

PRELIMINARY TECHNICAL DRAINAGE STUDY

KAISER PERMANENTE MORENO VALLEY MEDICAL CENTER

**City of Moreno Valley, California
August 08, 2019**

Prepared for:

LST18-0052
PEN18-0228 - 0230

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Revision History	
1/2019	2nd Submittal
6/2019	3rd Submittal
8/2019	4th Submittal

CITY OF MORENO VALLEY CASE # XXXXXXXX

Report Prepared By:

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JN 169814

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I. INTRODUCTION

This drainage study for Kaiser Permanente Moreno Valley Medical Center accompanies the development plan. It specifically accomplishes the following:

- Determine the peak onsite 10 & 100-year runoff according to the precise grading plan.
- Define design for storm drain systems to convey the offsite and onsite flows.

1. Area Description

The project site is in the City of Moreno Valley in the County of Riverside, California. It is located between Nason Street and Oliver Street and North of Iris Avenue. The project site will be developed in 29.8 acres of combined area of APN 486-310-033 and 486-310-034, with current legal descriptions as parcel 6 and 7 of Parcel Map MB 11/10. These two parcels have full width improvements with curb and within the property limits. Figure 1 shows the location of this project.

2. Project Description

The proposed project will develop three (3) multi-story parking structures, an energy center, emergency department, two (2) medical office buildings, multi-story patient bed towers, new D&T building, driveways, walkways, and landscape areas. It will develop 27.7 acres of the combined area parcel 7 and 6 of Parcel map MB 11/10 with the 2.1 acres of existing parking lot and medical office to remain. All on-site facilities will be privately maintained.

3. Surrounding Projects and Drainage Considerations

The project site is currently a Kaiser Permanente Medical Center and office along with a pharmacy. It has been a medical facility for as long back as two decades. It has moderate vegetation, and it has relatively flat terrain draining from southeast to northwest to the adjacent property to the northwest. There is expected to be no offsite flow oncoming to the property as the perimeter of the worked area contains berms and measures to keep offsite flow away. There is currently no storm drain network located in the site. The report was completed with a conceptual design of the project and will be updated to reflect revisions made to the grading plan or the site plan.

II. HYDROLOGIC/HYDRAULIC METHODOLOGY

The methodology presented in this study is in compliance with the RCFC&WCD 1978 Hydrology Manual (Reference 5), hereinafter referred to as the Manual.

Model Descriptions -The Integrated Rational Method Hydrology System Model Version 8.0, dated January 1, 2006, (Reference 3) within the Advanced Engineering Systems Software (AES) was used to generate the peak 100-year onsite flows. The Unit Hydrograph System Model Version 9.0, dated 2014 within the Civildesign software was used to generate the volume needed to attenuate the 100-year 24-hour storm event.

Soil Type - The Manual utilizes the Soil Conservation Service (SCS) soil classification system, which classifies soils into four (4) hydrological groups (HSG): A through D, with D being the least pervious. The soil Plates C-1.17 of the Manual showing location of project is included in Appendix B. According to this figure, this tract is located within a mixture of HSG "A", HSG "B". For this report, HSG "B" was conservatively used in the hydrologic models.

Development Type- For the proposed developed conditions the runoff was calculated considering a commercial development.

Intensity- The 10-minute / 60-minute intensity values (inches/hour) for the 10-year and 100-year storm events, obtained from Plate D-4.1 (6 of 6) of the Manual, are 2.01/0.82 and 2.94/1.20, respectively.

Drainage Areas and Flow Patterns - The drainage areas and flow patterns for existing and proposed conditions were determined using the existing topography (Cad) and the Tentative Tract Map, respectively. The areas were measured using the computer capabilities of AutoCAD.

III. HYDROLOGY/HYDRAULIC ANALYSIS

Figure 3 in Appendix A shows the proposed onsite drainage patterns for this project. The majority of the flows will be conveyed through a storm drain system which travel through various basins and storage facilities to treat the runoff. Velocities in the pipes will vary from 6 fps to 9 fps and are subject to change due to the conceptual nature of the storm drain system that is subject to change. These pipes will outlet to existing storm water overflow paths separated by east and west.

The undeveloped conditions outflows to the west overflow path at 23.19/34.56 CFS for the 10-year and 100-year storm respectively. The eastern overflow path received a flow of 26.39/39.08 CFS for the 10-year and 100-year storm respectively.

The developed conditions of the site outflow to the same over flow paths with the western overflow receiving 19.16/28.01CFS for the 10-year and 100-year storm respectively. The eastern peak flow will be 37.48/54.46 CFS for the 10-year and 100-year storm respectively.

The western peak flow is lower than predevelopment peak flow, thus attenuation is not applied. The eastern peak flow is higher than existing conditions, thus sized storage vaults will be installed to limit increase of overflow runoff to stay at existing conditions. The storage vaults are sized for the 100-year 24-hour storm event and these calculations are provided in Appendix B. The exact volumes are also provided in the conclusions below. These storage vaults are needed to mitigate the increase of flow offsite.

Hydraulic analysis was performed on major sections of the storm drain network to size for the 100-year storm event. See Appendix D for data pertaining to the size of the network.

The flow going to the discharge points of the developed site are subject to change as the site plans develops past the conceptual level.

IV. CONCLUSIONS

1. Methodology used in this report is in compliance with the Riverside County Flood Control and Water Conservation District.
2. There are no anticipated negative downstream or upstream impacts.
3. The western DMA is decreasing in size and the eastern DMA is increasing which is reflected the table below.

	DMA West	DMA East
Size Existing	14.20 Acres	15.25 Acres
Size Proposed	9.89 Acres	19.56 Acres
Q Existing	34.56 CFS	39.08 CFS
Q Proposed	28.01 CFS	54.46 CFS

4. WQMP modular wetland basins and pipelines are sized per WQMP report. All pipelines otherwise are sized to 100-year 1-hour storm event. See Storm Drain Network Exhibit in Appendix D for proposed sizes.
5. Storage vaults and pipes will be sized to the volumes provided in the table below in compliance with the 100-year 24 hour storm event. See DMA Exhibit in Appendix B for the proposed DMA locations.

DMA "B" (PROPOSED)					DMA "B" (EXISTING)					Difference	
	100-YEAR				100-YEAR				WORST CASE		
	1-HR	3-HR	6-HR	24-HR		1-HR	3-HR	6-HR	24-HR		
Q (CFS)	18.4	9.2	8.37	2.75	Q	16.69	8.63	7.75	2.37		
V (AC-FT)	0.48	0.68	0.89	1.47	V	0.46	0.58	0.74	1.15	0.32	AC-FT
										13,939	CU-FT

DMA "C" (PROPOSED)					DMA "C" (EXISTING)					Difference	
	100-YEAR				100-YEAR				WORST CASE		
	1-HR	3-HR	6-HR	24-HR		1-HR	3-HR	6-HR	24-HR		
Q (CFS)	23.4	13.26	12.01	4.25	Q	20.15	11.97	10.77	3.48		
V (AC-FT)	0.73	1.05	1.38	2.34	V	0.66	0.85	1.09	1.7	0.64	AC-FT
										27,878	CU-FT

DMA "D" (PROPOSED)					DMA "D" (EXISTING)					Difference	
	100-YEAR				100-YEAR				WORST CASE		
	1-HR	3-HR	6-HR	24-HR		1-HR	3-HR	6-HR	24-HR		
Q (CFS)	18.83	11.98	10.89	4.16	Q	17.51	9.32	7.85	2.17		
V (AC-FT)	0.7	1.02	1.37	2.35	V	0.51	0.55	0.64	0.77	1.58	AC-FT
										68,825	CU-FT

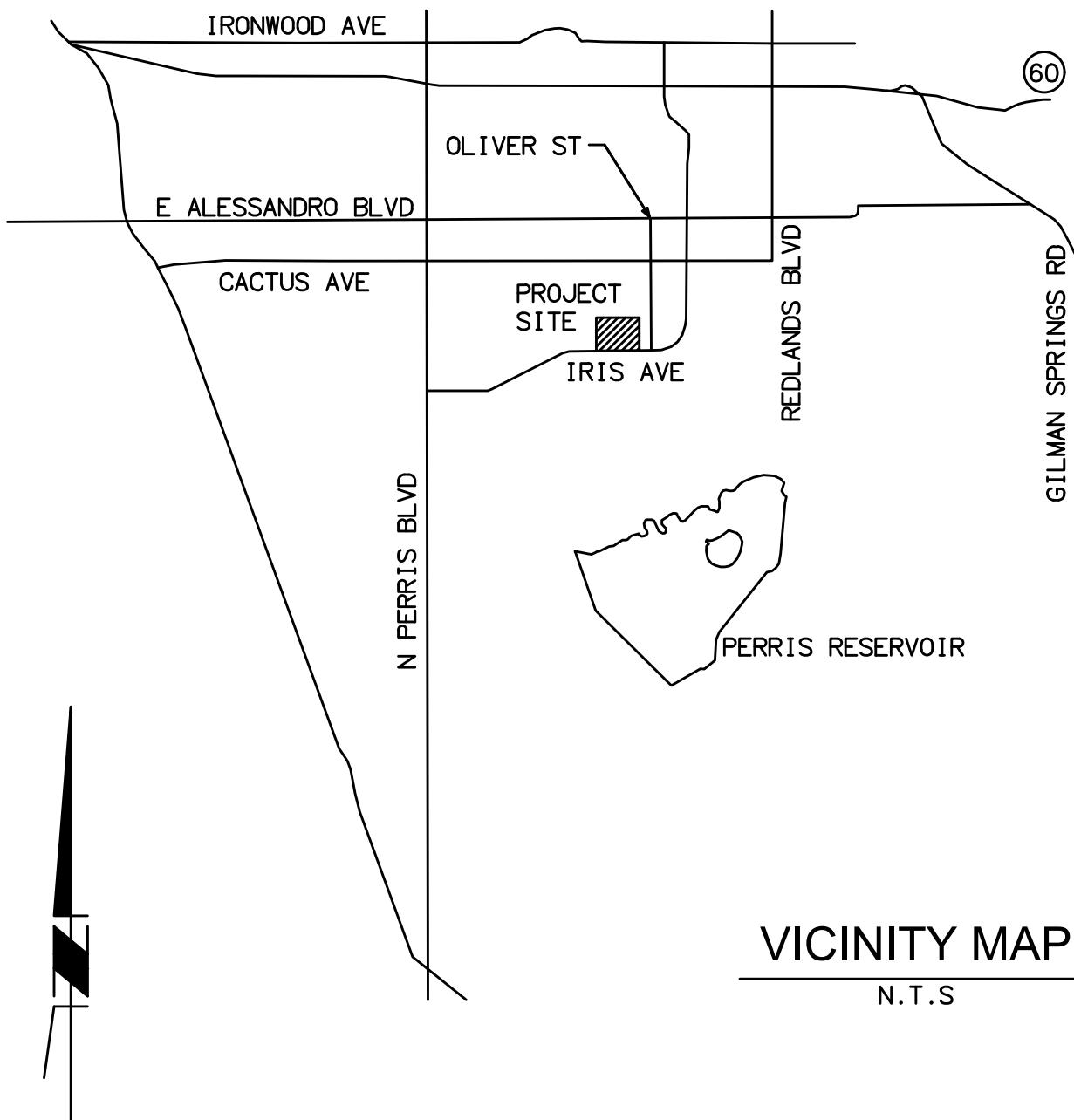
VI. REFERENCES

1. AEI-CASC Engineering, Hydrology Study Report for Bluestone Murrieta, October 5, 2001.
2. Riverside Flood Control District and Water Conservation District (RCFC&WCD) *Hydrology Manual*, 1978.
3. Advanced Engineering Systems Software (AES), Rational Method Hydrology System Model Version 8.0, January 1, 2006.
4. Advanced Engineering Systems Software (AES), Hydraulic Elements Program Package

(HELE1) Version 8.0, January 1, 2006.

5. Civildesign Engineering Software, Unit Hydrograph System Model, 1989-2014, Version 9.0.

6. Riverside Flood Control District and Water Conservation District, Riverside Design Handbook for Low Impact Development, Best Management Practices, September 2011.



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**KAISER PERMANENTE MORENO
VALLEY AREAMASTER PLAN
AND MEDICAL OFFICE BUILDING**

VICINITY MAP

FIGURE 1

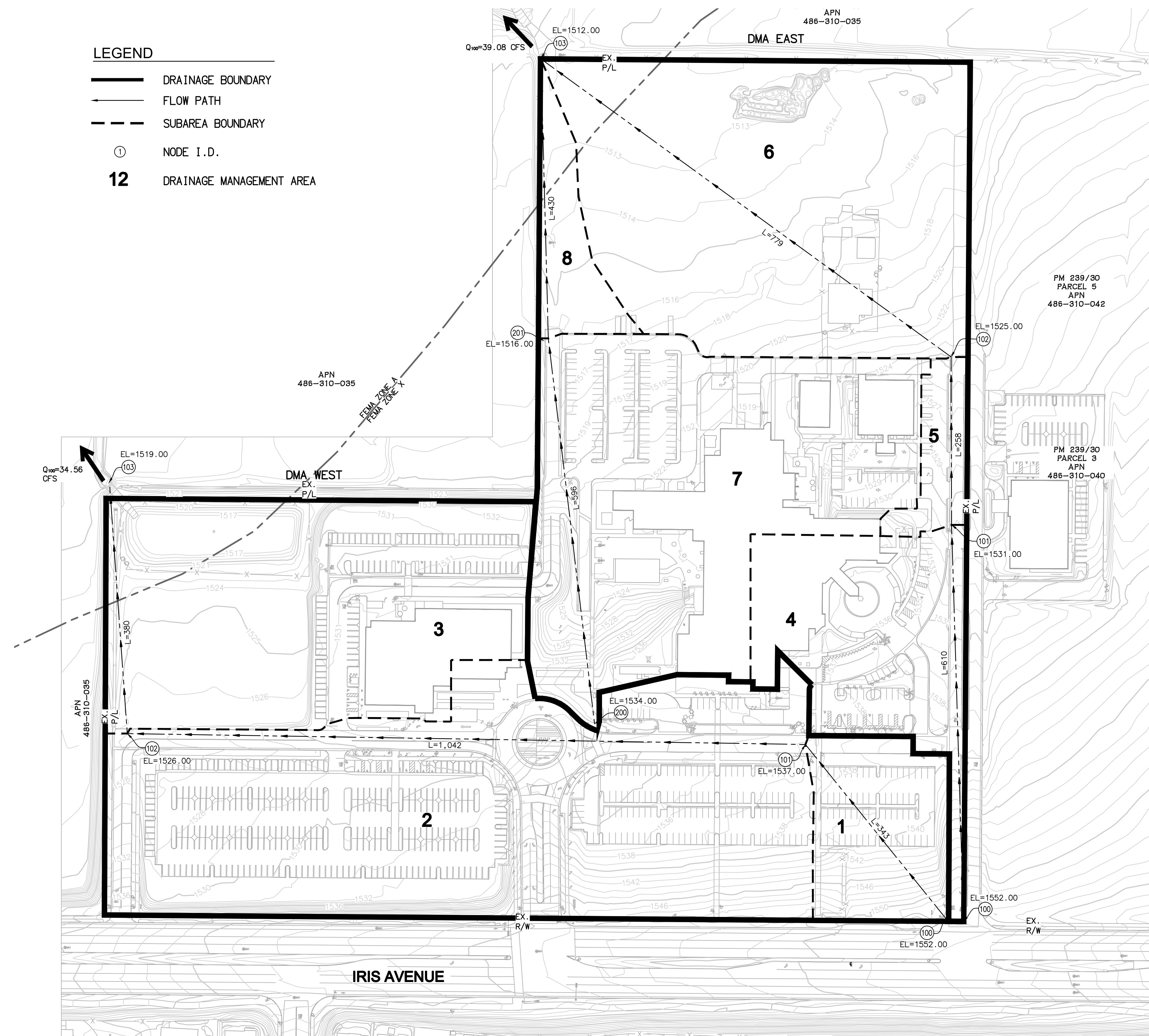
APPENDIX A

HYDROLOGY CALCULATIONS

**Undeveloped Condition
10 & 100-Year Hydrology
Rational Method Calculations**

LEGEND

- DRAINAGE BOUNDARY
- FLOW PATH
- - - SUBAREA BOUNDARY
- ① NODE I.D.
- 12** DRAINAGE MANAGEMENT AREA



80 40 0 80 160 240
SCALE: 1"=80'

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FIGURE 2-EXISTING
HYDROLOGY MAP - EXISTING CONDITIONS Q100
KAISSER MEDICAL MORENO VALLEY

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
(RCFC&WCD) 1978 HYDROLOGY MANUAL
(c) Copyright 1982-2013 Advanced Engineering Software (aes)
(Rational Tabling Version 20.0)
Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

***** DESCRIPTION OF STUDY *****

* KAISER PERMANENTE MORENO VALLEY MEDICAL CENTER *
* ON-SITE HYDROLOGY *
* 10-YEAR STORM EVENT EXISTING CONDITIONS *

FILE NAME: PREW10.DAT

TIME/DATE OF STUDY: 17:08 07/15/2019

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.010
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 0.820
100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.940
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.200
SLOPE OF 10-YEAR INTENSITY-DURATION CURVE = 0.5003939
SLOPE OF 100-YEAR INTENSITY-DURATION CURVE = 0.5001161

COMPUTED RAINFALL INTENSITY DATA:

STORM EVENT = 10.00 1-HOUR INTENSITY(INCH/HOUR) = 0.828

SLOPE OF INTENSITY DURATION CURVE = 0.5004

RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD

NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-CROWN TO STREET-CROSSFALL (FT)	WIDTH CROSSFALL (FT)	IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018 / 0.018 / 0.020	0.67	2.00	0.0313	0.167	0.0150

PREW10

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

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

=====

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 343.00
UPSTREAM ELEVATION(FEET) = 1552.00
DOWNSTREAM ELEVATION(FEET) = 1537.00
ELEVATION DIFFERENCE(FEET) = 15.00
TC = 0.303*[(343.00**3)/(15.00)]**.2 = 5.855
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.654
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8745
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 3.11
TOTAL AREA(ACRES) = 1.34 TOTAL RUNOFF(CFS) = 3.11

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 1537.00 DOWNSTREAM ELEVATION(FEET) = 1526.00
STREET LENGTH(FEET) = 1042.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.69
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

PREW10

STREET FLOW DEPTH(FEET) = 0.40
HALFSTREET FLOOD WIDTH(FEET) = 13.55
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.64
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.07
STREET FLOW TRAVEL TIME(MIN.) = 6.57 Tc(MIN.) = 12.43
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.821
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8671
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 12.96
TOTAL AREA(ACRES) = 9.6 PEAK FLOW RATE(CFS) = 16.07

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.84
FLOW VELOCITY(FEET/SEC.) = 2.95 DEPTH*VELOCITY(FT*FT/SEC.) = 1.37
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1385.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1526.00 DOWNSTREAM(FEET) = 1519.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 380.00 CHANNEL SLOPE = 0.0184
CHANNEL BASE(FEET) = 4.00 "Z" FACTOR = 0.000
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 2.00
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.766
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8665
SOIL CLASSIFICATION IS "B"
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.63
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.08
AVERAGE FLOW DEPTH(FEET) = 0.61 TRAVEL TIME(MIN.) = 0.78
Tc(MIN.) = 13.21
SUBAREA AREA(ACRES) = 4.65 SUBAREA RUNOFF(CFS) = 7.12
TOTAL AREA(ACRES) = 14.2 PEAK FLOW RATE(CFS) = 23.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.68 FLOW VELOCITY(FEET/SEC.) = 8.57
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 1765.00 FEET.

