12  V Q       |         |         |         |
  0+15       0.0386      2.51  V  Q      |         |         |         |
  0+20       0.0568      2.64  V  Q      |         |         |         |
  0+25       0.0751      2.66  V  Q      |         |         |         |
  0+30       0.0947      2.85  |V Q      |         |         |         |
  0+35       0.1157      3.04  |V  Q     |         |         |         |
  0+40       0.1369      3.08  |V  Q     |         |         |         |
  0+45       0.1583      3.10  |V  Q     |         |         |         |
  0+50       0.1796      3.10  | V Q     |         |         |         |
  0+55       0.2010      3.10  | V Q     |         |         |         |
  1+ 0       0.2236      3.30  | V Q     |         |         |         |
  1+ 5       0.2477      3.49  |  VQ     |         |         |         |
```

1+10	0.2719	3.52	VQ				
1+15	0.2963	3.54	VQ				
1+20	0.3207	3.54	VQ				
1+25	0.3451	3.54	Q				
1+30	0.3695	3.54	Q				
1+35	0.3939	3.54	Q				
1+40	0.4183	3.54	QV				
1+45	0.4427	3.54	QV				
1+50	0.4671	3.54	QV				
1+55	0.4915	3.54	Q V				
2+ 0	0.5173	3.74	Q V				
2+ 5	0.5430	3.73	Q V				
2+10	0.5690	3.78	Q V				
2+15	0.5962	3.95	Q V				
2+20	0.6235	3.97	Q V				
2+25	0.6510	3.99	Q V				
2+30	0.6784	3.99	Q V				
2+35	0.7059	3.99	Q V				
2+40	0.7333	3.99	Q V				
2+45	0.7621	4.18	Q V				
2+50	0.7922	4.37	Q V				
2+55	0.8226	4.41	Q V				
3+ 0	0.8531	4.43	Q V				
3+ 5	0.8836	4.43	Q V				
3+10	0.9155	4.62	Q V				
3+15	0.9486	4.81	Q V				
3+20	0.9820	4.85	Q V				
3+25	1.0169	5.07	Q V				
3+30	1.0545	5.45	Q V				
3+35	1.0950	5.88	Q V				
3+40	1.1371	6.12	Q V				
3+45	1.1811	6.38	Q V				
3+50	1.2264	6.59	Q V				
3+55	1.2735	6.84	Q V				
4+ 0	1.3222	7.07	Q V				
4+ 5	1.3728	7.35	Q V				
4+10	1.4269	7.85	Q V				
4+15	1.4846	8.38	Q V				
4+20	1.5461	8.93	Q V				
4+25	1.6115	9.49	Q V				
4+30	1.6789	9.79	Q V				
4+35	1.7485	10.11	Q V				
4+40	1.8216	10.61	Q V				
4+45	1.8984	11.14	Q V				
4+50	1.9772	11.45	Q V				
4+55	2.0583	11.77	Q V				
5+ 0	2.1428	12.27	Q V				
5+ 5	2.2376	13.77	Q V				
5+10	2.3495	16.25	Q V				
5+15	2.4764	18.43	Q V				

```
    5+20       2.6157     20.23  |          |          |     Q    | V         |
    5+25       2.7701     22.42  |          |          |        Q |   V       |
    5+30       2.9492     26.01  |          |          |          |   Q V     |
    5+35       3.0833     19.47  |          |          |    Q     |       V   |
    5+40       3.1459      9.10  |          | Q        |          |         V |
    5+45       3.1796      4.88  |     Q    |          |          |         V |
    5+50       3.1991      2.84  |  Q       |          |          |         V |
    5+55       3.2125      1.94  | Q        |          |          |         V |
    6+ 0       3.2212      1.27  |Q         |          |          |         V |
    6+ 5       3.2252      0.59  Q          |          |          |         V |
    6+10       3.2262      0.13  Q          |          |          |         V |
    6+15       3.2264      0.04  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 06/29/23 File: MenifeePrUH10YR6HR2410.out

++

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

IRV22-0086 ARES MENIFEE - PROPOSED 10 YEAR 24 HOUR UNIT HYDROGRAPH

Program License Serial Number 6350

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

English Units used in output format

Drainage Area = 26.58(Ac.) = 0.042 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 26.58(Ac.) = 0.042 Sq. Mi.
Length along longest watercourse = 1895.80(Ft.)
Length along longest watercourse measured to centroid = 618.30(Ft.)
Length along longest watercourse = 0.359 Mi.
Length along longest watercourse measured to centroid = 0.117 Mi.
Difference in elevation = 27.77(Ft.)
Slope along watercourse = 77.3423 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.041 Hr.
Lag time = 2.46 Min.
25% of lag time = 0.61 Min.
40% of lag time = 0.98 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]
26.58	1.85	49.17

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
26.58	4.75	126.25

STORM EVENT (YEAR) = 10.00

Area Averaged 2-Year Rainfall = 1.850(In)
Area Averaged 100-Year Rainfall = 4.750(In)

Point rain (area averaged) = 3.043(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 3.043(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
26.579	75.00	0.878

Total Area Entered = 26.58(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
75.0	75.0	0.303	0.878	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.198

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	203.446	43.991	11.784
2	0.167	406.891	43.128	11.552
3	0.250	610.337	8.655	2.318
4	0.333	813.782	4.227	1.132
			Sum = 100.000	Sum= 26.787

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 (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.024	(0.113)	0.005	0.020
2	0.17	0.07	0.024	(0.112)	0.005	0.020
3	0.25	0.07	0.024	(0.112)	0.005	0.020
4	0.33	0.10	0.037	(0.112)	0.007	0.029
5	0.42	0.10	0.037	(0.111)	0.007	0.029
6	0.50	0.10	0.037	(0.111)	0.007	0.029

7	0.58	0.10	0.037	(0.110)	0.007	0.029
8	0.67	0.10	0.037	(0.110)	0.007	0.029
9	0.75	0.10	0.037	(0.109)	0.007	0.029
10	0.83	0.13	0.049	(0.109)	0.010	0.039
11	0.92	0.13	0.049	(0.109)	0.010	0.039
12	1.00	0.13	0.049	(0.108)	0.010	0.039
13	1.08	0.10	0.037	(0.108)	0.007	0.029
14	1.17	0.10	0.037	(0.107)	0.007	0.029
15	1.25	0.10	0.037	(0.107)	0.007	0.029
16	1.33	0.10	0.037	(0.106)	0.007	0.029
17	1.42	0.10	0.037	(0.106)	0.007	0.029
18	1.50	0.10	0.037	(0.106)	0.007	0.029
19	1.58	0.10	0.037	(0.105)	0.007	0.029
20	1.67	0.10	0.037	(0.105)	0.007	0.029
21	1.75	0.10	0.037	(0.104)	0.007	0.029
22	1.83	0.13	0.049	(0.104)	0.010	0.039
23	1.92	0.13	0.049	(0.103)	0.010	0.039
24	2.00	0.13	0.049	(0.103)	0.010	0.039
25	2.08	0.13	0.049	(0.103)	0.010	0.039
26	2.17	0.13	0.049	(0.102)	0.010	0.039
27	2.25	0.13	0.049	(0.102)	0.010	0.039
28	2.33	0.13	0.049	(0.101)	0.010	0.039
29	2.42	0.13	0.049	(0.101)	0.010	0.039
30	2.50	0.13	0.049	(0.101)	0.010	0.039
31	2.58	0.17	0.061	(0.100)	0.012	0.049
32	2.67	0.17	0.061	(0.100)	0.012	0.049
33	2.75	0.17	0.061	(0.099)	0.012	0.049
34	2.83	0.17	0.061	(0.099)	0.012	0.049
35	2.92	0.17	0.061	(0.099)	0.012	0.049
36	3.00	0.17	0.061	(0.098)	0.012	0.049
37	3.08	0.17	0.061	(0.098)	0.012	0.049
38	3.17	0.17	0.061	(0.097)	0.012	0.049
39	3.25	0.17	0.061	(0.097)	0.012	0.049
40	3.33	0.17	0.061	(0.096)	0.012	0.049
41	3.42	0.17	0.061	(0.096)	0.012	0.049
42	3.50	0.17	0.061	(0.096)	0.012	0.049
43	3.58	0.17	0.061	(0.095)	0.012	0.049
44	3.67	0.17	0.061	(0.095)	0.012	0.049
45	3.75	0.17	0.061	(0.094)	0.012	0.049
46	3.83	0.20	0.073	(0.094)	0.014	0.059
47	3.92	0.20	0.073	(0.094)	0.014	0.059
48	4.00	0.20	0.073	(0.093)	0.014	0.059
49	4.08	0.20	0.073	(0.093)	0.014	0.059
50	4.17	0.20	0.073	(0.093)	0.014	0.059
51	4.25	0.20	0.073	(0.092)	0.014	0.059
52	4.33	0.23	0.085	(0.092)	0.017	0.068
53	4.42	0.23	0.085	(0.091)	0.017	0.068
54	4.50	0.23	0.085	(0.091)	0.017	0.068
55	4.58	0.23	0.085	(0.091)	0.017	0.068
56	4.67	0.23	0.085	(0.090)	0.017	0.068

57	4.75	0.23	0.085	(0.090)	0.017	0.068
58	4.83	0.27	0.097	(0.089)	0.019	0.078
59	4.92	0.27	0.097	(0.089)	0.019	0.078
60	5.00	0.27	0.097	(0.089)	0.019	0.078
61	5.08	0.20	0.073	(0.088)	0.014	0.059
62	5.17	0.20	0.073	(0.088)	0.014	0.059
63	5.25	0.20	0.073	(0.087)	0.014	0.059
64	5.33	0.23	0.085	(0.087)	0.017	0.068
65	5.42	0.23	0.085	(0.087)	0.017	0.068
66	5.50	0.23	0.085	(0.086)	0.017	0.068
67	5.58	0.27	0.097	(0.086)	0.019	0.078
68	5.67	0.27	0.097	(0.086)	0.019	0.078
69	5.75	0.27	0.097	(0.085)	0.019	0.078
70	5.83	0.27	0.097	(0.085)	0.019	0.078
71	5.92	0.27	0.097	(0.084)	0.019	0.078
72	6.00	0.27	0.097	(0.084)	0.019	0.078
73	6.08	0.30	0.110	(0.084)	0.022	0.088
74	6.17	0.30	0.110	(0.083)	0.022	0.088
75	6.25	0.30	0.110	(0.083)	0.022	0.088
76	6.33	0.30	0.110	(0.083)	0.022	0.088
77	6.42	0.30	0.110	(0.082)	0.022	0.088
78	6.50	0.30	0.110	(0.082)	0.022	0.088
79	6.58	0.33	0.122	(0.081)	0.024	0.098
80	6.67	0.33	0.122	(0.081)	0.024	0.098
81	6.75	0.33	0.122	(0.081)	0.024	0.098
82	6.83	0.33	0.122	(0.080)	0.024	0.098
83	6.92	0.33	0.122	(0.080)	0.024	0.098
84	7.00	0.33	0.122	(0.080)	0.024	0.098
85	7.08	0.33	0.122	(0.079)	0.024	0.098
86	7.17	0.33	0.122	(0.079)	0.024	0.098
87	7.25	0.33	0.122	(0.079)	0.024	0.098
88	7.33	0.37	0.134	(0.078)	0.026	0.107
89	7.42	0.37	0.134	(0.078)	0.026	0.107
90	7.50	0.37	0.134	(0.077)	0.026	0.107
91	7.58	0.40	0.146	(0.077)	0.029	0.117
92	7.67	0.40	0.146	(0.077)	0.029	0.117
93	7.75	0.40	0.146	(0.076)	0.029	0.117
94	7.83	0.43	0.158	(0.076)	0.031	0.127
95	7.92	0.43	0.158	(0.076)	0.031	0.127
96	8.00	0.43	0.158	(0.075)	0.031	0.127
97	8.08	0.50	0.183	(0.075)	0.036	0.146
98	8.17	0.50	0.183	(0.075)	0.036	0.146
99	8.25	0.50	0.183	(0.074)	0.036	0.146
100	8.33	0.50	0.183	(0.074)	0.036	0.146
101	8.42	0.50	0.183	(0.074)	0.036	0.146
102	8.50	0.50	0.183	(0.073)	0.036	0.146
103	8.58	0.53	0.195	(0.073)	0.039	0.156
104	8.67	0.53	0.195	(0.073)	0.039	0.156
105	8.75	0.53	0.195	(0.072)	0.039	0.156
106	8.83	0.57	0.207	(0.072)	0.041	0.166

107	8.92	0.57	0.207	(0.072)	0.041	0.166
108	9.00	0.57	0.207	(0.071)	0.041	0.166
109	9.08	0.63	0.231	(0.071)	0.046	0.185
110	9.17	0.63	0.231	(0.071)	0.046	0.185
111	9.25	0.63	0.231	(0.070)	0.046	0.185
112	9.33	0.67	0.243	(0.070)	0.048	0.195
113	9.42	0.67	0.243	(0.070)	0.048	0.195
114	9.50	0.67	0.243	(0.069)	0.048	0.195
115	9.58	0.70	0.256	(0.069)	0.051	0.205
116	9.67	0.70	0.256	(0.069)	0.051	0.205
117	9.75	0.70	0.256	(0.068)	0.051	0.205
118	9.83	0.73	0.268	(0.068)	0.053	0.215
119	9.92	0.73	0.268	(0.068)	0.053	0.215
120	10.00	0.73	0.268	(0.067)	0.053	0.215
121	10.08	0.50	0.183	(0.067)	0.036	0.146
122	10.17	0.50	0.183	(0.067)	0.036	0.146
123	10.25	0.50	0.183	(0.066)	0.036	0.146
124	10.33	0.50	0.183	(0.066)	0.036	0.146
125	10.42	0.50	0.183	(0.066)	0.036	0.146
126	10.50	0.50	0.183	(0.065)	0.036	0.146
127	10.58	0.67	0.243	(0.065)	0.048	0.195
128	10.67	0.67	0.243	(0.065)	0.048	0.195
129	10.75	0.67	0.243	(0.064)	0.048	0.195
130	10.83	0.67	0.243	(0.064)	0.048	0.195
131	10.92	0.67	0.243	(0.064)	0.048	0.195
132	11.00	0.67	0.243	(0.063)	0.048	0.195
133	11.08	0.63	0.231	(0.063)	0.046	0.185
134	11.17	0.63	0.231	(0.063)	0.046	0.185
135	11.25	0.63	0.231	(0.062)	0.046	0.185
136	11.33	0.63	0.231	(0.062)	0.046	0.185
137	11.42	0.63	0.231	(0.062)	0.046	0.185
138	11.50	0.63	0.231	(0.062)	0.046	0.185
139	11.58	0.57	0.207	(0.061)	0.041	0.166
140	11.67	0.57	0.207	(0.061)	0.041	0.166
141	11.75	0.57	0.207	(0.061)	0.041	0.166
142	11.83	0.60	0.219	(0.060)	0.043	0.176
143	11.92	0.60	0.219	(0.060)	0.043	0.176
144	12.00	0.60	0.219	(0.060)	0.043	0.176
145	12.08	0.83	0.304	0.059	(0.060)	0.245
146	12.17	0.83	0.304	0.059	(0.060)	0.245
147	12.25	0.83	0.304	0.059	(0.060)	0.245
148	12.33	0.87	0.316	0.059	(0.063)	0.258
149	12.42	0.87	0.316	0.058	(0.063)	0.258
150	12.50	0.87	0.316	0.058	(0.063)	0.258
151	12.58	0.93	0.341	0.058	(0.067)	0.283
152	12.67	0.93	0.341	0.057	(0.067)	0.283
153	12.75	0.93	0.341	0.057	(0.067)	0.284
154	12.83	0.97	0.353	0.057	(0.070)	0.296
155	12.92	0.97	0.353	0.057	(0.070)	0.296
156	13.00	0.97	0.353	0.056	(0.070)	0.297

157	13.08	1.13	0.414	0.056	(0.082)	0.358
158	13.17	1.13	0.414	0.056	(0.082)	0.358
159	13.25	1.13	0.414	0.055	(0.082)	0.358
160	13.33	1.13	0.414	0.055	(0.082)	0.359
161	13.42	1.13	0.414	0.055	(0.082)	0.359
162	13.50	1.13	0.414	0.055	(0.082)	0.359
163	13.58	0.77	0.280	0.054	(0.055)	0.226
164	13.67	0.77	0.280	0.054	(0.055)	0.226
165	13.75	0.77	0.280	0.054	(0.055)	0.226
166	13.83	0.77	0.280	0.053	(0.055)	0.227
167	13.92	0.77	0.280	0.053	(0.055)	0.227
168	14.00	0.77	0.280	0.053	(0.055)	0.227
169	14.08	0.90	0.329	0.053	(0.065)	0.276
170	14.17	0.90	0.329	0.052	(0.065)	0.276
171	14.25	0.90	0.329	0.052	(0.065)	0.277
172	14.33	0.87	0.316	0.052	(0.063)	0.265
173	14.42	0.87	0.316	0.052	(0.063)	0.265
174	14.50	0.87	0.316	0.051	(0.063)	0.265
175	14.58	0.87	0.316	0.051	(0.063)	0.265
176	14.67	0.87	0.316	0.051	(0.063)	0.266
177	14.75	0.87	0.316	0.051	(0.063)	0.266
178	14.83	0.83	0.304	0.050	(0.060)	0.254
179	14.92	0.83	0.304	0.050	(0.060)	0.254
180	15.00	0.83	0.304	0.050	(0.060)	0.255
181	15.08	0.80	0.292	0.049	(0.058)	0.243
182	15.17	0.80	0.292	0.049	(0.058)	0.243
183	15.25	0.80	0.292	0.049	(0.058)	0.243
184	15.33	0.77	0.280	0.049	(0.055)	0.231
185	15.42	0.77	0.280	0.048	(0.055)	0.231
186	15.50	0.77	0.280	0.048	(0.055)	0.232
187	15.58	0.63	0.231	(0.048)	0.046	0.185
188	15.67	0.63	0.231	(0.048)	0.046	0.185
189	15.75	0.63	0.231	(0.047)	0.046	0.185
190	15.83	0.63	0.231	(0.047)	0.046	0.185
191	15.92	0.63	0.231	(0.047)	0.046	0.185
192	16.00	0.63	0.231	(0.047)	0.046	0.185
193	16.08	0.13	0.049	(0.047)	0.010	0.039
194	16.17	0.13	0.049	(0.046)	0.010	0.039
195	16.25	0.13	0.049	(0.046)	0.010	0.039
196	16.33	0.13	0.049	(0.046)	0.010	0.039
197	16.42	0.13	0.049	(0.046)	0.010	0.039
198	16.50	0.13	0.049	(0.045)	0.010	0.039
199	16.58	0.10	0.037	(0.045)	0.007	0.029
200	16.67	0.10	0.037	(0.045)	0.007	0.029
201	16.75	0.10	0.037	(0.045)	0.007	0.029
202	16.83	0.10	0.037	(0.044)	0.007	0.029
203	16.92	0.10	0.037	(0.044)	0.007	0.029
204	17.00	0.10	0.037	(0.044)	0.007	0.029
205	17.08	0.17	0.061	(0.044)	0.012	0.049
206	17.17	0.17	0.061	(0.044)	0.012	0.049

207	17.25	0.17	0.061	(0.043)	0.012	0.049
208	17.33	0.17	0.061	(0.043)	0.012	0.049
209	17.42	0.17	0.061	(0.043)	0.012	0.049
210	17.50	0.17	0.061	(0.043)	0.012	0.049
211	17.58	0.17	0.061	(0.042)	0.012	0.049
212	17.67	0.17	0.061	(0.042)	0.012	0.049
213	17.75	0.17	0.061	(0.042)	0.012	0.049
214	17.83	0.13	0.049	(0.042)	0.010	0.039
215	17.92	0.13	0.049	(0.042)	0.010	0.039
216	18.00	0.13	0.049	(0.041)	0.010	0.039
217	18.08	0.13	0.049	(0.041)	0.010	0.039
218	18.17	0.13	0.049	(0.041)	0.010	0.039
219	18.25	0.13	0.049	(0.041)	0.010	0.039
220	18.33	0.13	0.049	(0.041)	0.010	0.039
221	18.42	0.13	0.049	(0.040)	0.010	0.039
222	18.50	0.13	0.049	(0.040)	0.010	0.039
223	18.58	0.10	0.037	(0.040)	0.007	0.029
224	18.67	0.10	0.037	(0.040)	0.007	0.029
225	18.75	0.10	0.037	(0.040)	0.007	0.029
226	18.83	0.07	0.024	(0.039)	0.005	0.020
227	18.92	0.07	0.024	(0.039)	0.005	0.020
228	19.00	0.07	0.024	(0.039)	0.005	0.020
229	19.08	0.10	0.037	(0.039)	0.007	0.029
230	19.17	0.10	0.037	(0.039)	0.007	0.029
231	19.25	0.10	0.037	(0.039)	0.007	0.029
232	19.33	0.13	0.049	(0.038)	0.010	0.039
233	19.42	0.13	0.049	(0.038)	0.010	0.039
234	19.50	0.13	0.049	(0.038)	0.010	0.039
235	19.58	0.10	0.037	(0.038)	0.007	0.029
236	19.67	0.10	0.037	(0.038)	0.007	0.029
237	19.75	0.10	0.037	(0.037)	0.007	0.029
238	19.83	0.07	0.024	(0.037)	0.005	0.020
239	19.92	0.07	0.024	(0.037)	0.005	0.020
240	20.00	0.07	0.024	(0.037)	0.005	0.020
241	20.08	0.10	0.037	(0.037)	0.007	0.029
242	20.17	0.10	0.037	(0.037)	0.007	0.029
243	20.25	0.10	0.037	(0.036)	0.007	0.029
244	20.33	0.10	0.037	(0.036)	0.007	0.029
245	20.42	0.10	0.037	(0.036)	0.007	0.029
246	20.50	0.10	0.037	(0.036)	0.007	0.029
247	20.58	0.10	0.037	(0.036)	0.007	0.029
248	20.67	0.10	0.037	(0.036)	0.007	0.029
249	20.75	0.10	0.037	(0.036)	0.007	0.029
250	20.83	0.07	0.024	(0.035)	0.005	0.020
251	20.92	0.07	0.024	(0.035)	0.005	0.020
252	21.00	0.07	0.024	(0.035)	0.005	0.020
253	21.08	0.10	0.037	(0.035)	0.007	0.029
254	21.17	0.10	0.037	(0.035)	0.007	0.029
255	21.25	0.10	0.037	(0.035)	0.007	0.029
256	21.33	0.07	0.024	(0.035)	0.005	0.020

257	21.42	0.07	0.024	(0.034)	0.005	0.020
258	21.50	0.07	0.024	(0.034)	0.005	0.020
259	21.58	0.10	0.037	(0.034)	0.007	0.029
260	21.67	0.10	0.037	(0.034)	0.007	0.029
261	21.75	0.10	0.037	(0.034)	0.007	0.029
262	21.83	0.07	0.024	(0.034)	0.005	0.020
263	21.92	0.07	0.024	(0.034)	0.005	0.020
264	22.00	0.07	0.024	(0.034)	0.005	0.020
265	22.08	0.10	0.037	(0.034)	0.007	0.029
266	22.17	0.10	0.037	(0.033)	0.007	0.029
267	22.25	0.10	0.037	(0.033)	0.007	0.029
268	22.33	0.07	0.024	(0.033)	0.005	0.020
269	22.42	0.07	0.024	(0.033)	0.005	0.020
270	22.50	0.07	0.024	(0.033)	0.005	0.020
271	22.58	0.07	0.024	(0.033)	0.005	0.020
272	22.67	0.07	0.024	(0.033)	0.005	0.020
273	22.75	0.07	0.024	(0.033)	0.005	0.020
274	22.83	0.07	0.024	(0.033)	0.005	0.020
275	22.92	0.07	0.024	(0.033)	0.005	0.020
276	23.00	0.07	0.024	(0.032)	0.005	0.020
277	23.08	0.07	0.024	(0.032)	0.005	0.020
278	23.17	0.07	0.024	(0.032)	0.005	0.020
279	23.25	0.07	0.024	(0.032)	0.005	0.020
280	23.33	0.07	0.024	(0.032)	0.005	0.020
281	23.42	0.07	0.024	(0.032)	0.005	0.020
282	23.50	0.07	0.024	(0.032)	0.005	0.020
283	23.58	0.07	0.024	(0.032)	0.005	0.020
284	23.67	0.07	0.024	(0.032)	0.005	0.020
285	23.75	0.07	0.024	(0.032)	0.005	0.020
286	23.83	0.07	0.024	(0.032)	0.005	0.020
287	23.92	0.07	0.024	(0.032)	0.005	0.020
288	24.00	0.07	0.024	(0.032)	0.005	0.020

(Loss Rate Not Used)

Sum = 100.0 Sum = 29.7

Flood volume = Effective rainfall 2.48(In)
times area 26.6(Ac.)/[(In)/(Ft.)] = 5.5(Ac.Ft)
Total soil loss = 0.57(In)
Total soil loss = 1.252(Ac.Ft)
Total rainfall = 3.04(In)
Flood volume = 239031.7 Cubic Feet
Total soil loss = 54555.1 Cubic Feet

Peak flow rate of this hydrograph = 9.624(CFS)

++

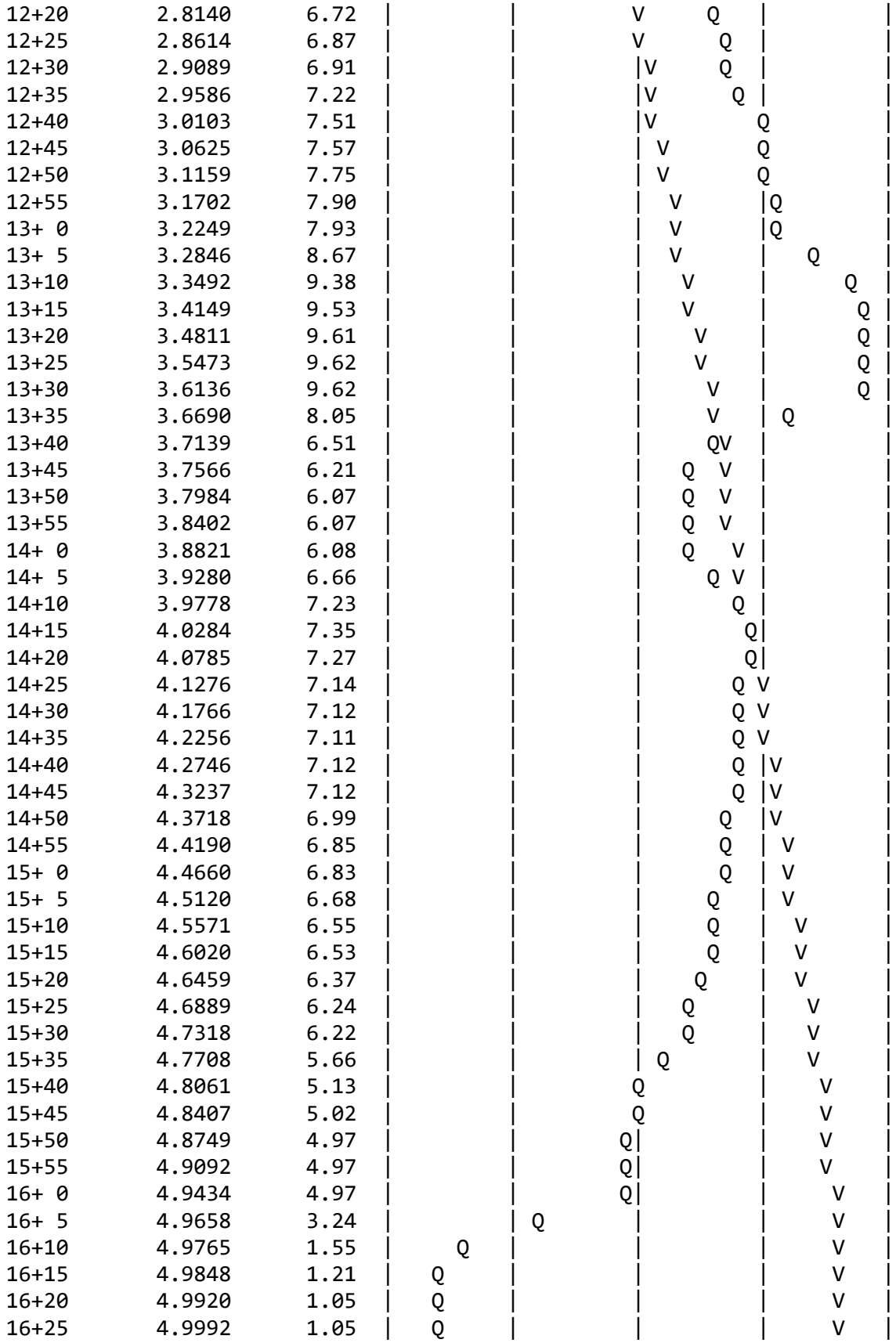
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

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	0.0016	0.23	Q				
0+10	0.0047	0.46	VQ				
0+15	0.0082	0.50	V Q				
0+20	0.0126	0.64	V Q				
0+25	0.0177	0.75	V Q				
0+30	0.0231	0.77	V Q				
0+35	0.0285	0.78	V Q				
0+40	0.0339	0.78	V Q				
0+45	0.0393	0.78	V Q				
0+50	0.0455	0.90	V Q				
0+55	0.0525	1.01	V Q				
1+ 0	0.0596	1.04	V Q				
1+ 5	0.0660	0.93	V Q				
1+10	0.0717	0.82	V Q				
1+15	0.0771	0.80	V Q				
1+20	0.0825	0.78	V Q				
1+25	0.0879	0.78	V Q				
1+30	0.0934	0.78	V Q				
1+35	0.0988	0.78	V Q				
1+40	0.1042	0.78	V Q				
1+45	0.1096	0.78	V Q				
1+50	0.1158	0.90	V Q				
1+55	0.1227	1.01	V Q				
2+ 0	0.1299	1.04	V Q				
2+ 5	0.1371	1.05	V Q				
2+10	0.1443	1.05	|V Q				
2+15	0.1515	1.05	|V Q				
2+20	0.1587	1.05	|V Q				
2+25	0.1659	1.05	|V Q				
2+30	0.1731	1.05	|V Q				
2+35	0.1811	1.16	|V Q				
2+40	0.1899	1.27	|V Q				
2+45	0.1988	1.30	|V Q				
2+50	0.2078	1.31	|V Q				
2+55	0.2169	1.31	|V Q				
3+ 0	0.2259	1.31	|V Q				
3+ 5	0.2349	1.31	|V Q				
3+10	0.2439	1.31	|V Q				
3+15	0.2529	1.31	|V Q				
3+20	0.2619	1.31	|V Q				
3+25	0.2709	1.31	|V Q				
3+30	0.2799	1.31	| V Q				
3+35	0.2889	1.31	| V Q				
3+40	0.2979	1.31	| V Q				
3+45	0.3070	1.31	| V Q				
3+50	0.3168	1.42	| V Q				
3+55	0.3273	1.54	| V Q				

```
4+ 0       0.3381      1.56  | V   Q   |         |         |         |
4+ 5       0.3489      1.57  | V   Q   |         |         |         |
4+10       0.3597      1.57  | V   Q   |         |         |         |
4+15       0.3705      1.57  | V   Q   |         |         |         |
4+20       0.3821      1.68  | V   Q   |         |         |         |
4+25       0.3945      1.80  | V    Q  |         |         |         |
4+30       0.4070      1.82  | V    Q  |         |         |         |
4+35       0.4196      1.83  |  V   Q  |         |         |         |
4+40       0.4323      1.83  |  V   Q  |         |         |         |
4+45       0.4449      1.83  |  V   Q  |         |         |         |
4+50       0.4583      1.95  |  V   Q  |         |         |         |
4+55       0.4725      2.06  |  V    Q |         |         |         |
5+ 0       0.4868      2.08  |  V    Q |         |         |         |
5+ 5       0.4996      1.86  |  V   Q  |         |         |         |
5+10       0.5109      1.64  |  V  Q   |         |         |         |
5+15       0.5219      1.59  |  V  Q   |         |         |         |
5+20       0.5335      1.68  |  V  Q   |         |         |         |
5+25       0.5459      1.80  |  V   Q  |         |         |         |
5+30       0.5584      1.82  |   V  Q  |         |         |         |
5+35       0.5718      1.95  |   V  Q  |         |         |         |
5+40       0.5860      2.06  |   V   Q |         |         |         |
5+45       0.6003      2.08  |   V   Q |         |         |         |
5+50       0.6147      2.09  |   V   Q |         |         |         |
5+55       0.6292      2.09  |   V   Q |         |         |         |
6+ 0       0.6436      2.09  |   V   Q |         |         |         |
6+ 5       0.6588      2.21  |   V   Q |         |         |         |
6+10       0.6748      2.32  |   V    Q|         |         |         |
6+15       0.6909      2.34  |    V   Q|         |         |         |
6+20       0.7071      2.35  |    V   Q|         |         |         |
6+25       0.7233      2.35  |    V   Q|         |         |         |
6+30       0.7396      2.35  |    V   Q|         |         |         |
6+35       0.7566      2.47  |    V   Q|         |         |         |
6+40       0.7744      2.58  |    V    Q         |         |         |
6+45       0.7923      2.61  |    V    Q         |         |         |
6+50       0.8103      2.62  |    V    Q         |         |         |
6+55       0.8283      2.62  |     V   Q         |         |         |
7+ 0       0.8464      2.62  |     V   Q         |         |         |
7+ 5       0.8644      2.62  |     V   Q         |         |         |
7+10       0.8824      2.62  |     V   Q         |         |         |
7+15       0.9004      2.62  |     V   Q         |         |         |
7+20       0.9192      2.73  |     V   Q         |         |         |
7+25       0.9388      2.84  |     V   |Q        |         |         |
7+30       0.9586      2.87  |     V   |Q        |         |         |
7+35       0.9792      2.99  |      V  |Q        |         |         |
7+40       1.0006      3.11  |      V  | Q       |         |         |
7+45       1.0221      3.13  |      V  | Q       |         |         |
7+50       1.0445      3.25  |      V  |  Q      |         |         |
7+55       1.0677      3.37  |      V  |  Q      |         |         |
8+ 0       1.0911      3.39  |      V  |  Q      |         |         |
8+ 5       1.1161      3.63  |       V |   Q     |         |         |
```

8+10	1.1427	3.86	V	Q			
8+15	1.1695	3.90	V	Q			
8+20	1.1966	3.92	V	Q			
8+25	1.2236	3.92	V	Q			
8+30	1.2506	3.92	V	Q			
8+35	1.2784	4.04	V	Q			
8+40	1.3070	4.15	V	Q			
8+45	1.3358	4.18	V	Q			
8+50	1.3654	4.30	V	Q			
8+55	1.3958	4.41	V	Q			
9+ 0	1.4264	4.44	V	Q			
9+ 5	1.4586	4.68	V	Q			
9+10	1.4924	4.90	V	Q			
9+15	1.5265	4.95	V	Q			
9+20	1.5615	5.09	V	Q			
9+25	1.5973	5.20	V	Q			
9+30	1.6333	5.22	V	Q			
9+35	1.6701	5.35	V	Q			
9+40	1.7077	5.46	V	Q			
9+45	1.7455	5.48	V	Q			
9+50	1.7841	5.61	V	Q			
9+55	1.8235	5.72	V	Q			
10+ 0	1.8631	5.75	V	Q			
10+ 5	1.8972	4.95	V	Q			
10+10	1.9258	4.16	V Q				
10+15	1.9534	4.00	V Q				
10+20	1.9804	3.92	VQ				
10+25	2.0074	3.92	VQ				
10+30	2.0345	3.92	VQ				
10+35	2.0655	4.50	V Q				
10+40	2.1003	5.06	V	Q			
10+45	2.1360	5.18	V	Q			
10+50	2.1720	5.23	V	Q			
10+55	2.2081	5.23	V	Q			
11+ 0	2.2441	5.23	V	Q			
11+ 5	2.2794	5.12	V	Q			
11+10	2.3138	5.00	V	Q			
11+15	2.3481	4.98	V Q				
11+20	2.3824	4.97	V Q				
11+25	2.4166	4.97	V Q				
11+30	2.4509	4.97	V Q				
11+35	2.4835	4.74	Q				
11+40	2.5146	4.52	Q				
11+45	2.5454	4.47	QV				
11+50	2.5768	4.56	Q				
11+55	2.6090	4.68	QV				
12+ 0	2.6414	4.70	QV				
12+ 5	2.6794	5.52	V	Q			
12+10	2.7230	6.33	V	Q			
12+15	2.7677	6.49	V	Q			



16+30	5.0064	1.05		Q			V
16+35	5.0128	0.93		Q			V
16+40	5.0185	0.82		Q			V
16+45	5.0240	0.80		Q			V
16+50	5.0294	0.78		Q			V
16+55	5.0348	0.78		Q			V
17+ 0	5.0402	0.78		Q			V
17+ 5	5.0472	1.02		Q			V
17+10	5.0557	1.24		Q			V
17+15	5.0646	1.29		Q			V
17+20	5.0736	1.31		Q			V
17+25	5.0826	1.31		Q			V
17+30	5.0916	1.31		Q			V
17+35	5.1006	1.31		Q			V
17+40	5.1096	1.31		Q			V
17+45	5.1186	1.31		Q			V
17+50	5.1268	1.19		Q			V
17+55	5.1343	1.08		Q			V
18+ 0	5.1416	1.06		Q			V
18+ 5	5.1488	1.05		Q			V
18+10	5.1560	1.05		Q			V
18+15	5.1632	1.05		Q			V
18+20	5.1704	1.05		Q			V
18+25	5.1776	1.05		Q			V
18+30	5.1848	1.05		Q			V
18+35	5.1912	0.93		Q			V
18+40	5.1969	0.82		Q			V
18+45	5.2024	0.80		Q			V
18+50	5.2070	0.67	Q				V
18+55	5.2108	0.56	Q				V
19+ 0	5.2145	0.53	Q				V
19+ 5	5.2189	0.64	Q				V
19+10	5.2241	0.75		Q			V
19+15	5.2294	0.77		Q			V
19+20	5.2356	0.90		Q			V
19+25	5.2426	1.01		Q			V
19+30	5.2497	1.04		Q			V
19+35	5.2561	0.93		Q			V
19+40	5.2617	0.82		Q			V
19+45	5.2672	0.80		Q			V
19+50	5.2718	0.67	Q				V
19+55	5.2757	0.56	Q				V
20+ 0	5.2794	0.53	Q				V
20+ 5	5.2838	0.64	Q				V
20+10	5.2889	0.75		Q			V
20+15	5.2943	0.77		Q			V
20+20	5.2997	0.78		Q			V
20+25	5.3051	0.78		Q			V
20+30	5.3105	0.78		Q			V
20+35	5.3159	0.78		Q			V

20+40	5.3213	0.78	| Q	|	|	|	V |
20+45	5.3267	0.78	| Q	|	|	|	V |
20+50	5.3313	0.67	| Q	|	|	|	V |
20+55	5.3351	0.56	| Q	|	|	|	V |
21+ 0	5.3388	0.53	| Q	|	|	|	V |
21+ 5	5.3432	0.64	| Q	|	|	|	V |
21+10	5.3484	0.75	| Q	|	|	|	V |
21+15	5.3537	0.77	| Q	|	|	|	V|
21+20	5.3583	0.67	| Q	|	|	|	V|
21+25	5.3622	0.56	| Q	|	|	|	V|
21+30	5.3658	0.53	| Q	|	|	|	V|
21+35	5.3702	0.64	| Q	|	|	|	V|
21+40	5.3754	0.75	| Q	|	|	|	V|
21+45	5.3807	0.77	| Q	|	|	|	V|
21+50	5.3854	0.67	| Q	|	|	|	V|
21+55	5.3892	0.56	| Q	|	|	|	V|
22+ 0	5.3929	0.53	| Q	|	|	|	V|
22+ 5	5.3973	0.64	| Q	|	|	|	V|
22+10	5.4024	0.75	| Q	|	|	|	V|
22+15	5.4078	0.77	| Q	|	|	|	V|
22+20	5.4124	0.67	| Q	|	|	|	V|
22+25	5.4162	0.56	| Q	|	|	|	V|
22+30	5.4199	0.53	| Q	|	|	|	V|
22+35	5.4235	0.52	| Q	|	|	|	V|
22+40	5.4271	0.52	| Q	|	|	|	V|
22+45	5.4307	0.52	| Q	|	|	|	V|
22+50	5.4343	0.52	| Q	|	|	|	V|
22+55	5.4379	0.52	| Q	|	|	|	V|
23+ 0	5.4415	0.52	| Q	|	|	|	V|
23+ 5	5.4451	0.52	| Q	|	|	|	V|
23+10	5.4487	0.52	| Q	|	|	|	V|
23+15	5.4523	0.52	| Q	|	|	|	V|
23+20	5.4559	0.52	| Q	|	|	|	V|
23+25	5.4596	0.52	| Q	|	|	|	V|
23+30	5.4632	0.52	| Q	|	|	|	V|
23+35	5.4668	0.52	| Q	|	|	|	V|
23+40	5.4704	0.52	| Q	|	|	|	V|
23+45	5.4740	0.52	| Q	|	|	|	V|
23+50	5.4776	0.52	| Q	|	|	|	V|
23+55	5.4812	0.52	| Q	|	|	|	V|
24+ 0	5.4848	0.52	| Q	|	|	|	V|
24+ 5	5.4868	0.29	|Q	|	|	|	V|
24+10	5.4873	0.07	Q	|	|	|	V|
24+15	5.4874	0.02	Q	|	|	|	V

Appendix H – Hydraulic Analysis Calculations

Worksheet for IRV22-0086 8" Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Normal Depth	8.0 in
Diameter	8.0 in
Discharge	0.85 cfs

Results	
Discharge	0.85 cfs
Normal Depth	8.0 in
Flow Area	0.3 ft²
Wetted Perimeter	2.1 ft
Hydraulic Radius	2.0 in
Top Width	0.00 ft
Critical Depth	5.3 in
Percent Full	100.0 %
Critical Slope	0.008 ft/ft
Velocity	2.45 ft/s
Velocity Head	0.09 ft
Specific Energy	0.76 ft
Froude Number	(N/A)
Maximum Discharge	0.92 cfs
Discharge Full	0.85 cfs
Slope Full	0.005 ft/ft
Flow Type	Undefined

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	8.0 in
Critical Depth	5.3 in
Channel Slope	0.005 ft/ft
Critical Slope	0.008 ft/ft

Worksheet for IRV22-0086 12" Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Normal Depth	12.0 in
Diameter	12.0 in
Discharge	2.52 cfs

Results	
Discharge	2.52 cfs
Normal Depth	12.0 in
Flow Area	0.8 ft²
Wetted Perimeter	3.1 ft
Hydraulic Radius	3.0 in
Top Width	0.00 ft
Critical Depth	8.2 in
Percent Full	100.0 %
Critical Slope	0.008 ft/ft
Velocity	3.21 ft/s
Velocity Head	0.16 ft
Specific Energy	1.16 ft
Froude Number	(N/A)
Maximum Discharge	2.71 cfs
Discharge Full	2.52 cfs
Slope Full	0.005 ft/ft
Flow Type	Undefined

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	12.0 in
Critical Depth	8.2 in
Channel Slope	0.005 ft/ft
Critical Slope	0.008 ft/ft

Worksheet for IRV22-0086 18" Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Normal Depth	18.0 in
Diameter	18.0 in
Discharge	7.43 cfs

Results	
Discharge	7.43 cfs
Normal Depth	18.0 in
Flow Area	1.8 ft²
Wetted Perimeter	4.7 ft
Hydraulic Radius	4.5 in
Top Width	0.00 ft
Critical Depth	12.7 in
Percent Full	100.0 %
Critical Slope	0.007 ft/ft
Velocity	4.20 ft/s
Velocity Head	0.27 ft
Specific Energy	1.77 ft
Froude Number	(N/A)
Maximum Discharge	7.99 cfs
Discharge Full	7.43 cfs
Slope Full	0.005 ft/ft
Flow Type	Undefined

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	18.0 in
Critical Depth	12.7 in
Channel Slope	0.005 ft/ft
Critical Slope	0.007 ft/ft

Worksheet for IRV22-0086 24" Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Normal Depth	24.0 in
Diameter	24.0 in
Discharge	16.00 cfs

Results	
Discharge	16.00 cfs
Normal Depth	24.0 in
Flow Area	3.1 ft²
Wetted Perimeter	6.3 ft
Hydraulic Radius	6.0 in
Top Width	0.00 ft
Critical Depth	17.3 in
Percent Full	100.0 %
Critical Slope	0.007 ft/ft
Velocity	5.09 ft/s
Velocity Head	0.40 ft
Specific Energy	2.40 ft
Froude Number	(N/A)
Maximum Discharge	17.21 cfs
Discharge Full	16.00 cfs
Slope Full	0.005 ft/ft
Flow Type	Undefined

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	24.0 in
Critical Depth	17.3 in
Channel Slope	0.005 ft/ft
Critical Slope	0.007 ft/ft

Worksheet for IRV22-0086 36" Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Normal Depth	36.0 in
Diameter	36.0 in
Discharge	47.16 cfs

Results	
Discharge	47.16 cfs
Normal Depth	36.0 in
Flow Area	7.1 ft²
Wetted Perimeter	9.4 ft
Hydraulic Radius	9.0 in
Top Width	0.00 ft
Critical Depth	26.8 in
Percent Full	100.0 %
Critical Slope	0.006 ft/ft
Velocity	6.67 ft/s
Velocity Head	0.69 ft
Specific Energy	3.69 ft
Froude Number	(N/A)
Maximum Discharge	50.73 cfs
Discharge Full	47.16 cfs
Slope Full	0.005 ft/ft
Flow Type	Undefined

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	36.0 in
Critical Depth	26.8 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for IRV22-0086 48" Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Normal Depth	48.0 in
Diameter	48.0 in
Discharge	101.57 cfs

Results	
Discharge	101.57 cfs
Normal Depth	48.0 in
Flow Area	12.6 ft²
Wetted Perimeter	12.6 ft
Hydraulic Radius	12.0 in
Top Width	0.00 ft
Critical Depth	36.6 in
Percent Full	100.0 %
Critical Slope	0.006 ft/ft
Velocity	8.08 ft/s
Velocity Head	1.02 ft
Specific Energy	5.02 ft
Froude Number	(N/A)
Maximum Discharge	109.25 cfs
Discharge Full	101.57 cfs
Slope Full	0.005 ft/ft
Flow Type	Undefined

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	48.0 in
Critical Depth	36.6 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Appendix I – Geotechnical Investigation Report

November 12, 2021

Mr. Alan J. Sharp
300 Spectrum Center Drive, Suite 880
Irvine, California 92618

Project No.: 21G237-2

Subject: Results of Infiltration Testing
Proposed Industrial Building
Murrieta Road, North of McLaughlin Road
Menifee, California

Reference: Geotechnical Investigation, Proposed Industrial Building, Murrieta Road, North of McLaughlin Road, Menifee, California, prepared for Mr. Alan J. Sharp, by Southern California Geotechnical, Inc. (SCG), SCG Project No. 21G237-1, dated November 3, 2021.

Mr. Sharp:

In accordance with your request, we have conducted infiltration testing at the subject site. We are pleased to present this report summarizing the results of the infiltration testing and our design recommendations.

Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 21P351, dated August 6, 2021. The scope of services included site reconnaissance, subsurface exploration, field testing, and engineering analysis to determine the infiltration rates of the onsite soils. The infiltration testing was performed in general accordance with ASTM Test Method D-3385-03, Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer.

Site and Project Description

The site is located on the west side of Murrieta Road, 350± feet north of McLaughlin Road in Menifee, California. The site is bounded to the north by single-family residences (SFRs), to the west by Geary Street, to the south by a vacant lot, and to the east by Murrieta Road. The general location of the site is illustrated on the Site Location Map, included as Plate 1 of this report.

The site consists of multiple contiguous parcels, which total 29.69± acres in size. The southeast area of the site is presently developed with four SFRs. Ground surface cover in this area consists of exposed soil with several medium to large trees. The remaining areas of the site are presently vacant and undeveloped. Ground surface cover in the undeveloped areas consists of exposed soil with sparse native grass and weed growth and sparse areas of trash and debris. The ground is generally uneven due to previous agricultural tilling. A stockpile that is 61,200± ft^2 in size is located in the south-central portion of the site, directly adjacent to the SFRs.

Detailed topographic information was not available at the time of this report. Based on elevations obtained from Google Earth and visual observations made at the time of the subsurface investigation, the site slopes to the northeast at a gradient of 1 to 2± percent. The stockpile located in the south-central area of the site is approximately 3 to 4 feet higher than the surrounding topography.

Proposed Development

SCG was provided with a conceptual site plan prepared by Ware Malcomb. Based on this plan, the site will be developed with one (1) new industrial building. The building will be 568,080± ft² in size, located in the central area of the subject site. Dock-high doors will be constructed in a cross-dock configuration, along a portion of the north and south building walls. The building will be surrounded by asphaltic concrete pavements in the parking and drive areas, Portland cement concrete pavements in the truck court areas, and limited areas of concrete flatwork and landscape planters.

The proposed development will include on-site storm water infiltration. The infiltration system will consist of an infiltration basin located in the eastern area of the site. The bottom of the infiltration system will range from 6 to 10± feet below the existing site grades.

Concurrent Study

SCG concurrently conducted a geotechnical investigation at the subject site, which is referenced above. As part of this study, eight (8) borings were advanced to depths of 10 to 25± feet below existing site grades. Artificial fill soils were encountered at the ground surface at several of the boring locations extending to depths of 2½ to 8± feet below ground surface. The fill soils consist of very stiff to hard silty clay, medium dense to dense silty fine sand and silty fine to coarse sand. Native alluvium was encountered beneath the fill soils or at the ground surface at all of the boring locations, extending to at least the maximum depth explored of 25± feet below ground surface. The alluvial soils generally consist of medium dense to very dense silty fine sand, silty fine to coarse sand, fine to coarse sand and stiff to hard silty clay. Occasional layers of medium dense to very dense fine sand, clayey fine to medium sand, fine sandy silt and hard fine to medium sandy clay were encountered. Some samples are cemented and include calcareous nodules and veining.

Groundwater

Free water was not encountered during the drilling of any of the borings. Based on the moisture content of the recovered soil samples and the lack of free water in the borings, the static groundwater table is at a greater depth than 25± feet below existing site grades.

Recent water level data was obtained from the California State Water Resources Control Board, GeoTracker, website, https://geotracker.waterboards.ca.gov/. One monitoring well on record are located 0.72± miles southeast of the site. Water level readings within this monitoring well indicate a high groundwater level of 72± feet below the ground surface in February 2015.

Subsurface Exploration

Scope of Exploration

The subsurface exploration for the infiltration testing consisted of three (3) backhoe-excavated trenches, extending to depths of 6 to 10± feet below existing site grades. The trenches were logged during excavation by a member of our staff. The approximate locations of the infiltration trenches (identified as I-1 through I-3) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Geotechnical Conditions

Native younger alluvium was encountered at the ground surface at all three infiltration trenches extending to depths of 2½ to 4± feet below the existing site grades. The younger alluvium consists of loose to dense silty fine sands, silty fine to medium sands and stiff to very stiff fine sandy clays, fine to medium sandy clays, and fine to coarse sandy clays. Beneath the younger alluvium, older alluvium was encountered at all of the infiltration trenches extending to the maximum depth explored of 10± feet. The older alluvium generally consists of dense to very dense clayey fine to medium sands and clayey fine to coarse sands with varying fine gravel content. The Trench Logs, which illustrate the conditions encountered at the infiltration test locations, are presented in this report.

Infiltration Testing

We understand that the results of the testing will be used to prepare a preliminary design for the storm water infiltration system that will be used at the subject site. As previously mentioned, the infiltration testing was performed in general accordance with ASTM Test Method D-3385-03, Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer.

Two stainless steel infiltration rings were used for the infiltration testing. The outer infiltration ring is 2 feet in diameter and 20 inches in height. The inner infiltration ring is 1 foot in diameter and 20 inches in height. At the test locations, the outer ring was driven 3± inches into the soil at the base of each trench. The inner ring was centered inside the outer ring and subsequently driven 3± inches into the soil at the base of the trench. The rings were driven into the soil using a ten-pound sledge hammer. The soil surrounding the wall of the infiltration rings was only slightly disturbed during the driving process.

Infiltration Testing Procedure

Infiltration testing was performed at all of the trench locations. The infiltration testing consisted of filling the inner ring and the annular space (the space between the inner and outer rings) with water, approximately 3 to 4 inches above the soil. To prevent the flow of water from one ring to the other, the water level in both the inner ring and the annular space between the rings was maintained using constant-head float valves. The volume of water that was added to maintain a constant head in the inner ring and the annular space during each time interval was determined and recorded. A cap was placed over the rings to minimize the evaporation of water during the tests.

The schedule for readings was determined based on the observed soil type at the base of each backhoe-excavated trench. Based on the existing soils at the trench locations, the volumetric measurements were made at 20 to 30-minute increments. The water volume measurements are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on these spreadsheets.

The infiltration rates for the infiltration tests are calculated in centimeters per hour and then converted to inches per hour. The rates are summarized below:

Infiltration Test No.	Depth (feet)	Soil Description	Infiltration Rate (inches/hour)
I-1	6	Red Brown Clayey fine to medium Sand, trace coarse Sand, trace fine Gravel	0.2
I-2	8	Red Brown Clayey fine to medium Sand, trace fine Gravel	0.0
I-3	10	Red Brown Clayey fine to coarse Sand	0.0

Design Recommendations

Three (3) infiltration tests were performed at the subject site. As noted above, the calculated infiltration rates at the infiltration test locations range from 0 to 0.2 inches per hour. The major factors affecting the lack of infiltration at these locations is the presence of dense to very dense older alluvium. Based on the lack of infiltration at the depths tested, infiltration is not considered feasible for this site.

Although infiltration is not considered feasible at the site, the client may desire to use storm water disposal systems that do not rely on infiltration at this site. The design of storm water disposal systems should be performed by the project civil engineer, in accordance with the City of Menifee and/or County of Riverside guidelines. It is recommended any such systems be designed and constructed to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the system. The presence of such materials would decrease the flow rates through the system. It should be noted that the recommended infiltration rates are based on infiltration testing at four (4) discrete locations and that the overall infiltration rates of the proposed infiltration systems could vary considerably.

Location of Infiltration Systems

The use of on-site storm water infiltration systems carries a risk of creating adverse geotechnical conditions. Increasing the moisture content of the soil can cause the soil to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Overlying structures and pavements in the infiltration area could potentially be damaged due to saturation of the subgrade soils. The proposed infiltration systems for this site should be located at least 25 feet away from any structures, including retaining walls. Even with this provision of locating the infiltration system at least 25 feet from the building(s), it is possible that infiltrating water into the subsurface soils could have an adverse effect on the proposed or existing structures. It should also be noted that utility trenches which happen to collect storm water can also serve as conduits to transmit storm water toward the structure, depending on the slope of the utility trench. Therefore, consideration should also be

given to the proposed locations of underground utilities which may pass near the proposed infiltration system.

The infiltration system designer should also give special consideration to the effect that the proposed infiltration systems may have on nearby subterranean structures, open excavations, or descending slopes. In particular, infiltration systems should not be located near the crest of descending slopes, particularly where the slopes are comprised of granular soils. Such systems will require specialized design and analysis to evaluate the potential for slope instability, piping failures and other phenomena that typically apply to earthen dam design. This type of analysis is beyond the scope of this infiltration test report, but these factors should be considered by the infiltration system designer when locating the infiltration systems.