=====
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 14.2 TC(MIN.) = 13.21
PEAK FLOW RATE(CFS) = 23.19

=====
=====
END OF RATIONAL METHOD ANALYSIS

▲

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
(RCFC&WCD) 1978 HYDROLOGY MANUAL
(c) Copyright 1982-2013 Advanced Engineering Software (aes)
(Rational Tabling Version 20.0)
Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

***** DESCRIPTION OF STUDY *****

* KAISER PERMANENTE MORENO VALLEY MEDICAL CENTER *
* ON-SITE HYDROLOGY *
* 100-YEAR STORM EVENT EXISTING CONDITIONS *

FILE NAME: PREW100.DAT

TIME/DATE OF STUDY: 17:04 07/15/2019

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.010
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 0.820
100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.940
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.200
SLOPE OF 10-YEAR INTENSITY-DURATION CURVE = 0.5003939
SLOPE OF 100-YEAR INTENSITY-DURATION CURVE = 0.5001161

COMPUTED RAINFALL INTENSITY DATA:

STORM EVENT = 100.00 1-HOUR INTENSITY(INCH/HOUR) = 1.200

SLOPE OF INTENSITY DURATION CURVE = 0.5001

RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD

NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-CROWN TO STREET-CROSSFALL (FT)	CROSSFALL IN- / OUT- / PARK- SIDE / SIDE / WAY (FT)	CURB HEIGHT (FT)	GUTTER-GEOMETRIES WIDTH (FT)	LIP (FT)	HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018 / 0.018 / 0.020	0.67	2.00	0.0312	0.167 0.0150

PREW100

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

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

=====

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2

INITIAL SUBAREA FLOW-LENGTH(FEET) = 343.00

UPSTREAM ELEVATION(FEET) = 1552.00

DOWNSTREAM ELEVATION(FEET) = 1537.00

ELEVATION DIFFERENCE(FEET) = 15.00

TC = 0.303*[(343.00**3)/(15.00)]**.2 = 5.855

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.842

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8807

SOIL CLASSIFICATION IS "B"

SUBAREA RUNOFF(CFS) = 4.53

TOTAL AREA(ACRES) = 1.34 TOTAL RUNOFF(CFS) = 4.53

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 1537.00 DOWNSTREAM ELEVATION(FEET) = 1526.00

STREET LENGTH(FEET) = 1042.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.37

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

PREW100

STREET FLOW DEPTH(FEET) = 0.45
HALFSTREET FLOOD WIDTH(FEET) = 16.05
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.88
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.29
STREET FLOW TRAVEL TIME(MIN.) = 6.03 Tc(MIN.) = 11.89
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.696
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8748
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 19.37
TOTAL AREA(ACRES) = 9.6 PEAK FLOW RATE(CFS) = 23.90

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.51 HALFSTREET FLOOD WIDTH(FEET) = 19.73
FLOW VELOCITY(FEET/SEC.) = 3.26 DEPTH*VELOCITY(FT*FT/SEC.) = 1.68
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1385.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1526.00 DOWNSTREAM(FEET) = 1519.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 380.00 CHANNEL SLOPE = 0.0184
CHANNEL BASE(FEET) = 4.00 "Z" FACTOR = 0.000
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.622
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8743
SOIL CLASSIFICATION IS "B"
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.23
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.24
AVERAGE FLOW DEPTH(FEET) = 0.79 TRAVEL TIME(MIN.) = 0.69
Tc(MIN.) = 12.57
SUBAREA AREA(ACRES) = 4.65 SUBAREA RUNOFF(CFS) = 10.66
TOTAL AREA(ACRES) = 14.2 PEAK FLOW RATE(CFS) = 34.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.89 FLOW VELOCITY(FEET/SEC.) = 9.73
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 1765.00 FEET.

=====
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 14.2 TC(MIN.) = 12.57
PEAK FLOW RATE(CFS) = 34.56

=====
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END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
(RCFC&WCD) 1978 HYDROLOGY MANUAL
(c) Copyright 1982-2013 Advanced Engineering Software (aes)
(Rational Tabling Version 20.0)
Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

***** DESCRIPTION OF STUDY *****

* KAISER PERMANENTE MORENO VALLEY MEDICAL CENTER *
* ON-SITE HYDROLOGY *
* 10-YEAR STORM EVENT EXISTING CONDITIONS *

FILE NAME: PREE10.DAT

TIME/DATE OF STUDY: 14:04 07/14/2019

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT(YEAR) = 10.00

SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00

SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95

10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.010

10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 0.820

100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.940

100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.200

SLOPE OF 10-YEAR INTENSITY-DURATION CURVE = 0.5003939

SLOPE OF 100-YEAR INTENSITY-DURATION CURVE = 0.5001161

COMPUTED RAINFALL INTENSITY DATA:

STORM EVENT = 10.00 1-HOUR INTENSITY(INCH/HOUR) = 0.828

SLOPE OF INTENSITY DURATION CURVE = 0.5004

RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD

NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-CROWN TO STREET-CROSSFALL (FT)	WIDTH CROSSFALL (FT)	IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES WIDTH (FT)	LIP (FT)	HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018 / 0.018 / 0.020	0.67	2.00	0.0312	0.167	0.0150

PREE10

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

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

=====

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2

INITIAL SUBAREA FLOW-LENGTH(FEET) = 610.00

UPSTREAM ELEVATION(FEET) = 1552.00

DOWNTSTREAM ELEVATION(FEET) = 1531.00

ELEVATION DIFFERENCE(FEET) = 21.00

TC = 0.303*[(610.00**3)/(21.00)]**.2 = 7.733

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.309

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8719

SOIL CLASSIFICATION IS "B"

SUBAREA RUNOFF(CFS) = 4.75

TOTAL AREA(ACRES) = 2.36 TOTAL RUNOFF(CFS) = 4.75

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 1531.00 DOWNTSTREAM ELEVATION(FEET) = 1525.00

STREET LENGTH(FEET) = 258.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.20

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

PREE10

STREET FLOW DEPTH(FEET) = 0.31
HALFSTREET FLOOD WIDTH(FEET) = 8.47
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.11
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.98
STREET FLOW TRAVEL TIME(MIN.) = 1.38 Tc(MIN.) = 9.11
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.127
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8703
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 0.48 SUBAREA RUNOFF(CFS) = 0.89
TOTAL AREA(ACRES) = 2.8 PEAK FLOW RATE(CFS) = 5.64

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 8.78
FLOW VELOCITY(FEET/SEC.) = 3.20 DEPTH*VELOCITY(FT*FT/SEC.) = 1.02
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 868.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1525.00 DOWNSTREAM(FEET) = 1512.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 779.00 CHANNEL SLOPE = 0.0167
CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 0.500
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 2.00
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.792
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8668
SOIL CLASSIFICATION IS "B"
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.38
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.50
AVERAGE FLOW DEPTH(FEET) = 0.15 TRAVEL TIME(MIN.) = 3.71
Tc(MIN.) = 12.83
SUBAREA AREA(ACRES) = 6.05 SUBAREA RUNOFF(CFS) = 9.40
TOTAL AREA(ACRES) = 8.9 PEAK FLOW RATE(CFS) = 15.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.19 FLOW VELOCITY(FEET/SEC.) = 4.02
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 1647.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21

PREE10

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

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 596.00
UPSTREAM ELEVATION(FEET) = 1534.00
DOWNSTREAM ELEVATION(FEET) = 1516.00
ELEVATION DIFFERENCE(FEET) = 18.00
TC = 0.303*[(596.00**3)/(18.00)]**.2 = 7.865
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.289
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8717
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 11.36
TOTAL AREA(ACRES) = 5.69 TOTAL RUNOFF(CFS) = 11.36

FLOW PROCESS FROM NODE 201.00 TO NODE 103.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1516.00 DOWNSTREAM(FEET) = 1512.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 430.00 CHANNEL SLOPE = 0.0093
CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 0.500
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.975
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8688
SOIL CLASSIFICATION IS "B"
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.66
AVERAGE FLOW DEPTH(FEET) = 0.44 TRAVEL TIME(MIN.) = 2.70
Tc(MIN.) = 10.56
SUBAREA AREA(ACRES) = 0.67 SUBAREA RUNOFF(CFS) = 1.15
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 12.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 2.69
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 103.00 = 1026.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

** MAIN STREAM CONFLUENCE DATA **

PREE10

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	12.51	10.56	1.975	6.36
LONGEST FLOWPATH FROM NODE		200.00	TO NODE	103.00 = 1026.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	15.04	12.83	1.792	8.89
LONGEST FLOWPATH FROM NODE		100.00	TO NODE	103.00 = 1647.00 FEET.

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	24.89	10.56	1.975
2	26.39	12.83	1.792

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 26.39 Tc(MIN.) = 12.83
TOTAL AREA(ACRES) = 15.2

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 15.2 TC(MIN.) = 12.83
PEAK FLOW RATE(CFS) = 26.39

=====

=====

END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
(RCFC&WCD) 1978 HYDROLOGY MANUAL
(c) Copyright 1982-2013 Advanced Engineering Software (aes)
(Rational Tabling Version 20.0)
Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* KAISER PERMANENTE MORENO VALLEY MEDICAL CENTER *
* ON-SITE HYDROLOGY *
* 100-YEAR STORM EVENT EXISTING CONDITIONS *

FILE NAME: PREE100.DAT

TIME/DATE OF STUDY: 11:40 07/15/2019

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.010
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 0.820
100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.940
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.200
SLOPE OF 10-YEAR INTENSITY-DURATION CURVE = 0.5003939
SLOPE OF 100-YEAR INTENSITY-DURATION CURVE = 0.5001161
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 100.00 1-HOUR INTENSITY(INCH/HOUR) = 1.200
SLOPE OF INTENSITY DURATION CURVE = 0.5001
RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)
==== ===== ===== ===== ===== ===== ===== ===== ===== =====
1 30.0 20.0 0.018/0.018/0.020 0.67 2.00 0.0312 0.167 0.0150

PREE100

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

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

=====

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2

INITIAL SUBAREA FLOW-LENGTH(FEET) = 610.00

UPSTREAM ELEVATION(FEET) = 1552.00

DOWNSTREAM ELEVATION(FEET) = 1531.00

ELEVATION DIFFERENCE(FEET) = 21.00

TC = 0.303*[(610.00**3)/(21.00)]**.2 = 7.733

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.343

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8785

SOIL CLASSIFICATION IS "B"

SUBAREA RUNOFF(CFS) = 6.93

TOTAL AREA(ACRES) = 2.36 TOTAL RUNOFF(CFS) = 6.93

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 1531.00 DOWNSTREAM ELEVATION(FEET) = 1525.00

STREET LENGTH(FEET) = 258.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.58

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

PREE100

STREET FLOW DEPTH(FEET) = 0.34
HALFSTREET FLOOD WIDTH(FEET) = 10.20
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.38
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.16
STREET FLOW TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 9.01
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.098
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8773
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 0.48 SUBAREA RUNOFF(CFS) = 1.30
TOTAL AREA(ACRES) = 2.8 PEAK FLOW RATE(CFS) = 8.24

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.59
FLOW VELOCITY(FEET/SEC.) = 3.45 DEPTH*VELOCITY(FT*FT/SEC.) = 1.21
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 868.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1525.00 DOWNSTREAM(FEET) = 1512.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 779.00 CHANNEL SLOPE = 0.0167
CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 0.500
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.665
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8746
SOIL CLASSIFICATION IS "B"
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.34
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.10
AVERAGE FLOW DEPTH(FEET) = 0.19 TRAVEL TIME(MIN.) = 3.16
Tc(MIN.) = 12.17
SUBAREA AREA(ACRES) = 6.05 SUBAREA RUNOFF(CFS) = 14.10
TOTAL AREA(ACRES) = 8.9 PEAK FLOW RATE(CFS) = 22.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.23 FLOW VELOCITY(FEET/SEC.) = 4.79
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 1647.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21

PREE100

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

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 596.00
UPSTREAM ELEVATION(FEET) = 1534.00
DOWNSTREAM ELEVATION(FEET) = 1516.00
ELEVATION DIFFERENCE(FEET) = 18.00
TC = 0.303*[(596.00**3)/(18.00)]**.2 = 7.865
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.315
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8784
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 16.57
TOTAL AREA(ACRES) = 5.69 TOTAL RUNOFF(CFS) = 16.57

FLOW PROCESS FROM NODE 201.00 TO NODE 103.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1516.00 DOWNSTREAM(FEET) = 1512.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 430.00 CHANNEL SLOPE = 0.0093
CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 0.500
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.910
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8762
SOIL CLASSIFICATION IS "B"
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.06
AVERAGE FLOW DEPTH(FEET) = 0.55 TRAVEL TIME(MIN.) = 2.34
Tc(MIN.) = 10.21
SUBAREA AREA(ACRES) = 0.67 SUBAREA RUNOFF(CFS) = 1.71
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 18.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.58 FLOW VELOCITY(FEET/SEC.) = 3.09
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 103.00 = 1026.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

** MAIN STREAM CONFLUENCE DATA **

PREE100

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	18.28	10.21	2.910	6.36
LONGEST FLOWPATH FROM NODE		200.00	TO NODE	103.00 = 1026.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	22.34	12.17	2.665	8.89
LONGEST FLOWPATH FROM NODE		100.00	TO NODE	103.00 = 1647.00 FEET.

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	37.02	10.21	2.910
2	39.08	12.17	2.665

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 39.08 Tc(MIN.) = 12.17
TOTAL AREA(ACRES) = 15.2

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 15.2 TC(MIN.) = 12.17
PEAK FLOW RATE(CFS) = 39.08

=====

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END OF RATIONAL METHOD ANALYSIS

↑

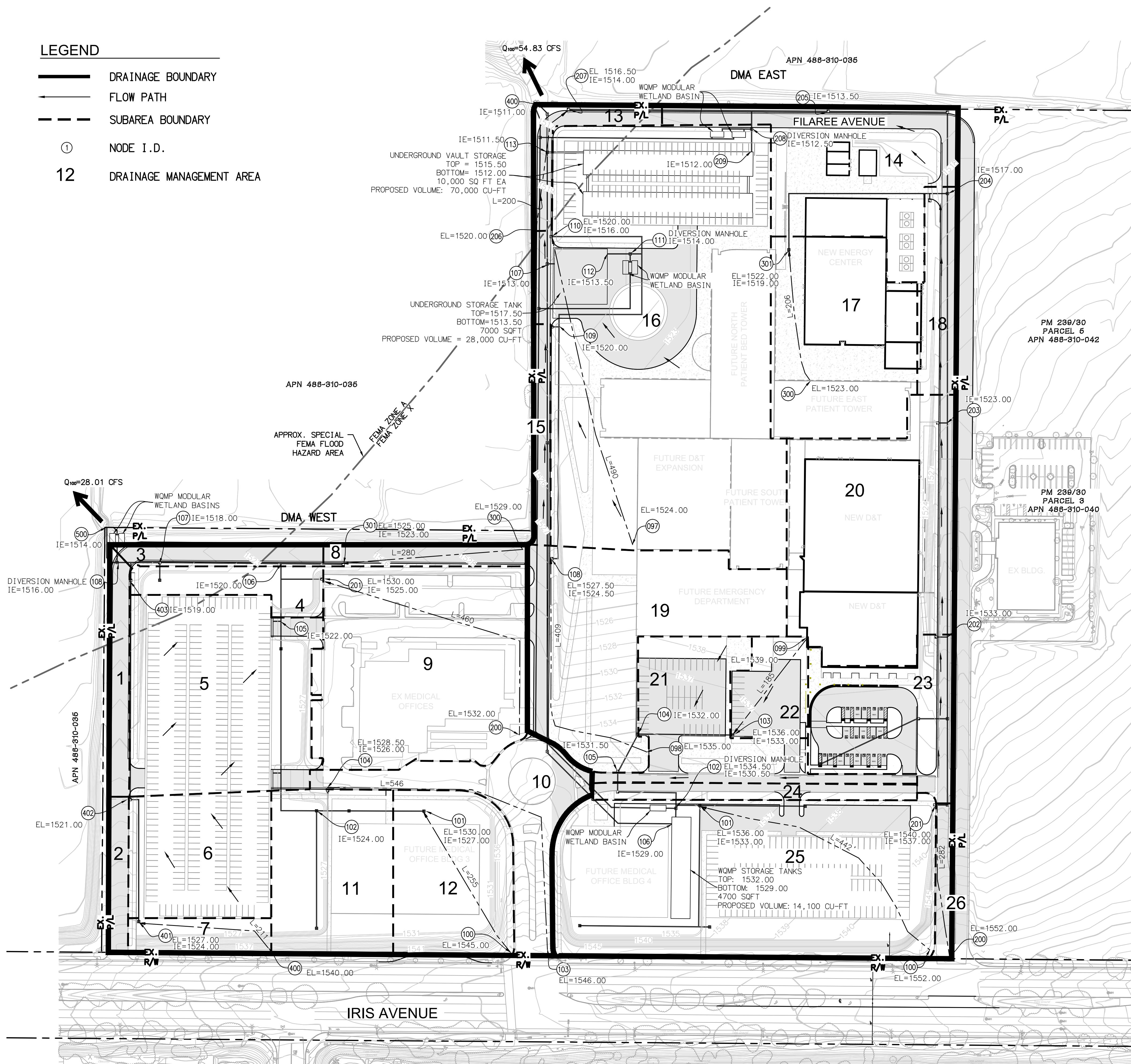
APPENDIX A

HYDROLOGY CALCULATIONS

**Developed Condition
10 & 100-Year Hydrology
Rational Method Calculations**

LEGEND

- DRAINAGE BOUNDARY
- FLOW PATH
- - - SUBAREA BOUNDARY
- ① NODE I.D.
- 12 DRAINAGE MANAGEMENT AREA



DMA WEST		DMA EAST	
DMA	SIZE [ACRE]	DMA	SIZE [ACRE]
1	0.27	13	0.23
2	0.17	14	1.42
3	0.20	15	0.21
4	0.42	16	5.44
5	1.95	17	1.36
6	0.98	18	0.60
7	0.28	19	1.97
8	0.24	20	2.14
9	2.31	21	1.04
10	0.91	22	0.39
11	1.10	23	0.99
12	1.06	24	0.26
		25	3.36
		26	0.15

SCALE: 1"=80'

Michael Baker
INTERNATIONAL
9755 Clairemont Mesa Blvd., San Diego, CA 92124
Phone: (858) 614-5000 MBAKERINTL.COM

FIGURE 3-PROPOSED
HYDROLOGY MAP - PROPOSED CONDITIONS Q100
KAI SER MEDICAL MORENO VALLEY

PROPW10

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
(RCFC&WCD) 1978 HYDROLOGY MANUAL
(c) Copyright 1982-2013 Advanced Engineering Software (aes)
(Rational Tabling Version 20.0)
Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* KAISER PERMANENTE MORENO VALLEY MEDICAL CENTER *
* ON-SITE HYDROLOGY *
* 10-YEAR STORM EVENT DEVELOPED CONDITIONS *

FILE NAME: PROPW10.DAT

TIME/DATE OF STUDY: 11:09 07/14/2019

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.010
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 0.820
100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.940
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.200
SLOPE OF 10-YEAR INTENSITY-DURATION CURVE = 0.5003939
SLOPE OF 100-YEAR INTENSITY-DURATION CURVE = 0.5001161
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 10.00 1-HOUR INTENSITY(INCH/HOUR) = 0.828
SLOPE OF INTENSITY DURATION CURVE = 0.5004
RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)
==== ===== ===== ===== ===== ===== ===== ===== ===== =====
1 30.0 20.0 0.018/0.018/0.020 0.67 2.00 0.0313 0.167 0.0150

PROPW10

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

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

=====

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2

INITIAL SUBAREA FLOW-LENGTH(FEET) = 255.00

UPSTREAM ELEVATION(FEET) = 1545.00

DOWNTSTREAM ELEVATION(FEET) = 1530.00

ELEVATION DIFFERENCE(FEET) = 15.00

TC = 0.303*[(255.00**3)/(15.00)]**.2 = 4.901

COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.872

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8759

SOIL CLASSIFICATION IS "B"

SUBAREA RUNOFF(CFS) = 2.67

TOTAL AREA(ACRES) = 1.06 TOTAL RUNOFF(CFS) = 2.67

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1527.00 DOWNTSTREAM(FEET) = 1524.00

FLOW LENGTH(FEET) = 110.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 7.16

ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 2.67

PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 5.26

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 365.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

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

PROPW10

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.801
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8755
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 2.70
TOTAL AREA(ACRES) = 2.2 TOTAL RUNOFF(CFS) = 5.36
TC(MIN.) = 5.26

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 10

>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 21

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

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 546.00
UPSTREAM ELEVATION(FEET) = 1546.00
DOWNSTREAM ELEVATION(FEET) = 1528.50
ELEVATION DIFFERENCE(FEET) = 17.50
TC = 0.303*[(546.00**3)/(17.50)]**.2 = 7.504
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.344
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8722
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 1.86
TOTAL AREA(ACRES) = 0.91 TOTAL RUNOFF(CFS) = 1.86

FLOW PROCESS FROM NODE 104.00 TO NODE 102.00 IS CODE = 31

>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1526.00 DOWNSTREAM(FEET) = 1524.00
FLOW LENGTH(FEET) = 45.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
DEPTH OF FLOW IN 12.0 INCH PIPE IS 4.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.77
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1.86
PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 7.60
LONGEST FLOWPATH FROM NODE 103.00 TO NODE 102.00 = 591.00 FEET.

PROPW10

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	1.86	7.60	2.329	0.91

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 102.00 = 591.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	5.36	5.26	2.801	2.16

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 365.00 FEET.

*****WARNING*****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	6.65	5.26	2.801
2	6.32	7.60	2.329

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 6.65 Tc(MIN.) = 5.26
TOTAL AREA(ACRES) = 3.1

FLOW PROCESS FROM NODE 102.00 TO NODE 105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 1524.00 DOWNSTREAM(FEET) = 1522.00

FLOW LENGTH(FEET) = 350.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.9 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.92

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 6.65

PIPE TRAVEL TIME(MIN.) = 1.19 Tc(MIN.) = 6.44

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 105.00 = 941.00 FEET.

PROPW10

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

=====

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.530

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8736

SOIL CLASSIFICATION IS "B"

SUBAREA AREA(ACRES) = 1.95 SUBAREA RUNOFF(CFS) = 4.31

TOTAL AREA(ACRES) = 5.0 TOTAL RUNOFF(CFS) = 10.96

TC(MIN.) = 6.44

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1524.00 DOWNSTREAM(FEET) = 1520.00

FLOW LENGTH(FEET) = 130.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 15.0 INCH PIPE IS 12.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.26

ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 10.96

PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 6.65

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 106.00 = 1071.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<

=====

FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21

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

=====

ASSUMED INITIAL SUBAREA UNIFORM

DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2

INITIAL SUBAREA FLOW-LENGTH(FEET) = 460.00

UPSTREAM ELEVATION(FEET) = 1532.00

DOWNSTREAM ELEVATION(FEET) = 1530.00

ELEVATION DIFFERENCE(FEET) = 2.00

TC = 0.303*[(460.00**3)/(2.00)]**.2 = 10.448

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.986

PROPW10

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8689

SOIL CLASSIFICATION IS "B"

SUBAREA RUNOFF(CFS) = 3.99

TOTAL AREA(ACRES) = 2.31 TOTAL RUNOFF(CFS) = 3.99

FLOW PROCESS FROM NODE 201.00 TO NODE 106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1525.00 DOWNSTREAM(FEET) = 1520.00

FLOW LENGTH(FEET) = 80.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000

DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.82

ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 3.99

PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 10.57

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 106.00 = 540.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	3.99	10.57	1.974	2.31

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 106.00 = 540.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	10.96	6.65	2.489	5.02

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 106.00 = 1071.00 FEET.

*****WARNING*****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
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	PROPW10		
1	13.47	6.65	2.489
2	12.68	10.57	1.974

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 13.47 Tc(MIN.) = 6.65
 TOTAL AREA(ACRES) = 7.3

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 10

 >>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<

FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

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

ASSUMED INITIAL SUBAREA UNIFORM
 DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 280.00
 UPSTREAM ELEVATION(FEET) = 1529.00
 DOWNSTREAM ELEVATION(FEET) = 1525.00
 ELEVATION DIFFERENCE(FEET) = 4.00
 TC = 0.303*[(280.00**3)/(4.00)]**.2 = 6.753
 10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.471
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8732
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) = 0.52
 TOTAL AREA(ACRES) = 0.24 TOTAL RUNOFF(CFS) = 0.52

FLOW PROCESS FROM NODE 301.00 TO NODE 106.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1523.00 DOWNSTREAM(FEET) = 1520.00
 FLOW LENGTH(FEET) = 95.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN 12.0 INCH PIPE IS 2.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.79
 ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 0.52
 PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 7.08
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 106.00 = 375.00 FEET.

PROPW10

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	0.52	7.08	2.412	0.24

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 106.00 = 375.00 FEET.

** MEMORY BANK # 3 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	13.47	6.65	2.489	7.33

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 106.00 = 1071.00 FEET.

*****WARNING*****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	13.96	6.65	2.489
2	13.57	7.08	2.412

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 13.96 Tc(MIN.) = 6.65

TOTAL AREA(ACRES) = 7.6

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1520.00 DOWNSTREAM(FEET) = 1518.00

FLOW LENGTH(FEET) = 188.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 7.47

ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 13.96

PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 7.07

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 107.00 = 1259.00 FEET.

PROPW10

FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

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

=====

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.414

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8728

SOIL CLASSIFICATION IS "B"

SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.42

TOTAL AREA(ACRES) = 7.8 TOTAL RUNOFF(CFS) = 14.38

TC(MIN.) = 7.07

FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

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

=====

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.414

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8728

SOIL CLASSIFICATION IS "B"

SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 0.89

TOTAL AREA(ACRES) = 8.2 TOTAL RUNOFF(CFS) = 15.26

TC(MIN.) = 7.07

FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1518.00 DOWNSTREAM(FEET) = 1516.00

FLOW LENGTH(FEET) = 45.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.25

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 15.26

PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 7.13

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 108.00 = 1304.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<

=====

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 10

PROPW10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

FLOW PROCESS FROM NODE 400.00 TO NODE 401.00 IS CODE = 21

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

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2

INITIAL SUBAREA FLOW-LENGTH(FEET) = 211.00

UPSTREAM ELEVATION(FEET) = 1540.00

DOWNSHIFT ELEVATION(FEET) = 1527.00

ELEVATION DIFFERENCE(FEET) = 13.00

TC = 0.303*[(211.00**3)/(13.00)]**.2 = 4.502

COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.872

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8759

SOIL CLASSIFICATION IS "B"

SUBAREA RUNOFF(CFS) = 0.70

TOTAL AREA(ACRES) = 0.28 TOTAL RUNOFF(CFS) = 0.70

FLOW PROCESS FROM NODE 401.00 TO NODE 402.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1524.00 DOWNSHIFT(FEET) = 1521.00

FLOW LENGTH(FEET) = 200.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000

DEPTH OF FLOW IN 12.0 INCH PIPE IS 3.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.00

ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 0.70

PIPE TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 5.83

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 402.00 = 411.00 FEET.

FLOW PROCESS FROM NODE 402.00 TO NODE 402.00 IS CODE = 81

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

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.658

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8746

SOIL CLASSIFICATION IS "B"

PROPW10

SUBAREA AREA(ACRES) = 0.17 SUBAREA RUNOFF(CFS) = 0.40
TOTAL AREA(ACRES) = 0.4 TOTAL RUNOFF(CFS) = 1.10
TC(MIN.) = 5.83

FLOW PROCESS FROM NODE 402.00 TO NODE 402.00 IS CODE = 81

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

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.658
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8746
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 0.98 SUBAREA RUNOFF(CFS) = 2.28
TOTAL AREA(ACRES) = 1.4 TOTAL RUNOFF(CFS) = 3.38
TC(MIN.) = 5.83

FLOW PROCESS FROM NODE 402.00 TO NODE 403.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1521.00 DOWNSTREAM(FEET) = 1519.00
FLOW LENGTH(FEET) = 340.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 15.0 INCH PIPE IS 9.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.26
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.38
PIPE TRAVEL TIME(MIN.) = 1.33 Tc(MIN.) = 7.16
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 751.00 FEET.

FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 81

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

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.399
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8726
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 0.27 SUBAREA RUNOFF(CFS) = 0.57
TOTAL AREA(ACRES) = 1.7 TOTAL RUNOFF(CFS) = 3.94
TC(MIN.) = 7.16

FLOW PROCESS FROM NODE 403.00 TO NODE 108.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

PROPW10

ELEVATION DATA: UPSTREAM(FEET) = 1519.00 DOWNSTREAM(FEET) = 1516.00
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.82
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.94
PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 7.20
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 108.00 = 781.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

** MAIN STREAM CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 3.94 7.20 2.392 1.70
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 108.00 = 781.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 15.26 7.13 2.405 8.19
LONGEST FLOWPATH FROM NODE 103.00 TO NODE 108.00 = 1304.00 FEET.

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

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 19.16 7.13 2.405
2 19.13 7.20 2.392

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 19.16 Tc(MIN.) = 7.13
TOTAL AREA(ACRES) = 9.9

FLOW PROCESS FROM NODE 108.00 TO NODE 500.00 IS CODE = 31

PROPW10

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1516.00 DOWNSTREAM(FEET) = 1514.00

FLOW LENGTH(FEET) = 70.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.86

ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 19.16

PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 7.23

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 500.00 = 1374.00 FEET.

=====
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 9.9 TC(MIN.) = 7.23

PEAK FLOW RATE(CFS) = 19.16

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=====
END OF RATIONAL METHOD ANALYSIS

▲

PROPW100

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
(RCFC&WCD) 1978 HYDROLOGY MANUAL
(c) Copyright 1982-2013 Advanced Engineering Software (aes)
(Rational Tabling Version 20.0)
Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

***** DESCRIPTION OF STUDY *****

* KAISER PERMANENTE MORENO VALLEY MEDICAL CENTER *
* ON-SITE HYDROLOGY *
* 100-YEAR STORM EVENT DEVELOPED CONDITIONS *

FILE NAME: PROPW100.DAT

TIME/DATE OF STUDY: 10:53 07/14/2019

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.010
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 0.820
100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.940
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.200
SLOPE OF 10-YEAR INTENSITY-DURATION CURVE = 0.5003939
SLOPE OF 100-YEAR INTENSITY-DURATION CURVE = 0.5001161
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 100.00 1-HOUR INTENSITY(INCH/HOUR) = 1.200
SLOPE OF INTENSITY DURATION CURVE = 0.5001
RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)
==== ===== ===== ===== ===== ===== ===== ===== ===== =====
1 30.0 20.0 0.018/0.018/0.020 0.67 2.00 0.0313 0.167 0.0150

PROPW100

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

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

=====

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2

INITIAL SUBAREA FLOW-LENGTH(FEET) = 255.00

UPSTREAM ELEVATION(FEET) = 1545.00

DOWNTSTREAM ELEVATION(FEET) = 1530.00

ELEVATION DIFFERENCE(FEET) = 15.00

TC = 0.303*[(255.00**3)/(15.00)]**.2 = 4.901

COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.158

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8819

SOIL CLASSIFICATION IS "B"

SUBAREA RUNOFF(CFS) = 3.89

TOTAL AREA(ACRES) = 1.06 TOTAL RUNOFF(CFS) = 3.89

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1527.00 DOWNTSTREAM(FEET) = 1524.00

FLOW LENGTH(FEET) = 110.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 12.0 INCH PIPE IS 7.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 7.84

ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 3.89

PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 5.23

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 365.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

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

PROPW100
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.064
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8816
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 3.94
TOTAL AREA(ACRES) = 2.2 TOTAL RUNOFF(CFS) = 7.83
TC(MIN.) = 5.23

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 10

>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 21

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

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 546.00
UPSTREAM ELEVATION(FEET) = 1546.00
DOWNSTREAM ELEVATION(FEET) = 1528.50
ELEVATION DIFFERENCE(FEET) = 17.50
TC = 0.303*[(546.00**3)/(17.50)]**.2 = 7.504
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.394
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8788
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 2.71
TOTAL AREA(ACRES) = 0.91 TOTAL RUNOFF(CFS) = 2.71

FLOW PROCESS FROM NODE 104.00 TO NODE 102.00 IS CODE = 31

>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1526.00 DOWNSTREAM(FEET) = 1524.00
FLOW LENGTH(FEET) = 45.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.63
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.71
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 7.59
LONGEST FLOWPATH FROM NODE 103.00 TO NODE 102.00 = 591.00 FEET.

PROPW100

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	2.71	7.59	3.375	0.91

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 102.00 = 591.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	7.83	5.23	4.064	2.16

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 365.00 FEET.

*****WARNING*****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	9.70	5.23	4.064
2	9.21	7.59	3.375

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 9.70 Tc(MIN.) = 5.23

TOTAL AREA(ACRES) = 3.1

FLOW PROCESS FROM NODE 102.00 TO NODE 105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1524.00 DOWNSTREAM(FEET) = 1522.00

FLOW LENGTH(FEET) = 350.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 5.43

ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 9.70

PIPE TRAVEL TIME(MIN.) = 1.07 Tc(MIN.) = 6.31

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 105.00 = 941.00 FEET.

PROPW100

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.702

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8801

SOIL CLASSIFICATION IS "B"

SUBAREA AREA(ACRES) = 1.95 SUBAREA RUNOFF(CFS) = 6.35

TOTAL AREA(ACRES) = 5.0 TOTAL RUNOFF(CFS) = 16.05

TC(MIN.) = 6.31

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1524.00 DOWNSTREAM(FEET) = 1520.00

FLOW LENGTH(FEET) = 130.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.49

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 16.05

PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 6.50

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 106.00 = 1071.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<

=====

FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21

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

=====

ASSUMED INITIAL SUBAREA UNIFORM

DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2

INITIAL SUBAREA FLOW-LENGTH(FEET) = 460.00

UPSTREAM ELEVATION(FEET) = 1532.00

DOWNSTREAM ELEVATION(FEET) = 1530.00

ELEVATION DIFFERENCE(FEET) = 2.00

TC = 0.303*[(460.00**3)/(2.00)]**.2 = 10.448

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.876

PROPW100

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8760
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) = 5.82
 TOTAL AREA(ACRES) = 2.31 TOTAL RUNOFF(CFS) = 5.82

 FLOW PROCESS FROM NODE 201.00 TO NODE 106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<

ELEVATION DATA: UPSTREAM(FEET) = 1525.00 DOWNSTREAM(FEET) = 1520.00
 FLOW LENGTH(FEET) = 80.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 12.0 INCH PIPE IS 7.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.85
 ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 5.82
 PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 10.56
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 106.00 = 540.00 FEET.

 FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	5.82	10.56	2.861	2.31

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 106.00 = 540.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	16.05	6.50	3.648	5.02

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 106.00 = 1071.00 FEET.

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

 ** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	19.63	6.50	3.648

2 18.41 10.56 PROPW100
 2.861

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 19.63 Tc(MIN.) = 6.50
TOTAL AREA(ACRES) = 7.3

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 10

>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<

=====

FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

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

=====

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 280.00
UPSTREAM ELEVATION(FEET) = 1529.00
DOWNSTREAM ELEVATION(FEET) = 1525.00
ELEVATION DIFFERENCE(FEET) = 4.00
TC = 0.303*[(280.00**3)/(- 4.00)]**.2 = 6.753
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.578
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8796
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 0.76
TOTAL AREA(ACRES) = 0.24 TOTAL RUNOFF(CFS) = 0.76

FLOW PROCESS FROM NODE 301.00 TO NODE 106.00 IS CODE = 31

>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1523.00 DOWNSTREAM(FEET) = 1520.00
FLOW LENGTH(FEET) = 95.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
DEPTH OF FLOW IN 12.0 INCH PIPE IS 2.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.33
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 0.76
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 7.05
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 106.00 = 375.00 FEET.