General Comments

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the proposed storm water infiltration system is the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate only. By using the design infiltration rate contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the proposed storm water infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and testing depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted. The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

Closure

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

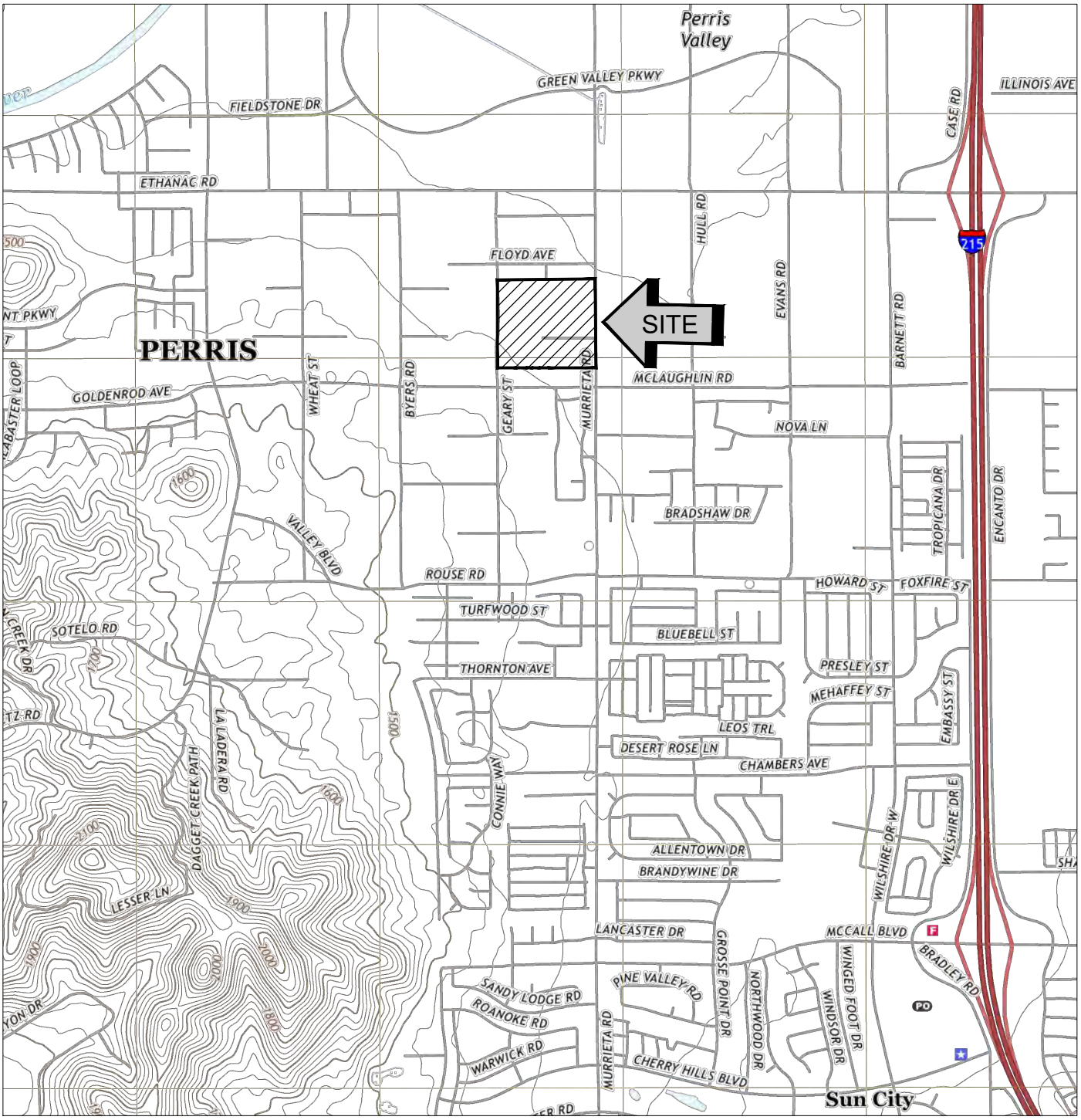
SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

Daryl Kas, CEG 2467
Senior Geologist

Robert G. Trazo, GE 2655
Principal Engineer

Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map
Plate 2 - Infiltration Test Location Plan
Trench Log Legend and Logs (5 pages)
Infiltration Test Results Spreadsheets (3 pages)
Grainsize Distribution Graphs (3 pages)



SOURCE: USGS TOPOGRAPHIC MAP OF THE ROMOLAND QUADRANGLE, RIVERSIDE COUNTY, CALIFORNIA, 2018

SITE LOCATION MAP

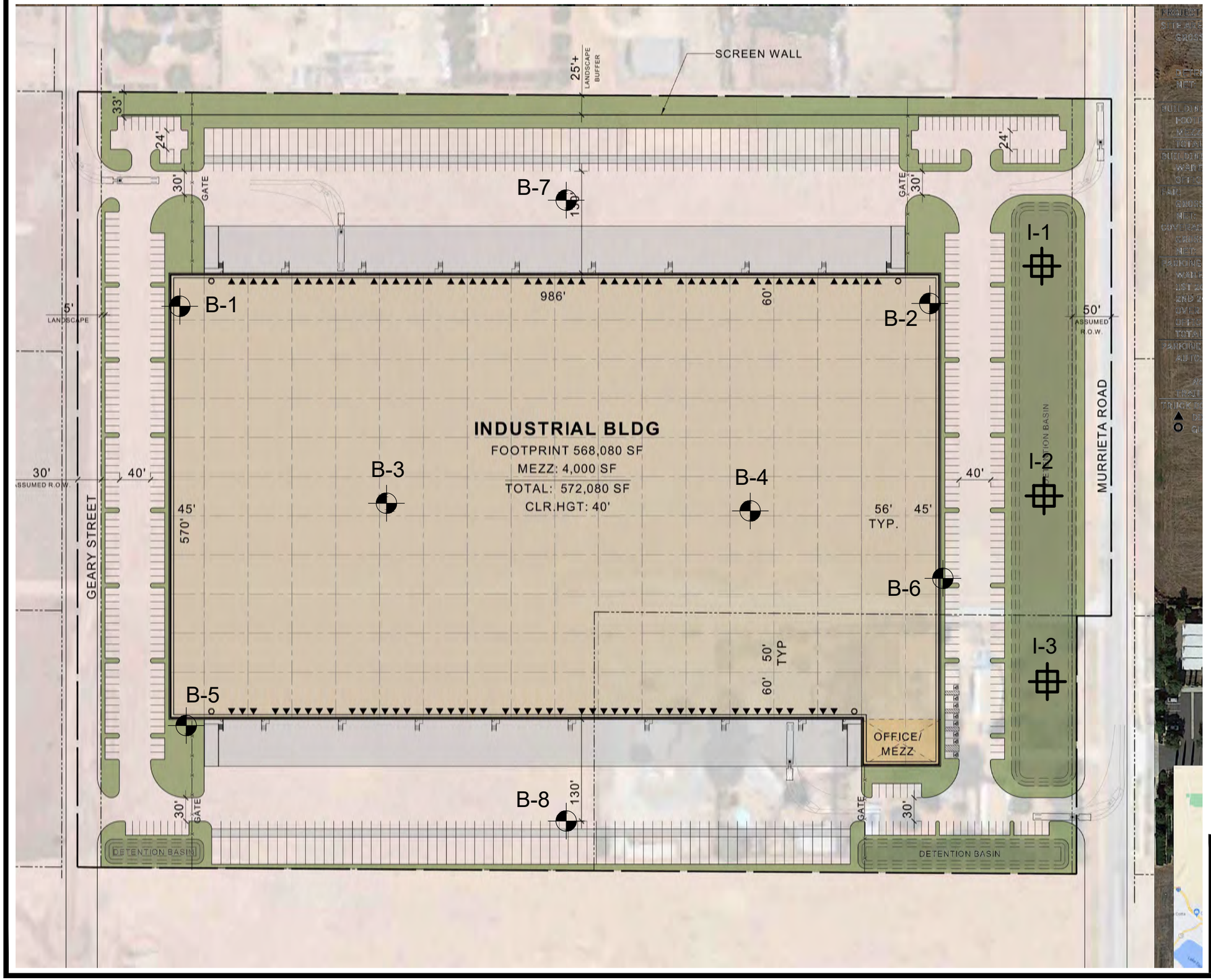
PROPOSED INDUSTRIAL BUILDING

MENIFEE, CALIFORNIA

SCALE: 1" = 2000'	
DRAWN: MD CHKD: RGT	
SCG PROJECT 21G237-2	
PLATE 1	

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



GEOTECHNICAL LEGEND

- APPROXIMATE INFILTRATION TEST LOCATION
- APPROXIMATE BORING LOCATION (SCG PROJECT 21G237-1)

INFILTRATION TEST LOCATION PLAN

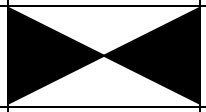
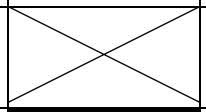
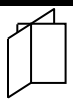
PROPOSED INDUSTRIAL BUILDING

MENIFEE, CALIFORNIA

SCALE: 1" = 120'	
DRAWN: MD CHKD: RGT	
SCG PROJECT 21G237-2	
PLATE 2	

SOUTHERN CALIFORNIA GEOTECHNICAL

TRENCH LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS		CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR		NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT		STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH		SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

BLOW COUNT: Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

POCKET PEN.: Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

GRAPHIC LOG: Graphic Soil Symbol as depicted on the following page.

DRY DENSITY: Dry density of an undisturbed or relatively undisturbed sample in lbs/ft^3.

MOISTURE CONTENT: Moisture content of a soil sample, expressed as a percentage of the dry weight.

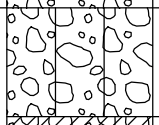
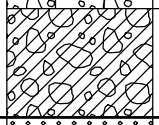
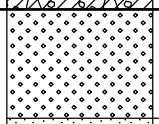
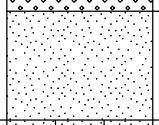
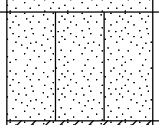
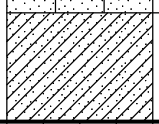
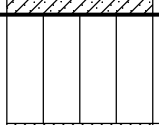
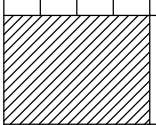
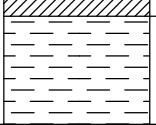
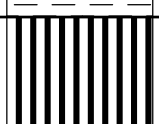
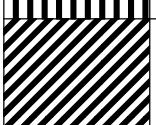
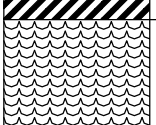
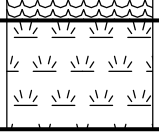
LIQUID LIMIT: The moisture content above which a soil behaves as a liquid.

PLASTIC LIMIT: The moisture content above which a soil behaves as a plastic.

PASSING #200 SIEVE: The percentage of the sample finer than the #200 standard sieve.

UNCONFINED SHEAR: The shear strength of a cohesive soil sample, as measured in the unconfined state.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT 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	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS 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	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-1

JOB NO.: 21G237-2
PROJECT: Proposed Industrial Building
LOCATION: Menifee, California

DRILLING DATE: 10/7/21
DRILLING METHOD: Backhoe
LOGGED BY: Caleb Brackett

WATER DEPTH: Dry
CAVE DEPTH: Dry
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Brown Silty fine Sand, trace to little Clay, trace fine Root Fibers, dense-dry							
					Dark Brown fine Sandy Clay, trace Silt, stiff-damp							
					Brown Clayey fine to medium Sand, very dense-damp							
					OLDER ALLUVIUM: Brown Clayey fine to medium Sand, very dense-dry to damp							
5												
					Trench Terminated at 6'							

TBL 21G237-2.GPJ SOCALGEO.GDT 11/12/21

TEST TRENCH LOG **PLATE B-1**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-2

JOB NO.: 21G237-2
PROJECT: Proposed Industrial Building
LOCATION: Menifee, California

DRILLING DATE: 10/7/21
DRILLING METHOD: Backhoe
LOGGED BY: Caleb Brackett

WATER DEPTH: Dry
CAVE DEPTH: Dry
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Dark Brown Silty fine to medium Sand, trace to little Clay, trace fine Root Fibers, loose-dry							
					Brown fine to medium Sandy Clay, trace fine Gravel, stiff to very stiff-damp							
					OLDER ALLUVIUM: Red Brown Clayey fine to medium Sand, trace fine Gravel, trace Calcareous nodules/veining, slightly cemented, porous, very dense-damp							
5												
					Trench Terminated at 8'							

TBL 21G237-2.GPJ SOCALGEO.GDT 11/12/21

TEST TRENCH LOG **PLATE B-2**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-3

JOB NO.: 21G237-2
PROJECT: Proposed Industrial Building
LOCATION: Menifee, California

DRILLING DATE: 10/7/21
DRILLING METHOD: Backhoe
LOGGED BY: Caleb Brackett

WATER DEPTH: Dry
CAVE DEPTH: Dry
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM Brown Silty fine to medium Sand, trace to little Clay, trace fine Root Fibers, dense-dry							
					Brown fine to coarse Sandy Clay, very stiff-dry							
5					OLDER ALLUVIUM: Red Brown fine to medium Sandy Clay, trace fine Gravel, Calcareous nodules, stiff-dry							
					Red Brown Clayey fine to coarse Sand, slightly cemented, very dense-dry to damp							
10					Trench Terminated at 10'							

TBL 21G237-2.GPJ SOCALGEO.GDT 11/12/21

TEST TRENCH LOG **PLATE B-3**

INFILTRATION CALCULATIONS

Project Name	Proposed Industrial Building
Project Location	Menifee, California
Project Number	21G237-2
Engineer	Caleb Brackett

Infiltration Test No: I-1

Constants

	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.785	730
Anlr. Space	2	2.356	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Flow Readings: Ring Flow (cm^3)	Flow Readings: Annular Ring (ml)	Flow Readings: Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Infiltration Rates: Annular Space* (cm/hr)	Infiltration Rates: Inner Ring* (in/hr)	Infiltration Rates: Annular Space* (in/hr)
1	Initial	8:10 AM	30	0	250	0	1500	0.69	1.37	0.27	0.54
	Final	8:40 AM	**30**	250		1500					
2	Initial	8:40 AM	30	0	300	0	1000	0.82	0.91	0.32	0.36
	Final	9:10 AM	**60**	300		1000					
3	Initial	9:10 AM	30	0	300	0	1200	0.82	1.10	0.32	0.43
	Final	9:40 AM	**90**	300		1200					
4	Initial	9:40 AM	30	0	250	0	1000	0.69	0.91	0.27	0.36
	Final	10:10 AM	**120**	250		1000					
5	Initial	10:10 AM	30	0	300	0	1100	0.82	1.01	0.32	0.40
	Final	10:40 AM	**150**	300		1100					
6	Initial	10:40 AM	30	0	200	0	1000	0.55	0.91	0.22	0.36
	Final	11:10 AM	**180**	200		1000					

INFILTRATION CALCULATIONS

Project Name	Proposed Industrial Building
Project Location	Menifee, California
Project Number	21G237-2
Engineer	Caleb Brackett

Infiltration Test No: I-2

Constants

	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.785	730
Anlr. Space	2	2.356	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Flow Readings: Ring Flow (cm^3)	Flow Readings: Annular Ring (ml)	Flow Readings: Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Infiltration Rates: Annular Space* (cm/hr)	Infiltration Rates: Inner Ring* (in/hr)	Infiltration Rates: Annular Space* (in/hr)
1	Initial	10:23 AM	20	0	25	0	200	0.10	0.27	0.04	0.11
	Final	10:43 AM	**20**	25		200					
2	Initial	10:43 AM	20	0	25	0	200	0.10	0.27	0.04	0.11
	Final	11:03 AM	**40**	25		200					
3	Initial	11:03 AM	20	0	0	0	100	0.00	0.14	0.00	0.05
	Final	11:23 AM	**60**	0		100					
4	Initial	11:23 AM	20	0	0	0	200	0.00	0.27	0.00	0.11
	Final	11:43 AM	**80**	0		200					
5	Initial	11:43 AM	20	0	25	0	200	0.10	0.27	0.04	0.11
	Final	12:03 PM	**100**	25		200					
6	Initial	12:23 PM	20	0	0	0	100	0.00	0.14	0.00	0.05
	Final	12:43 PM	**120**	0		100					

INFILTRATION CALCULATIONS

Project Name	Proposed Industrial Building
Project Location	Menifee, California
Project Number	21G237-2
Engineer	Caleb Brackett

Infiltration Test No: I-3

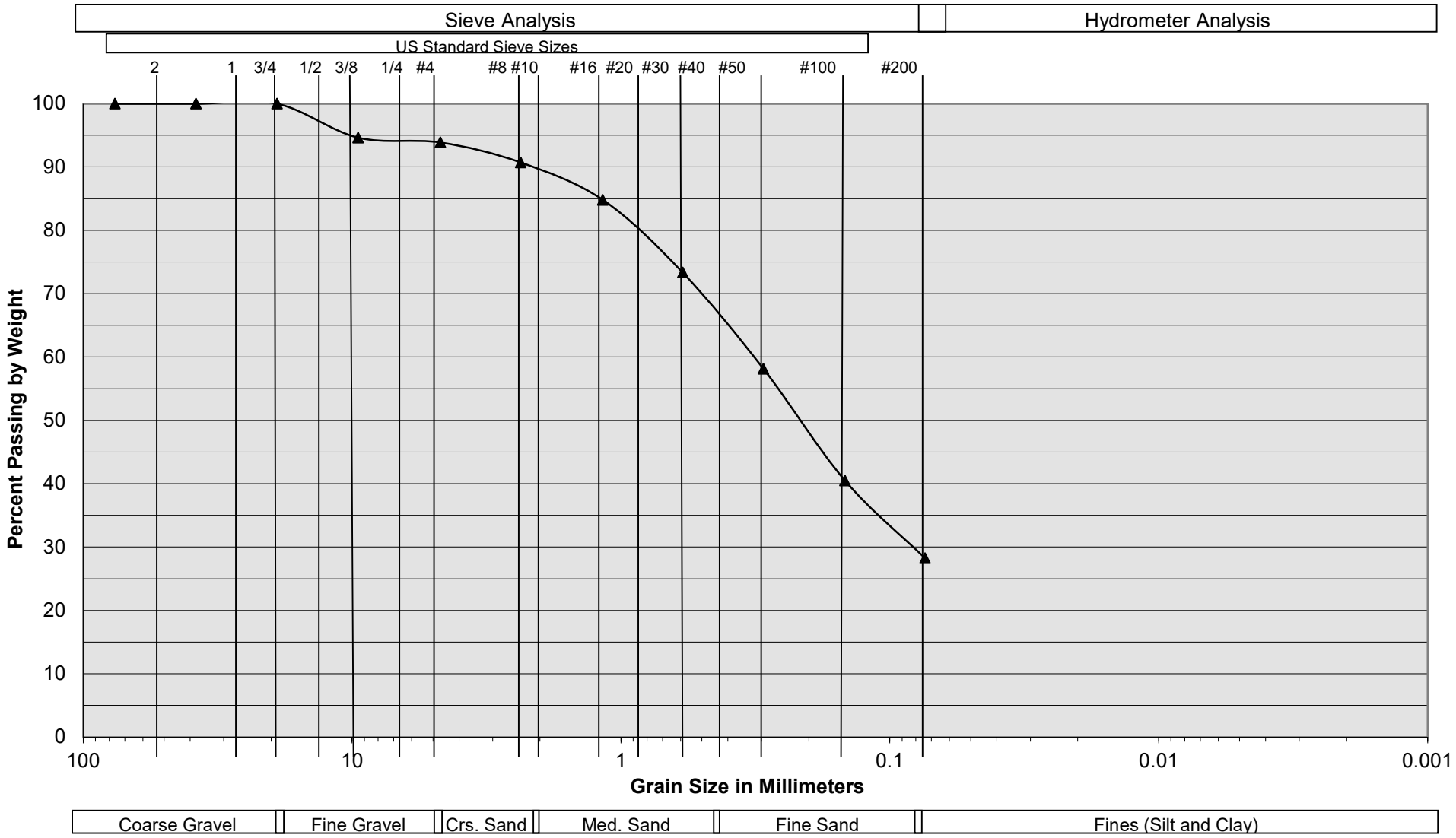
Constants

	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.785	730
Anlr. Space	2	2.356	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Flow Readings: Ring Flow (cm^3)	Flow Readings: Annular Ring (ml)	Flow Readings: Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Infiltration Rates: Annular Space* (cm/hr)	Infiltration Rates: Inner Ring* (in/hr)	Infiltration Rates: Annular Space* (in/hr)
1	Initial	12:20 PM	20	0	50	0	300	0.21	0.41	0.08	0.16
	Final	12:40 PM	**20**	50		300					
2	Initial	12:40 PM	20	0	50	0	300	0.21	0.41	0.08	0.16
	Final	1:00 PM	**40**	50		300					
3	Initial	1:00 PM	20	0	25	0	200	0.10	0.27	0.04	0.11
	Final	1:20 PM	**60**	25		200					
4	Initial	1:20 PM	20	0	25	0	200	0.10	0.27	0.04	0.11
	Final	1:40 PM	**80**	25		200					
5	Initial	1:40 PM	20	0	25	0	100	0.10	0.14	0.04	0.05
	Final	2:00 PM	**100**	25		100					
6	Initial	2:00 PM	20	0	0	0	100	0.00	0.14	0.00	0.05
	Final	2:20 PM	**120**	0		100					

Grain Size Distribution

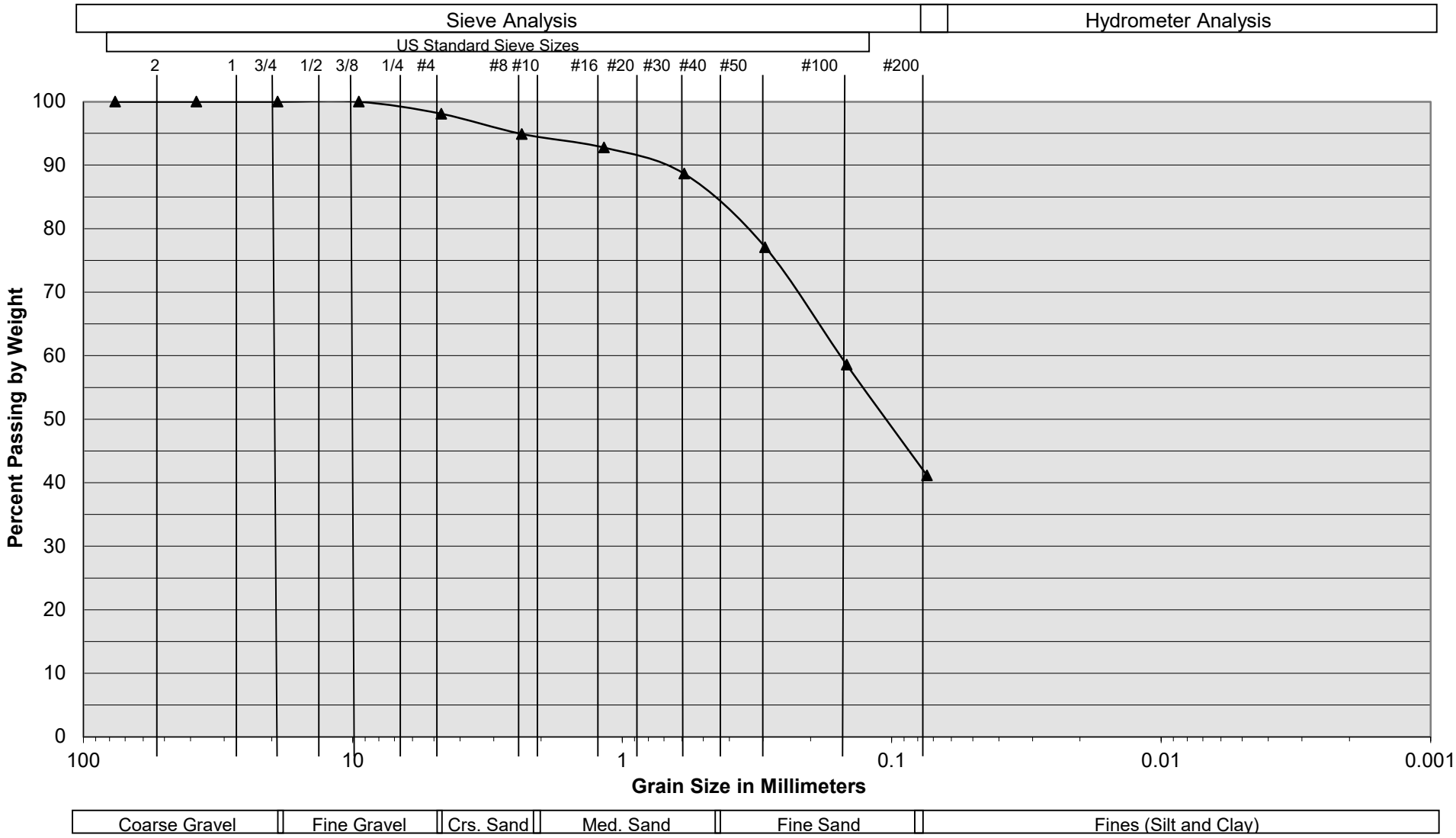


Sample Description	I-1 @6'
Soil Classification	0

Proposed Industrial Building
Menifee, California
Project No. 21G237-2
PLATE C- 1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

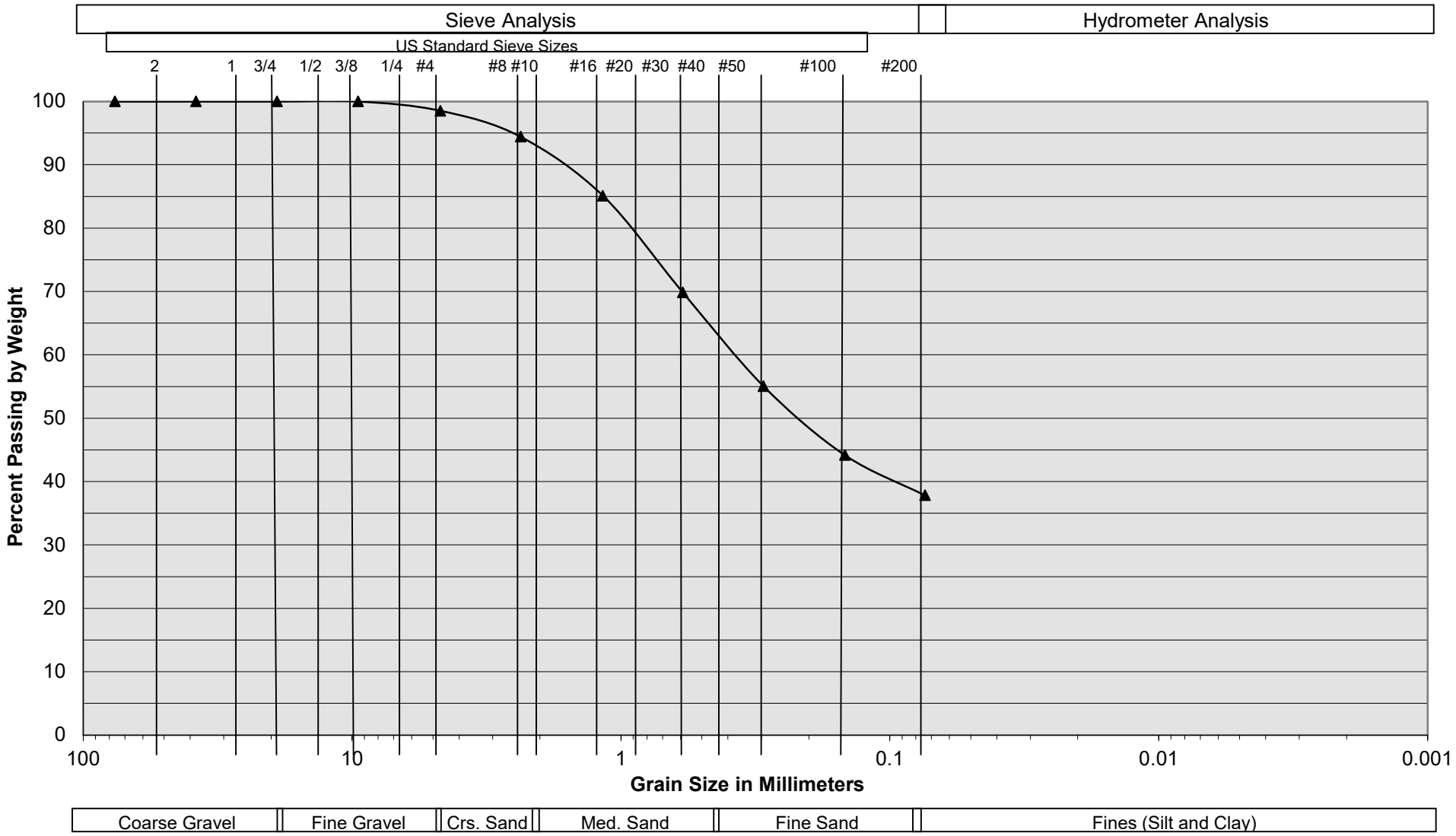


Sample Description	I-2 @ 8'
Soil Classification	Red Brown Clayey fine to medium Sand, trace fine Gravel

Proposed Industrial Building
Menifee, California
Project No. 21G237-2
PLATE C- 2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution



Sample Description	I-3 @ 10'
Soil Classification	Red Brown Clayey fine to coarse Sand

Proposed Industrial Building
Menifee, California
Project No. 21G237-2
PLATE C- 3

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Appendix J – ADS MC-7200 StormTech Chamber System Details

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
VISIT OUR APP

ARES MENIFEE

MENIFEE, CA, USA

MC-7200 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-7200.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-7200 CHAMBER SYSTEM

1. STORMTECH MC-7200 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
12. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-7200 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-7200 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

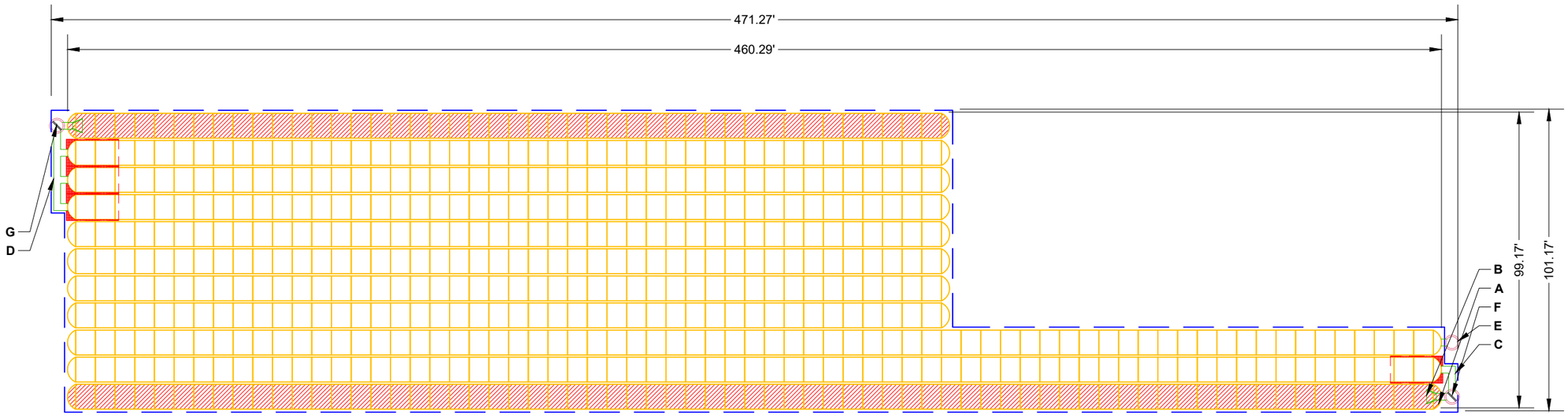
CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

©2023 ADS, INC.