PROPW100

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	0.76	7.05	3.502	0.24

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 106.00 = 375.00 FEET.

** MEMORY BANK # 3 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	19.63	6.50	3.648	7.33

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 106.00 = 1071.00 FEET.

*****WARNING*****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	20.33	6.50	3.648
2	19.60	7.05	3.502

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 20.33 Tc(MIN.) = 6.50
TOTAL AREA(ACRES) = 7.6

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1520.00 DOWNSTREAM(FEET) = 1518.00

FLOW LENGTH(FEET) = 188.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 8.18

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 20.33

PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 6.88

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 107.00 = 1259.00 FEET.

PROPW100

FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.545

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8795

SOIL CLASSIFICATION IS "B"

SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.62

TOTAL AREA(ACRES) = 7.8 TOTAL RUNOFF(CFS) = 20.95

TC(MIN.) = 6.88

FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.545

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8795

SOIL CLASSIFICATION IS "B"

SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 1.31

TOTAL AREA(ACRES) = 8.2 TOTAL RUNOFF(CFS) = 22.26

TC(MIN.) = 6.88

FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

->>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

->>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1518.00 DOWNSTREAM(FEET) = 1516.00

FLOW LENGTH(FEET) = 45.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 14.57

ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 22.26

PIPE TRAVEL TIME(MIN.) = 0.05 Tc(MIN.) = 6.93

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 108.00 = 1304.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 12

->>>CLEAR MEMORY BANK # 1 <<<<

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 10

PROPW100

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

=====

 FLOW PROCESS FROM NODE 400.00 TO NODE 401.00 IS CODE = 21

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

=====

ASSUMED INITIAL SUBAREA UNIFORM
 DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 211.00
 UPSTREAM ELEVATION(FEET) = 1540.00
 DOWNSTREAM ELEVATION(FEET) = 1527.00
 ELEVATION DIFFERENCE(FEET) = 13.00
 TC = 0.303*[(211.00**3)/(13.00)]**.2 = 4.502
 COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.158
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8819
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) = 1.03
 TOTAL AREA(ACRES) = 0.28 TOTAL RUNOFF(CFS) = 1.03

 FLOW PROCESS FROM NODE 401.00 TO NODE 402.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1524.00 DOWNSTREAM(FEET) = 1521.00
 FLOW LENGTH(FEET) = 200.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN 12.0 INCH PIPE IS 4.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.45
 ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1.03
 PIPE TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 5.75
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 402.00 = 411.00 FEET.

 FLOW PROCESS FROM NODE 402.00 TO NODE 402.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.878
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8809
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) = 0.17 SUBAREA RUNOFF(CFS) = 0.58

PROPW100

TOTAL AREA(ACRES) = 0.4 TOTAL RUNOFF(CFS) = 1.61
TC(MIN.) = 5.75

FLOW PROCESS FROM NODE 402.00 TO NODE 402.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.878
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8809
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 0.98 SUBAREA RUNOFF(CFS) = 3.35
TOTAL AREA(ACRES) = 1.4 TOTAL RUNOFF(CFS) = 4.96
TC(MIN.) = 5.75

FLOW PROCESS FROM NODE 402.00 TO NODE 403.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1521.00 DOWNSTREAM(FEET) = 1519.00
FLOW LENGTH(FEET) = 340.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.70
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.96
PIPE TRAVEL TIME(MIN.) = 1.21 Tc(MIN.) = 6.95
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 751.00 FEET.

FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.526
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8794
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 0.27 SUBAREA RUNOFF(CFS) = 0.84
TOTAL AREA(ACRES) = 1.7 TOTAL RUNOFF(CFS) = 5.79
TC(MIN.) = 6.95

FLOW PROCESS FROM NODE 403.00 TO NODE 108.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

PROPW100

ELEVATION DATA: UPSTREAM(FEET) = 1519.00 DOWNSTREAM(FEET) = 1516.00
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 6.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.17
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.79
PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 6.99
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 108.00 = 781.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	5.79	6.99	3.517	1.70

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 108.00 = 781.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	22.26	6.93	3.531	8.19

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 108.00 = 1304.00 FEET.

*****WARNING*****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	28.01	6.93	3.531
2	27.96	6.99	3.517

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 28.01 Tc(MIN.) = 6.93
TOTAL AREA(ACRES) = 9.9

FLOW PROCESS FROM NODE 108.00 TO NODE 500.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

PROPW100

=====

ELEVATION DATA: UPSTREAM(FEET) = 1516.00 DOWNSTREAM(FEET) = 1514.00
FLOW LENGTH(FEET) = 70.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.02
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 28.01
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 7.02
LONGEST FLOWPATH FROM NODE 103.00 TO NODE 500.00 = 1374.00 FEET.

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 9.9 TC(MIN.) = 7.02
PEAK FLOW RATE(CFS) = 28.01

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END OF RATIONAL METHOD ANALYSIS

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PROPE10

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
(RCFC&WCD) 1978 HYDROLOGY MANUAL
(c) Copyright 1982-2013 Advanced Engineering Software (aes)
(Rational Tabling Version 20.0)
Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* KAISER PERMANENTE MORENO VALLEY MEDICAL CENTER *
* ON-SITE HYDROLOGY *
* 10-YEAR STORM EVENT DEVELOPED CONDITIONS *

FILE NAME: PROPE10.DAT

TIME/DATE OF STUDY: 10:20 07/30/2019

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.010
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 0.820
100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.940
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.200
SLOPE OF 10-YEAR INTENSITY-DURATION CURVE = 0.5003939
SLOPE OF 100-YEAR INTENSITY-DURATION CURVE = 0.5001161
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 10.00 1-HOUR INTENSITY(INCH/HOUR) = 0.828
SLOPE OF INTENSITY DURATION CURVE = 0.5004
RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)
==== ===== ===== ===== ===== ===== ===== ===== ===== =====
1 30.0 20.0 0.018/0.018/0.020 0.67 2.00 0.0312 0.167 0.0150

PROPE10

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

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

=====

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2

INITIAL SUBAREA FLOW-LENGTH(FEET) = 442.00

UPSTREAM ELEVATION(FEET) = 1552.00

DOWNTSTREAM ELEVATION(FEET) = 1536.00

ELEVATION DIFFERENCE(FEET) = 16.00

TC = 0.303*[(442.00**3)/(16.00)]**.2 = 6.730

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.475

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8732

SOIL CLASSIFICATION IS "B"

SUBAREA RUNOFF(CFS) = 7.26

TOTAL AREA(ACRES) = 3.36 TOTAL RUNOFF(CFS) = 7.26

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1533.00 DOWNTSTREAM(FEET) = 1530.50

FLOW LENGTH(FEET) = 40.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 12.0 INCH PIPE IS 8.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 12.38

ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 7.26

PIPE TRAVEL TIME(MIN.) = 0.05 Tc(MIN.) = 6.78

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 482.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

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FLOW PROCESS FROM NODE 99.00 TO NODE 103.00 IS CODE = 21

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

=====
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 185.00
UPSTREAM ELEVATION(FEET) = 1539.00
DOWNSTREAM ELEVATION(FEET) = 1536.00
ELEVATION DIFFERENCE(FEET) = 3.00
TC = 0.303*[(185.00**3)/(3.00)]**.2 = 5.578
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.719
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8750
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 0.93
TOTAL AREA(ACRES) = 0.39 TOTAL RUNOFF(CFS) = 0.93

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

----->>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1533.00 DOWNSTREAM(FEET) = 1532.00
FLOW LENGTH(FEET) = 145.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
DEPTH OF FLOW IN 12.0 INCH PIPE IS 4.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.27
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 0.93
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 6.32
LONGEST FLOWPATH FROM NODE 99.00 TO NODE 104.00 = 330.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

----->>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1532.00 DOWNSTREAM(FEET) = 1531.50
FLOW LENGTH(FEET) = 60.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
DEPTH OF FLOW IN 12.0 INCH PIPE IS 4.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.50
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 0.93

PROPE10

PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 6.60
LONGEST FLOWPATH FROM NODE 99.00 TO NODE 105.00 = 390.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

=====
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.499
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8734
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 1.04 SUBAREA RUNOFF(CFS) = 2.27
TOTAL AREA(ACRES) = 1.4 TOTAL RUNOFF(CFS) = 3.20
TC(MIN.) = 6.60

FLOW PROCESS FROM NODE 105.00 TO NODE 102.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1531.50 DOWNSTREAM(FEET) = 1530.50
FLOW LENGTH(FEET) = 140.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 15.0 INCH PIPE IS 8.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.53
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.20
PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 7.12
LONGEST FLOWPATH FROM NODE 99.00 TO NODE 102.00 = 530.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

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

=====
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.407
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8727
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 0.26 SUBAREA RUNOFF(CFS) = 0.55
TOTAL AREA(ACRES) = 1.7 TOTAL RUNOFF(CFS) = 3.74
TC(MIN.) = 7.12

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

PROPE10

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	3.74	7.12	2.407	1.69
LONGEST FLOWPATH FROM NODE			99.00 TO NODE	102.00 = 530.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	7.26	6.78	2.465	3.36
LONGEST FLOWPATH FROM NODE			100.00 TO NODE	102.00 = 482.00 FEET.

*****WARNING*****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	10.83	6.78	2.465
2	10.83	7.12	2.407

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 10.83 Tc(MIN.) = 6.78
TOTAL AREA(ACRES) = 5.0

FLOW PROCESS FROM NODE 102.00 TO NODE 106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1530.50 DOWNSTREAM(FEET) = 1529.00
FLOW LENGTH(FEET) = 10.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 8.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.05
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.83
PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 6.79
LONGEST FLOWPATH FROM NODE 99.00 TO NODE 106.00 = 540.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

PROPE10

ELEVATION DATA: UPSTREAM(FEET) = 1529.00 DOWNSTREAM(FEET) = 1513.00
FLOW LENGTH(FEET) = 900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.57
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.83
PIPE TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 8.54
LONGEST FLOWPATH FROM NODE 99.00 TO NODE 107.00 = 1440.00 FEET.

FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<

FLOW PROCESS FROM NODE 98.00 TO NODE 108.00 IS CODE = 21

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

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 409.00
UPSTREAM ELEVATION(FEET) = 1535.00
DOWNSTREAM ELEVATION(FEET) = 1527.50
ELEVATION DIFFERENCE(FEET) = 7.50
TC = 0.303*[(409.00**3)/(7.50)]**.2 = 7.475
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.348
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8722
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 4.04
TOTAL AREA(ACRES) = 1.97 TOTAL RUNOFF(CFS) = 4.04

FLOW PROCESS FROM NODE 108.00 TO NODE 109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1524.50 DOWNSTREAM(FEET) = 1520.00
FLOW LENGTH(FEET) = 370.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 15.0 INCH PIPE IS 8.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.87
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.04
PIPE TRAVEL TIME(MIN.) = 1.05 Tc(MIN.) = 8.52

PROPE10
LONGEST FLOWPATH FROM NODE 98.00 TO NODE 109.00 = 779.00 FEET.

FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE = 81

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

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.199
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8710
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 0.21 SUBAREA RUNOFF(CFS) = 0.40
TOTAL AREA(ACRES) = 2.2 TOTAL RUNOFF(CFS) = 4.44
TC(MIN.) = 8.52

FLOW PROCESS FROM NODE 109.00 TO NODE 111.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1520.00 DOWNSTREAM(FEET) = 1514.00
FLOW LENGTH(FEET) = 250.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 8.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.65
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.44
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 9.07
LONGEST FLOWPATH FROM NODE 98.00 TO NODE 111.00 = 1029.00 FEET.

FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<

FLOW PROCESS FROM NODE 97.00 TO NODE 110.00 IS CODE = 21

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

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 490.00
UPSTREAM ELEVATION(FEET) = 1524.00
DOWNSTREAM ELEVATION(FEET) = 1520.00
ELEVATION DIFFERENCE(FEET) = 4.00
TC = 0.303*[(490.00**3)/(4.00)]**.2 = 9.447

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10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.089
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8699
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 9.88
TOTAL AREA(ACRES) = 5.44 TOTAL RUNOFF(CFS) = 9.88

FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1516.00 DOWNSTREAM(FEET) = 1514.00
FLOW LENGTH(FEET) = 180.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.93
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 9.88
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 9.88
LONGEST FLOWPATH FROM NODE 97.00 TO NODE 111.00 = 670.00 FEET.

FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	9.88	9.88	2.042	5.44

LONGEST FLOWPATH FROM NODE 97.00 TO NODE 111.00 = 670.00 FEET.

** MEMORY BANK # 3 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	4.44	9.07	2.132	2.18

LONGEST FLOWPATH FROM NODE 98.00 TO NODE 111.00 = 1029.00 FEET.

*****WARNING*****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
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			PROPE10
1	13.51	9.07	2.132
2	14.14	9.88	2.042

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 14.14 Tc(MIN.) = 9.88
 TOTAL AREA(ACRES) = 7.6

FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1514.00 DOWNSTREAM(FEET) = 1513.50
 FLOW LENGTH(FEET) = 34.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.56
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 14.14
 PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 9.95
 LONGEST FLOWPATH FROM NODE 98.00 TO NODE 112.00 = 1063.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 107.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1513.50 DOWNSTREAM(FEET) = 1513.00
 FLOW LENGTH(FEET) = 10.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.63
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 14.14
 PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 9.96
 LONGEST FLOWPATH FROM NODE 98.00 TO NODE 107.00 = 1073.00 FEET.

FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	14.14	9.96	2.034	7.62
LONGEST FLOWPATH FROM NODE	98.00	TO NODE	107.00	= 1073.00 FEET.

PROPE10

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 10.83 8.54 2.197 5.05
LONGEST FLOWPATH FROM NODE 99.00 TO NODE 107.00 = 1440.00 FEET.

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

** PEAK FLOW RATE TABLE **

STREAM	RUNOFF	Tc	INTENSITY
NUMBER	(CFS)	(MIN.)	(INCH/HOUR)
1	22.96	8.54	2.197
2	24.17	9.96	2.034

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 24.17 Tc(MIN.) = 9.96
TOTAL AREA(ACRES) = 12.7

FLOW PROCESS FROM NODE 107.00 TO NODE 113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1513.00 DOWNSTREAM(FEET) = 1511.50
FLOW LENGTH(FEET) = 170.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.01
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 24.17
PIPE TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 10.31
LONGEST FLOWPATH FROM NODE 99.00 TO NODE 113.00 = 1610.00 FEET.

FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<

FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

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FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21

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

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.00

UPSTREAM ELEVATION(FEET) = 1552.00

DOWNSTREAM ELEVATION(FEET) = 1540.00

ELEVATION DIFFERENCE(FEET) = 12.00

TC = 0.303*[(282.00**3)/(12.00)]**.2 = 5.444

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.752

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8752

SOIL CLASSIFICATION IS "B"

SUBAREA RUNOFF(CFS) = 0.36

TOTAL AREA(ACRES) = 0.15 TOTAL RUNOFF(CFS) = 0.36

FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1537.00 DOWNSTREAM(FEET) = 1533.00

FLOW LENGTH(FEET) = 270.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000

DEPTH OF FLOW IN 12.0 INCH PIPE IS 2.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 3.30

ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 0.36

PIPE TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 6.81

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 552.00 FEET.

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

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

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.461

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8731

SOIL CLASSIFICATION IS "B"

SUBAREA AREA(ACRES) = 0.99 SUBAREA RUNOFF(CFS) = 2.13

TOTAL AREA(ACRES) = 1.1 TOTAL RUNOFF(CFS) = 2.49

TC(MIN.) = 6.81

PROPE10

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1533.00 DOWNSTREAM(FEET) = 1523.00

FLOW LENGTH(FEET) = 325.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000

DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 7.35

ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 2.49

PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 7.54

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 877.00 FEET.

FLOW PROCESS FROM NODE 203.00 TO NODE 203.00 IS CODE = 81

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

=====
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.338

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8721

SOIL CLASSIFICATION IS "B"

SUBAREA AREA(ACRES) = 2.14 SUBAREA RUNOFF(CFS) = 4.36

TOTAL AREA(ACRES) = 3.3 TOTAL RUNOFF(CFS) = 6.85

TC(MIN.) = 7.54

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1523.00 DOWNSTREAM(FEET) = 1517.00

FLOW LENGTH(FEET) = 350.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 15.0 INCH PIPE IS 10.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 7.51

ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 6.85

PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 8.32

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 1227.00 FEET.

FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81

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

PROPE10

=====

10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.226
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8712
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.16
TOTAL AREA(ACRES) = 3.9 TOTAL RUNOFF(CFS) = 8.01
TC(MIN.) = 8.32

FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<

FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<

FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

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

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 206.00
UPSTREAM ELEVATION(FEET) = 1523.00
DOWNSTREAM ELEVATION(FEET) = 1522.00
ELEVATION DIFFERENCE(FEET) = 1.00
TC = 0.303*[(206.00**3)/(1.00)]**.2 = 7.412
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.358
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8723
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 2.80
TOTAL AREA(ACRES) = 1.36 TOTAL RUNOFF(CFS) = 2.80

FLOW PROCESS FROM NODE 301.00 TO NODE 204.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1519.00 DOWNSTREAM(FEET) = 1517.00
FLOW LENGTH(FEET) = 340.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 15.0 INCH PIPE IS 8.2 INCHES

PROPE10
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.08
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.80
PIPE TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 8.80
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 204.00 = 546.00 FEET.

FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<
=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	2.80	8.80	2.164	1.36

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 204.00 = 546.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	8.01	8.32	2.226	3.88

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 1227.00 FEET.

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	10.66	8.32	2.226
2	10.59	8.80	2.164

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 10.66 Tc(MIN.) = 8.32
TOTAL AREA(ACRES) = 5.2

FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 1517.00 DOWNSTREAM(FEET) = 1513.50
FLOW LENGTH(FEET) = 306.00 MANNING'S N = 0.013

PROPE10

DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.06
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.66
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 9.04
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 205.00 = 1533.00 FEET.

FLOW PROCESS FROM NODE 205.00 TO NODE 205.00 IS CODE = 81

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

=====
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.135
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8704
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 1.42 SUBAREA RUNOFF(CFS) = 2.64
TOTAL AREA(ACRES) = 6.7 TOTAL RUNOFF(CFS) = 13.30
TC(MIN.) = 9.04

FLOW PROCESS FROM NODE 205.00 TO NODE 208.00 IS CODE = 31

----->>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1513.50 DOWNSTREAM(FEET) = 1512.50
FLOW LENGTH(FEET) = 130.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.42
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.30
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 9.38
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 208.00 = 1663.00 FEET.