PROPOSED LAYOUT		CONCEPTUAL ELEVATIONS	
559	STORMTECH MC-7200 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	12.75
22	STORMTECH MC-7200 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	8.25
12	STONE ABOVE (in)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	7.75
9	STONE BELOW (in)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	7.75
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	7.75
154076	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	6.75
		TOP OF MC-7200 CHAMBER:	5.75
		24" x 24" BOTTOM MANIFOLD INVERT:	0.94
		24" x 24" BOTTOM MANIFOLD INVERT:	0.94
35021	SYSTEM AREA (SF)	24" ISOLATOR ROW PLUS INVERT:	0.94
1144.9	SYSTEM PERIMETER (ft)	24" ISOLATOR ROW PLUS INVERT:	0.94
		24" BOTTOM CONNECTION INVERT:	0.94
		BOTTOM OF MC-7200 CHAMBER:	0.75
		BOTTOM OF STONE:	0.00

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	24" BOTTOM PARTIAL CUT END CAP, PART#: MC7200IEPP24B / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	2.26"	
FLAMP	B	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: MC720024RAMP (TYP 2 PLACES)		
MANIFOLD	C	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.26"	
MANIFOLD	D	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.26"	
CONCRETE STRUCTURE	E	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		7.0 CFS OUT
CONCRETE STRUCTURE W/WEIR	F	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		9.5 CFS IN
CONCRETE STRUCTURE W/WEIR	G	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		28.5 CFS IN



ISOLATOR ROW PLUS
(SEE DETAIL/TYP 2 PLACES)

PLACE MINIMUM 17.50' OF ADSPLUS175 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING
THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

ARES MENIFEE
MENIFEE, CA, USA
DRAWN: JP
CHECKED: N/A
DATE:
PROJECT #:

DESCRIPTION	DATE	DRW	CHK

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM

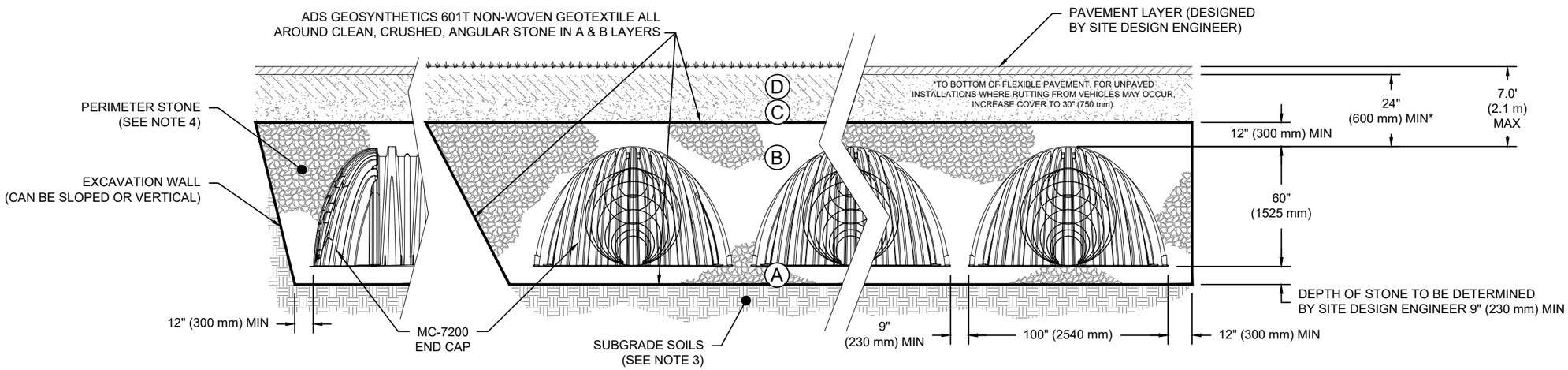
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

0 40 80

ACCEPTABLE FILL MATERIALS: STORMTECH MC-7200 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
2. MC-7200 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

ARES MENIFEE
MENIFEE, CA, USA
DATE:
DRAWN: JP
PROJECT #:
CHECKED: N/A

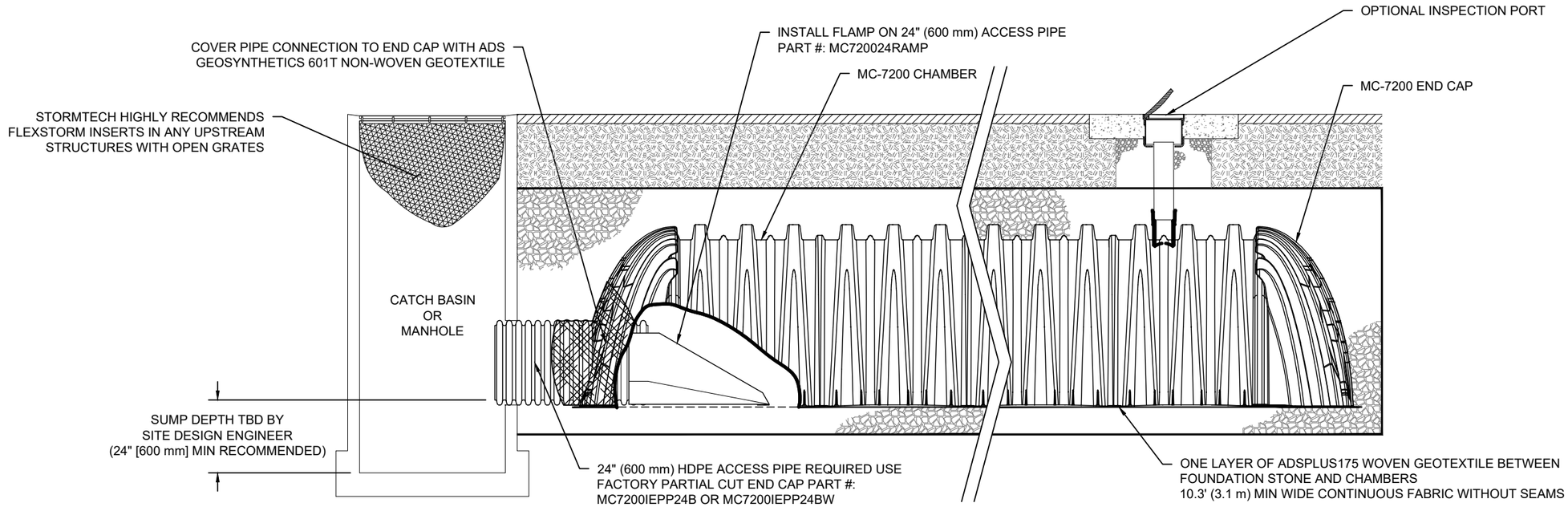
DATE	DRW	CHK	DESCRIPTION

StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SHEET
3 OF 5

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.



MC-7200 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

ARES MENIFEE
MENIFEE, CA, USA
DATE:
DRAWN: JP
PROJECT #:
CHECKED: N/A

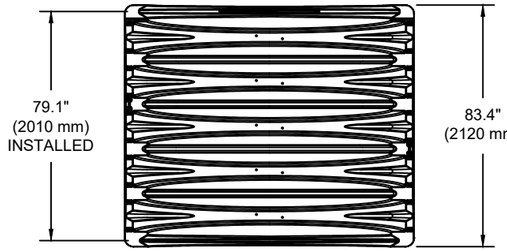
DATE	DRW	CHK	DESCRIPTION

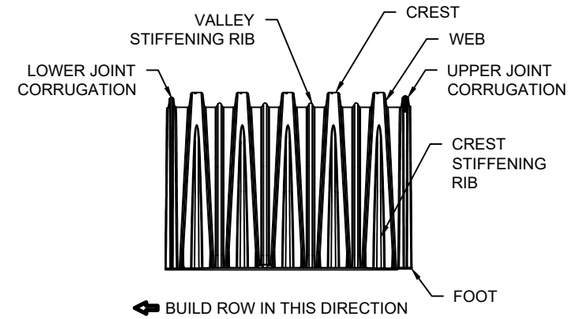
StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

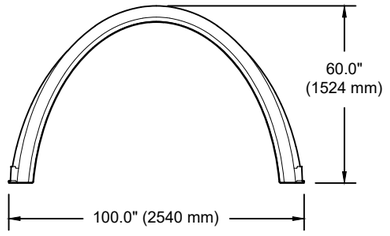
THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

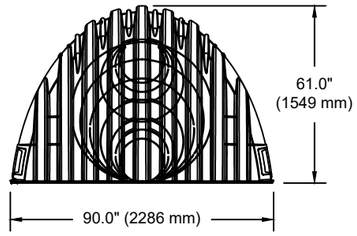
MC-7200 TECHNICAL SPECIFICATION

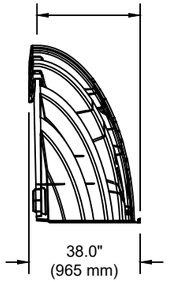
NTS











NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 79.1"	(2540 mm X 1524 mm X 2010 mm)
CHAMBER STORAGE	175.9 CUBIC FEET	(4.98 m³)
MINIMUM INSTALLED STORAGE*	267.3 CUBIC FEET	(7.56 m³)
WEIGHT (NOMINAL)	205 lbs.	(92.9 kg)

NOMINAL END CAP SPECIFICATIONS

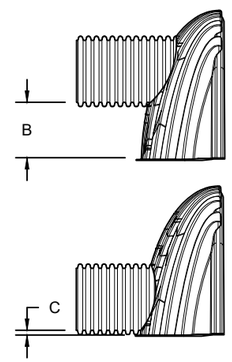
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC7200IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC7200IEPP06B		---	0.86" (22 mm)
MC7200IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC7200IEPP08B		---	1.01" (26 mm)
MC7200IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC7200IEPP10B		---	1.33" (34 mm)
MC7200IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC7200IEPP12B		---	1.55" (39 mm)
MC7200IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC7200IEPP15B		---	1.70" (43 mm)
MC7200IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC7200IEPP18TW			
MC7200IEPP18B		---	1.97" (50 mm)
MC7200IEPP18BW			
MC7200IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC7200IEPP24TW			
MC7200IEPP24B		---	2.26" (57 mm)
MC7200IEPP24BW			
MC7200IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC7200IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC7200IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

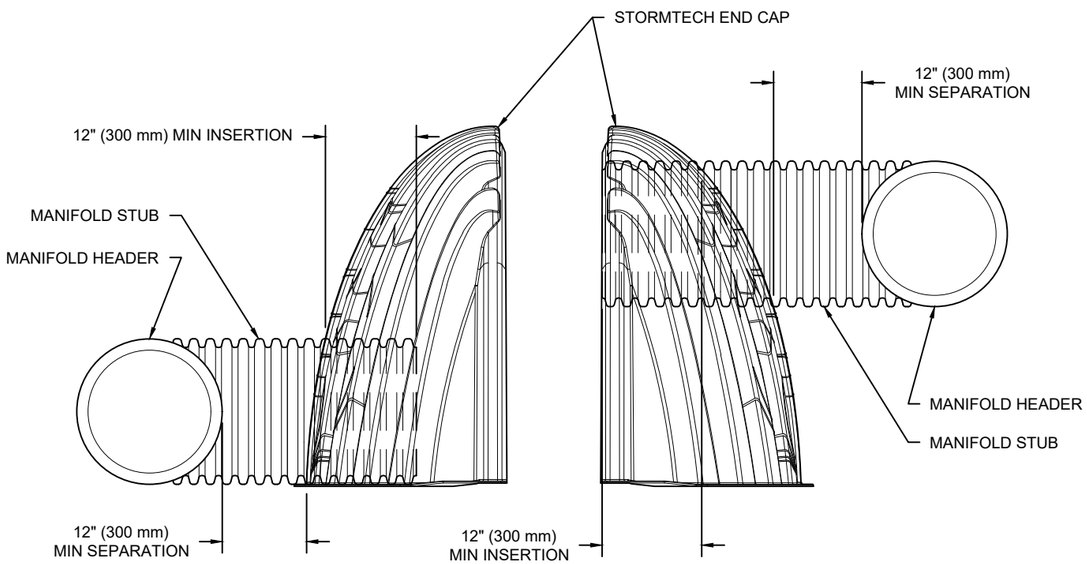
NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PREFABRICATED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-7200 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

MC-SERIES END CAP INSERTION DETAIL

NTS



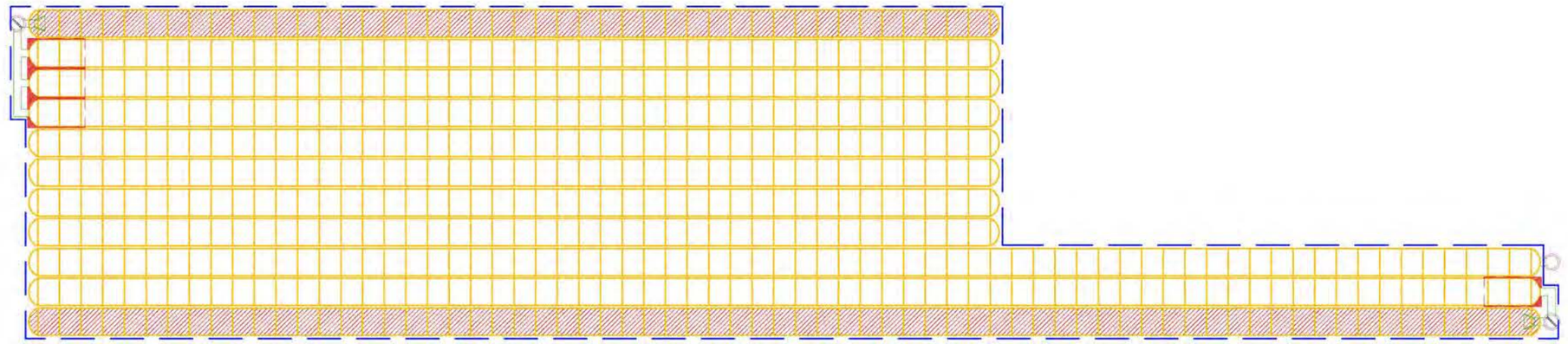
NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

ARES MENIFEE
MENIFEE, CA, USA
DATE:
DRAWN: JP
PROJECT #:
CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473
ADS



User Inputs

Chamber Model:	MC-7200
Outlet Control Structure:	Yes
Project Name:	Ares Menifee
Engineer:	Jessica Park
Project Location:	California
Measurement Type:	Imperial
Required Storage Volume:	150000 cubic ft.
Stone Porosity:	40%
Stone Foundation Depth:	9 in.
Stone Above Chambers:	12 in.
Average Cover Over Chambers:	24 in.
Design Constraint Dimensions:	(100 ft. x 500 ft.)

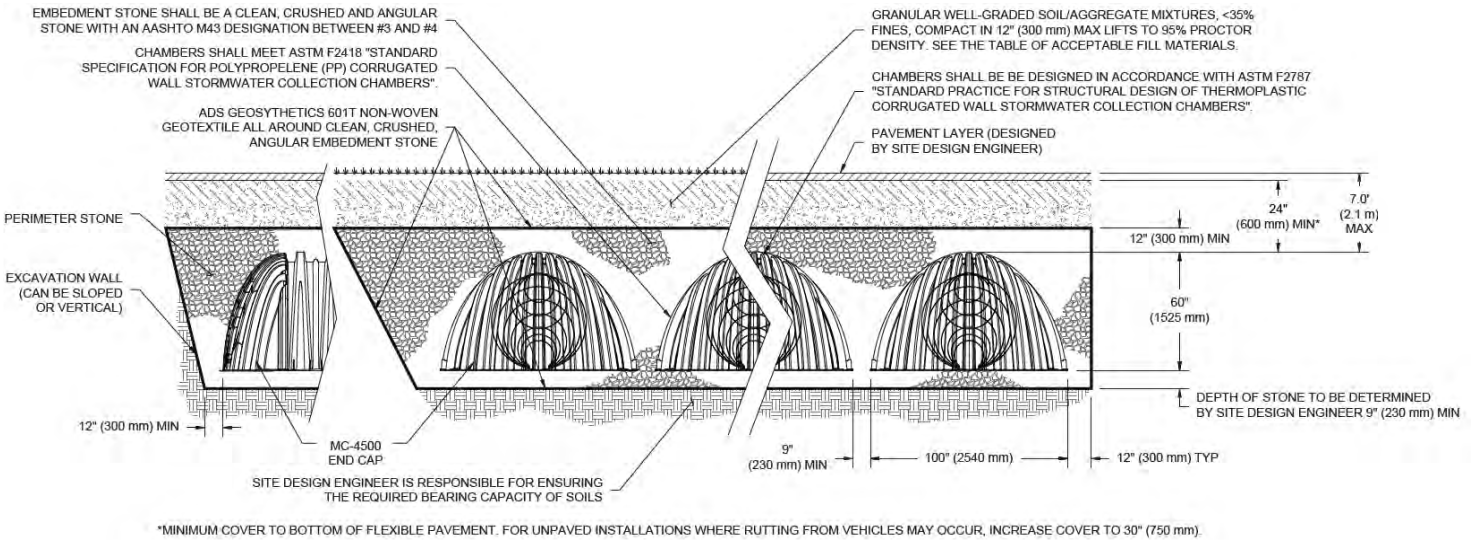
Results

System Volume and Bed Size

Installed Storage Volume:	154074.59 cubic ft.
Storage Volume Per Chamber:	175.90 cubic ft.
Number Of Chambers Required:	559
Number Of End Caps Required:	22
Chamber Rows:	11
Maximum Length:	471.27 ft.
Maximum Width:	101.17 ft.
Approx. Bed Size Required:	35020.86 square ft.

System Components

Amount Of Stone Required:	5082 cubic yards
Volume Of Excavation (Not Including Fill):	8756 cubic yards
Total Non-woven Geotextile Required:	10370 square yards
Woven Geotextile Required (excluding Isolator Row):	85 square yards
Woven Geotextile Required (Isolator Row):	1764 square yards
Total Woven Geotextile Required:	1849 square yards
Impervious Liner Required:	0 square yards



StormTech® MC-7200 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

Nominal Chamber Specifications
(not to scale)

Size (L x W x H)
83” x 100” x 60”
2108 mm x 2540 mm x 1524 mm

Chamber Storage
175.9 ft³ (4.98 m³)

Min. Installed Storage*
267.3 ft³ (7.57 m³)

Weight
202 lbs (91.6 kg)

Shipping
7 chambers/pallet
5 end caps/pallet
6 pallets/truck

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below chambers, 9” (230 mm) of stone between chambers/end caps and 40% stone porosity.

Nominal End Cap Specifications
(not to scale)

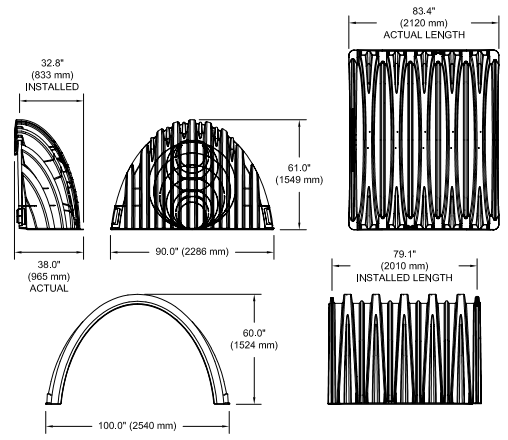
Size (L x W x H)
38” x 90” x 61”
965 mm x 2286 mm x 1549 mm

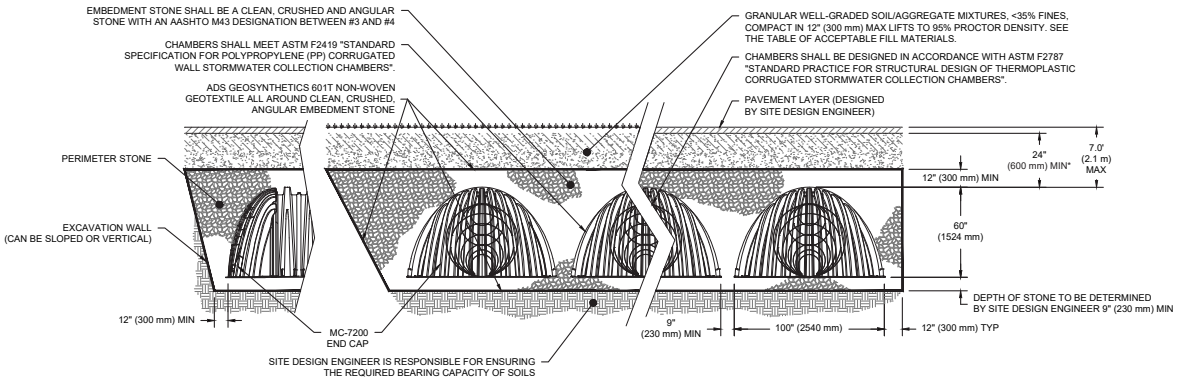
End Cap Storage
39.5 ft³ (1.12 m³)

Min. Installed Storage*
115.3 ft³ (3.26 m³)

Weight
Nominal 90.0 lbs (40.8 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below, 12” (300 mm) of stone perimeter, 9” (230 mm) of stone between chambers/end caps and 40% stone porosity.





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

ADS StormTech™

StormTech MC-7200 Specifications

Storage Volume Per Chamber

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)			
		9 in (230 mm)	12 in (300 mm)	15 in (375 mm)	18 in (450 mm)
Chamber	175.9 (4.98)	267.3 (7.57)	273.3 (7.74)	279.3 (7.91)	285.3 (8.08)
End Cap	39.5 (1.12)	115.3 (3.26)	118.6 (3.36)	121.9 (3.45)	125.2 (3.54)

Note: Assumes 9" (230 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 12" (300 mm) stone perimeter in front of end cap.

Amount of Stone Per Chamber

English Tons (yds³)	Stone Foundation Depth			
	9 in	12 in	15 in	18 in
Chamber	12.1 (8.5)	12.9 (9.0)	13.6 (9.6)	14.3 (10.1)
End Cap	9.8 (7.0)	10.2 (7.3)	10.6 (7.6)	11.1 (7.9)
Metric Kilograms (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
Chamber	10977 (6.5)	11703 (6.9)	12338 (7.3)	12973 (7.7)
End Cap	8890 (5.3)	9253 (5.5)	9616 (5.8)	10069 (6.0)

Note: Assumes 12" (300 mm) of stone above and 9" (230 mm) row spacing and 12" (300 mm) of perimeter stone in front of end caps. 1 yd³ = 1.42 english tons.

Volume Excavation Per Chamber yd³ (m³)

	Stone Foundation Depth			
	9 in (230 mm)	12 in (300 mm)	15 in (375mm)	18 in (450 mm)
Chamber	17.2 (13.2)	17.7 (13.5)	18.3 (14.0)	18.8 (14.4)
End Cap	9.7 (7.4)	10.0 (7.6)	10.3 (7.9)	10.6 (8.1)

Note: Assumes 9" (230 mm) of separation between chamber rows, 12" (300 mm) of perimeter in front of the end caps, and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

ADS StormTech products, manufactured in accordance with ASTM F2418 or ASTMF2922, comply with all requirements in the Build America, Buy America (BABA) Act.

Working on a project?
Visit us at adspipe.com/stormtech and utilize the Design Tool

ADS StormTech™

adspipe.com
800-821-6710

ADS "Terms and Conditions of Sale" are available on the ADS website, www.ads-pipe.com
The ADS logo and the Green Stripe are registered trademarks of Advanced Drainage Systems, Inc.
StormTech® is a registered trademark of StormTech, Inc.
© 2022 Advanced Drainage Systems, Inc. #11133 12/22 CS

MC-3500 & MC-7200
Design Manual

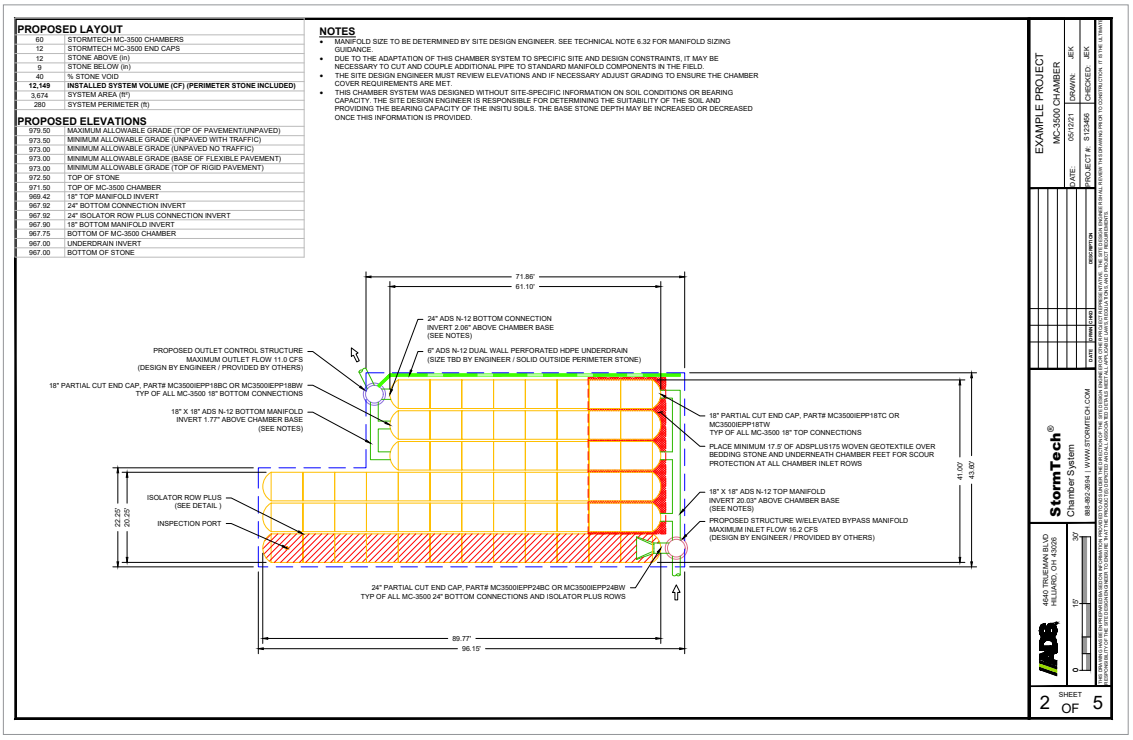
StormTech® Chamber Systems for Stormwater Management

ADS StormTech™

Table of Contents

*For SC-160LP, SC-310, SC-740 & DC-780 designs, please refer to the SC-160LP/SC-310/SC-740/DC-780 Design Manual.

StormTech Engineering Services assists design professionals in specifying StormTech stormwater systems. This assistance includes the layout of chambers to meet the engineer's volume requirements and the connections to and from the chambers. They can also assist converting and cost engineering projects currently specified with ponds, pipe, concrete vaults and other manufactured stormwater detention/ retention products. Please note that it is the responsibility of the site design engineer to ensure that the chamber bed layout meets all design requirements and is in compliance with applicable laws and regulations governing a project.



This manual is exclusively intended to assist engineers in the design of subsurface stormwater systems using StormTech chambers.

StormTech MC-3500 Chamber

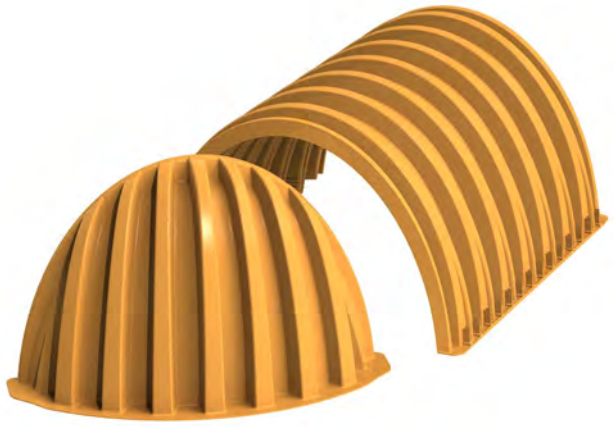
Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

MC-3500 Chamber (not to scale)

Nominal Specifications

Size (LxWxH)	90” x 77” x 45” (2286 x 1956 x 1143 mm)
Chamber Storage	109.9 ft³ (3.11 m³)
Min. Installed Storage*	175.0 ft³ (4.96 m³)
Weight	134 lbs (60.8 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below chambers, 6” (150 mm) of stone between chambers/end caps and 40% stone porosity.