FLOW PROCESS FROM NODE 208.00 TO NODE 208.00 IS CODE = 12

----->>>>CLEAR MEMORY BANK # 2 <<<<

FLOW PROCESS FROM NODE 208.00 TO NODE 208.00 IS CODE = 10

----->>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<

FLOW PROCESS FROM NODE 206.00 TO NODE 207.00 IS CODE = 21

PROPE10

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

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 200.00
UPSTREAM ELEVATION(FEET) = 1520.00
DOWNSTREAM ELEVATION(FEET) = 1516.50
ELEVATION DIFFERENCE(FEET) = 3.50
TC = 0.303*[(200.00**3)/(3.50)]**.2 = 5.667
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.697
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8748
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 0.54
TOTAL AREA(ACRES) = 0.23 TOTAL RUNOFF(CFS) = 0.54

FLOW PROCESS FROM NODE 207.00 TO NODE 208.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1514.00 DOWNSTREAM(FEET) = 1512.50
FLOW LENGTH(FEET) = 300.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
DEPTH OF FLOW IN 12.0 INCH PIPE IS 3.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 2.50
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 0.54
PIPE TRAVEL TIME(MIN.) = 2.00 Tc(MIN.) = 7.67
LONGEST FLOWPATH FROM NODE 206.00 TO NODE 208.00 = 500.00 FEET.

FLOW PROCESS FROM NODE 208.00 TO NODE 208.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	0.54	7.67	2.319	0.23

LONGEST FLOWPATH FROM NODE 206.00 TO NODE 208.00 = 500.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
------------------	-----------------	--------------	--------------------------	----------------

PROPE10

1	13.30	9.38	2.096	6.66
LONGEST FLOWPATH FROM NODE		200.00 TO NODE		208.00 = 1663.00 FEET.

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	11.41	7.67	2.319
2	13.79	9.38	2.096

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) =	13.79	Tc(MIN.) =	9.38
TOTAL AREA(ACRES) =	6.9		

FLOW PROCESS FROM NODE 208.00 TO NODE 209.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1512.50 DOWNSTREAM(FEET) = 1512.00
FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.26
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.79
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 9.49
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 209.00 = 1713.00 FEET.

FLOW PROCESS FROM NODE 209.00 TO NODE 113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1512.00 DOWNSTREAM(FEET) = 1511.50
FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.26
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.79
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 9.61
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 113.00 = 1763.00 FEET.

PROPE10

FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	13.79	9.61	2.071	6.89

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 113.00 = 1763.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	24.17	10.31	1.999	12.67

LONGEST FLOWPATH FROM NODE 99.00 TO NODE 113.00 = 1610.00 FEET.

*****WARNING*****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	36.31	9.61	2.071
2	37.48	10.31	1.999

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 37.48 Tc(MIN.) = 10.31

TOTAL AREA(ACRES) = 19.6

FLOW PROCESS FROM NODE 113.00 TO NODE 400.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1511.50 DOWNSTREAM(FEET) = 1511.00

FLOW LENGTH(FEET) = 90.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 7.37

ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 37.48

PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 10.52

PROPE10

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 400.00 = 1853.00 FEET.

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 19.6 TC(MIN.) = 10.52

PEAK FLOW RATE(CFS) = 37.48

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END OF RATIONAL METHOD ANALYSIS

↑

PROPE100

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
(RCFC&WCD) 1978 HYDROLOGY MANUAL
(c) Copyright 1982-2013 Advanced Engineering Software (aes)
(Rational Tabling Version 20.0)
Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

***** DESCRIPTION OF STUDY *****

* KAISER PERMANENTE MORENO VALLEY MEDICAL CENTER *
* ON-SITE HYDROLOGY *
* 100-YEAR STORM EVENT DEVELOPED CONDITIONS *

FILE NAME: PROPE100.DAT

TIME/DATE OF STUDY: 14:29 07/30/2019

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.010
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 0.820
100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) = 2.940
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.200
SLOPE OF 10-YEAR INTENSITY-DURATION CURVE = 0.5003939
SLOPE OF 100-YEAR INTENSITY-DURATION CURVE = 0.5001161
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 100.00 1-HOUR INTENSITY(INCH/HOUR) = 1.200
SLOPE OF INTENSITY DURATION CURVE = 0.5001
RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)
==== ===== ===== ===== ===== ===== ===== ===== ===== =====
1 30.0 20.0 0.018/0.018/0.020 0.67 2.00 0.0312 0.167 0.0150

PROPE100

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

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

=====
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 442.00
UPSTREAM ELEVATION(FEET) = 1552.00
DOWNSTREAM ELEVATION(FEET) = 1536.00
ELEVATION DIFFERENCE(FEET) = 16.00
TC = 0.303*[(442.00**3)/(16.00)]**.2 = 6.730
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.584
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8796
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 10.59
TOTAL AREA(ACRES) = 3.36 TOTAL RUNOFF(CFS) = 10.59

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1533.00 DOWNSTREAM(FEET) = 1530.50
FLOW LENGTH(FEET) = 40.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 15.0 INCH PIPE IS 9.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.76
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.59
PIPE TRAVEL TIME(MIN.) = 0.05 Tc(MIN.) = 6.78
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 482.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

PROPE100

FLOW PROCESS FROM NODE 99.00 TO NODE 103.00 IS CODE = 21

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

=====
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 185.00
UPSTREAM ELEVATION(FEET) = 1539.00
DOWNSTREAM ELEVATION(FEET) = 1536.00
ELEVATION DIFFERENCE(FEET) = 3.00
TC = 0.303*[(185.00**3)/(3.00)]**.2 = 5.578
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.937
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8811
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 1.35
TOTAL AREA(ACRES) = 0.39 TOTAL RUNOFF(CFS) = 1.35

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

----->>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1533.00 DOWNSTREAM(FEET) = 1532.00
FLOW LENGTH(FEET) = 145.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.61
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1.35
PIPE TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 6.25
LONGEST FLOWPATH FROM NODE 99.00 TO NODE 104.00 = 330.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

----->>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1532.00 DOWNSTREAM(FEET) = 1531.50
FLOW LENGTH(FEET) = 60.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.88
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1.35
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 6.50

PROPE100
LONGEST FLOWPATH FROM NODE 99.00 TO NODE 105.00 = 390.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.646
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8799
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 1.04 SUBAREA RUNOFF(CFS) = 3.34
TOTAL AREA(ACRES) = 1.4 TOTAL RUNOFF(CFS) = 4.69
TC(MIN.) = 6.50

FLOW PROCESS FROM NODE 105.00 TO NODE 102.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1531.50 DOWNSTREAM(FEET) = 1530.50
FLOW LENGTH(FEET) = 140.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 15.0 INCH PIPE IS 10.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.90
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.69
PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 6.98
LONGEST FLOWPATH FROM NODE 99.00 TO NODE 102.00 = 530.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

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

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.519
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8794
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 0.26 SUBAREA RUNOFF(CFS) = 0.80
TOTAL AREA(ACRES) = 1.7 TOTAL RUNOFF(CFS) = 5.49
TC(MIN.) = 6.98

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

** MAIN STREAM CONFLUENCE DATA **

PROPE100

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	5.49	6.98	3.519	1.69
LONGEST FLOWPATH FROM NODE			99.00 TO NODE	102.00 = 530.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	10.59	6.78	3.571	3.36
LONGEST FLOWPATH FROM NODE			100.00 TO NODE	102.00 = 482.00 FEET.

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	15.93	6.78	3.571
2	15.93	6.98	3.519

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 15.93 Tc(MIN.) = 6.78
 TOTAL AREA(ACRES) = 5.0

 FLOW PROCESS FROM NODE 102.00 TO NODE 106.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
 ELEVATION DATA: UPSTREAM(FEET) = 1530.50 DOWNSTREAM(FEET) = 1529.00
 FLOW LENGTH(FEET) = 10.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 15.0 INCH PIPE IS 8.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 21.18
 ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 15.93
 PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 6.79
 LONGEST FLOWPATH FROM NODE 99.00 TO NODE 106.00 = 540.00 FEET.

 FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

PROPE100

ELEVATION DATA: UPSTREAM(FEET) = 1529.00 DOWNSTREAM(FEET) = 1513.00
FLOW LENGTH(FEET) = 900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.45
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 15.93
PIPE TRAVEL TIME(MIN.) = 1.59 Tc(MIN.) = 8.37
LONGEST FLOWPATH FROM NODE 99.00 TO NODE 107.00 = 1440.00 FEET.

FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<
=====

FLOW PROCESS FROM NODE 98.00 TO NODE 108.00 IS CODE = 21

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

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 409.00
UPSTREAM ELEVATION(FEET) = 1535.00
DOWNSTREAM ELEVATION(FEET) = 1527.50
ELEVATION DIFFERENCE(FEET) = 7.50
TC = 0.303*[(409.00**3)/(7.50)]**.2 = 7.475
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.401
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8788
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 5.89
TOTAL AREA(ACRES) = 1.97 TOTAL RUNOFF(CFS) = 5.89

FLOW PROCESS FROM NODE 108.00 TO NODE 109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 1524.50 DOWNSTREAM(FEET) = 1520.00
FLOW LENGTH(FEET) = 370.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 15.0 INCH PIPE IS 10.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.35
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.89
PIPE TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 8.45
LONGEST FLOWPATH FROM NODE 98.00 TO NODE 109.00 = 779.00 FEET.

PROPE100

FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE = 81

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

=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.199
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8778
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 0.21 SUBAREA RUNOFF(CFS) = 0.59
TOTAL AREA(ACRES) = 2.2 TOTAL RUNOFF(CFS) = 6.48
TC(MIN.) = 8.45

FLOW PROCESS FROM NODE 109.00 TO NODE 111.00 IS CODE = 31

----->>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1520.00 DOWNSTREAM(FEET) = 1514.00
FLOW LENGTH(FEET) = 250.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 15.0 INCH PIPE IS 8.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.51
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 6.48
PIPE TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 8.94
LONGEST FLOWPATH FROM NODE 98.00 TO NODE 111.00 = 1029.00 FEET.

FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 10

----->>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<

FLOW PROCESS FROM NODE 97.00 TO NODE 110.00 IS CODE = 21

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

=====
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 490.00
UPSTREAM ELEVATION(FEET) = 1524.00
DOWNSTREAM ELEVATION(FEET) = 1520.00
ELEVATION DIFFERENCE(FEET) = 4.00
TC = 0.303*[(490.00**3)/(4.00)]**.2 = 9.447
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.025

PROPE100

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8768
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) = 14.43
 TOTAL AREA(ACRES) = 5.44 TOTAL RUNOFF(CFS) = 14.43

 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<
 ======

ELEVATION DATA: UPSTREAM(FEET) = 1516.00 DOWNSTREAM(FEET) = 1514.00
 FLOW LENGTH(FEET) = 180.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.64
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 14.43
 PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 9.84
 LONGEST FLOWPATH FROM NODE 97.00 TO NODE 111.00 = 670.00 FEET.

 FLOW PROCESS FROM NODE 111.00 TO NODE 111.00 IS CODE = 11

 >>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<
 ======

** MAIN STREAM CONFLUENCE DATA **
 STREAM RUNOFF Tc INTENSITY AREA
 NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
 1 14.43 9.84 2.964 5.44
 LONGEST FLOWPATH FROM NODE 97.00 TO NODE 111.00 = 670.00 FEET.

** MEMORY BANK # 3 CONFLUENCE DATA **
 STREAM RUNOFF Tc INTENSITY AREA
 NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
 1 6.48 8.94 3.110 2.18
 LONGEST FLOWPATH FROM NODE 98.00 TO NODE 111.00 = 1029.00 FEET.

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

** PEAK FLOW RATE TABLE **
 STREAM RUNOFF Tc INTENSITY
 NUMBER (CFS) (MIN.) (INCH/HOUR)
 1 19.58 8.94 3.110

PROPE100
2 20.60 9.84 2.964

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 20.60 Tc(MIN.) = 9.84
TOTAL AREA(ACRES) = 7.6

FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1514.00 DOWNSTREAM(FEET) = 1513.50

FLOW LENGTH(FEET) = 34.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 9.39

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 20.60

PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 9.90

LONGEST FLOWPATH FROM NODE 98.00 TO NODE 112.00 = 1063.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 107.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1513.50 DOWNSTREAM(FEET) = 1513.00

FLOW LENGTH(FEET) = 10.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 14.66

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 20.60

PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 9.91

LONGEST FLOWPATH FROM NODE 98.00 TO NODE 107.00 = 1073.00 FEET.

FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM RUNOFF Tc INTENSITY AREA

NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)

1 20.60 9.91 2.953 7.62

LONGEST FLOWPATH FROM NODE 98.00 TO NODE 107.00 = 1073.00 FEET.

PROPE100

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 15.93 8.37 3.213 5.05
LONGEST FLOWPATH FROM NODE 99.00 TO NODE 107.00 = 1440.00 FEET.

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

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 33.33 8.37 3.213
2 35.24 9.91 2.953

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 35.24 Tc(MIN.) = 9.91
TOTAL AREA(ACRES) = 12.7

FLOW PROCESS FROM NODE 107.00 TO NODE 113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1513.00 DOWNSTREAM(FEET) = 1511.50
FLOW LENGTH(FEET) = 170.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.70
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 35.24
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 10.24
LONGEST FLOWPATH FROM NODE 99.00 TO NODE 113.00 = 1610.00 FEET.

FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<
=====

FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====

PROPE100

FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21

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

=====

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.00

UPSTREAM ELEVATION(FEET) = 1552.00

DOWNSTREAM ELEVATION(FEET) = 1540.00

ELEVATION DIFFERENCE(FEET) = 12.00

TC = 0.303*[(282.00**3)/(12.00)]**.2 = 5.444

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.985

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8813

SOIL CLASSIFICATION IS "B"

SUBAREA RUNOFF(CFS) = 0.53

TOTAL AREA(ACRES) = 0.15 TOTAL RUNOFF(CFS) = 0.53

FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1537.00 DOWNSTREAM(FEET) = 1533.00

FLOW LENGTH(FEET) = 270.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000

DEPTH OF FLOW IN 12.0 INCH PIPE IS 2.9 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 3.66

ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 0.53

PIPE TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 6.67

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 552.00 FEET.

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.599

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8797

SOIL CLASSIFICATION IS "B"

SUBAREA AREA(ACRES) = 0.99 SUBAREA RUNOFF(CFS) = 3.13

TOTAL AREA(ACRES) = 1.1 TOTAL RUNOFF(CFS) = 3.66

TC(MIN.) = 6.67

PROPE100

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1533.00 DOWNSTREAM(FEET) = 1523.00

FLOW LENGTH(FEET) = 325.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 12.0 INCH PIPE IS 6.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 8.10

ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 3.66

PIPE TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 7.34

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 877.00 FEET.

FLOW PROCESS FROM NODE 203.00 TO NODE 203.00 IS CODE = 81

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

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.431

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8789

SOIL CLASSIFICATION IS "B"

SUBAREA AREA(ACRES) = 2.14 SUBAREA RUNOFF(CFS) = 6.45

TOTAL AREA(ACRES) = 3.3 TOTAL RUNOFF(CFS) = 10.11

TC(MIN.) = 7.34

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1523.00 DOWNSTREAM(FEET) = 1517.00

FLOW LENGTH(FEET) = 350.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 8.34

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 10.11

PIPE TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 8.04

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 1227.00 FEET.

FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81

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

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.278

PROPE100
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8782
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.73
 TOTAL AREA(ACRES) = 3.9 TOTAL RUNOFF(CFS) = 11.84
 TC(MIN.) = 8.04

FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<

=====

FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<

=====

FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

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

=====

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL

TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 206.00
UPSTREAM ELEVATION(FEET) = 1523.00
DOWNSTREAM ELEVATION(FEET) = 1522.00
ELEVATION DIFFERENCE(FEET) = 1.00
TC = 0.303*[(206.00**3)/(1.00)]**.2 = 7.412
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.415
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8789
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 4.08
TOTAL AREA(ACRES) = 1.36 TOTAL RUNOFF(CFS) = 4.08

FLOW PROCESS FROM NODE 301.00 TO NODE 204.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1519.00 DOWNSTREAM(FEET) = 1517.00
FLOW LENGTH(FEET) = 340.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 15.0 INCH PIPE IS 10.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.41
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1

PROPE100

PIPE-FLOW(CFS) = 4.08
PIPE TRAVEL TIME(MIN.) = 1.28 Tc(MIN.) = 8.70
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 204.00 = 546.00 FEET.

FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<

=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	4.08	8.70	3.153	1.36

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 204.00 = 546.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	11.84	8.04	3.278	3.88

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 1227.00 FEET.

*****WARNING*****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	15.62	8.04	3.278
2	15.47	8.70	3.153

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 15.62 Tc(MIN.) = 8.04
TOTAL AREA(ACRES) = 5.2

FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1517.00 DOWNSTREAM(FEET) = 1513.50

FLOW LENGTH(FEET) = 306.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 7.81

PROPE100
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 15.62
PIPE TRAVEL TIME(MIN.) = 0.65 Tc(MIN.) = 8.70
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 205.00 = 1533.00 FEET.

FLOW PROCESS FROM NODE 205.00 TO NODE 205.00 IS CODE = 81

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

=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.153
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8776
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 1.42 SUBAREA RUNOFF(CFS) = 3.93
TOTAL AREA(ACRES) = 6.7 TOTAL RUNOFF(CFS) = 19.55
TC(MIN.) = 8.70

FLOW PROCESS FROM NODE 205.00 TO NODE 208.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1513.50 DOWNSTREAM(FEET) = 1512.50
FLOW LENGTH(FEET) = 130.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.28
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 19.55
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 8.99
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 208.00 = 1663.00 FEET.

FLOW PROCESS FROM NODE 208.00 TO NODE 208.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<

FLOW PROCESS FROM NODE 208.00 TO NODE 208.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<

FLOW PROCESS FROM NODE 206.00 TO NODE 207.00 IS CODE = 21

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

PROPE100

=====

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 200.00
UPSTREAM ELEVATION(FEET) = 1520.00
DOWNSTREAM ELEVATION(FEET) = 1516.50
ELEVATION DIFFERENCE(FEET) = 3.50
TC = 0.303*[(200.00**3)/(3.50)]**.2 = 5.667
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.906
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8810
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 0.79
TOTAL AREA(ACRES) = 0.23 TOTAL RUNOFF(CFS) = 0.79

FLOW PROCESS FROM NODE 207.00 TO NODE 208.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1514.00 DOWNSTREAM(FEET) = 1512.50
FLOW LENGTH(FEET) = 300.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
DEPTH OF FLOW IN 12.0 INCH PIPE IS 4.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 2.79
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 0.79
PIPE TRAVEL TIME(MIN.) = 1.79 Tc(MIN.) = 7.46
LONGEST FLOWPATH FROM NODE 206.00 TO NODE 208.00 = 500.00 FEET.

FLOW PROCESS FROM NODE 208.00 TO NODE 208.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<

=====

** MAIN STREAM CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 0.79 7.46 3.404 0.23
LONGEST FLOWPATH FROM NODE 206.00 TO NODE 208.00 = 500.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 19.55 8.99 3.100 6.66
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 208.00 = 1663.00 FEET.

PROPE100

*****WARNING*****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	17.00	7.46	3.404
2	20.27	8.99	3.100

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 20.27 Tc(MIN.) = 8.99
TOTAL AREA(ACRES) = 6.9

FLOW PROCESS FROM NODE 208.00 TO NODE 209.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1512.50 DOWNSTREAM(FEET) = 1512.00
FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.96
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.27
PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 9.10
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 209.00 = 1713.00 FEET.

FLOW PROCESS FROM NODE 209.00 TO NODE 113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 1512.00 DOWNSTREAM(FEET) = 1511.50
FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.96
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.27
PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 9.20
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 113.00 = 1763.00 FEET.

PROPE100

FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	20.27	9.20	3.065	6.89

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 113.00 = 1763.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	35.24	10.24	2.906	12.67

LONGEST FLOWPATH FROM NODE 99.00 TO NODE 113.00 = 1610.00 FEET.

*****WARNING*****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	51.95	9.20	3.065
2	54.46	10.24	2.906

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 54.46 Tc(MIN.) = 10.24
TOTAL AREA(ACRES) = 19.6

FLOW PROCESS FROM NODE 113.00 TO NODE 400.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1511.50 DOWNSTREAM(FEET) = 1511.00

FLOW LENGTH(FEET) = 90.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 8.19

ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 54.46

PIPE TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 10.42

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 400.00 = 1853.00 FEET.

PROPE100

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 19.6 TC(MIN.) = 10.42
PEAK FLOW RATE(CFS) = 54.46

=====

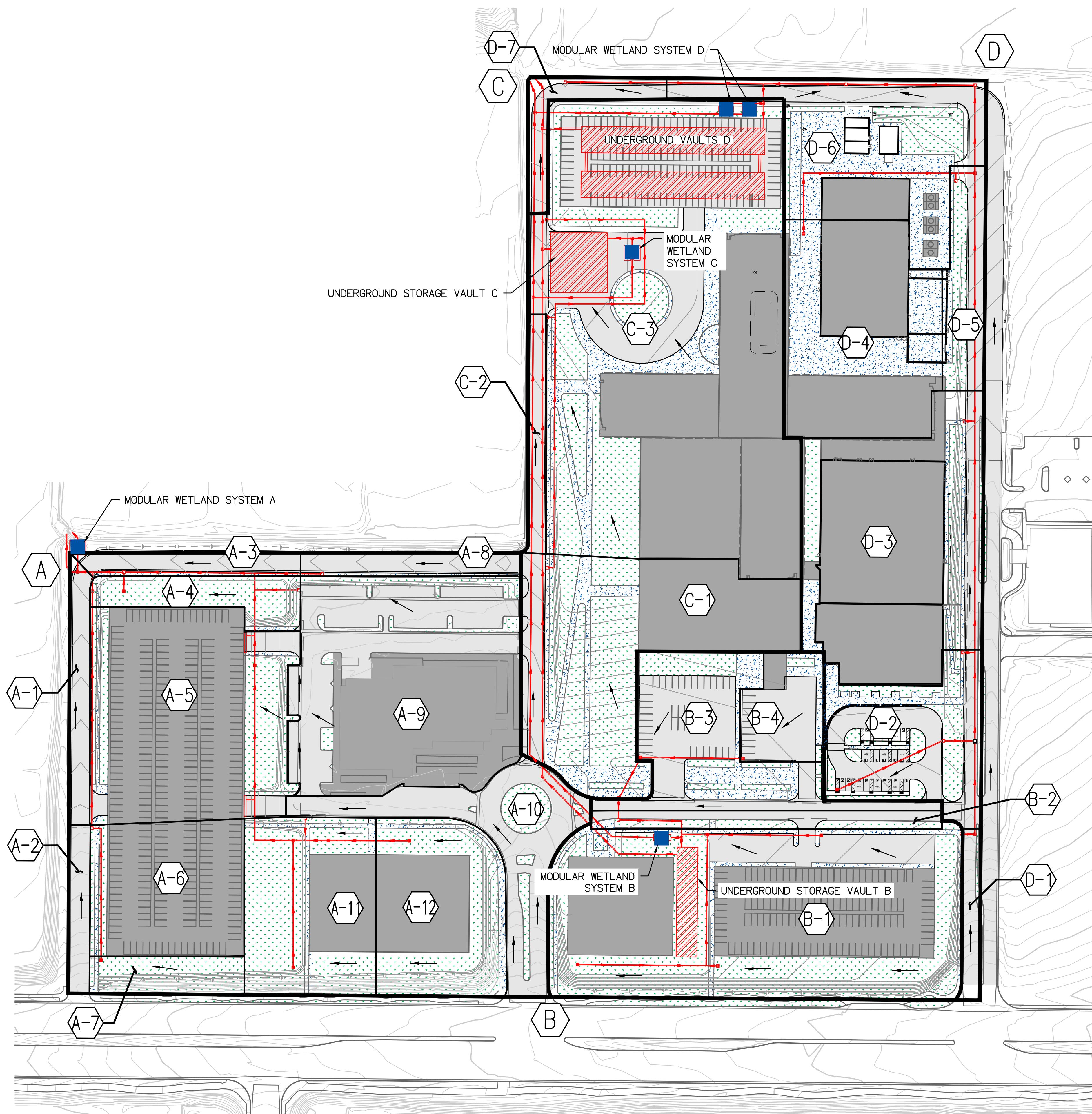
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END OF RATIONAL METHOD ANALYSIS

↑

APPENDIX B

UNIT HYDROGRAPH ANALYSIS DMA EXHIBIT



LEGEND

- MODULAR WETLAND
- EXISTING RIGHT-OF-WAY
- DMA SUB-AREA BOUNDARY
- PROPOSED STORM DRAIN
- STORAGE PIPES
- UNDERGROUND STORAGE VAULT
- (A) DMA NUMBER
- (A-1) DMA SUB-AREA NUMBER

80 40 0 80 160 240
SCALE: 1"=80'

APPENDIX B

EXISTING AND PROPOSED UNIT HYDROGRAPH CALCULATIONS

DMA B

Unit Hydrograph Analyses

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Study date 07/22/19 File: dmab5exist15.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION

5-YR 1-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.025 Hr.
Lag time = 1.52 Min.
25% of lag time = 0.38 Min.
40% of lag time = 0.61 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]
5.10	0.49	2.49

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	1.33	6.78

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 0.686(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.686(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.500
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.500	0.388	1.000	0.388
				Sum (F)	=	0.388

Area averaged mean soil loss (F) (In/Hr) = 0.388
Minimum soil loss rate ((In/Hr)) = 0.194

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	327.873	59.371
2	0.167	655.747	35.647
3	0.250	983.620	4.982
		Sum = 100.000	Sum= 5.140

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

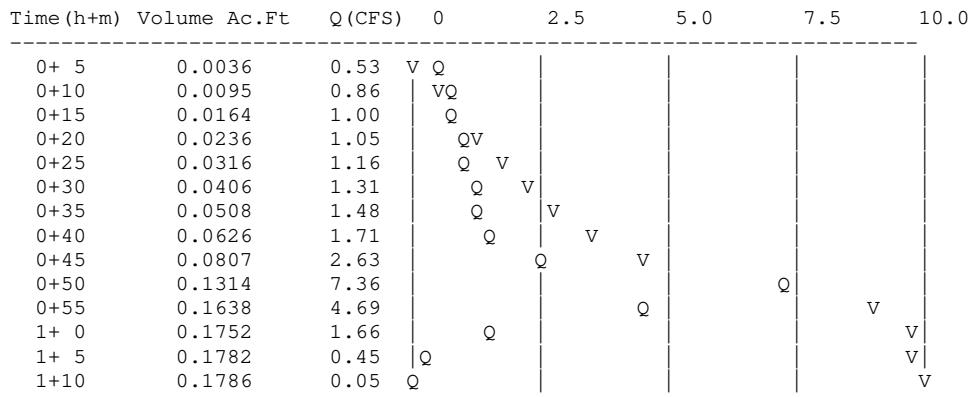
Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate (In./Hr) Max Low	Effective (In/Hr)
1	0.08	4.20	0.346	(0.388) 0.173	0.173
2	0.17	4.30	0.354	(0.388) 0.177	0.177
3	0.25	5.00	0.412	(0.388) 0.206	0.206
4	0.33	5.00	0.412	(0.388) 0.206	0.206
5	0.42	5.80	0.477	(0.388) 0.239	0.239
6	0.50	6.50	0.535	(0.388) 0.268	0.268
7	0.58	7.40	0.609	(0.388) 0.305	0.305
8	0.67	8.60	0.708	(0.388) 0.354	0.354
9	0.75	12.30	1.012	0.388 (0.506)	0.624
10	0.83	29.10	2.395	0.388 (1.198)	2.007
11	0.92	6.80	0.560	(0.388) 0.280	0.280
12	1.00	5.00	0.412	(0.388) 0.206	0.206
		(Loss Rate Not Used)			
		Sum = 100.0		Sum = 5.0	

Flood volume = Effective rainfall 0.42(In)
times area 5.1(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)
Total soil loss = 0.27(In)
Total soil loss = 0.113(Ac.Ft)
Total rainfall = 0.69(In)
Flood volume = 7780.1 Cubic Feet
Total soil loss = 4918.9 Cubic Feet

Peak flow rate of this hydrograph = 7.363(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))



Unit Hydrograph Analyses

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Study date 07/22/19 File: dmab5exist35.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION

5-YR 3-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.025 Hr.
Lag time = 1.52 Min.
25% of lag time = 0.38 Min.
40% of lag time = 0.61 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]
5.10	0.87	4.42

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	2.09	10.66

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 1.153(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.153(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.500
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.500	0.388	1.000	0.388
				Sum (F)	=	0.388

Area averaged mean soil loss (F) (In/Hr) = 0.388
Minimum soil loss rate ((In/Hr)) = 0.194

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

U n i t H y d r o g r a p h
V A L L E Y S-C u r v e

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	327.873	59.371	3.052
2 0.167	655.747	35.647	1.832
3 0.250	983.620	4.982	0.256
		Sum = 100.000	Sum= 5.140

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

Unit	Time	Pattern	Storm Rain (In/Hr)	Loss rate (In./Hr) Max Low	Effective (In/Hr)
1	0.08	1.30	0.180	(0.388) 0.090	0.090
2	0.17	1.30	0.180	(0.388) 0.090	0.090
3	0.25	1.10	0.152	(0.388) 0.076	0.076
4	0.33	1.50	0.207	(0.388) 0.104	0.104
5	0.42	1.50	0.207	(0.388) 0.104	0.104
6	0.50	1.80	0.249	(0.388) 0.124	0.124
7	0.58	1.50	0.207	(0.388) 0.104	0.104
8	0.67	1.80	0.249	(0.388) 0.124	0.124
9	0.75	1.80	0.249	(0.388) 0.124	0.124
10	0.83	1.50	0.207	(0.388) 0.104	0.104
11	0.92	1.60	0.221	(0.388) 0.111	0.111
12	1.00	1.80	0.249	(0.388) 0.124	0.124
13	1.08	2.20	0.304	(0.388) 0.152	0.152
14	1.17	2.20	0.304	(0.388) 0.152	0.152
15	1.25	2.20	0.304	(0.388) 0.152	0.152
16	1.33	2.00	0.277	(0.388) 0.138	0.138
17	1.42	2.60	0.360	(0.388) 0.180	0.180
18	1.50	2.70	0.373	(0.388) 0.187	0.187
19	1.58	2.40	0.332	(0.388) 0.166	0.166
20	1.67	2.70	0.373	(0.388) 0.187	0.187
21	1.75	3.30	0.456	(0.388) 0.228	0.228
22	1.83	3.10	0.429	(0.388) 0.214	0.214
23	1.92	2.90	0.401	(0.388) 0.201	0.201
24	2.00	3.00	0.415	(0.388) 0.207	0.207
25	2.08	3.10	0.429	(0.388) 0.214	0.214
26	2.17	4.20	0.581	(0.388) 0.290	0.290
27	2.25	5.00	0.692	(0.388) 0.346	0.346
28	2.33	3.50	0.484	(0.388) 0.242	0.242
29	2.42	6.80	0.941	0.388 (0.470)	0.552
30	2.50	7.30	1.010	0.388 (0.505)	0.621
31	2.58	8.20	1.134	0.388 (0.567)	0.746
32	2.67	5.90	0.816	0.388 (0.408)	0.428
33	2.75	2.00	0.277	(0.388) 0.138	0.138
34	2.83	1.80	0.249	(0.388) 0.124	0.124
35	2.92	1.80	0.249	(0.388) 0.124	0.124
36	3.00	0.60	0.083	(0.388) 0.041	0.041

(Loss Rate Not Used)

Sum = 100.0 Sum = 7.3

Flood volume = Effective rainfall 0.61 (In)
times area 5.1 (Ac.) / [(In)/(Ft.)] = 0.3 (Ac.Ft)
Total soil loss = 0.54 (In)
Total soil loss = 0.231 (Ac.Ft)
Total rainfall = 1.15 (In)
Flood volume = 11282.3 Cubic Feet
Total soil loss = 10057.0 Cubic Feet

Peak flow rate of this hydrograph = 3.558 (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	2.5	5.0	7.5	10.0
0+ 5	0.0019	0.27	VQ					
0+10	0.0049	0.44	VQ					
0+15	0.0078	0.42	Q					
0+20	0.0111	0.48	Q					
0+25	0.0147	0.53	Q					
0+30	0.0188	0.60	Q					
0+35	0.0228	0.57	QV					
0+40	0.0269	0.60	Q V					
0+45	0.0313	0.63	Q V					
0+50	0.0353	0.58	Q V					
0+55	0.0391	0.56	Q V					
1+ 0	0.0433	0.61	Q V					
1+ 5	0.0483	0.72	Q V					
1+10	0.0536	0.78	Q V					
1+15	0.0590	0.78	Q V					
1+20	0.0641	0.74	Q V					
1+25	0.0699	0.84	Q V					
1+30	0.0764	0.94	Q V					
1+35	0.0825	0.90	Q V					
1+40	0.0889	0.92	Q V					
1+45	0.0963	1.08	Q V					
1+50	0.1040	1.12	Q V					
1+55	0.1114	1.06	Q V					
2+ 0	0.1186	1.06	Q V					
2+ 5	0.1261	1.09	Q V					
2+10	0.1353	1.33	Q V					
2+15	0.1466	1.64	Q V					
2+20	0.1566	1.45	Q V					
2+25	0.1719	2.22	Q V					
2+30	0.1923	2.97	Q V					
2+35	0.2168	3.56	Q V					
2+40	0.2363	2.83	Q V					
2+45	0.2460	1.40	Q V					
2+50	0.2511	0.74	Q V					
2+55	0.2555	0.64	Q V					
3+ 0	0.2582	0.39	Q V					
3+ 5	0.2589	0.11	Q V					
3+10	0.2590	0.01	Q V					

Unit Hydrograph Analyses

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Study date 07/22/19 File: dmab5exist65.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION

5-YR 6-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.025 Hr.
Lag time = 1.52 Min.
25% of lag time = 0.38 Min.
40% of lag time = 0.61 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]
5.10	1.21	6.17

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	2.86	14.59

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 1.596(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.596(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.500
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.500	0.388	1.000	0.388
				Sum (F)	=	0.388

Area averaged mean soil loss (F) (In/Hr) = 0.388
Minimum soil loss rate ((In/Hr)) = 0.194

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

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	327.873	59.371	3.052
2 0.167	655.747	35.647	1.832
3 0.250	983.620	4.982	0.256
		Sum = 100.000	Sum= 5.140

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	0.096	(0.388) 0.048	0.048
2	0.17	0.60	0.115	(0.388) 0.057	0.057
3	0.25	0.60	0.115	(0.388) 0.057	0.057
4	0.33	0.60	0.115	(0.388) 0.057	0.057
5	0.42	0.60	0.115	(0.388) 0.057	0.057
6	0.50	0.70	0.134	(0.388) 0.067	0.067
7	0.58	0.70	0.134	(0.388) 0.067	0.067
8	0.67	0.70	0.134	(0.388) 0.067	0.067
9	0.75	0.70	0.134	(0.388) 0.067	0.067
10	0.83	0.70	0.134	(0.388) 0.067	0.067
11	0.92	0.70	0.134	(0.388) 0.067	0.067
12	1.00	0.80	0.153	(0.388) 0.077	0.077
13	1.08	0.80	0.153	(0.388) 0.077	0.077
14	1.17	0.80	0.153	(0.388) 0.077	0.077
15	1.25	0.80	0.153	(0.388) 0.077	0.077
16	1.33	0.80	0.153	(0.388) 0.077	0.077
17	1.42	0.80	0.153	(0.388) 0.077	0.077
18	1.50	0.80	0.153	(0.388) 0.077	0.077
19	1.58	0.80	0.153	(0.388) 0.077	0.077
20	1.67	0.80	0.153	(0.388) 0.077	0.077
21	1.75	0.80	0.153	(0.388) 0.077	0.077
22	1.83	0.80	0.153	(0.388) 0.077	0.077
23	1.92	0.80	0.153	(0.388) 0.077	0.077
24	2.00	0.90	0.172	(0.388) 0.086	0.086
25	2.08	0.80	0.153	(0.388) 0.077	0.077
26	2.17	0.90	0.172	(0.388) 0.086	0.086
27	2.25	0.90	0.172	(0.388) 0.086	0.086
28	2.33	0.90	0.172	(0.388) 0.086	0.086
29	2.42	0.90	0.172	(0.388) 0.086	0.086
30	2.50	0.90	0.172	(0.388) 0.086	0.086
31	2.58	0.90	0.172	(0.388) 0.086	0.086
32	2.67	0.90	0.172	(0.388) 0.086	0.086
33	2.75	1.00	0.192	(0.388) 0.096	0.096
34	2.83	1.00	0.192	(0.388) 0.096	0.096
35	2.92	1.00	0.192	(0.388) 0.096	0.096
36	3.00	1.00	0.192	(0.388) 0.096	0.096
37	3.08	1.00	0.192	(0.388) 0.096	0.096
38	3.17	1.10	0.211	(0.388) 0.105	0.105
39	3.25	1.10	0.211	(0.388) 0.105	0.105
40	3.33	1.10	0.211	(0.388) 0.105	0.105
41	3.42	1.20	0.230	(0.388) 0.115	0.115
42	3.50	1.30	0.249	(0.388) 0.125	0.125
43	3.58	1.40	0.268	(0.388) 0.134	0.134
44	3.67	1.40	0.268	(0.388) 0.134	0.134
45	3.75	1.50	0.287	(0.388) 0.144	0.144
46	3.83	1.50	0.287	(0.388) 0.144	0.144
47	3.92	1.60	0.307	(0.388) 0.153	0.153
48	4.00	1.60	0.307	(0.388) 0.153	0.153
49	4.08	1.70	0.326	(0.388) 0.163	0.163
50	4.17	1.80	0.345	(0.388) 0.172	0.172
51	4.25	1.90	0.364	(0.388) 0.182	0.182
52	4.33	2.00	0.383	(0.388) 0.192	0.192
53	4.42	2.10	0.402	(0.388) 0.201	0.201
54	4.50	2.10	0.402	(0.388) 0.201	0.201
55	4.58	2.20	0.421	(0.388) 0.211	0.211