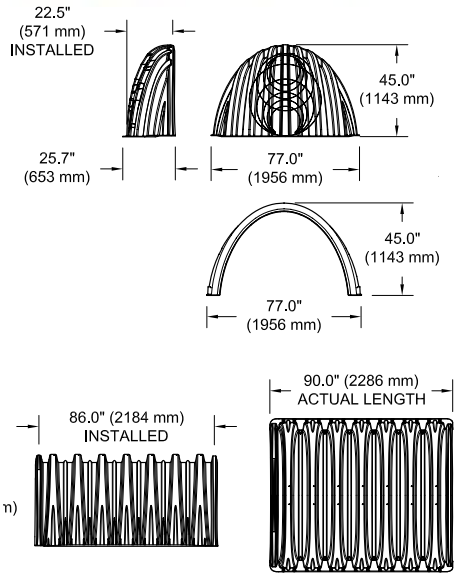


MC-3500 Chamber (not to scale)

Nominal Specifications

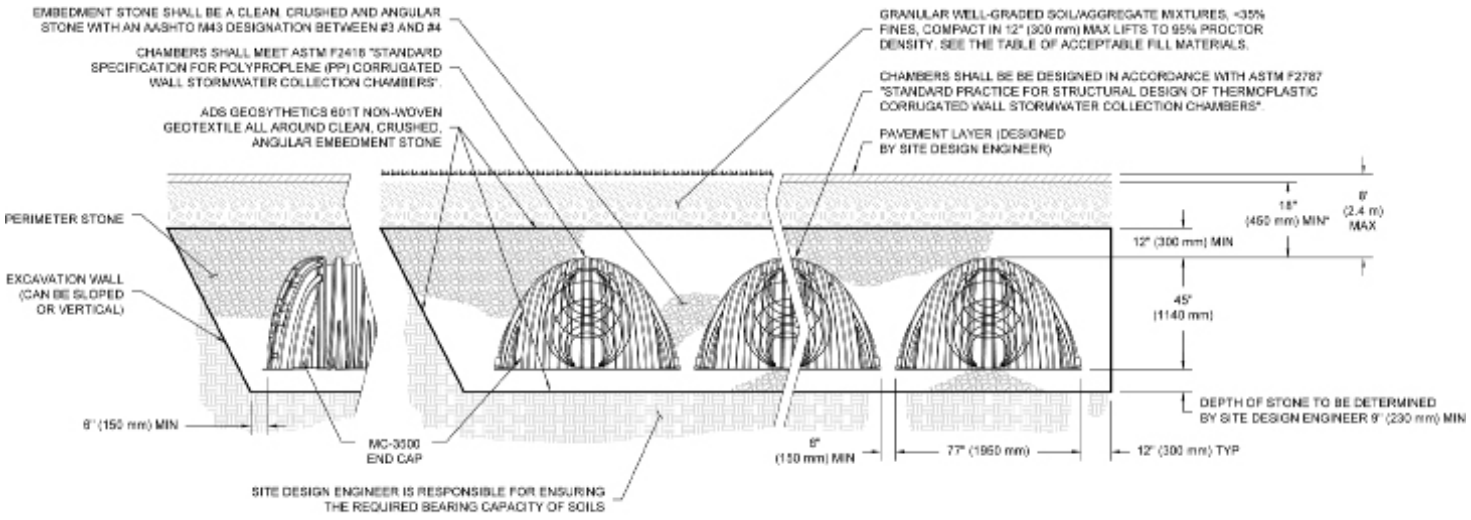
Size (LxWxH)	26.5” x 71” x 45.1” (673 x 1803 x 1145 mm)
End Cap Storage	14.9 ft³ (0.42 m³)
Min. Installed Storage*	45.1 ft³ (1.28 m³)
Weight	49 lbs (22.2 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below, 6” (150 mm) of stone perimeter, 6” (150 mm) of stone between chambers/end caps and 40% stone porosity.



Shipping

15 chambers/pallet
7 end caps/pallet
7 pallets/truck



Storage Volume Per Chamber/End Cap ft³ (m³)

	Bare Unit Storage ft³ (m³)	Chamber/End Cap and Stone Volume — Stone Foundation Depth in. (mm)			
		9 (230)	12 (300)	15 (375)	18 (450)
Chamber	109.9 (3.11)	175.0 (4.96)	179.9 (5.09)	184.9 (5.24)	189.9 (5.38)
End Cap	14.9 (0.42)	45.1 (1.28)	46.6 (1.32)	48.3 (1.37)	49.9 (1.41)

Note: Assumes 6" (150 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume.

Amount of Stone Per Chamber

ENGLISH tons (yd³)	Stone Foundation Depth			
	9"	12"	15"	18"
Chamber	8.5 (6.0)	9.1 (6.5)	9.7 (6.9)	10.4 (7.4)
End Cap	3.9 (2.8)	4.1 (2.9)	4.3 (3.1)	4.5 (3.2)
METRIC kg (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
Chamber	7711 (4.6)	8255 (5.0)	8800 (5.3)	9435 (5.7)
End Cap	3538 (2.1)	3719 (2.2)	3901 (2.4)	4082 (2.5)

Note: Assumes 12" (300 mm) of stone above and 6" (150 mm) row spacing and 6" (150 mm) of perimeter stone in front of end caps.

Volume of Excavation Per Chamber/End Cap yd³ (m³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
Chamber	11.9 (9.1)	12.4 (9.5)	12.8 (9.8)	13.3 (10.2)
End Cap	4.0 (3.1)	4.1 (3.2)	4.3 (3.3)	4.4 (3.4)

Note: Assumes 6" (150 mm) of separation between chamber rows and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

Special applications will be considered on a project by project basis. Please contact our application department should you have a unique application for our team to evaluate.

StormTech MC-7200 Chamber

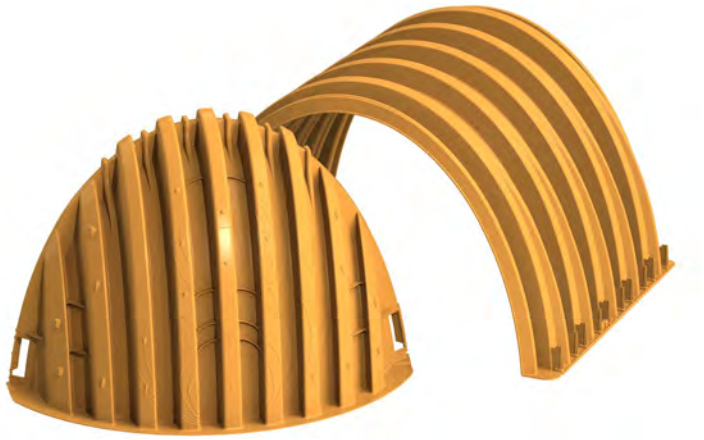
Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

MC-7200 Chamber (not to scale)

Nominal Specifications

Size (LxWxH)	83.4” x 100” x 60” (2120 x 2540 x 1524 mm)
Chamber Storage	175.9 ft³ (4.98 m³)
Min. Installed Storage*	267.3 ft³ (7.56 m³)
Weight	205 lbs (92.9 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below chambers, 9” (230 mm) of stone between chambers/end caps and 40% stone porosity.

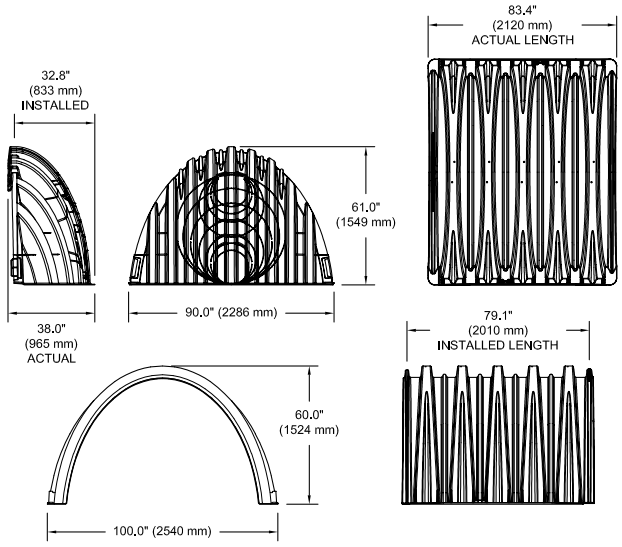


MC-7200 Chamber (not to scale)

Nominal Specifications

Size (LxWxH)	38” x 90” x 61” (965 x 2286 x 1549 mm)
End Cap Storage	39.5 ft³ (1.12 m³)
Min. Installed Storage*	115.3 ft³ (3.26 m³)
Weight	90.0 lbs (40.8 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below, 12” (300 mm) of stone perimeter, 9” (230 mm) of stone between chambers/end caps and 40% stone porosity.

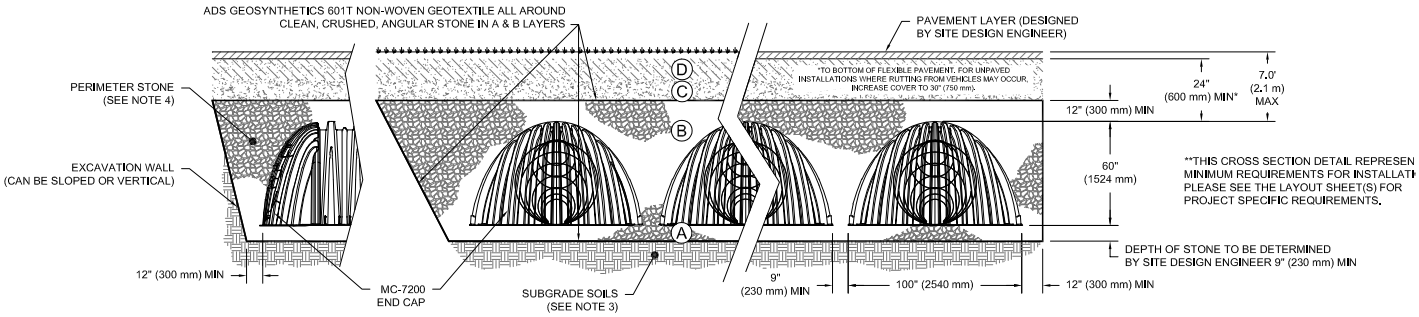


Shipping

7 chambers/pallet

5 end caps/pallet

6 pallets/truck



Storage Volume Per Chamber/End Cap ft³ (m³)

	Bare Unit Storage ft³ (m³)	Chamber/End Cap and Stone Volume — Stone Foundation Depth in. (mm)			
		9 (230)	12 (300)	15 (375)	18 (450)
Chamber	175.9 (4.98)	267.3 (7.57)	273.3 (7.74)	279.3 (7.91)	285.2 (8.08)
End Cap	39.5 (1.12)	115.3 (3.26)	111.9 (3.17)	121.9 (3.45)	125.2 (3.54)

Note: Assumes 9" (230 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 12" (300 mm) stone perimeter in front of end cap.

Amount of Stone Per Chamber

ENGLISH tons (yd³)	Stone Foundation Depth			
	9"	12"	15"	18"
Chamber	11.9 (8.5)	12.6 (9.0)	13.4 (9.6)	14.6 (10.1)
End Cap	9.8 (7.0)	10.2 (7.3)	10.6 (7.6)	11.1 (7.9)
METRIC kg (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
Chamber	10796 (6.5)	11431 (6.9)	12156 (7.3)	13245 (7.7)
End Cap	8890 (5.3)	9253 (5.5)	9616 (5.8)	10069 (6.0)

Note: Assumes 12" (300 mm) of stone above and 9" (230 mm) row spacing and 12" (300 mm) of perimeter stone in front of end caps.

Volume of Excavation Per Chamber/End Cap yd³ (m³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
Chamber	17.2 (13.2)	17.7 (13.5)	18.3 (14.0)	18.8 (14.4)
End Cap	9.7 (7.4)	10.0 (7.6)	10.3 (7.9)	10.6 (8.1)

Note: Assumes 9" (230 mm) of separation between chamber rows, 12" (300 mm) of perimeter in front of the end caps, and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

Special applications will be considered on a project by project basis. Please contact our application department should you have a unique application for our team to evaluate.

1.0 Product Information

1.1 Product Design

StormTech's commitment to thorough product testing programs, materials evaluation and adherence to national standards has resulted in two more superior products. Like other StormTech chambers, the MC-3500 and MC-7200 are designed to meet the full scope of design requirements of the American Society of Testing Materials (ASTM) International specification F2787 "Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers" and produced to the requirements of the ASTM F 2418 "Standard Specification for Polypropylene (PP) Corrugated Stormwater Collection Chambers".

The StormTech MC-3500 and MC-7200 chambers provide the full AASHTO safety factors for live loads and permanent earth loads. The ASTM F 2787 standard provides specific guidance on how to design thermoplastic chambers in accordance with AASHTO Section 12.12. of the AASHTO LRFD Bridge Design Specifications. ASTM F 2787 requires that the safety factors included in the AASHTO guidance are achieved as a prerequisite to meeting ASTM F 2418. The three standards provide both the assurance of product quality and safe structural design.

The design of larger chambers in the same tradition of our other chambers required the collaboration of experts in soil-structure interaction, plastics and manufacturing. Years of extensive research, including laboratory testing and field verification, were required to produce chambers that are ready to meet both the rigors of installation and the longevity expected by engineers and owners.

This Design Manual provides the details and specifications necessary for consulting engineers to design stormwater management systems using the MC-3500 and MC-7200 chambers. It provides specifications for storage capacities, layout dimensions as well as requirements for design to ensure a long service life. The basic design concepts for foundation and backfill materials, subgrade bearing capacities and row spacing remain equally as pertinent for the MC-3500 and MC-7200 as the SC-740, SC-310 and DC-780 chamber systems. However, since many design values and dimensional requirements are different for these larger chambers than the SC-740, SC-310 and DC-780 chambers, design manuals and installation instructions are not interchangeable.

This manual includes only those details, dimensions, cover limits, etc for the MC-3500 and MC-7200 and is intended to be a stand-alone design guide for the MC-3500 and MC-7200 chambers. A Construction Guide specifically for these two chamber models has also been published.

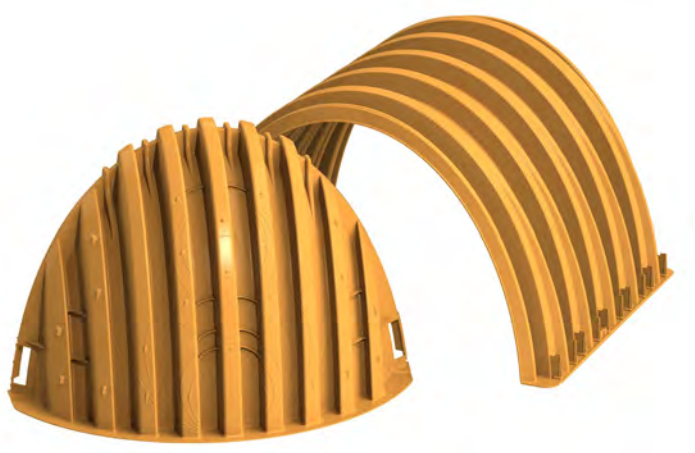
1.2 Technical Support

The StormTech Technical Services Department is available to assist the engineer with the layout of MC-3500 and MC-7200 chamber systems and answer questions regarding all the StormTech chamber models. Call the Technical Services Department, email us at info@stormtech.com or contact your local StormTech representative.

1.3 MC-3500 and MC-7200 Chambers

All StormTech chambers are designed to the full scope of AASHTO requirements without repeating end walls or other structural reinforcing. StormTech's continuously curved, elliptical arch and the surrounding angular backfill are the key components of the structural system. With the addition of patent pending integral stiffening ribs (Figure 5), the MC-3500 and MC-7200 are assured to provide a long, safe service life. Like other StormTech chambers, the MC-3500 and MC-7200 are produced from high quality, impact modified resins which are tested for short-term and long-term mechanical properties.

With all StormTech chambers, one chamber type is used for the start, middle and end of rows. Rows are formed by overlapping the upper joint corrugation of the next chamber over the lower joint corrugation of the previous chamber (Figure 6).



1.4 Chamber Joints

All StormTech chambers are designed with an optimized joining system. The height and width of the end corrugations have been designed to provide the required structural safety factors while providing an unobstructed flow path down each row.

1.0 Product Information

To assist the contractor, StormTech chambers are molded with simple assembly instructions and arrows that indicate the direction in which to build rows. The corrugation valley immediately adjacent to the lower joint corrugation is marked “Overlap Here - Lower Joint.” The corrugation valley immediately adjacent to the upper joint corrugation is marked “Build This Direction - Upper Joint.”

Two people can safely and efficiently carry and place chambers without cumbersome connectors, special tools or heavy equipment. Each row of chambers must begin and end with a joint corrugation. Since joint corrugations are of a different size than the corrugations along the body of the chamber, chambers cannot be field cut and installed. Only whole MC-3500 and MC-7200 chambers can be used. For system layout assistance contact StormTech.

1.5 MC-3500 and MC-7200 End Caps

The MC-3500 and MC-7200 end caps are easy to install. These end caps are designed with a corrugation joint that fits over the top of either end of the chamber. The end cap joint is simply set over the top of either of the upper or lower chamber joint corrugations (Figure 7).

The MC-3500 end cap has pipe cutting guides for 12”–24” (300 mm–600 mm) top inverts (Figure 9).

The MC-7200 end cap has pipe cutting guides for 12”–42” (300 mm–1050 mm) bottom inverts and 12”–24” (300 mm–600 mm) top inverts (Figure 8).

Standard and custom pre-cored end caps are available. MC-3500 pre-cored end caps, 18” in diameter and larger include a welded crown plate.

Figure 5 - Chamber and End Cap Components

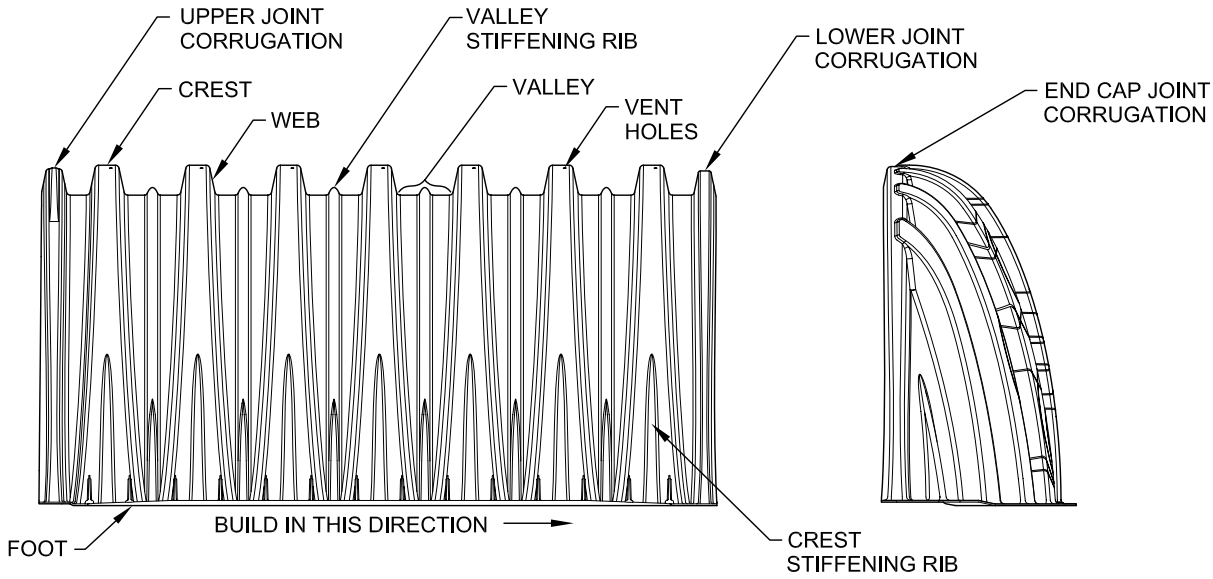


Figure 6 - Chamber Joint Overlap

Figure 7 - End Cap Joint Overlap

1.0 Product Information

Figure 8 - MC-7200 End Cap Inverts

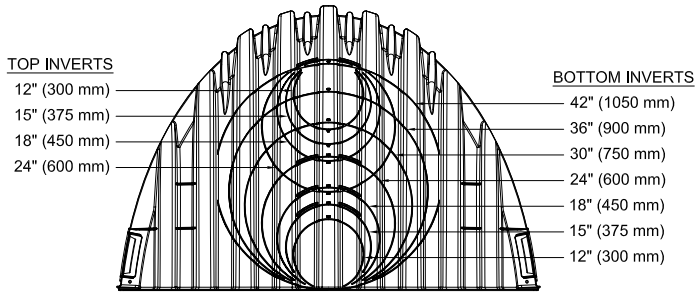
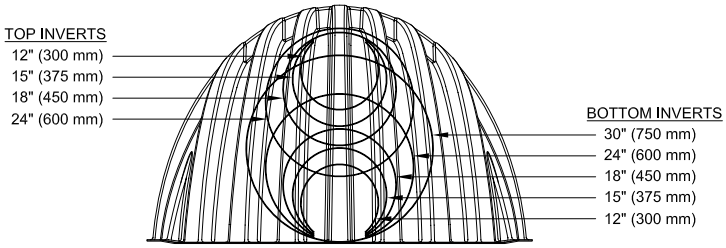


Figure 9 - MC-3500 End Cap Inverts

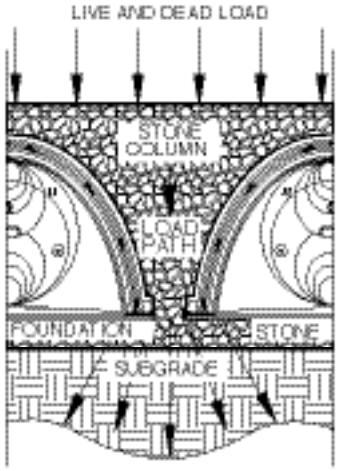


2.0 Foundations for Chambers

2.1 Foundation Requirements

StormTech chamber systems can be installed in various soil types. The subgrade bearing capacity and the cover height over the chambers determine the required depth of clean, crushed, angular foundation stone below the chambers. Foundation stone, also called bedding, is the stone between the subgrade soils and the feet of the chamber. Flexible structures are designed to transfer a significant portion of both live and dead loads through the surrounding soils. Chamber systems accomplish this by creating load paths through the columns of embedment stone between and around the rows of chambers. This creates load concentrations at the base of the columns between the rows. The foundation stone spreads out the concentrated loads to distributed loads that can be supported by the subgrade soils.

Since increasing the cover height (top of chamber to finished grade) causes increasing soil load, a greater depth of foundation stone is necessary to distribute the load to the subgrade soils. **Table 1** and **2** specify the minimum required foundation depths for varying cover heights and allowable subgrade bearing capacities. These tables are based on StormTech service loads. The minimum required foundation depth is 9” (230 mm) for both chambers.



For additional guidance on foundation stone design please see our Technical Note 6.22 - StormTech Subgrade Performance

2.2 Weaker Soils

StormTech has not provided guidance for subgrade bearing capacities less than 2000 pounds per square foot [(2.0 ksf) (96 kPa)]. These soils are often highly vari- able, may contain organic materials and could be more sensitive to moisture. A geotechnical engineer must be consulted if soils with bearing capacities less than 2000 psf (96 kPa) are present.

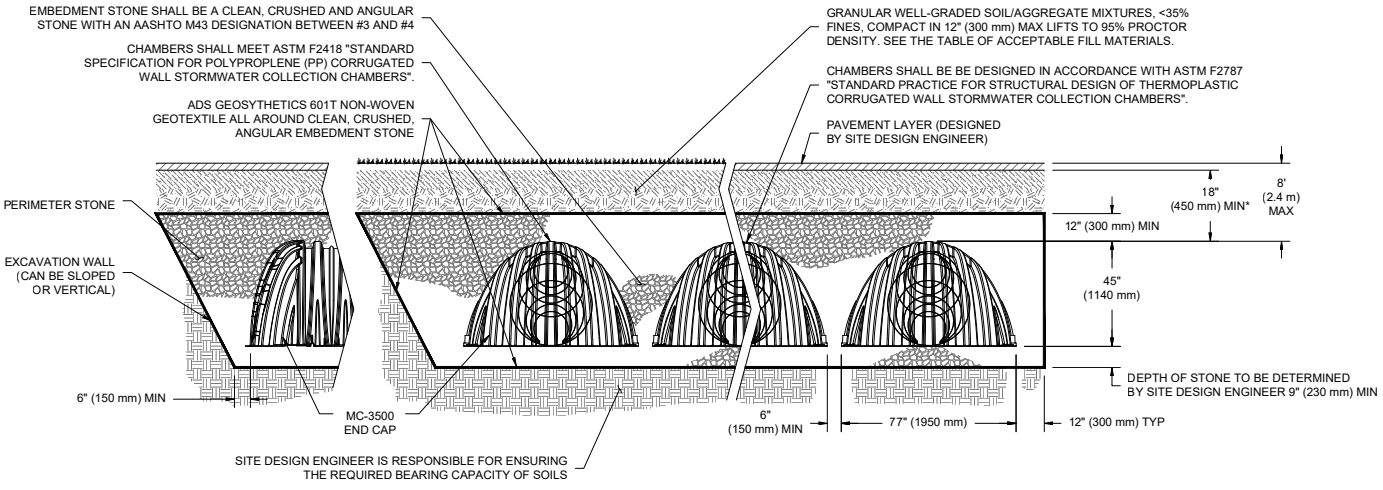
2.0 Foundations for Chambers

Table 1 - MC-3500 Minimum Required Foundation Depth in inches (millimeters)
Assumes 6" (150 mm) row spacing.

Cover Hgt. ft. (m)	Minimum Bearing Resistance for Service Loads ksf (kPa)																								
	4.4 (211)	4.3 (206)	4.2 (201)	4.1 (196)	4.0 (192)	3.9 (187)	3.8 (182)	3.7 (177)	3.6 (172)	3.5 (168)	3.4 (163)	3.3 (158)	3.2 (153)	3.1 (148)	3.0 (144)	2.9 (139)	2.8 (134)	2.7 (129)	2.6 (124)	2.5 (120)	2.4 (115)	2.3 (110)	2.2 (105)	2.1 (101)	2.0 (96)
1.5 (0.46)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)
2.0 (0.61)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)
2.5 (0.76)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	21 (525)
3.0 (0.91)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)
3.5 (1.07)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)
4.0 (1.22)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)
4.5 (1.37)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)
5.0 (1.52)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)	24 (600)	24 (600)	27 (675)	30 (750)
5.5 (1.68)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)
6.0 (1.83)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	30 (750)
6.5 (1.98)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	30 (750)	30 (750)
7.0 (2.13)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	30 (750)	30 (750)	30 (750)
7.5 (2.30)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)	27 (675)	27 (675)	30 (750)	30 (750)	30 (750)	30 (750)
8.0 (2.44)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	30 (750)	30 (750)	30 (750)	30 (750)

NOTE: The design engineer is solely responsible for assessing the bearing resistance (allowable bearing capacity) of the subgrade soils and determining the depth of foundation stone. Subgrade bearing resistance should be assessed with consideration for the range of soil moisture conditions expected under a stormwater system.

Figure 10A - MC-3500 Structural Cross Section Detail (Not to Scale)



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

Special applications will be considered on a project by project basis. Please contact our applications department should you have a unique application for our team to evaluate.

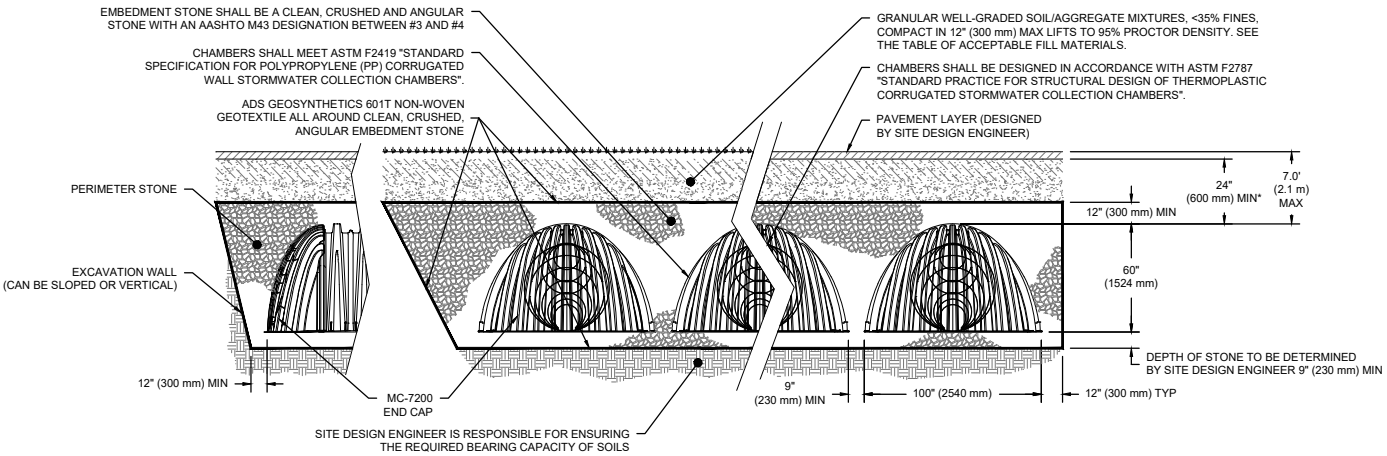
2.0 Foundations for Chambers

Table 2 - MC-7200 Minimum Required Foundation Depth in inches (millimeters)
Assumes 9” (230 mm) row spacing.

Cover Hgt. ft. (m)	Minimum Bearing Resistance for Service Loads ksf (kPa)																								
	4.4 (211)	4.3 (206)	4.2 (201)	4.1 (196)	4.0 (192)	3.9 (187)	3.8 (182)	3.7 (177)	3.6 (172)	3.5 (168)	3.4 (163)	3.3 (158)	3.2 (153)	3.1 (148)	3.0 (144)	2.9 (139)	2.8 (134)	2.7 (129)	2.6 (124)	2.5 (120)	2.4 (115)	2.3 (110)	2.2 (105)	2.1 (101)	2.0 (96)
2.0 (0.61)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	21 (525)	21 (525)
2.5 (0.76)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)
3.0 (0.91)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)
3.5 (1.07)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)	30 (750)
4.0 (1.22)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	27 (675)	27 (675)	30 (750)	30 (750)
4.5 (1.37)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	33 (825)	33 (825)
5.0 (1.52)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	33 (825)	33 (825)	36 (900)
5.5 (1.68)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	33 (825)	33 (825)	36 (900)	36 (900)
6.0 (1.83)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	30 (750)	33 (825)	33 (825)	36 (900)	36 (900)	36 (900)
6.5 (1.98)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	30 (750)	33 (825)	33 (825)	36 (900)	36 (900)	36 (900)	36 (900)
7.0 (2.13)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	30 (750)	33 (825)	36 (900)	36 (900)	36 (900)	36 (900)	36 (900)	36 (900)

NOTE: The design engineer is solely responsible for assessing the bearing resistance (allowable bearing capacity) of the subgrade soils and determining the depth of foundation stone. Subgrade bearing resistance should be assessed with consideration for the range of soil moisture conditions expected under a stormwater system.

Figure 10B - MC-7200 Structural Cross Section Detail (Not to Scale)



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

Special applications will be considered on a project by project basis. Please contact our applications department should you have a unique application for our team to evaluate.

3.0 Required Materials/Row Separation

3.1 Foundation and Embedment Stone

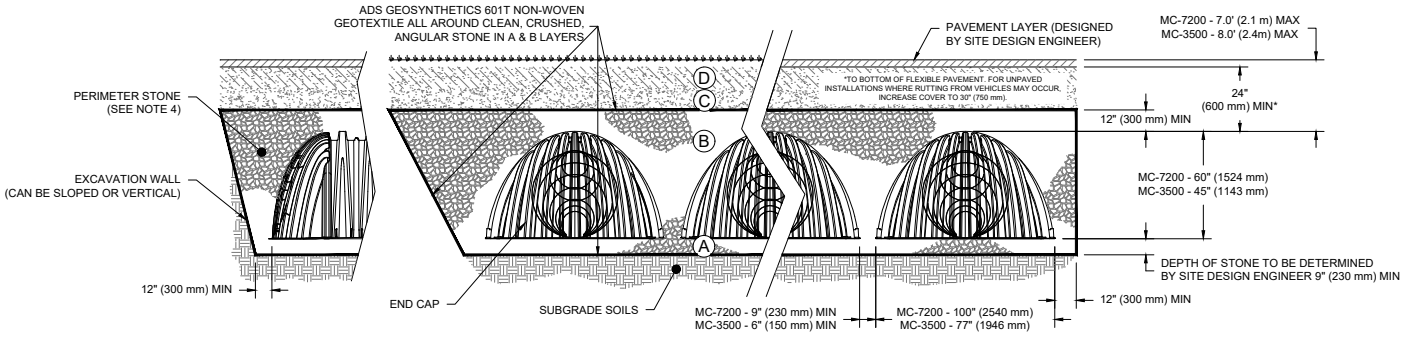
The stone surrounding the chambers consists of the foundation stone below the chambers and embedment stone surrounding the chambers. The foundation stone and embedment stone are important components of the structural system and also provide open void space for stormwater storage. Table 3 provides the stone specifications that achieve both structural requirements and a porosity of 40% for stormwater storage. Figure 11 specifies the extents of each backfill stone location.

Table 3 - Acceptable Fill Materials

	Material Location	Description	AASHTO Material Classifications	Compaction / Density Requirement
D	**Final Fill:** Fill Material for layer 'D' starts from the top of the 'C' layer to the bottom of flexible pavement or unpaved finished grade above. Note that pavement subbase may be part of the 'D' layer.	Any soil/rock materials, native soils, or per engineer's plans. check plans for pavement subgrade requirements.	N/A	Prepare per site design engineer's plans. Paved installations may have stringent material and preparation requirements.
C	**Initial Fill:** Fill material for layer 'C' starts from the top of the embedment stone ('B' layer) to 24" (600 mm) above the top of the chamber. note that pavement subbase may be a part of the 'C' layer.	Granular well-graded soil/aggregate mixtures, <35% fines or processed aggregate. most pavement subbase materials can be used in lieu of this layer.	AASHTO M145[1] a-1,a-2-4,a-3 or AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	Begin compactoins after 24" (600 mm) of material over the chambers is reached. compact addtional layers in 12" (300 mm) max lifts to a min. 95% proctor density for well-graded material and 95% relative density for processed aggregate materials.
B	**Embedment Stone:** Fill surrounding the chambers form the foudation stone ('A' layer) to the 'C' layer above.	Clean, crushed, angular stone	AASHTO M43[1] 3, 4	No compaction required
A	**Foundation Stone:** Fill below chambers from the subgrade up to the foot (bottom) of the chamber.	Clean, crushed, angular stone	AASHTO M43[1] 3, 4	Plate compact or roll to achieve a flat surface. [2] [3]

Please Note:
1. The listed AASHTO designations are for gradations only. The stone must also be clean, crushed, angular. For example, a specification for #4 stone would state: "clean, crushed, angular NO. 4 (AASHTO m43) stone".
2. Stormtech compaction requirements are met for 'A' location materials when placed and compacted in 9" (230 mm) (max) lifts using two full coverages with a vibratory compactor.
3. Where infiltration surfaces may be compromised by compaction, for standard design load conditions, a flat surface may be achieved by raking or dragging without compaction equipment. For special load designs, contact stormtech for compaction requirements.

Figure 11 - Fill Material Locations



Once layer 'C' is placed, any soil/material can be placed in layer 'D' up to the finished grade. Most pavement subbase soils can be used to replace the materials of layer 'C' or 'D' at the design engineer's discretion.

3.0 Required Materials/Row Separation

3.2 Fill Above Chambers

Refer to Table 3 and Figure 11 for acceptable fill material above the clean, crushed, angular stone. StormTech requires a minimum of 24" (600 mm) from the top of the chamber to the bottom of flexible pavement. For non-paved installations where rutting from vehicles may occur StormTech requires a minimum of 30" (750 mm) from top of chamber to finished grade.

3.3 Geotextile Separation

A non-woven geotextile meeting AASHTO M288 Class 2 separation requirements must be installed to completely envelope the system and prevent soil intrusion into the crushed, angular stone. Overlap adjacent geotextile rolls per AASHTO M288 separation guidelines. Contact StormTech for a list of acceptable geotextiles.

3.4 Parallel Row Separation/ Perpendicular Bed Separation

Parallel Row Separation

The minimum installed spacing between parallel rows after backfilling is 9" (230 mm) for the MC-7200 chambers and 6" (150mm) for the MC-3500 (measurement taken between the outside edges of the feet). Spacers may be used for layout convenience. Row spacing wider than the minimum spacing above may be specified.

Perpendicular Bed Separation

When beds are laid perpendicular to each other, a minimum installed spacing of 36" (900 mm) between beds is required.

3.5 Special Structural Designs

StormTech engineers may provide special structural designs to enable deeper cover depths or increase the capacity to carry higher live loads. Special designs may utilize the additional strength that can be achieved by compaction of embedment stone or by increasing the spacing between rows.

Increasing the spacing between chamber rows may also facilitate the application of StormTech chambers with either less foundation stone or with weaker subgrade soils. This may be a good option where vertical restrictions on site prevent the use of a deeper foundation.

Contact ADS Engineering Services for more information on special structural designs.

System Cross Section

Minimum Row Spacing

4.0 Hydraulics

4.1 General

StormTech subsurface chamber systems offer the flexibility for a variety of inlet and outlet configurations. Contact the StormTech Technical Services Department or your local StormTech representative for assistance configuring inlet and outlet connections.

The open graded stone around and under the chambers provides a significant conveyance capacity ranging from approximately 0.8 cfs (23 l/s) to 13 cfs (368 l/s) per MC-3500 chamber and for the MC-7200 chamber. The actual conveyance capacity is dependent upon stone size, depth of foundation stone and head of water. Although the high conveyance capacity of the open graded stone is an important component of the flow network, StormTech recommends that a system of inlet and outlet manifolds be designed to distribute and convey the peak flow through the chamber system.

It is the responsibility of the design engineer to provide the design flow rates and storage volumes for the stormwater system and to ensure that the final design meets all conveyance and storage requirements. However, StormTech will work with the design engineer to assist with manifold and chamber layouts that meet the design objectives.

4.2 The Isolator® Row Plus

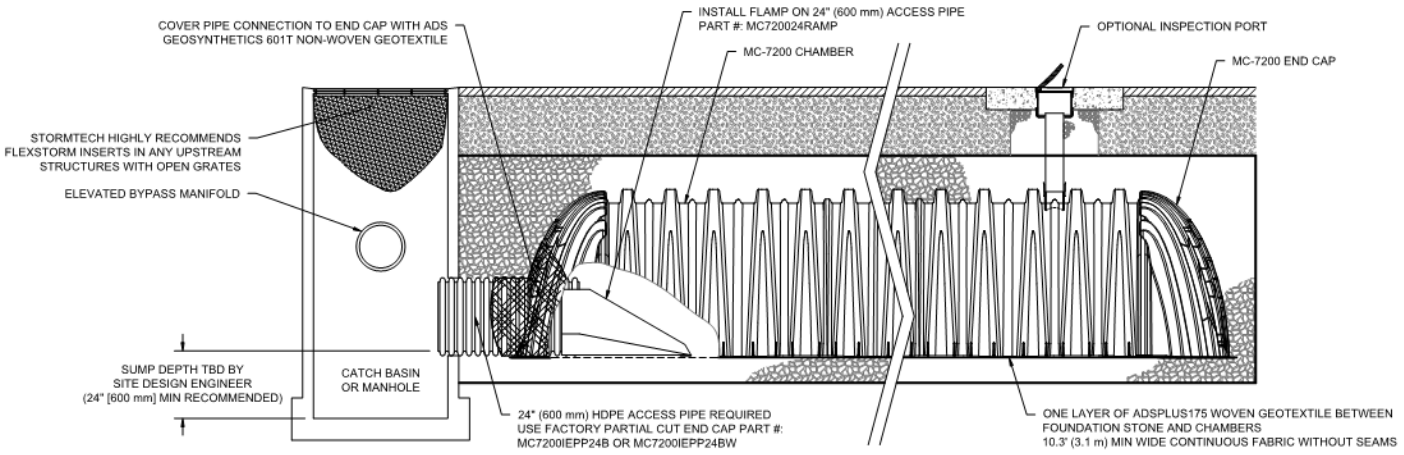
The Isolator Row Plus is a system that inexpensively captures total suspended solids (TSS) and debris and provides easy access for inspection and maintenance. In a typical configuration, a single layer of ADS Plus fabric is placed between the chambers and the stone foundations. This fabric traps and filters sediments as well as protects the stone base during cleaning and maintenance. Each installed MC-3500 chamber and MC-3500 end cap provides 42.9 ft2 (4.0 m^2) and 7.5 ft^2 (0.7 m^2) of bottom filter area respectively. Each installed MC-7200 chamber and MC-7200 end cap provides 57.9 ft^2 (5.4 m^2) and 12.8 ft^2 (1.19 m^2) of bottom filter area respectively.

The Isolator Row Plus can be configured for maintenance objectives or, in some regulatory jurisdictions, for water quality objectives. For water quality applications, the Isolator Row Plus can be sized based on water quality volume or flow rate.

All Isolator Plus Rows require: 1) a manhole for maintenance access, 2) a means of diversion of flows to the Isolator Row Plus 3) a high flow bypass and 4)FLAMP (Flared End Ramp). When used on an Isolator Row Plus, a 24” FLAMP (flared end ramp) is attached to the inside of the inlet pipe with a provided threaded rod and bolt. The FLAMP then lays on top of the ADS Plus fabric.. Flow diversion can be accomplished by either a weir in the upstream access manhole or simply by feeding the Isolator Row Plus at a lower elevation than the high flow bypass. Contact StormTech for assistance sizing Isolator Plus Rows.

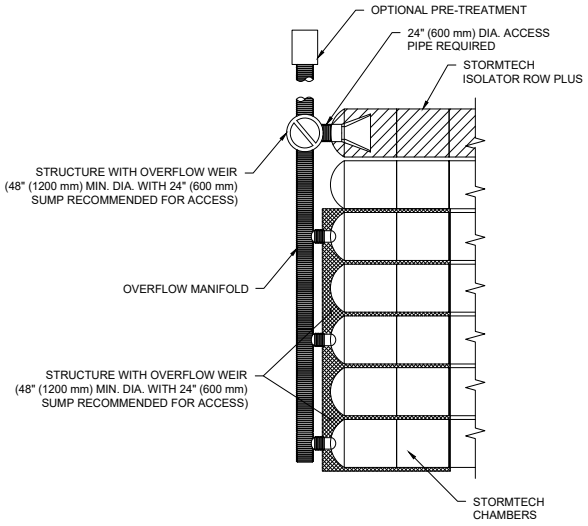
When additional stormwater treatment is required, StormTech systems can be configured using a treatment train approach where other stormwater BMPs are located in series.

Figure 12 - StormTech Isolator Row Plus Detail



4.0 Hydraulics

Figure 13 - Typical Inlet Configuration With Isolator Row Plus and Scour Protection



4.3 Inlet Manifolds

The primary function of the inlet manifold is to convey and distribute flows to a sufficient number of rows in the chamber bed such that there is ample conveyance capacity to pass the peak flows without creating an unacceptable backwater condition in upstream piping or scour the foundation stone under the chambers.

Manifolds are connected to the end caps either at the top or bottom of the end cap. Standard distances from the base of chamber to the invert of inlet and outlet manifolds connecting to StormTech end caps can be found in table 6. High inlet flow rates from either connection location produce a shear scour potential of the foundation stone. Inlet flows from top inlets also produce impingement scour potential. Scour potential is reduced when standing water is present over the foundation stone. However, for safe design across the wide range of applications, StormTech assumes minimal standing water at the time the design flow occurs.

To minimize scour potential, StormTech recommends the installation of woven scour protection fabric at each inlet row. This enables a protected transition zone from the concentrated flow coming out of the inlet pipe to a uniform flow across the entire width of the chamber for both top and bottom connections.

Allowable flow rates for design are dependent upon: the elevation of inlet pipe, foundation stone size and scour protection. With an appropriate scour protection geotextile installed from the end cap to at least 14.5 ft (4.42 m) in front of the inlet pipe for the MC-3500 and for the MC-7200, for both top and bottom feeds, the flow rates listed in Table 4 can be used for all StormTech specified foundation stone gradations.

*See StormTech's Tech Note 6.32 for manifold sizing guidance.

Table 4 - Allowable Inlet Flows*

Inlet Pipe Diameter Inches (mm)	Allowable Maximum Flow Rate cfs (l/s)
12 (300)	2.48 (70)
15 (375)	3.5 (99)
18 (450)	5.5 (156)
24 (600)	8.5 (241) [MC-3500]
24 (600)	9.5 (269) [MC-7200]

*Assumes appropriate length of scour fabric per section 4.3

Table 5 - Maximum Outlet Flow Rate Capacities From StormTech Oulet Manifolds

Pipe Diameter	Flow (CFS)	Flow (L/S)
6" (150 mm)	0.4	11.3
8" (200 mm)	0.7	19.8
10" (250 mm)	1.0	28.3
12" (300 mm)	2.0	56.6
15" (375 mm)	2.7	76.5
18" (450 mm)	4.0	113.3
24" (600 mm)	7.0	198.2
30" (750 mm)	11.0	311.5
36" (900 mm)	16.0	453.1
42" (1050 mm)	22.0	623.0
48" (1200 mm)	28.0	792.9

Table 6 - Standard Distances From Base of Chamber to Invert of Inlet and Outlet Manifolds on StormTech End Caps

MC-3500 ENDCAPS			
	Pipe Diameter	Inv. (in)	Inv. (mm)
Top	6" (150 mm)	33.21	841
	8" (200 mm)	31.16	789
	10" (250 mm)	29.04	738
	12" (300 mm)	26.36	671
	15" (375 mm)	23.39	594
	18" (450 mm)	20.03	509
	24" (600 mm)	14.48	369
Bottom	12" (750 mm)	1.35	34
	15" (900 mm)	1.5	40
	18" (1050 mm)	1.77	46
	24" (1200 mm)	2.06	52

MC-7200 ENDCAPS			
	Pipe Diameter	Inv. (in)	Inv. (mm)
Top	12" (300 mm)	35.69	907
	15" (375 mm)	32.72	831
	18" (450 mm)	29.36	746
	24" (600 mm)	23.05	585
Bottom	12" (750 mm)	1.55	34
	15" (900 mm)	1.7	43
	18" (1050 mm)	1.97	50
	24" (1200 mm)	2.26	57

5.0 Cumulative Storage Volumes

4.4 Outlet Manifolds

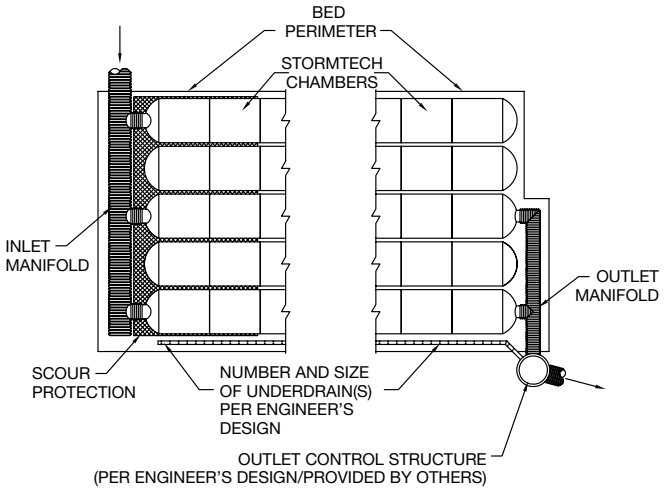
The primary function of the outlet manifold is to convey peak flows from the chamber system to the outlet control structure. Outlet manifolds are often sized for attenuated flows. They may be smaller in diameter and have fewer row connections than inlet manifolds. In some applications however, the intent of the outlet piping is to convey an unattenuated bypass flow rate and manifolds may be sized similar to inlet manifolds.

Since chambers are generally flowing at or near full at the time of the peak outlet flow rate, scour is generally not governing and outlet manifold sizing is based on pipe flow equations. In most cases, StormTech recommends that outlet manifolds connect the same rows that are connected to an inlet manifold. This provides a continuous flow path through open conduits to pass the peak flow without dependence on passing peak flows through stone.

The primary function of the underdrains is to draw down water stored in the stone below the invert of the manifold. Underdrains are generally not sized for conveyance of the peak flow.

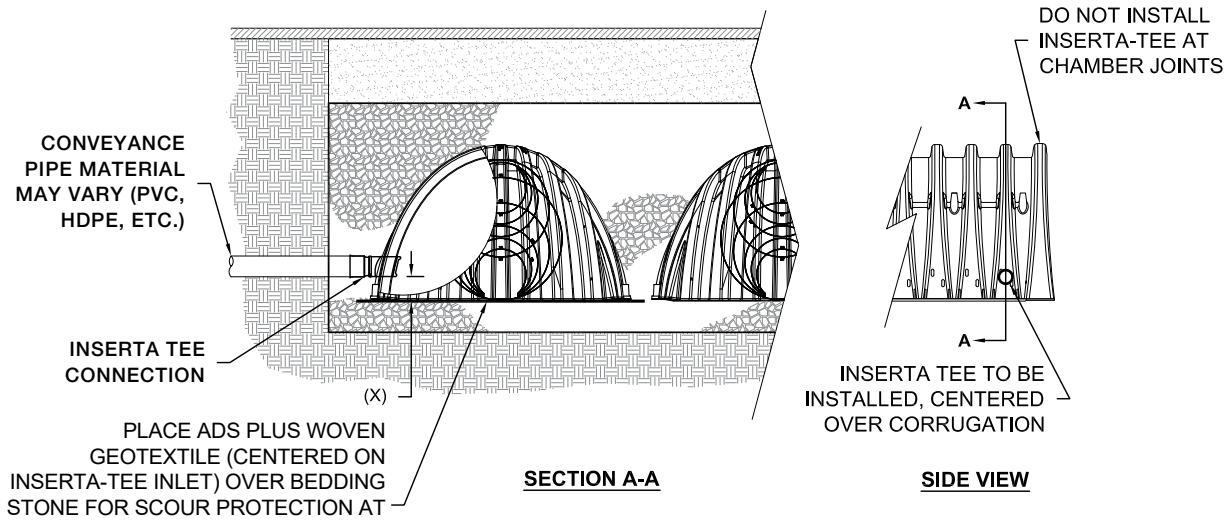
The maximum outlet flow rate capacities from StormTech outlet manifolds can be found in Table 5.

Figure 14 - Typical Inlet, Outlet and Underdrain Configuration



4.5 Inserta Tee® Inlet Connections

Figure 15 - Inserta Tee Detail



CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
MC-3500	12" (250 mm)	6" (150 mm)
MC-7200	12" (250 mm)	8" (200 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

NOTE:
PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.

5.0 Cumulative Storage Volumes

Tables 7 and 8 provide cumulative storage volumes for the MC-3500 chamber and end cap. These tables can be used to calculate the stage-storage relationship for the retention or detention system. Digital spreadsheets in which the number of chambers and end caps can be input for quick cumulative storage calculations are available at www.stormtech.com. For assistance with site-specific calculations or input into routing software, contact the StormTech Technical Services Department.

Table 7 – MC-3500 Incremental Storage Volume Per Chamber
Assumes 40% stone porosity. Calculations are based upon a 9" (230 mm) stone base under the chambers, 12" (300 mm) of stone above chambers, and 6" (150 mm) of spacing between chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft^3 (m^3)	Total System Cumulative Storage ft^3 (m^3)
66 (1676)	0.00	175.02 (4.956)
65 (1651)	0.00	173.36 (4.909)
64 (1626)	0.00	171.71 (4.862)
63 (1600)	0.00	170.06 (4.816)
62 (1575)	0.00	168.41 (4.7.69)
61 (1549)	0.00	166.76 (4.722)
60 (1524)	0.00	165.10 (4.675)
59 (1499)	0.00	163.45 (4.628)
58 (1473)	0.00	161.80 (4.582)
57 (1448)	0.00	160.15 (4.535)
56 (1422)	0.00	158.49 (4.488)
55 (1397)	0.00	156.84 (4.441)
54 (1372)	109.95 (3.113)	155.19 (4.394)
53 (1346)	109.89 (3.112)	153.50 (4.347)
52 (1321)	109.69 (3.106)	151.73 (4.297)
51 (1295)	109.40 (3.098)	149.91 (4.245)
50 (1270)	109.00 (3.086)	148.01 (4.191)
49 (1245)	108.31 (3.067)	145.95 (4.133)
48 (1219)	107.28 (3.038)	143.68 (4.068)
47 (1194)	106.03 (3.003)	141.28 (4.000)
46 (1168)	104.61 (2.962)	138.77 (3.930)
45 (1143)	103.04 (2.918)	136.17 (3.856)
44 (1118)	101.33 (2.869)	133.50 (3.780)
43 (1092)	99.50 (2.818)	130.75 (3.702)
42 (1067)	97.56 (2.763)	127.93 (3.623)
41 (1041)	95.52 (2.705)	125.06 (3.541)
40 (1016)	93.39 (2.644)	122.12 (3.458)
39 (991)	91.16 (2.581)	119.14 (3.374)
38 (965)	88.86 (2.516)	116.10 (3.288)
37 (948)	86.47 (2.449)	113.02 (3.200)
36 (914)	84.01 (2.379)	109.89 (3.112)
35 (889)	81.49 (2.307)	106.72 (3.022)
34 (864)	78.89 (2.234)	103.51 (2.931)
33 (838)	76.24 (2.159)	100.27 (2.839)

Stone Cover

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft^3 (m^3)	Total System Cumulative Storage ft^3 (m^3)
32 (813)	73.52 (2.082)	96.98 (2.746)
31 (787)	70.75 (2.003)	93.67 (2.652)
30 (762)	67.92 (1.923)	90.32 (2.558)
29 (737)	65.05 (1.842)	86.94 (2.462)
28 (711)	62.12 (1.759)	83.54 (2.366)
27 (686)	59.15 (1.675)	80.10 (2.268)
26 (680)	56.14 (1.590)	76.64 (2.170)
25 (635)	53.09 (1.503)	73.16 (2.072)
24 (610)	49.99 (1.416)	69.65 (1.972)
23 (584)	46.86 (1.327)	66.12 (1.872)
22 (559)	43.70 (1.237)	62.57 (1.772)
21 (533)	40.50 (1.147)	59.00 (1.671)
20 (508)	37.27 (1.055)	55.41 (1.569)
19 (483)	34.01 (0.963)	51.80 (1.467)
18 (457)	30.72 (0.870)	48.17 (1.364)
17 (432)	27.40 (0.776)	44.53 (1.261)
16 (406)	24.05 (0.681)	40.87 (1.157)
15 (381)	20.69 (0.586)	37.20 (1.053)
14 (356)	17.29 (0.490)	33.51 (0.949)
13 (330)	13.88 (0.393)	29.81 (0.844)
12 (305)	10.44 (0.296)	26.09 (0.739)
11 (279)	6.98 (0.198)	22.37 (0.633)
10 (254)	3.51 (0.099)	18.63 (0.527)
9 (229)	0.00	14.87 (0.421)
8 (203)	0.00	13.22 (0.374)
7 (178)	0.00	11.57 (0.328)
6 (152)	0.00	9.91 (0.281)
5 (127)	0.00	8.26 (0.234)
4 (102)	0.00	6.61 (0.187)
3 (76)	0.00	4.96 (0.140)
2 (51)	0.00	3.30 (0.094)
1 (25)	0.00	1.65 (0.047)

Stone Cover

NOTE: Add 1.65 ft^3 (0.047 m^3) of storage for each additional inch (25 mm) of stone foundation. Contact StormTech for cumulative volume spreadsheets in digital format.

5.0 Cumulative Storage Volume

Table 8 – MC-3500 Incremental Storage Volume Per End Cap
Assumes 40% stone porosity. Calculations are based upon a 9” (230 mm) stone base under the chambers, 12” (300 mm) of stone above end caps, and 6” (150 mm) of spacing between end caps and 6” (150 mm) of stone perimeter.

Depth of Water in System Inches (mm)	Cumulative End Cap Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
66 (1676)	0.00	45.10 (1.277)
65 (1651)	0.00	44.55 (1.262)
64 (1626)	0.00	44.00 (1.246)
63 (1600)	0.00	43.46 (1.231)
62 (1575)	0.00	42.91 (1.2.15)
61 (1549)	0.00	42.36 (1.200)
60 (1524)	0.00	41.81 (1.184)
59 (1499)	0.00	41.27 (1.169)
58 (1473)	0.00	40.72 (1.153)
57 (1448)	0.00	40.17 (1.138)
56 (1422)	0.00	39.62 (1.122)
55 (1397)	0.00	39.08 (1.107)
54 (1372)	15.64 (0.443)	38.53 (1.091)
53 (1346)	15.64 (0.443)	37.98 (1.076)
52 (1321)	15.63 (0.443)	37.42 (1.060)
51 (1295)	15.62 (0.442)	36.85 (1.043)
50 (1270)	15.60 (0.442)	36.27 (1.027)
49 (1245)	15.56 (0.441)	35.68 (1.010)
48 (1219)	15.51 (0.439)	35.08 (0.993)
47 (1194)	15.44 (0.437)	34.47 (0.976)
46 (1168)	15.35 (0.435)	33.85 (0.959)
45 (1143)	15.25 (0.432)	33.22 (0.941)
44 (1118)	15.13 (0.428)	32.57 (0.922)
43 (1092)	14.99 (0.424)	31.91 (0.904)
42 (1067)	14.83 (0.420)	31.25 (0.885)
41 (1041)	14.65 (0.415)	30.57 (0.866)
40 (1016)	14.45 (0.409)	29.88 (0.846)
39 (991)	14.24 (0.403)	29.18 (0.826)
38 (965)	14.00 (0.396)	28.48 (0.806)
37 (948)	13.74 (0.389)	27.76 (0.786)
36 (914)	13.47 (0.381)	27.04 (0.766)
35 (889)	13.18 (0.373)	26.30 (0.745)
34 (864)	12.86 (0.364)	25.56 (0.724)

Stone Cover

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
33 (838)	12.53 (0.355)	24.82 (0.703)
32 (813)	12.18 (0.345)	24.06 (0.681)
31 (787)	11.81 (0.335)	23.30 (0.660)
30 (762)	11.42 (0.323)	22.53 (0.638)
29 (737)	11.01 (0.312)	21.75 (0.616)
28 (711)	10.58 (0.300)	20.96 (0.594)
27 (686)	10.13 (0.287)	20.17 (0.571)
26 (680)	9.67 (0.274)	19.37 (0.549)
25 (635)	9.19 (0.260)	18.57 (0.526)
24 (610)	8.70 (0.246)	17.76 (0.503)
23 (584)	8.19 (0.232)	16.94 (0.480)
22 (559)	7.67 (0.217)	16.12 (0.456)
21 (533)	7.13 (0.202)	15.29 (0.433)
20 (508)	6.59 (0.187)	14.45 (0.409)
19 (483)	6.03 (0.171)	13.61 (0.385)
18 (457)	5.46 (0.155)	12.76 (0.361)
17 (432)	4.88 (0.138)	11.91 (0.337)
16 (406)	4.30 (0.122)	11.06 (0.313)
15 (381)	3.70 (0.105)	10.20 (0.289)
14 (356)	3.10 (0.088)	9.33 (0.264)
13 (330)	2.49 (0.071)	8.46 (0.240)
12 (305)	1.88 (0.053)	7.59 (0.215)
11 (279)	1.26 (0.036)	6.71 (0.190)
10 (254)	0.63 (0.018)	5.83 (0.165)
9 (229)	0.00	4.93 (0.139)
8 (203)	0.00	4.38 (0.124)
7 (178)	0.00	3.83 (0.108)
6 (152)	0.00	3.28 (0.093)
5 (127)	0.00	2.74 (0.077)
4 (102)	0.00	2.19 (0.062)
3 (76)	0.00	1.64 (0.046)
2 (51)	0.00	1.09 (0.031)
1 (25)	0.00	0.55 (0.015)

Stone Cover

NOTE: Add 0.56 ft³ (0.016 m³) of storage for each additional inch (25 mm) of stone foundation. Contact StormTech for cumulative volume spreadsheets in digital format.