56	4.67	2.30	0.441	(-0.388)	0.220	0.220
57	4.75	2.40	0.460	(-0.388)	0.230	0.230
58	4.83	2.40	0.460	(-0.388)	0.230	0.230
59	4.92	2.50	0.479	(-0.388)	0.239	0.239
60	5.00	2.60	0.498	(-0.388)	0.249	0.249
61	5.08	3.10	0.594	(-0.388)	0.297	0.297
62	5.17	3.60	0.690	(-0.388)	0.345	0.345
63	5.25	3.90	0.747	(-0.388)	0.374	0.374
64	5.33	4.20	0.805	0.388	(-0.402)	0.416
65	5.42	4.70	0.900	0.388	(-0.450)	0.512
66	5.50	5.60	1.073	0.388	(-0.536)	0.685
67	5.58	1.90	0.364	(-0.388)	0.182	0.182
68	5.67	0.90	0.172	(-0.388)	0.086	0.086
69	5.75	0.60	0.115	(-0.388)	0.057	0.057
70	5.83	0.50	0.096	(-0.388)	0.048	0.048
71	5.92	0.30	0.057	(-0.388)	0.029	0.029
72	6.00	0.20	0.038	(-0.388)	0.019	0.019

(Loss Rate Not Used)

Sum = 100.0

Sum = 9.8

Flood volume = Effective rainfall 0.82 (In)

times area 5.1(Ac.)/[(In)/(Ft.)] = 0.3 (Ac.Ft)

Total soil loss = 0.78 (In)

Total soil loss = 0.331 (Ac.Ft)

Total rainfall = 1.60 (In)

Flood volume = 15123.0 Cubic Feet

Total soil loss = 14431.9 Cubic Feet

Peak flow rate of this hydrograph = 3.135 (CFS)

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6 - H O U R S T O R M
Runoff Hydrograph

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	0.15	Q				
0+10	0.0028	0.26	VQ				
0+15	0.0048	0.29	VQ				
0+20	0.0069	0.30	VQ				
0+25	0.0089	0.30	Q				
0+30	0.0111	0.32	Q				
0+35	0.0135	0.34	Q				
0+40	0.0159	0.34	Q				
0+45	0.0183	0.34	QV				
0+50	0.0206	0.34	QV				
0+55	0.0230	0.34	QV				
1+ 0	0.0256	0.37	QV				
1+ 5	0.0283	0.39	Q V				
1+10	0.0310	0.39	Q V				
1+15	0.0337	0.39	Q V				
1+20	0.0364	0.39	Q V				
1+25	0.0391	0.39	Q V				
1+30	0.0418	0.39	Q V				
1+35	0.0446	0.39	Q V				
1+40	0.0473	0.39	Q V				
1+45	0.0500	0.39	Q V				
1+50	0.0527	0.39	Q V				
1+55	0.0554	0.39	Q V				
2+ 0	0.0583	0.42	Q V				
2+ 5	0.0612	0.41	Q V				
2+10	0.0641	0.43	Q V				
2+15	0.0671	0.44	Q V				
2+20	0.0702	0.44	Q V				
2+25	0.0732	0.44	Q V				
2+30	0.0763	0.44	Q V				
2+35	0.0793	0.44	Q V				
2+40	0.0824	0.44	Q V				
2+45	0.0857	0.47	Q V				
2+50	0.0890	0.49	Q V				
2+55	0.0924	0.49	Q V				
3+ 0	0.0958	0.49	Q V				
3+ 5	0.0992	0.49	Q V				
3+10	0.1028	0.52	Q V				
3+15	0.1065	0.54	Q V				
3+20	0.1102	0.54	Q V				
3+25	0.1142	0.57	Q V				

3+30	0.1184	0.62	Q	V				
3+35	0.1230	0.67	Q	V				
3+40	0.1278	0.69	Q	V				
3+45	0.1327	0.72	Q	V				
3+50	0.1378	0.74	Q	V				
3+55	0.1431	0.77	Q	V				
4+ 0	0.1485	0.79	Q	V				
4+ 5	0.1541	0.82	Q	V				
4+10	0.1601	0.86	Q	V				
4+15	0.1664	0.91	Q	V				
4+20	0.1730	0.96	Q	V				
4+25	0.1800	1.01	Q	V				
4+30	0.1871	1.03	Q	V				
4+35	0.1944	1.06	Q	V				
4+40	0.2020	1.11	Q	V				
4+45	0.2100	1.16	Q	V				
4+50	0.2182	1.18	Q	V				
4+55	0.2265	1.21	Q	V				
5+ 0	0.2352	1.26	Q	V				
5+ 5	0.2450	1.42	Q	V				
5+10	0.2564	1.66	Q	V				
5+15	0.2691	1.85	Q	V				
5+20	0.2832	2.04	Q	V				
5+25	0.2999	2.42	Q	V				
5+30	0.3215	3.14	Q	V				
5+35	0.3349	1.94	Q	V				
5+40	0.3402	0.77	Q	V				
5+45	0.3428	0.38	Q	V				
5+50	0.3447	0.27	Q	V				
5+55	0.3460	0.19	Q	V				
6+ 0	0.3469	0.12	Q	V				
6+ 5	0.3471	0.04	Q	V				
6+10	0.3472	0.00	Q	V				

Unit Hydrograph Analyses

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Study date 07/22/19 File: DMAB5EXIST245.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION

5-YR 24-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.025 Hr.
Lag time = 1.52 Min.
25% of lag time = 0.38 Min.
40% of lag time = 0.61 Min.
Unit time = 15.00 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]
5.10	2.05	10.45

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	5.16	26.32

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 2.778(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.778(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.500
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.500	0.388	1.000	0.388
				Sum (F)	=	0.388

Area averaged mean soil loss (F) (In/Hr) = 0.388
Minimum soil loss rate ((In/Hr)) = 0.194

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

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 0.250	983.620	100.000 Sum = 100.000	5.140 Sum= 5.140

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 (Hr.)	Time Percent	Pattern	Storm Rain (In/Hr)	Loss rate (In./Hr)		Effective (In/Hr)
				Max	Low	
1 0.25	0.20		0.022	(0.686)	0.011	0.011
2 0.50	0.30		0.033	(0.678)	0.017	0.017
3 0.75	0.30		0.033	(0.670)	0.017	0.017
4 1.00	0.40		0.044	(0.662)	0.022	0.022
5 1.25	0.30		0.033	(0.654)	0.017	0.017
6 1.50	0.30		0.033	(0.646)	0.017	0.017
7 1.75	0.30		0.033	(0.639)	0.017	0.017
8 2.00	0.40		0.044	(0.631)	0.022	0.022
9 2.25	0.40		0.044	(0.623)	0.022	0.022
10 2.50	0.40		0.044	(0.616)	0.022	0.022
11 2.75	0.50		0.056	(0.608)	0.028	0.028
12 3.00	0.50		0.056	(0.601)	0.028	0.028
13 3.25	0.50		0.056	(0.593)	0.028	0.028
14 3.50	0.50		0.056	(0.586)	0.028	0.028
15 3.75	0.50		0.056	(0.579)	0.028	0.028
16 4.00	0.60		0.067	(0.571)	0.033	0.033
17 4.25	0.60		0.067	(0.564)	0.033	0.033
18 4.50	0.70		0.078	(0.557)	0.039	0.039
19 4.75	0.70		0.078	(0.550)	0.039	0.039
20 5.00	0.80		0.089	(0.543)	0.044	0.044
21 5.25	0.60		0.067	(0.536)	0.033	0.033
22 5.50	0.70		0.078	(0.529)	0.039	0.039
23 5.75	0.80		0.089	(0.522)	0.044	0.044
24 6.00	0.80		0.089	(0.515)	0.044	0.044
25 6.25	0.90		0.100	(0.508)	0.050	0.050
26 6.50	0.90		0.100	(0.501)	0.050	0.050
27 6.75	1.00		0.111	(0.494)	0.056	0.056
28 7.00	1.00		0.111	(0.488)	0.056	0.056
29 7.25	1.00		0.111	(0.481)	0.056	0.056
30 7.50	1.10		0.122	(0.475)	0.061	0.061
31 7.75	1.20		0.133	(0.468)	0.067	0.067
32 8.00	1.30		0.144	(0.462)	0.072	0.072
33 8.25	1.50		0.167	(0.455)	0.083	0.083
34 8.50	1.50		0.167	(0.449)	0.083	0.083
35 8.75	1.60		0.178	(0.443)	0.089	0.089
36 9.00	1.70		0.189	(0.436)	0.094	0.094
37 9.25	1.90		0.211	(0.430)	0.106	0.106
38 9.50	2.00		0.222	(0.424)	0.111	0.111
39 9.75	2.10		0.233	(0.418)	0.117	0.117
40 10.00	2.20		0.245	(0.412)	0.122	0.122
41 10.25	1.50		0.167	(0.406)	0.083	0.083
42 10.50	1.50		0.167	(0.400)	0.083	0.083
43 10.75	2.00		0.222	(0.394)	0.111	0.111
44 11.00	2.00		0.222	(0.389)	0.111	0.111
45 11.25	1.90		0.211	(0.383)	0.106	0.106
46 11.50	1.90		0.211	(0.377)	0.106	0.106
47 11.75	1.70		0.189	(0.372)	0.094	0.094
48 12.00	1.80		0.200	(0.366)	0.100	0.100
49 12.25	2.50		0.278	(0.361)	0.139	0.139
50 12.50	2.60		0.289	(0.355)	0.144	0.144
51 12.75	2.80		0.311	(0.350)	0.156	0.156
52 13.00	2.90		0.322	(0.345)	0.161	0.161
53 13.25	3.40		0.378	(0.339)	0.189	0.189
54 13.50	3.40		0.378	(0.334)	0.189	0.189
55 13.75	2.30		0.256	(0.329)	0.128	0.128
56 14.00	2.30		0.256	(0.324)	0.128	0.128
57 14.25	2.70		0.300	(0.319)	0.150	0.150

58	14.50	2.60	0.289	(0.314)	0.144	0.144
59	14.75	2.60	0.289	(0.310)	0.144	0.144
60	15.00	2.50	0.278	(0.305)	0.139	0.139
61	15.25	2.40	0.267	(0.300)	0.133	0.133
62	15.50	2.30	0.256	(0.296)	0.128	0.128
63	15.75	1.90	0.211	(0.291)	0.106	0.106
64	16.00	1.90	0.211	(0.287)	0.106	0.106
65	16.25	0.40	0.044	(0.282)	0.022	0.022
66	16.50	0.40	0.044	(0.278)	0.022	0.022
67	16.75	0.30	0.033	(0.274)	0.017	0.017
68	17.00	0.30	0.033	(0.270)	0.017	0.017
69	17.25	0.50	0.056	(0.266)	0.028	0.028
70	17.50	0.50	0.056	(0.262)	0.028	0.028
71	17.75	0.50	0.056	(0.258)	0.028	0.028
72	18.00	0.40	0.044	(0.254)	0.022	0.022
73	18.25	0.40	0.044	(0.250)	0.022	0.022
74	18.50	0.40	0.044	(0.246)	0.022	0.022
75	18.75	0.30	0.033	(0.243)	0.017	0.017
76	19.00	0.20	0.022	(0.239)	0.011	0.011
77	19.25	0.30	0.033	(0.236)	0.017	0.017
78	19.50	0.40	0.044	(0.233)	0.022	0.022
79	19.75	0.30	0.033	(0.230)	0.017	0.017
80	20.00	0.20	0.022	(0.226)	0.011	0.011
81	20.25	0.30	0.033	(0.223)	0.017	0.017
82	20.50	0.30	0.033	(0.221)	0.017	0.017
83	20.75	0.30	0.033	(0.218)	0.017	0.017
84	21.00	0.20	0.022	(0.215)	0.011	0.011
85	21.25	0.30	0.033	(0.213)	0.017	0.017
86	21.50	0.20	0.022	(0.210)	0.011	0.011
87	21.75	0.30	0.033	(0.208)	0.017	0.017
88	22.00	0.20	0.022	(0.206)	0.011	0.011
89	22.25	0.30	0.033	(0.204)	0.017	0.017
90	22.50	0.20	0.022	(0.202)	0.011	0.011
91	22.75	0.20	0.022	(0.200)	0.011	0.011
92	23.00	0.20	0.022	(0.198)	0.011	0.011
93	23.25	0.20	0.022	(0.197)	0.011	0.011
94	23.50	0.20	0.022	(0.196)	0.011	0.011
95	23.75	0.20	0.022	(0.195)	0.011	0.011
96	24.00	0.20	0.022	(0.194)	0.011	0.011

(Loss Rate Not Used)

Sum = 100.0

Sum = 5.6

Flood volume = Effective rainfall 1.39 (In)
times area 5.1(Ac.)/((In)/(Ft.)) = 0.6 (Ac.Ft)
Total soil loss = 1.39 (In)
Total soil loss = 0.590 (Ac.Ft)
Total rainfall = 2.78 (In)
Flood volume = 25718.4 Cubic Feet
Total soil loss = 25718.4 Cubic Feet

Peak flow rate of this hydrograph = 0.972 (CFS)

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24 - H O U R S T O R M
Run off Hydrograph

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0012	0.06	Q				
0+30	0.0030	0.09	Q				
0+45	0.0047	0.09	Q				
1+ 0	0.0071	0.11	Q				
1+15	0.0089	0.09	Q				
1+30	0.0106	0.09	Q				
1+45	0.0124	0.09	Q				
2+ 0	0.0148	0.11	Q				
2+15	0.0171	0.11	QV				
2+30	0.0195	0.11	QV				
2+45	0.0224	0.14	QV				
3+ 0	0.0254	0.14	QV				
3+15	0.0283	0.14	QV				
3+30	0.0313	0.14	Q V				
3+45	0.0342	0.14	Q V				
4+ 0	0.0378	0.17	Q V				
4+15	0.0413	0.17	Q V				
4+30	0.0455	0.20	Q V				
4+45	0.0496	0.20	Q V				

5+ 0	0.0543	0.23	Q	V					
5+15	0.0579	0.17	Q	V					
5+30	0.0620	0.20	Q	V					
5+45	0.0667	0.23	Q	V					
6+ 0	0.0714	0.23	Q	V					
6+15	0.0768	0.26	Q	V					
6+30	0.0821	0.26	Q	V					
6+45	0.0880	0.29	Q	V					
7+ 0	0.0939	0.29	Q	V					
7+15	0.0998	0.29	Q	V					
7+30	0.1063	0.31	Q	V					
7+45	0.1134	0.34	Q	V					
8+ 0	0.1210	0.37	Q	V					
8+15	0.1299	0.43	Q	V					
8+30	0.1387	0.43	Q	V					
8+45	0.1482	0.46	Q	V					
9+ 0	0.1582	0.49	Q	V					
9+15	0.1694	0.54	Q	V					
9+30	0.1813	0.57	Q	V					
9+45	0.1937	0.60	Q	V					
10+ 0	0.2066	0.63	Q	V					
10+15	0.2155	0.43	Q	V					
10+30	0.2244	0.43	Q	V					
10+45	0.2362	0.57	Q	V					
11+ 0	0.2480	0.57	Q	V					
11+15	0.2592	0.54	Q	V					
11+30	0.2704	0.54	Q	V					
11+45	0.2804	0.49	Q	V					
12+ 0	0.2911	0.51	Q	V					
12+15	0.3058	0.71	Q	V					
12+30	0.3212	0.74	Q	V					
12+45	0.3377	0.80	Q	V					
13+ 0	0.3548	0.83	Q	V					
13+15	0.3749	0.97	Q	V					
13+30	0.3950	0.97	Q	V					
13+45	0.4086	0.66	Q	V					
14+ 0	0.4221	0.66	Q	V					
14+15	0.4381	0.77	Q	V					
14+30	0.4534	0.74	Q	V					
14+45	0.4688	0.74	Q	V					
15+ 0	0.4835	0.71	Q	V					
15+15	0.4977	0.69	Q	V					
15+30	0.5113	0.66	Q	V					
15+45	0.5225	0.54	Q	V					
16+ 0	0.5337	0.54	Q	V					
16+15	0.5361	0.11	Q	V					
16+30	0.5385	0.11	Q	V					
16+45	0.5402	0.09	Q	V					
17+ 0	0.5420	0.09	Q	V					
17+15	0.5450	0.14	Q	V					
17+30	0.5479	0.14	Q	V					
17+45	0.5509	0.14	Q	V					
18+ 0	0.5532	0.11	Q	V					
18+15	0.5556	0.11	Q	V					
18+30	0.5579	0.11	Q	V					
18+45	0.5597	0.09	Q	V					
19+ 0	0.5609	0.06	Q	V					
19+15	0.5627	0.09	Q	V					
19+30	0.5650	0.11	Q	V					
19+45	0.5668	0.09	Q	V					
20+ 0	0.5680	0.06	Q	V					
20+15	0.5697	0.09	Q	V					
20+30	0.5715	0.09	Q	V					
20+45	0.5733	0.09	Q	V					
21+ 0	0.5745	0.06	Q	V					
21+15	0.5762	0.09	Q	V					
21+30	0.5774	0.06	Q	V					
21+45	0.5792	0.09	Q	V					
22+ 0	0.5804	0.06	Q	V					
22+15	0.5821	0.09	Q	V					
22+30	0.5833	0.06	Q	V					
22+45	0.5845	0.06	Q	V					
23+ 0	0.5857	0.06	Q	V					
23+15	0.5869	0.06	Q	V					
23+30	0.5881	0.06	Q	V					
23+45	0.5892	0.06	Q	V					
24+ 0	0.5904	0.06	Q	V					

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAB5PROP15.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA B
5-YR 1-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.019 Hr.
Lag time = 1.14 Min.
25% of lag time = 0.29 Min.
40% of lag time = 0.46 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]
5.10	0.49	2.49

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	1.33	6.78

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 0.686(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.686(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.690
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.690	0.268	1.000	0.268
				Sum (F)	=	0.268

Area averaged mean soil loss (F) (In/Hr) = 0.268
Minimum soil loss rate ((In/Hr)) = 0.134

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.350

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	437.165	67.483	3.469
2 0.167	874.329	32.517	1.671
	Sum = 100.000	Sum=	5.140

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)		Effective (In/Hr)
				Max	Low	
1	0.08	4.20	0.346	(0.268)	0.121	0.225
2	0.17	4.30	0.354	(0.268)	0.124	0.230
3	0.25	5.00	0.412	(0.268)	0.144	0.268
4	0.33	5.00	0.412	(0.268)	0.144	0.268
5	0.42	5.80	0.477	(0.268)	0.167	0.310
6	0.50	6.50	0.535	(0.268)	0.187	0.348
7	0.58	7.40	0.609	(0.268)	0.213	0.396
8	0.67	8.60	0.708	(0.268)	0.248	0.460
9	0.75	12.30	1.012	0.268	(0.354)	0.745
10	0.83	29.10	2.395	0.268	(0.838)	2.128
11	0.92	6.80	0.560	(0.268)	0.196	0.364
12	1.00	5.00	0.412	(0.268)	0.144	0.268

(Loss Rate Not Used)

m = 100.0 Sum =
 Flood volume = Effective rainfall 0.50 (In)

Total area 9.12 (sq.)