5.0 Cumulative Storage Volumes

Tables 9 and **10** provide cumulative storage volumes for the MC-7200 chamber and end cap. These tables can be used to calculate the stage-storage relationship for the retention or detention system. Digital spreadsheets in which the number of chambers and end caps can be input for quick cumulative storage calculations are available at www.stormtech.com. For assistance with site-specific calculations or input into routing software, contact the StormTech Technical Services Department.

Table 9 – MC-7200 Incremental Storage Volume Per Chamber
Assumes 40% stone porosity. Calculations are based upon a 9" (230 mm) stone base under the chambers, 12" (300 mm) of stone above chambers, and 9" (230 mm) of spacing between chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
81 (2057)	0.00	267.30 (7.569)
80 (2032)	0.00	265.30 (7.512)
79 (2007)	0.00	263.30 (7.456)
78 (1981)	0.00	261.31 (7.399)
77 (1956)	0.00	259.31 (7.343)
76 (1930)	0.00	257.31 (7.286)
75 (1905)	0.00	255.32 (7.230)
74 (1880)	0.00	253.32 (7.173)
73 (1854)	0.00	251.32 (7.117)
72 (1829)	0.00	249.33 (7.060)
71 (1803)	0.00	247.33 (7.004)
70 (1778)	0.00	245.33 (6.947)
69 (1753)	175.90 (4.981)	243.33 (6.890)
68 (1727)	175.84 (4.979)	241.30 (6.833)
67 (1702)	175.65 (4.974)	239.19 (6.773)
66 (1676)	175.38 (4.966)	237.03 (6.712)
65 (1651)	175.02 (4.956)	234.82 (6.649)
64 (1626)	174.56 (4.943)	232.54 (6.585)
63 (1600)	173.82 (4.922)	230.10 (6.516)
62 (1575)	172.72 (4.891)	227.45 (6.441)
61 (1549)	171.41 (4.854)	224.66 (6.362)
60 (1524)	169.91 (4.811)	221.76 (6.280)
59 (1499)	168.25 (4.764)	218.77 (6.195)
58 (1473)	166.46 (4.714)	215.70 (6.108)
57 (1448)	164.53 (4.659)	212.55 (6.019)
56 (1422)	162.50 (4.602)	209.33 (5.928)
55 (1397)	160.36 (4.541)	206.05 (5.835)
54 (1372)	158.11 (4.477)	202.70 (5.740)
53 (1346)	155.77 (4.411)	199.30 (5.644)
52 (1321)	153.33 (4.342)	195.84 (5.546)
51 (1295)	150.81 (4.271)	192.33 (5.446)
50 (1270)	148.21 (4.197)	188.78 (5.346)
49 (1245)	145.53 (4.121)	185.17 (5.244)
48 (1219)	142.78 (4.043)	181.52 (5.140)
47 (1194)	139.96 (3.963)	177.83 (5.036)
46 (1168)	137.07 (3.881)	174.10 (4.930)
45 (1143)	134.11 (3.798)	170.33 (4.823)
44 (1118)	131.09 (3.712)	166.52 (4.715)
43 (1092)	128.01 (3.625)	162.68 (4.607)
42 (1067)	124.88 (3.536)	158.80 (4.497)
41 (1041)	121.68 (3.446)	154.89 (4.386)

Stone Cover

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
40 (1016)	118.44 (3.354)	150.94 (4.274)
39 (991)	115.14 (3.260)	146.97 (4.162)
38 (965)	111.80 (3.166)	142.96 (4.048)
37 (948)	108.40 (3.070)	138.93 (3.934)
36 (914)	104.97 (2.972)	134.87 (3.819)
35 (889)	101.48 (2.874)	130.78 (3.703)
34 (864)	97.96 (2.774)	126.67 (3.587)
33 (838)	94.39 (2.673)	122.54 (3.470)
32 (813)	90.79 (2.571)	118.38 (3.352)
31 (787)	87.14 (2.468)	114.19 (3.234)
30 (762)	83.46 (2.363)	109.99 (3.114)
29 (737)	79.75 (2.258)	105.76 (2.995)
28 (711)	76.00 (2.152)	101.52 (2.875)
27 (686)	72.22 (2.045)	97.25 (2.754)
26 (680)	68.41 (1.937)	92.97 (2.632)
25 (610)	64.56 (1.828)	88.66 (2.511)
24 (609)	60.69 (1.719)	84.34 (2.388)
23 (584)	56.80 (1.608)	80.01 (2.266)
22 (559)	52.87 (1.497)	75.66 (2.142)
21 (533)	48.92 (1.385)	71.29 (2.019)
20 (508)	44.95 (1.273)	66.91 (1.895)
19 (483)	40.96 (1.160)	62.52 (1.770)
18 (457)	36.94 (1.046)	58.11 (1.646)
17 (432)	32.91 (0.932)	53.69 (1.520)
16 (406)	28.85 (0.817)	49.26 (1.395)
15 (381)	24.78 (0.702)	44.82 (1.269)
14 (356)	20.69 (0.586)	40.37 (1.143)
13 (330)	16.58 (0.469)	35.91 (1.017)
12 (305)	12.46 (0.353)	31.44 (0.890)
11 (279)	8.32 (0.236)	26.96 (0.763)
10 (254)	4.17 (0.118)	22.47 (0.636)
9 (229)	0.00	17.97 (0.509)
8 (203)	0.00	15.98 (0.452)
7 (178)	0.00	13.98 (0.396)
6 (152)	0.00	11.98 (0.339)
5 (127)	0.00	9.99 (0.283)
4 (102)	0.00	7.99 (0.226)
3 (76)	0.00	5.99 (0.170)
2 (51)	0.00	3.99 (0.113)
1 (25)	0.00	2.00 (0.057)

Stone Cover

NOTE: Add 2.00 ft³ (0.057 m³) of storage for each additional inch (25 mm) of stone foundation. Contact StormTech for cumulative volume spreadsheets in digital format.

5.0 Cumulative Storage Volumes

Table 10 – MC-7200 Incremental Storage Volume Per End Cap
Assumes 40% stone porosity. Calculations are based upon a 9" (230 mm) stone base under the chambers, 12" (300 mm) of stone above end caps, and 9" (230 mm) of spacing between end caps and 6" (150 mm) of stone perimeter.

Depth of Water in System Inches (mm)	Cumulative End Cap Storage ft^3 (m^3)	Total System Cumulative Storage ft^3 (m^3)
81 (2057)	0.00	115.28 (3.264)
80 (2032)	0.00	114.15 (3.232)
79 (2007)	0.00	113.02 (3.200)
78 (1981)	0.00	111.89 (3.168)
77 (1956)	0.00	110.76 (3.136)
76 (1930)	0.00	109.63 (3.104)
75 (1905)	0.00	108.50 (3.072)
74 (1880)	0.00	107.37 (3.040)
73 (1854)	0.00	106.24 (3.008)
72 (1829)	0.00	105.11 (2.976)
71 (1803)	0.00	103.98 (2.944)
70 (1778)	0.00	102.85 (2.912)
69 (1753)	39.54 (1.120)	101.72 (2.880)
68 (1727)	39.53 (1.119)	100.58 (2.848)
67 (1702)	39.50 (1.118)	99.43 (2.816)
66 (1676)	39.45 (1.117)	98.27 (2.783)
65 (1651)	39.38 (1.115)	97.10 (2.750)
64 (1626)	39.30 (1.113)	95.92 (2.716)
63 (1600)	39.19 (1.110)	94.73 (2.682)
62 (1575)	39.06 (1.106)	93.52 (2.648)
61 (1549)	38.90 (1.101)	92.29 (2.613)
60 (1524)	38.71 (1.096)	91.04 (2.578)
59 (1499)	38.49 (1.090)	89.78 (2.542)
58 (1473)	38.24 (1.083)	88.50 (2.506)
57 (1448)	37.97 (1.075)	87.21 (2.469)
56 (1422)	37.67 (1.067)	85.90 (2.432)
55 (1397)	37.34 (1.057)	84.57 (2.395)
54 (1372)	36.98 (1.047)	83.23 (2.357)
53 (1346)	36.60 (1.036)	81.87 (2.318)
52 (1321)	36.19 (1.025)	80.49 (2.279)
51 (1295)	35.75 (1.012)	79.10 (2.240)
50 (1270)	35.28 (0.999)	77.69 (2.200)
49 (1245)	34.79 (0.985)	76.26 (2.159)
48 (1219)	34.27 (0.970)	74.82 (2.119)
47 (1194)	33.72 (0.955)	73.36 (2.077)
46 (1168)	33.15 (0.939)	71.89 (2.036)
45 (1143)	32.57 (0.922)	70.40 (1.994)
44 (1118)	31.96 (0.905)	68.91 (1.951)
43 (1092)	31.32 (0.887)	67.40 (1.909)
42 (1067)	30.68 (0.869)	65.88 (1.866)
41 (1041)	30.00 (0.850)	64.35 (1.822)

Stone Cover

Depth of Water in System Inches (mm)	Cumulative End Cap Storage ft^3 (m^3)	Total System Cumulative Storage ft^3 (m^3)
40 (1016)	29.30 (0.830)	62.80 (1.778)
39 (991)	28.58 (0.809)	61.23 (1.734)
38 (965)	27.84 (0.788)	59.65 (1.689)
37 (948)	27.07 (0.767)	58.07 (1.644)
36 (914)	26.29 (0.744)	56.46 (1.599)
35 (889)	25.48 (0.722)	54.85 (1.553)
34 (864)	24.66 (0.698)	53.23 (1.507)
33 (838)	23.83 (0.675)	51.60 (1.461)
32 (813)	22.98 (0.651)	49.96 (1.415)
31 (787)	22.12 (0.626)	48.31 (1.368)
30 (762)	21.23 (0.601)	46.65 (1.321)
29 (737)	20.32 (0.575)	44.97 (1.273)
28 (711)	19.40 (0.549)	43.29 (1.226)
27 (686)	18.48 (0.523)	41.61 (1.178)
26 (680)	17.54 (0.497)	39.91 (1.130)
25 (610)	16.59 (0.470)	38.21 (1.082)
24 (609)	15.62 (0.442)	36.50 (1.033)
23 (584)	14.64 (0.414)	34.78 (0.985)
22 (559)	13.66 (0.387)	33.07 (0.936)
21 (533)	12.66 (0.359)	31.33 (0.887)
20 (508)	11.65 (0.330)	29.60 (0.838)
19 (483)	10.63 (0.301)	27.85 (0.3789)
18 (457)	9.60 (0.272)	26.11 (0.739)
17 (432)	8.56 (0.242)	24.35 (0.690)
16 (406)	7.51 (0.213)	22.59 (0.640)
15 (381)	6.46 (0.183)	20.83 (0.590)
14 (356)	5.41 (0.153)	19.07 (0.540)
13 (330)	4.35 (0.123)	17.31 (0.490)
12 (305)	3.28 (0.093)	15.53 (0.440)
11 (279)	2.19 (0.062)	13.75 (0.389)
10 (254)	1.11 (0.031)	11.97 (0.339)
9 (229)	0.00	10.17 (0.288)
8 (203)	0.00	9.04 (0.256)
7 (178)	0.00	7.91 (0.224)
6 (152)	0.00	6.78 (0.192)
5 (127)	0.00	5.65 (0.160)
4 (102)	0.00	4.52 (0.128)
3 (76)	0.00	3.39 (0.096)
2 (51)	0.00	2.26 (0.064)
1 (25)	0.00	1.13 (0.032)

Stone Cover

NOTE: Add 1.08 ft^3 (0.031 m^3) of storage for each additional inch (25 mm) of stone foundation. Contact StormTech for cumulative volume spreadsheets in digital format.

6.0 MC-3500 Chamber System Sizing

The following steps provide the calculations necessary for preliminary sizing of an MC-3500 chamber system. For custom bed configurations to fit specific sites, contact the StormTech Technical Services Department or your local StormTech representative.

1) Determine the amount of storage volume (VS) required. It is the design engineer's sole responsibility to determine the storage volume required.

Table 11 - Storage Volume Per Chamber/End Cap ft³ (m³)

	Bare Unit Storage ft³ (m³)	Chamber/End Cap and Stone Volume — Stone Foundation Depth in. (mm)			
		9 (230)	12 (300)	15 (375)	18 (450)
MC-3500 Chamber	109.9 (3.11)	175.0 (4.96)	179.9 (5.09)	184.9 (5.24)	189.9 (5.38)
MC-3500 End Cap	14.9 (0.42)	45.1 (1.28)	46.6 (1.32)	48.3 (1.37)	49.9 (1.41)

NOTE: Assumes 6" (150 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 6" (150 mm) stone perimeter.

2) Determine the number of chambers (C) required. To calculate the number of chambers required for adequate storage, divide the storage volume (Vs) by the storage volume of the chamber (from **Table 11**), as follows: **C = Vs / Storage Volume per Chamber**

3) Determine the number of end caps required. The number of end caps (EC) required depends on the number of rows required by the project. Once the num- ber of chamber rows is determined, multiply the number of chamber rows by 2 to determine the number of end caps required. **EC = No. of Chamber Rows x 2**

NOTE: Additional end caps may be required for systems having inlet locations within the chamber bed.

4) Determine additional storage provided by end caps. End Caps will provide additional storage to the project. Multiply the number of end caps (EC) by the storage volume per end cap (ECS) to determine the additional storage (As) provided by the end caps. **As = EC x ECs**

5) Adjust number of chambers (C) to account for additional end cap storage (As). The original number of chambers (C) can now be reduced due to the additional storage in the end caps. Divide the additional storage (As) by the storage volume per chamber to determine the number of chambers that can be removed. **Number of chambers to remove = As/ volume per chamber**

NOTE: Additional storage exists in the stone perimeter as well as in the inlet and outlet manifold systems. Contact StormTech's Technical Services Department for assistance with determining the number of chambers and end caps required for your project.

6) Determine the required bed size (S). The size of the bed will depend on the number of chambers and end caps required:

MC-3500 area per chamber = 49.6 ft² (4.6 m²)
MC-3500 area per end cap = 16.4 ft² (1.5 m²)
S = (C x area per chamber) + (EC x area per end cap)

NOTE: It is necessary to add 12" (300 mm) of stone perimeter parallel to the chamber rows and 6" (150 mm) of stone perimeter from the base of all end caps. The additional area due to perimeter stone is not included in the area numbers above.

7) Determine the amount of stone (Vst) required. To calculate the total amount of clean, crushed, angular stone required, multiply the number of chambers (C) and the number of end caps (EC) by the selected weight of stone from **Table 12.**

NOTE: Clean, crushed, angular stone is also required around the perimeter of the system.

Table 12 - Amount of Stone Per Chamber/End Cap

ENGLISH tons (yd³)	Stone Foundation Depth			
	9"	12"	15"	18"
Chamber	8.5 (6.0)	9.1 (6.5)	9.7 (6.9)	10.4 (7.4)
End Cap	3.9 (2.8)	4.1 (2.9)	4.3 (3.1)	4.5 (3.2)
METRIC kg (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
Chamber	7711 (4.6)	8255 (5.0)	8800 (5.3)	9435 (5.7)
End Cap	3538 (2.1)	3719 (2.2)	3901 (2.4)	4082 (2.5)

NOTE: Assumes 12" (300 mm) of stone above, and 6" (150 mm) row spacing, and 6" (150 mm) of perimeter stone in front of end caps.

8) Determine the volume of excavation (Ex) required. Each additional foot of cover will add a volume of excavation of 1.9 yd³ (1.5 m³) per MC-3500 chamber and 0.6 yd³ (0.5 m³) per MC-3500 end cap.

Table 13—Volume of Excavation Per Chamber/End Cap yd³ (m³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
Chamber	11.9 (9.1)	12.4 (9.5)	12.8 (9.8)	13.3 (10.2)
End Cap	4.0 (3.1)	4.1 (3.2)	4.3 (3.3)	4.4 (3.4)

NOTE: Assumes 6" (150 mm) separation between chamber rows, 6" (150 mm) of perimeter in front of end caps, and 24" (600 mm) of cover. The volume of excavation will vary as the depth of cover increases.

9) Determine the area of geotextile (F) required. The bottom, top and sides of the bed must be covered with a non-woven geotextile (filter fabric) that meets AASHTO M288 Class 2 requirements. The area of the sidewalls must be calculated and a 24" (600 mm) overlap must be included for all seams. Geotextiles typically come in 15 foot (4.57 m) wide rolls.

6.0 MC-7200 Chamber System Sizing

The following steps provide the calculations necessary for preliminary sizing of an MC-7200 chamber system. For custom bed configurations to fit specific sites, contact the StormTech Technical Services Department or your local StormTech representative.

1) Determine the amount of storage volume (VS) required. It is the design engineer's sole responsibility to determine the storage volume required.

Table 14 - Storage Volume Per Chamber/End Cap ft³ (m³)

	Bare Unit Storage ft³ (m³)	Chamber/End Cap and Stone Volume — Stone Foundation Depth in. (mm)			
		9 (230)	12 (300)	15 (375)	18 (450)
MC-7200 Chamber	175.9 (4.98)	267.3 (7.57)	273.3 (7.74)	279.3 (7.91)	285.2 (8.08)
MC-7200 End Cap	39.5 (1.12)	115.3 (3.26)	118.6 (3.36)	121.9 (3.45)	125.29 (3.54)

NOTE: Assumes 9" (230 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 12" (300 mm) stone perimeter.

2) Determine the number of chambers (C) required.
To calculate the number of chambers required for adequate storage, divide the storage volume (Vs) by the storage volume of the chamber (from **Table 14**), as follows: **C = Vs / Storage Volume per Chamber**

3) Determine the number of end caps required.
The number of end caps (EC) required depends on the number of rows required by the project. Once the number of chamber rows is determined, multiply the number of chamber rows by 2 to determine the number of end caps required. **EC = No. of Chamber Rows x 2**

NOTE: Additional end caps may be required for systems having inlet locations within the chamber bed.

4) Determine additional storage provided by end caps.
End Caps will provide additional storage to the project. Multiply the number of end caps (EC) by the storage volume per end cap (ECS) to determine the additional storage (As) provided by the end caps. **As = EC x ECs**

5) Adjust number of chambers (C) to account for additional end cap storage (As). The original number of chambers (C) can now be reduced due to the additional storage in the end caps. Divide the additional storage (As) by the storage volume per chamber to determine the number of chambers that can be removed. **Number of chambers to remove = As/ volume per chamber**

NOTE: Additional storage exists in the stone perimeter as well as in the inlet and outlet manifold systems. Contact StormTech's Technical Services Department for assistance with determining the number of chambers and end caps required for your project.

6) Determine the required bed size (S).
The size of the bed will depend on the number of chambers and end caps required:

MC-7200 area per chamber = 59.9 ft² (5.6 m²)
MC-7200 area per end cap = 33.9 ft² (3.1 m²)

S = (C x area per chamber) + (EC x area per end cap)

NOTE: It is necessary to add 12" (300 mm) of stone perimeter parallel to the chamber rows and 6" (150 mm) of stone perimeter from the base of all end caps. The additional area due to perimeter stone is not included in the area numbers above.

7) Determine the amount of stone (Vst) required.
To calculate the total amount of clean, crushed, angular stone required, multiply the number of chambers (C) and the number of end caps (EC) by the selected weight of stone from **Table 15.**

NOTE: Clean, crushed, angular stone is also required around the perimeter of the system.

Table 15 - Amount of Stone Per Chamber/End Cap

ENGLISH tons (yd³)	Stone Foundation Depth			
	9"	12"	15"	18"
Chamber	11.9 (8.5)	12.6 (9.0)	13.4 (9.6)	14.6 (10.1)
End Cap	9.8 (7.0)	10.2 (7.3)	10.6 (7.6)	11.1 (7.9)
METRIC kg (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
Chamber	10796 (6.5)	11431 (6.9)	12156 (7.3)	13245 (7.7)
End Cap	8890 (5.3)	9253 (5.5)	9616 (5.8)	10069 (6.0)

NOTE: Assumes 12" (300 mm) of stone above, and 9" (230 mm) row spacing, and 12" (300 mm) of perimeter stone in front of end caps.

8) Determine the volume of excavation (Ex) required.
Each additional foot of cover will add a volume of excavation of 2.2 yd³ (1.7 m³) per MC-7200 chamber and 1.4 yd³ (0.8 m³) per MC-7200 end cap.

Table 13- Volume of Excavation Per Chamber/End Cap yd³ (m³)

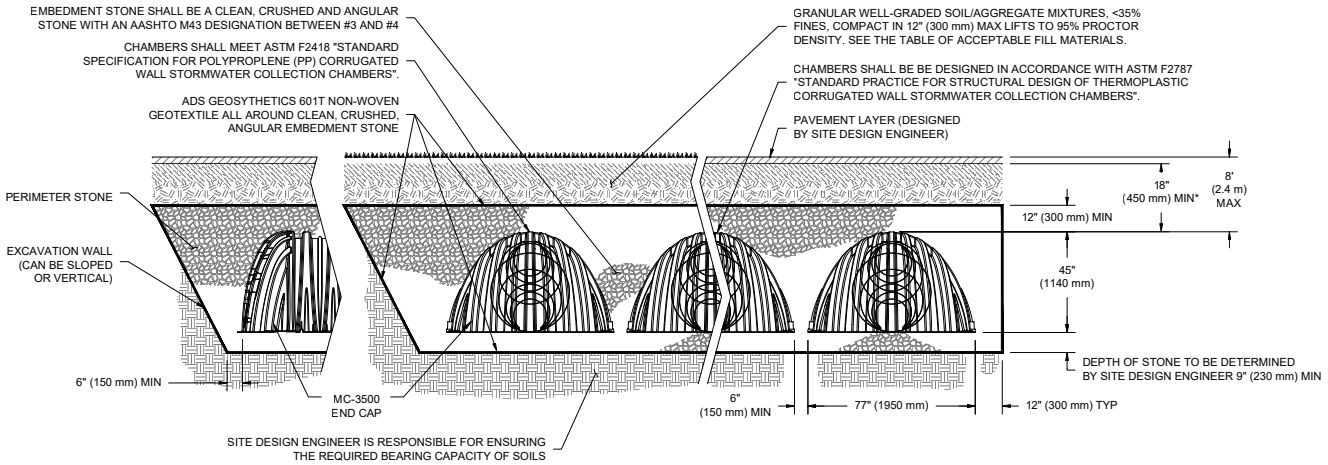
	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
Chamber	17.2 (13.2)	17.7 (13.5)	18.3 (14.0)	18.8 (14.4)
End Cap	9.7 (7.4)	10.0 (7.6)	10.3 (7.9)	10.6 (8.1)

NOTE: Assumes 9" (230 mm) separation between chamber rows, 12" (300 mm) of perimeter in front of end caps, and 24" (600 mm) of cover. The volume of excavation will vary as the depth of cover increases.

9) Determine the area of geotextile (F) required.
The bottom, top and sides of the bed must be covered with a non-woven geotextile (filter fabric) that meets AASHTO M288 Class 2 requirements. The area of the sidewalls must be calculated and a 24" (600 mm) overlap must be included for all seams. Geotextiles typically come in 15 foot (4.57 m) wide rolls.

7.0 Structural Cross Sections and Specifications

Figure 16A - MC-3500 Structural Cross Section Detail (Not to Scale)



Special applications will be considered on a project by project basis. Please contact our application department should you have a unique application for our team to evaluate.

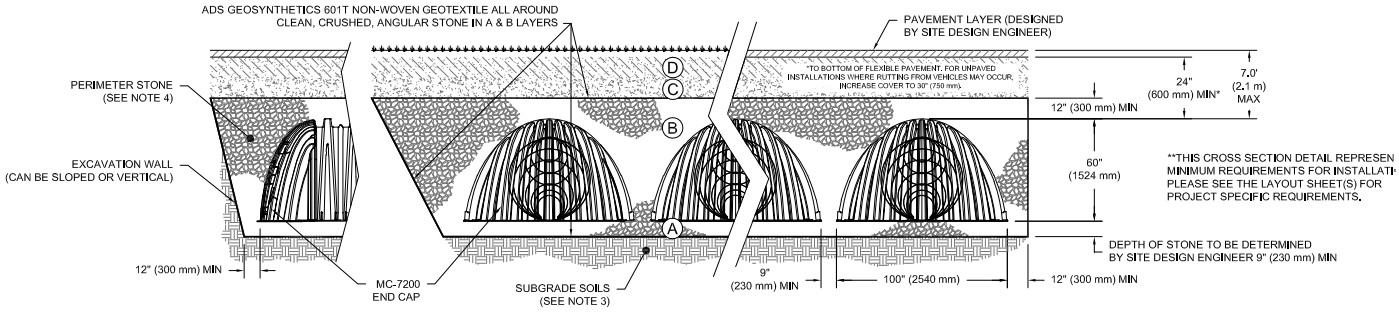
MC-3500 Stormwater Chamber Specifications

1. Chambers shall be StormTech MC-3500 or approved equal.
2. Chambers shall be made from virgin, impact-modified polypropylene copolymers.
3. Chamber rows shall provide continuous, unobstructed internal space with no internal panels that would impede flow.
4. The structural design of the chambers, the structural backfill and the installation requirements shall ensure that the load factors specified in the AASHTO LRFD Bridge Design Specifications, Section 12.12 are met for: 1) long-duration dead loads and 2) short-duration live loads, based on the AASHTO Design Truck with consideration for impact and multiple vehicle presences.
5. Chambers shall meet the requirements of ASTM F 2418, “Standard Specification for Polypropylene (PP) Corrugated Wall Stormwater Collection Chambers.”
6. Chambers shall conform to the requirements of ASTM F 2787, “Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers.”
7. Only chambers that are approved by the engineer will be allowed. The contractor shall submit (3 sets) of the following to the engineer for approval before delivering chambers to the project site:
   - A structural evaluation by a registered structural engineer that demonstrates that the load factors specified in the AASHTO LRFD Bridge Design Specifications, Section 12.12 are met. The 50-year creep modulus data specified in ASTM F 2418 must be used as part of the AASHTO structural evaluation to verify long-term performance.
   - Structural cross section detail on which the structural cross section is based.
8. The installation of chambers shall be in accordance with the manufacturer’s latest Construction Guide.

Detail drawings available in Cad Rev. 2000 format at www.stormtech.com

7.0 Structural Cross Sections and Specifications

Figure 16B - MC-7200 Structural Cross Section Detail (Not to Scale)



Special applications will be considered on a project by project basis. Please contact our application department should you have a unique application for our team to evaluate.

MC-7200 Stormwater Chamber Specifications

1. Chambers shall be StormTech MC-7200 or approved equal.
2. Chambers shall be made from virgin, impact-modified polypropylene copolymers.
3. Chamber rows shall provide continuous, unobstructed internal space with no internal panels that would impede flow.
4. The structural design of the chambers, the structural backfill and the installation requirements shall ensure that the load factors specified in the AASHTO LRFD Bridge Design Specifications, Section 12.12 are met for: 1) long-duration dead loads and 2) short-duration live loads, based on the AASHTO Design Truck with consideration for impact and multiple vehicle presences.
5. Chambers shall meet the requirements of ASTM F 2418, “Standard Specification for Polypropylene (PP) Corrugated Wall Stormwater Collection Chambers.”
6. Chambers shall conform to the requirements of ASTM F 2787, “Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers.”
7. Only chambers that are approved by the engineer will be allowed. The contractor shall submit (3 sets) of the following to the engineer for approval before delivering chambers to the project site:
   - A structural evaluation by a registered structural engineer that demonstrates that the load factors specified in the AASHTO LRFD Bridge Design Specifications, Section 12.12 are met. The 50-year creep modulus data specified in ASTM F 2418 must be used as part of the AASHTO structural evaluation to verify long-term performance.
   - Structural cross section detail on which the structural cross section is based.
8. The installation of chambers shall be in accordance with the manufacturer’s latest Construction Guide.

Detail drawings available in Cad Rev. 2000 format at www.stormtech.com

8.0 General Notes

1. StormTech requires installing contractors to use and understand the latest StormTech **MC-3500 and MC-7200 Construction Guides** prior to beginning system installation.
2. StormTech offers installation consultations to installing contractors. Contact our Technical Service Department or local StormTech representative at least 30 days prior to system installation to arrange a pre-installation consultation. Our representatives can then answer questions or address comments on the StormTech chamber system and inform the installing contractor of the minimum installation requirements before beginning the system's construction. Call 860-529-8188 to speak to a Technical Service Representative or visit www.stormtech.com to receive a copy of our Construction Guide.
3. StormTech requirements for systems with pavement design (asphalt, concrete pavers, etc.): Minimum cover is 18" (450mm) for the MC-3500 and 24"(600mm) for the MC-7200 not including pavement; MC-3500 maximum cover is 8.0' (1.98 m) and MC-7200 maximum cover is 7.0' (2.43 m) both including pavement. For designs with cover depths deeper than these maximums, please contact Stormtech. For installations that do not include pavement, where rutting from vehicles may occur, minimum required cover is increased to 30" (762 mm).
4. The contractor must report any discrepancies with the bearing capacity of the subgrade materials to the design engineer.
5. AASHTO M288 Class 2 non-woven geotextile (ADS601 or equal) (filter fabric) must be used as indicated in the project plans.
6. Stone placement between chamber rows and around perimeter must follow instructions as indicated in the most current version of StormTech MC-3500 / MC-7200 Construction Guides.
7. Backfilling over the chambers must follow requirements as indicated in the most current version of StormTech MC-3500 / MC-7200 Construction Guides.
8. The contractor must refer to StormTech MC-3500 / MC-7200 Construction Guides for a Table of Acceptable Vehicle Loads at various depths of cover. This information is also available at the StormTech website: www.stormtech.com. The contractor is responsible for preventing vehicles that exceed StormTech requirements from traveling across or parking over the stormwater system. Temporary fencing, warning tape and appropriately located signs are commonly used to prevent unauthorized vehicles from entering sensitive construction areas.
9. The contractor must apply erosion and sediment control measures to protect the stormwater system during all phases of site construction per local codes and design engineer's specifications.
10. STORMTECH PRODUCT WARRANTY IS LIMITED. Contact StormTech for warranty information.

9.0 Inspection and Maintenance

9.1 Isolator Row Plus Inspection

Regular inspection and maintenance are essential to assure a properly functioning stormwater system. Inspection is easily accomplished through the manhole or optional inspection ports of an Isolator Row Plus. Please follow local and OSHA rules for a confined space entry.

Inspection ports can allow inspection to be accomplished completely from the surface without the need for a con- fined space entry. Inspection ports provide visual access to the system with the use of a flashlight. A stadia rod may be inserted to determine the depth of sediment. If upon visual inspection it is found that sediment has accumulated to an average depth exceeding 3" (76 mm), cleanout is required.

A StormTech Isolator Row Plus should initially be inspected immediately after completion of the site's construction. While every effort should be made to prevent sediment from entering the system during construction, it is during this time that excess amounts of sediments are most likely to enter any stormwater system. Inspection and maintenance, if necessary, should be performed prior to passing responsibility over to the site's owner. Once in normal service, a StormTech Isolator Row Plus should be inspected bi-annually until an understanding of the sites characteristics is developed. The site's maintenance manager can then revise the inspection schedule based on experience or local requirements.

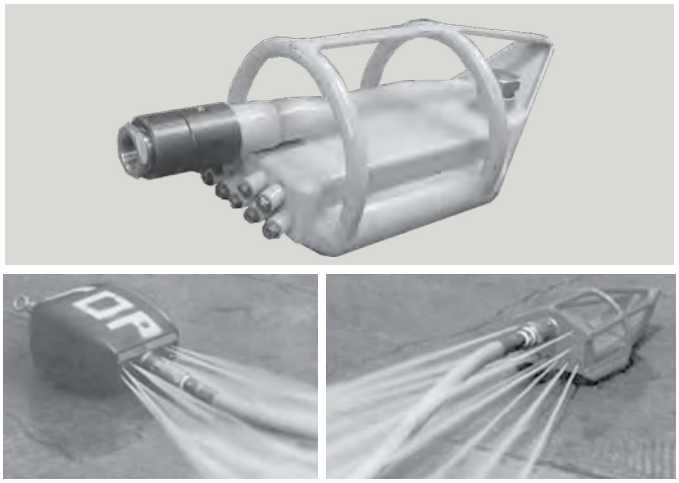
9.2 Isolator Row Plus Maintenance

JetVac maintenance is recommended if sediment has been collected to an average depth of 3" (76 mm) inside the Isolator Row Plus. More frequent maintenance may be required to maintain minimum flow rates through the Isolator Row Plus. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row Plus while scouring and suspending sediments. As the nozzle is retrieved, a wave of suspended sediments is flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/ JetVac combi- nation vehicles. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" (1143 mm) are best. StormTech recommends a maximum nozzle pressure of 2000 psi be utilized during cleaning. The JetVac process shall only be performed on StormTech Rows that have ADS Plus fabric over the foundation stone.

A Flamp (flared end ramp) is attached to the inlet pipe on the inside of the chamber end cap to provide a smooth transition from pipe invert to fabric bottom. It is configured to improve chamber function performance over time by distributing sediment and debris that would otherwise collect at the inlet. It also serves to improve the fluid and solid flow back into the inlet pipe during maintenance and cleaning, and to guide cleaning and inspection equipment back into the inlet pipe when complete.

Flamp (Flared End Ramp)

A typical JetVac truck (This is not a StormTech product.)



Examples of culvert cleaning nozzles appropriate for Isolator Row Plus maintenance. (These are not StormTech products).

MC-7200 MC-3500 DC-780 SC-740 SC-310 SC-160LP

A Family of Products and Services for the Stormwater Industry:

MC-3500 and MC-7200 Chambers and End Caps

SC-160LP, SC-310 and SC-740 Chambers & End Caps

DC-780 Chambers and End Caps

Fabricated End Caps

Fabricated Manifold Fittings

Patented Isolator Row PLUS for Maintenance and Water Quality

Chamber Separation Spacers

In-House System Layout Assistance

On-Site Educational Seminars

Worldwide Technical Sales Group

Centralized Product Applications Department

Research and Development Team

Technical Literature, O&M Manuals and Detailed CAD drawings all downloadable via our Website

StormTech provides state-of-the-art products and services that meet or exceed industry performance standards and expectations. We offer designers, regulators, owners and contractors the highest quality products and services for stormwater management that Saves Valuable Land and Protects Water Resources.

adspipe.com

800-821-6710

ADS "Terms and Conditions of Sale" are available on the ADS website, www.ads-pipe.com
Advanced Drainage Systems, the ADS logo and the Green Stripe are registered trademarks of Advanced Drainage Systems, Inc.
StormTech® and the Isolator® Row PLUS are registered trademarks of StormTech, Inc.
© 2022 Advanced Drainage Systems, Inc. #11116 3/22 CS

ADS StormTech™

StormTech® Installation Guide

MC-7200 Chamber

StormTech Installation Video

Required Materials and Equipment List

- Acceptable fill materials per Table 1
- ADS PLUS and non-woven geotextile fabrics
- StormTech solid end caps, pre-cored and pre-fabricated end caps
- StormTech chambers, manifolds and fittings

Note: MC-7200 chamber pallets are 100" x 84" (2.5 m x 2.1 m) and weigh about 1435 lbs. (651 kg). Unloading chambers requires 72" (1.8 m) (min.) forks and/or tie downs (straps, chains, etc).

Important Notes:

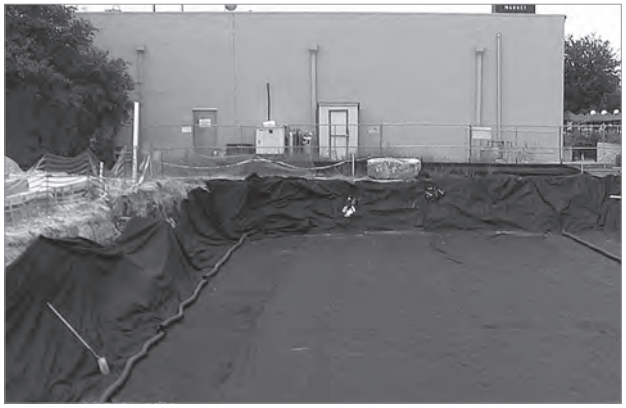
A. This installation guide provides the minimum requirements for proper installation of chambers. Non-adherence to this guide may result in damage to chambers during installation. Replacement of damaged chambers during or after backfilling is costly and very time consuming. It is recommended that all installers are familiar with this guide, and that the contractor inspects the chambers for distortion, damage and joint integrity as work progresses.

B. Use of a dozer to push embedment stone between the rows of chambers may cause damage to chambers and is not an acceptable backfill method. Any chambers damaged by using the "dump and push" method are not covered under the StormTech standard warranty.

C. Care should be taken in the handling of chambers and end caps. End caps must be stored standing upright. Avoid dropping, prying or excessive force on chambers during removal from pallet and initial placement.

Requirements for System Installation

Excavate bed and prepare subgrade per engineer's plans. Plans and specifications should include Best Management Practices (BMPs) to deter contamination of open pits during construction.



Place non-woven geotextile over prepared soils and up excavation walls.

Place clean, crushed, angular stone foundation 9" (230 mm) min. Install underdrains if required. Compact to achieve a flat surface.

Manifold, Scour Fabric and Chamber Assembly

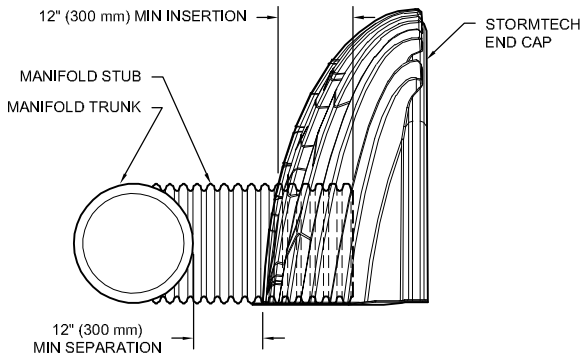
Install manifolds and lay out ADS Plus fabric at inlet rows [min. 17.5 ft (5.33 m)] at each inlet end cap. Place a continuous piece (no seams) along entire length of Isolator® Plus Row(s). Align the first chamber and end cap of each row with inlet pipes. Contractor may choose to postpone stone placement around end chambers and leave ends of rows open for easy inspection of chambers during the backfill process.

The MC-7200 contains built in ropes at the feet on both sides of the chambers to be used to lift and place the chambers using an excavator. No more than two chambers should be lifted at a time using the ropes. A 14' x 3/8" (10 mm) chain is recommended along with a 5/8" (16 mm) Jaw and Eye Swivel. Using this method, chambers can be placed directly on an existing row. Using too long of a chain may cause the chambers to be less stable during picking.

Continue installing chambers by overlapping chamber end corrugations. Chamber joints are labeled "Lower Joint – Overlap Here" and "Build this direction – Upper Joint" Be sure that the chamber placement does not exceed the reach of the construction equipment used to place the stone. Maintain minimum 9" (230 mm) spacing between MC-7200 rows.

Place a continuous layer of ADS Plus fabric between the foundation stone and the Isolator Row Plus chambers, making sure the fabric lays flat and extends the entire width of the chamber feet. When used on an Isolator Row Plus, a 24" FLAMP (flared end ramp) is attached to the inside of the inlet pipe with a provided threaded rod and bolt. The FLAMP then lays on top of the ADS Plus fabric.

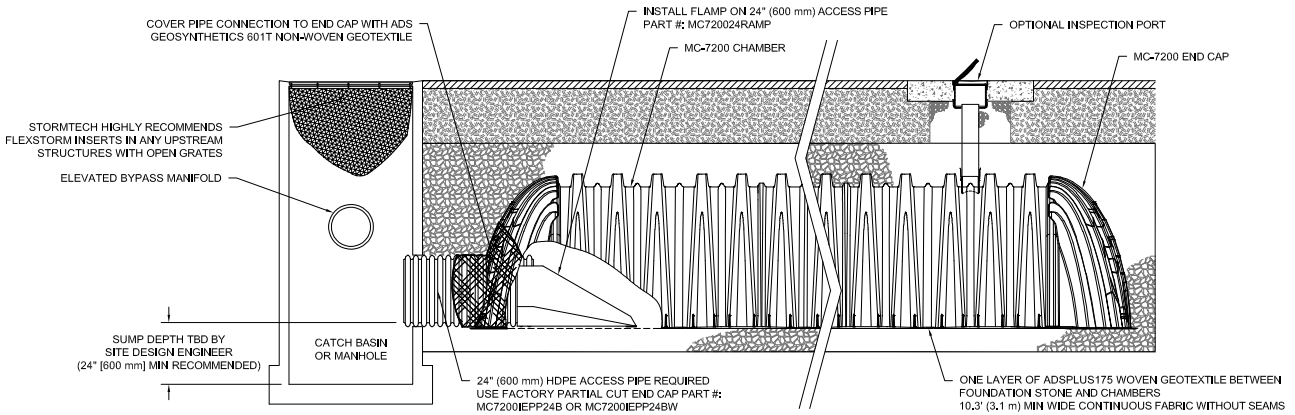
Manifold Insertion



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

Insert inlet and outlet manifolds a minimum 12" (300 mm) into chamber end caps. Manifold header should be a minimum 12" (300 mm) from base of end cap.

StormTech Isolator Row Plus Detail

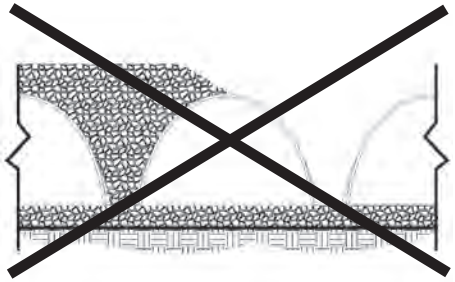


Initial Anchoring of Chambers – Embedment Stone

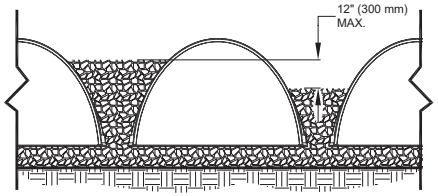
Initial embedment shall be spotted along the centerline of the chamber evenly anchoring the lower portion of the chamber. This is best accomplished with a stone conveyor or excavator reaching along the row.

No equipment shall be operated on the bed at this stage of the installation. Excavators must be located off the bed. Dump trucks shall not dump stone directly on to the bed. Dozers or loaders are not allowed on the bed at this time.

Backfill of Chambers – Embedment Stone

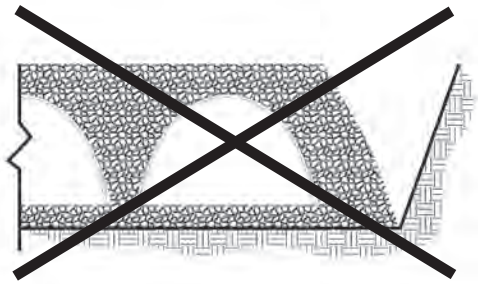


Uneven Backfill

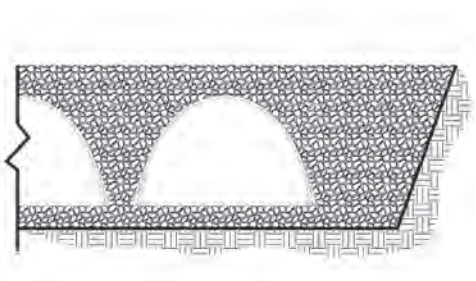


Even Backfill

Backfill chambers evenly. Stone column height should never differ by more than 12” (300 mm) between adjacent chamber rows or between chamber rows and perimeter.



Perimeter Not Backfilled



Perimeter Fully Backfilled

Perimeter stone must be brought up evenly with chamber rows. Perimeter must be fully backfilled, with stone extended horizontally to the excavation wall.

Backfill of Chambers – Embedment Stone and Cover Stone

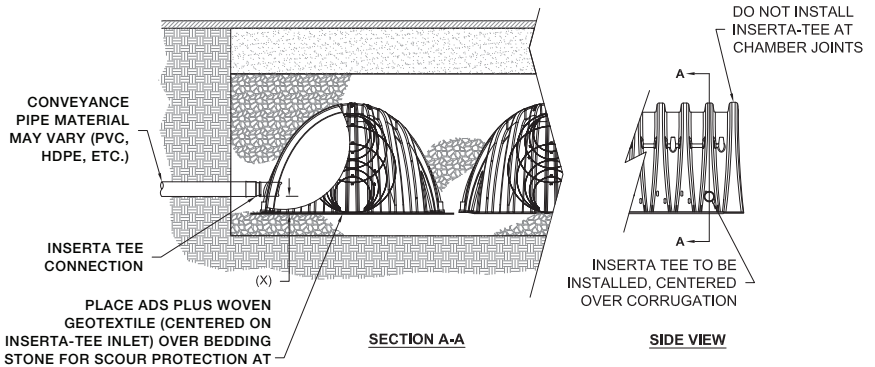
Continue evenly backfilling between rows and around perimeter until embedment stone reaches tops of chambers and a minimum 12” (300 mm) of cover stone is in place. Perimeter stone must extend horizontally to the excavation wall for both straight or sloped sidewalls. The recommended backfill methods are with a stone conveyor outside of the bed or build as you go with an excavator inside the bed reaching along the rows. Backfilling while assembling chambers rows as shown in the picture will help to ensure that equipment reach is not exceeded.

Only after chambers have been backfilled to top of chamber and with a minimum 12” (300 mm) of cover stone on top of chambers can skid loaders and small LGP dozers be used to final grade cover stone and backfill material in accordance with ground pressure limits in Table 2. Equipment must push material parallel to rows only. Never push perpendicular to rows. StormTech recommends the contractor inspect chamber rows before placing final backfill. Any chambers damaged by construction equipment shall be removed and replaced.

Final Backfill of Chambers – Fill Material

Install non-woven geotextile over stone. Geotextile must overlap 24” (600 mm) where edges meet. Compact at 24” (600 mm) of fill. Roller travel parallel with rows.

Inserta Tee Detail



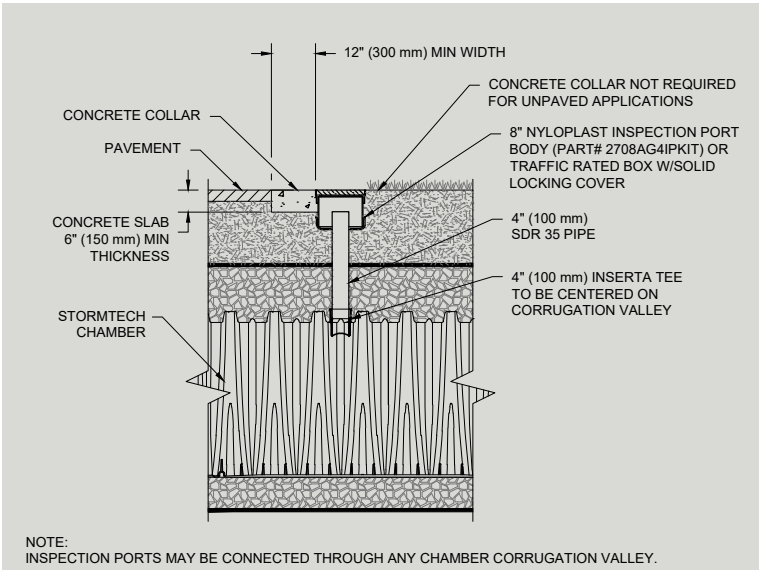
NOTE:
PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.

CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
MC-7200	12" (250 mm)	8" (200 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

Table 1- Acceptable Fill Materials

Material Location	Description	AASHTO M43 Designation[1]	Compaction/Density Requirement
(D) **Final Fill:** Fill Material for layer 'D' starts from the top of the 'C' layer to the bottom of flexible pavement or unpaved finished grade above. Note that the pavement subbase may be part of the 'D' layer.	Any soil/rock materials, native soils or per engineer's plans. Check plans for pavement subgrade requirements.	N/A	Prepare per site design engineer's plans. Paved installations may have stringent material and preparation requirements.
(C) **Initial Fill:** Fill Material for layer 'C' starts from the top of the embedment stone ('B' layer) to 24" (600 mm) above the top of the chamber. Note that pavement subbase may be part of the 'C' layer.	Granular well-graded soil/aggregate mixtures, <35% fines or processed aggregate. Most pavement subbase materials can be used in lieu of this layer.	AASHTO M145[1] A-1, A-2-4, A-3 or AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	Begin compaction after min. 24" (600 mm) of material over the chambers is reached. Compact additional layers in 12" (300 mm) max. lifts to a min. 95% Proctor density for well-graded material and 95% relative density for processed aggregate materials.
(B) **Embedment Stone:** Fill the surrounding chambers from the foundation stone ('A' layer) to the 'C' layer above.	Clean, crushed, angular stone	AASHTO M43[1] 3, 4	No compaction required.
(A) **Foundation Stone:** Fill below chambers from the subgrade up to the foot (bottom) of the chamber.	Clean, crushed, angular stone,	AASHTO M43[1] 3, 4	Place and compact in 9" (230 mm) max lifts using two full coverages with a vibratory compactor.[2, 3]

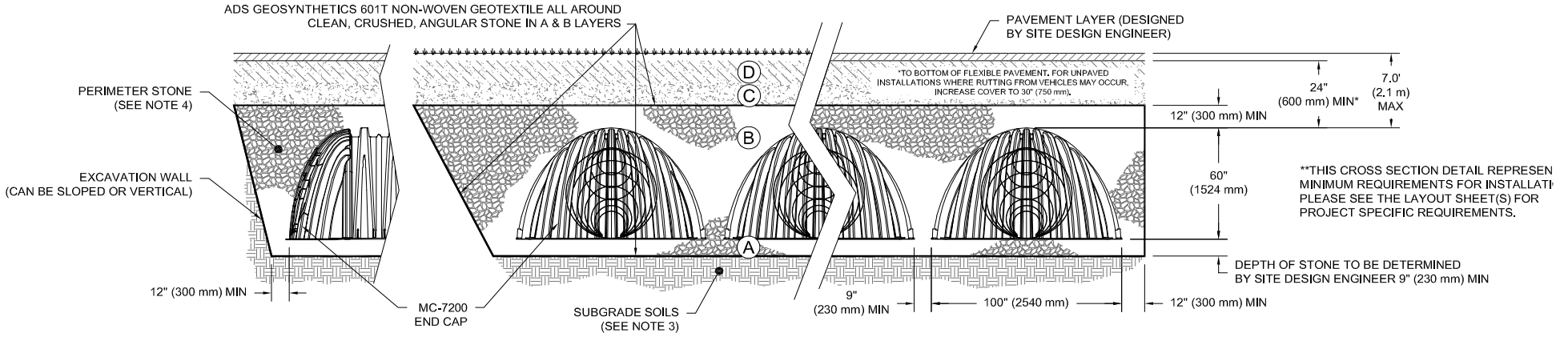
Figure 1- Inspection Port Detail



Please Note:

1. The listed AASHTO designations are for gradations only. The stone must also be clean, crushed, angular. For example, a specification for #4 stone would state: "clean, crushed, angular no. 4 (AASHTO M43) stone".
2. StormTech compaction requirements are met for 'A' location materials when placed and compacted in 9" (230 mm) (max) lifts using two full coverages with a vibratory compactor.
3. Where infiltration surfaces may be comprised by compaction, for standard installations and standard design load conditions, a flat surface may be achieved by raking or dragging without compaction equipment. For special load designs, contact StormTech for compaction requirements.

Figure 2 - Fill Material Locations



Notes:

1. 36" (900 mm) of stabilized cover materials over the chambers is recommended during the construction phase if general construction activities, such as full dump truck travel and dumping, are to occur over the bed.
2. During paving operations, dump truck axle loads on 18" (450 mm) of cover for MC-7200s may be necessary. Precautions should be taken to avoid rutting of the road base layer, to ensure that compaction requirements have been met, and that a minimum of 18" (450 mm) of cover for MC-7200s exists over the chambers. Contact StormTech for additional guidance on allowable axle loads during paving.
3. Ground pressure for track dozers is the vehicle operating weight divided by total ground contact area for both tracks. Excavators will exert higher ground pressures based on loaded bucket weight and boom extension.
4. Mini-excavators (<8,000 lbs/3,628 kg) can be used with at least 12" (300 mm) of stone over the chambers and are limited by the maximum ground pressures in Table 2 based on a full bucket at maximum boom extension.
5. StormTech does not require compaction of initial fill at 18" (450 mm) of cover. However, requirements by others for 6" (150 mm) lifts may necessitate the use of small compactors at 18" (450 mm) of cover.
6. Storage of materials such as construction materials, equipment, spoils, etc. should not be located over the StormTech system. The use of equipment over the StormTech system not covered in Table 2 (ex. soil mixing equipment, cranes, etc) is limited. Please contact StormTech for more information.
7. Allowable track loads based on vehicle travel only. Excavators shall not operate on chamber beds until the total backfill reaches 3 feet (900 mm) over the entire bed.

Call StormTech at **888.892.2694** for technical and product information or visit www.stormtech.com

Table 2 - Maximum Allowable Construction Vehicle Loads[6]

Material Location	Fill Depth over Chambers in. (mm)	Maximum Allowable Wheel Loads		Maximum Allowable Track Loads[6]		Maximum Allowable Roller Loads
		Max Axle Load for Trucks lbs (kN)	Max Wheel Load for Loaders lbs (kN)	Track Width in. (mm)	Max Ground Pressure psf (kPa)	Max Drum Weight or Dynamic Force lbs (kN)
Ⓓ Final Fill Material	36" (900) Compacted	32,000 (142)	16,000 (71)	12" (305) 18" (457) 24" (610) 30" (762) 36" (914)	4050 (194) 2760 (132) 2130 (102) 1770 (84) 1530 (73)	38,000 (169)
Ⓒ Initial Fill Material	24" (600) Compacted	32,000 (142)	16,000 (71)	12" (305) 18" (457) 24" (610) 30" (762) 36" (914)	2750 (131) 1920 (92) 1520 (73) 1310 (63) 1180 (56)	20,000 (89)
	24" (600) Loose/Dumped	24,000 (107)	12,000 (53)	12" (305) 18" (457) 24" (610) 30" (762) 36" (914)	2430 (116) 1730 (82) 1390 (66) 1210 (58) 1100 (52)	16,000 (71)
	18" (450)	24,000 (107)	12,000 (53)	12" (305) 18" (457) 24" (610) 30" (762) 36" (914)	2140 (102) 1530 (73) 1260 (60) 1120 (53) 1030 (49)	5,000 (22) (static loads only)[5]
Ⓑ Embedment Stone	12" (300)	Not Allowed	Not Allowed	12" (305) 18" (457) 24" (610) 30" (762)	1100 (53) 710 (34) 660 (32) 580 (28)	Not Allowed
	6" (150)	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed

Table 3 - Placement Methods and Descriptions

Material Location	Placement Methods/ Restrictions	Wheel Load Restrictions	Track Load Restrictions	Roller Load Restrictions
		See Table 2 for Maximum Construction Loads		
Ⓓ Final Fill Material	A variety of placement methods may be used. All construction loads must not exceed the maximum limits in Table 2.	36" (900 mm) minimum cover required for dump trucks to dump over chambers.	Dozers to push parallel to rows.[4]	Roller travel parallel to rows only until 36" (900 mm) compacted cover is reached.
Ⓒ Initial Fill Material	Excavator positioned off bed recommended. Small excavator allowed over chambers. Small dozer allowed.	Asphalt can be dumped into paver when compacted pavement subbase reaches 24" (600 mm) above top of chambers.	Small LGP track dozers & skid loaders allowed to grade cover stone with at least 12" (300 mm) stone under tracks at all times. Equipment must push parallel to rows at all times.	Use dynamic force of roller only after compacted fill depth reaches 24" (600 mm) over chambers. Roller travel parallel to chamber rows only.
Ⓑ Embedment Stone	No equipment allowed on bare chambers. Use excavator or stone conveyor positioned off bed or on foundation stone to evenly fill around all chambers to at least the top of chambers.	No wheel loads allowed. Material must be placed outside the limits of the chamber bed.	No tracked equipment is allowed on chambers until a min. 12" (300 mm) cover stone is in place.	No rollers allowed.
Ⓐ Foundation Stone	No StormTech restrictions. Contractor responsible for any conditions or requirements by others relative to subgrade bearing capacity, dewatering or protection of subgrade.			

ADS "Terms and Conditions of Sale" are available on the ADS website, www.ads-pipe.com. Advanced Drainage Systems, the ADS logo, and the green stripe are registered trademarks of Advanced Drainage Systems, Inc. StormTech® and the Isolator® Row PLUS are registered trademarks of StormTech, Inc.
©2022 Advanced Drainage Systems, Inc. #11103 5/22 CS