Total soil loss = 0.19 (in)

Total rainfall = 0.68 (In)

Flood volume = 8268.8 Cubic Feet

Total soil loss = 3430 ? Cubic Feet

Peak flow rate of this hydrograph = 8,630 (CFS)

1 - H O U R S T O R M
B u n c f f H u d r o g n 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	0.0054	0.78	V Q					
0+10	0.0135	1.17	V Q					
0+15	0.0225	1.31	VQ					
0+20	0.0320	1.38	QV					
0+25	0.0425	1.52	QV					
0+30	0.0544	1.73	Q	V				
0+35	0.0678	1.96	Q	V				
0+40	0.0834	2.26	Q	V				
0+45	0.1065	3.35	Q	V				
0+50	0.1659	8.63					V	Q
0+55	0.1991	4.82			Q			V
1+ 0	0.2097	1.54	Q					V
1+ 5	0.2128	0.45	Q					V

Unit Hydrograph Analyses

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA B
5-YR 3-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.019 Hr.
Lag time = 1.14 Min.
25% of lag time = 0.29 Min.
40% of lag time = 0.46 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]
5.10	0.87	4.42

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	2.09	10.66

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 1.153(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.153(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.690
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.690	0.268	1.000	0.268
				Sum (F)	=	0.268

Area averaged mean soil loss (F) (In/Hr) = 0.268
Minimum soil loss rate ((In/Hr)) = 0.134

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.350

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	437.165	67.483	3.469
2 0.167	874.329	32.517	1.671
	Sum = 100.000	Sum=	5.140

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	0.180	(0.268) 0.063	0.117
2	0.17	1.30	0.180	(0.268) 0.063	0.117
3	0.25	1.10	0.152	(0.268) 0.053	0.099
4	0.33	1.50	0.207	(0.268) 0.073	0.135
5	0.42	1.50	0.207	(0.268) 0.073	0.135
6	0.50	1.80	0.249	(0.268) 0.087	0.162
7	0.58	1.50	0.207	(0.268) 0.073	0.135
8	0.67	1.80	0.249	(0.268) 0.087	0.162
9	0.75	1.80	0.249	(0.268) 0.087	0.162
10	0.83	1.50	0.207	(0.268) 0.073	0.135
11	0.92	1.60	0.221	(0.268) 0.077	0.144
12	1.00	1.80	0.249	(0.268) 0.087	0.162
13	1.08	2.20	0.304	(0.268) 0.107	0.198
14	1.17	2.20	0.304	(0.268) 0.107	0.198
15	1.25	2.20	0.304	(0.268) 0.107	0.198
16	1.33	2.00	0.277	(0.268) 0.097	0.180
17	1.42	2.60	0.360	(0.268) 0.126	0.234
18	1.50	2.70	0.373	(0.268) 0.131	0.243
19	1.58	2.40	0.332	(0.268) 0.116	0.216
20	1.67	2.70	0.373	(0.268) 0.131	0.243
21	1.75	3.30	0.456	(0.268) 0.160	0.297
22	1.83	3.10	0.429	(0.268) 0.150	0.279
23	1.92	2.90	0.401	(0.268) 0.140	0.261
24	2.00	3.00	0.415	(0.268) 0.145	0.270
25	2.08	3.10	0.429	(0.268) 0.150	0.279
26	2.17	4.20	0.581	(0.268) 0.203	0.378
27	2.25	5.00	0.692	(0.268) 0.242	0.450
28	2.33	3.50	0.484	(0.268) 0.169	0.315
29	2.42	6.80	0.941	0.268 (0.329)	0.673
30	2.50	7.30	1.010	0.268 (0.353)	0.742
31	2.58	8.20	1.134	0.268 (0.397)	0.867
32	2.67	5.90	0.816	0.268 (0.286)	0.549
33	2.75	2.00	0.277	(0.268) 0.097	0.180
34	2.83	1.80	0.249	(0.268) 0.087	0.162
35	2.92	1.80	0.249	(0.268) 0.087	0.162
36	3.00	0.60	0.083	(0.268) 0.029	0.054

(Loss Rate Not Used)

Sum = 100.0 Sum = 9.3

Flood volume = Effective rainfall 0.77 (In)
times area 5.1 (Ac.) / [(In) / (Ft.)] = 0.3 (Ac.Ft)

Total soil loss = 0.38 (In)

Total soil loss = 0.161 (Ac.Ft)

Total rainfall = 1.15 (In)

Flood volume = 14325.5 Cubic Feet

Total soil loss = 7013.8 Cubic Feet

Peak flow rate of this hydrograph = 4.249 (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 2.5 5.0 7.5 10.0

0+ 5	0.0028	0.41	VQ
0+10	0.0069	0.60	V Q
0+15	0.0106	0.54	VQ
0+20	0.0150	0.63	VQ
0+25	0.0198	0.69	Q
0+30	0.0252	0.79	Q
0+35	0.0303	0.74	QV
0+40	0.0357	0.79	QV
0+45	0.0414	0.83	Q V
0+50	0.0465	0.74	Q V
0+55	0.0515	0.72	Q V
1+ 0	0.0570	0.80	Q V
1+ 5	0.0636	0.96	Q V
1+10	0.0706	1.02	Q V
1+15	0.0776	1.02	Q V
1+20	0.0842	0.95	Q V
1+25	0.0919	1.11	Q V
1+30	0.1004	1.23	Q V
1+35	0.1083	1.15	Q V
1+40	0.1166	1.20	Q V
1+45	0.1265	1.44	Q V
1+50	0.1366	1.46	Q V
1+55	0.1460	1.37	Q V
2+ 0	0.1555	1.37	Q V
2+ 5	0.1652	1.42	Q V
2+10	0.1775	1.78	Q V
2+15	0.1926	2.19	Q V
2+20	0.2053	1.84	Q V
2+25	0.2250	2.86	Q V
2+30	0.2505	3.70	Q V
2+35	0.2797	4.25	Q V
2+40	0.3028	3.35	Q V
2+45	0.3134	1.54	Q V
2+50	0.3194	0.86	Q V
2+55	0.3251	0.83	Q V
3+ 0	0.3282	0.46	Q V
3+ 5	0.3289	0.09	Q V

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAB5PROP65.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA B
5-YR 6-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.019 Hr.
Lag time = 1.14 Min.
25% of lag time = 0.29 Min.
40% of lag time = 0.46 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]
5.10	1.21	6.17

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	2.86	14.59

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 1.596(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.596(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.690
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.690	0.268	1.000	0.268
				Sum (F)	=	0.268

Area averaged mean soil loss (F) (In/Hr) = 0.268
Minimum soil loss rate ((In/Hr)) = 0.134

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.350

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	437.165	67.483	3.469
2 0.167	874.329	32.517	1.671
	Sum = 100.000	Sum=	5.140

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	0.096	(0.268) 0.034	0.062
2	0.17	0.60	0.115	(0.268) 0.040	0.075
3	0.25	0.60	0.115	(0.268) 0.040	0.075
4	0.33	0.60	0.115	(0.268) 0.040	0.075
5	0.42	0.60	0.115	(0.268) 0.040	0.075
6	0.50	0.70	0.134	(0.268) 0.047	0.087
7	0.58	0.70	0.134	(0.268) 0.047	0.087
8	0.67	0.70	0.134	(0.268) 0.047	0.087
9	0.75	0.70	0.134	(0.268) 0.047	0.087
10	0.83	0.70	0.134	(0.268) 0.047	0.087
11	0.92	0.70	0.134	(0.268) 0.047	0.087
12	1.00	0.80	0.153	(0.268) 0.054	0.100
13	1.08	0.80	0.153	(0.268) 0.054	0.100
14	1.17	0.80	0.153	(0.268) 0.054	0.100
15	1.25	0.80	0.153	(0.268) 0.054	0.100
16	1.33	0.80	0.153	(0.268) 0.054	0.100
17	1.42	0.80	0.153	(0.268) 0.054	0.100
18	1.50	0.80	0.153	(0.268) 0.054	0.100
19	1.58	0.80	0.153	(0.268) 0.054	0.100
20	1.67	0.80	0.153	(0.268) 0.054	0.100
21	1.75	0.80	0.153	(0.268) 0.054	0.100
22	1.83	0.80	0.153	(0.268) 0.054	0.100
23	1.92	0.80	0.153	(0.268) 0.054	0.100
24	2.00	0.90	0.172	(0.268) 0.060	0.112
25	2.08	0.80	0.153	(0.268) 0.054	0.100
26	2.17	0.90	0.172	(0.268) 0.060	0.112
27	2.25	0.90	0.172	(0.268) 0.060	0.112
28	2.33	0.90	0.172	(0.268) 0.060	0.112
29	2.42	0.90	0.172	(0.268) 0.060	0.112
30	2.50	0.90	0.172	(0.268) 0.060	0.112
31	2.58	0.90	0.172	(0.268) 0.060	0.112
32	2.67	0.90	0.172	(0.268) 0.060	0.112
33	2.75	1.00	0.192	(0.268) 0.067	0.125
34	2.83	1.00	0.192	(0.268) 0.067	0.125
35	2.92	1.00	0.192	(0.268) 0.067	0.125
36	3.00	1.00	0.192	(0.268) 0.067	0.125
37	3.08	1.00	0.192	(0.268) 0.067	0.125
38	3.17	1.10	0.211	(0.268) 0.074	0.137
39	3.25	1.10	0.211	(0.268) 0.074	0.137
40	3.33	1.10	0.211	(0.268) 0.074	0.137
41	3.42	1.20	0.230	(0.268) 0.080	0.149
42	3.50	1.30	0.249	(0.268) 0.087	0.162
43	3.58	1.40	0.268	(0.268) 0.094	0.174
44	3.67	1.40	0.268	(0.268) 0.094	0.174
45	3.75	1.50	0.287	(0.268) 0.101	0.187
46	3.83	1.50	0.287	(0.268) 0.101	0.187
47	3.92	1.60	0.307	(0.268) 0.107	0.199
48	4.00	1.60	0.307	(0.268) 0.107	0.199
49	4.08	1.70	0.326	(0.268) 0.114	0.212
50	4.17	1.80	0.345	(0.268) 0.121	0.224
51	4.25	1.90	0.364	(0.268) 0.127	0.237
52	4.33	2.00	0.383	(0.268) 0.134	0.249
53	4.42	2.10	0.402	(0.268) 0.141	0.261
54	4.50	2.10	0.402	(0.268) 0.141	0.261
55	4.58	2.20	0.421	(0.268) 0.148	0.274
56	4.67	2.30	0.441	(0.268) 0.154	0.286

57	4.75	2.40	0.460	(0.268)	0.161	0.299
58	4.83	2.40	0.460	(0.268)	0.161	0.299
59	4.92	2.50	0.479	(0.268)	0.168	0.311
60	5.00	2.60	0.498	(0.268)	0.174	0.324
61	5.08	3.10	0.594	(0.268)	0.208	0.386
62	5.17	3.60	0.690	(0.268)	0.241	0.448
63	5.25	3.90	0.747	(0.268)	0.261	0.486
64	5.33	4.20	0.805	0.268	(0.282)	0.537
65	5.42	4.70	0.900	0.268	(0.315)	0.633
66	5.50	5.60	1.073	0.268	(0.375)	0.805
67	5.58	1.90	0.364	(0.268)	0.127	0.237
68	5.67	0.90	0.172	(0.268)	0.060	0.112
69	5.75	0.60	0.115	(0.268)	0.040	0.075
70	5.83	0.50	0.096	(0.268)	0.034	0.062
71	5.92	0.30	0.057	(0.268)	0.020	0.037
72	6.00	0.20	0.038	(0.268)	0.013	0.025

(Loss Rate Not Used)

Sum = 100.0

Sum = 12.6

Flood volume = Effective rainfall 1.05 (In)

times area 5.1(Ac.)/[(In)/(Ft.)] = 0.4 (Ac.Ft)

Total soil loss = 0.54 (In)

Total soil loss = 0.231 (Ac.Ft)

Total rainfall = 1.60 (In)

Flood volume = 19472.2 Cubic Feet

Total soil loss = 10082.7 Cubic Feet

Peak flow rate of this hydrograph = 3.853 (CFS)

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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	2.5	5.0	7.5	10.0
0+ 5	0.0015	0.22	Q				
0+10	0.0040	0.36	VQ				
0+15	0.0066	0.38	VQ				
0+20	0.0093	0.38	VQ				
0+25	0.0119	0.38	Q				
0+30	0.0149	0.43	Q				
0+35	0.0180	0.45	Q				
0+40	0.0210	0.45	Q				
0+45	0.0241	0.45	QV				
0+50	0.0272	0.45	QV				
0+55	0.0303	0.45	QV				
1+ 0	0.0337	0.49	Q V				
1+ 5	0.0372	0.51	QV				
1+10	0.0407	0.51	QV				
1+15	0.0443	0.51	QV				
1+20	0.0478	0.51	Q V				
1+25	0.0513	0.51	Q V				
1+30	0.0549	0.51	Q V				
1+35	0.0584	0.51	Q V				
1+40	0.0619	0.51	Q V				
1+45	0.0654	0.51	Q V				
1+50	0.0690	0.51	Q V				
1+55	0.0725	0.51	Q V				
2+ 0	0.0763	0.56	Q V				
2+ 5	0.0800	0.53	Q V				
2+10	0.0838	0.56	Q V				
2+15	0.0878	0.58	Q V				
2+20	0.0918	0.58	Q V				
2+25	0.0957	0.58	Q V				
2+30	0.0997	0.58	Q V				
2+35	0.1037	0.58	Q V				
2+40	0.1076	0.58	Q V				
2+45	0.1119	0.62	Q V				
2+50	0.1163	0.64	Q V				
2+55	0.1207	0.64	Q V				
3+ 0	0.1251	0.64	Q V				
3+ 5	0.1295	0.64	Q V				
3+10	0.1343	0.68	Q V				
3+15	0.1391	0.70	Q V				
3+20	0.1440	0.70	Q V				
3+25	0.1491	0.75	Q V				
3+30	0.1547	0.81	Q V				

3+35	0.1607	0.88	Q	V			
3+40	0.1669	0.90	Q	V			
3+45	0.1734	0.94	Q	V			
3+50	0.1800	0.96	Q	V			
3+55	0.1869	1.00	Q	V			
4+ 0	0.1940	1.02	Q	V			
4+ 5	0.2013	1.07	Q	V			
4+10	0.2091	1.13	Q	V			
4+15	0.2173	1.20	Q	V			
4+20	0.2260	1.26	Q	V			
4+25	0.2351	1.32	Q	V			
4+30	0.2444	1.34	Q	V			
4+35	0.2540	1.39	Q	V			
4+40	0.2640	1.45	Q	V			
4+45	0.2744	1.52	Q	V			
4+50	0.2850	1.54	Q	V			
4+55	0.2959	1.58	Q	V			
5+ 0	0.3072	1.64	Q	V			
5+ 5	0.3201	1.88	Q	V			
5+10	0.3353	2.20	Q	V			
5+15	0.3521	2.43	Q	V			
5+20	0.3705	2.68	Q	V			
5+25	0.3918	3.09	Q	V			
5+30	0.4183	3.85	Q	V			
5+35	0.4333	2.17	Q	V			
5+40	0.4387	0.78	Q	V			
5+45	0.4418	0.45	Q	V			
5+50	0.4441	0.34	Q	V			
5+55	0.4457	0.23	Q	V			
6+ 0	0.4467	0.15	Q	V			
6+ 5	0.4470	0.04	Q	V			

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAB5PROP245.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA B
5-YR 24-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.019 Hr.
Lag time = 1.14 Min.
25% of lag time = 0.29 Min.
40% of lag time = 0.46 Min.
Unit time = 15.00 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]
5.10	2.05	10.45

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	5.16	26.32

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 2.778(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.778(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.690
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.690	0.268	1.000	0.268
				Sum (F)	=	0.268

Area averaged mean soil loss (F) (In/Hr) = 0.268
Minimum soil loss rate ((In/Hr)) = 0.134

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.350

U n i t H y d r o g r a p h
V A L L E Y S-C u r v e

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	1311.494	100.000 Sum = 100.000	5.140 Sum= 5.140

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 (Hr.)	Time Percent	Pattern	Storm Rain (In/Hr)	Loss rate (In./Hr)		Effective (In/Hr)
				Max	Low	
1 0.25	0.20		0.022	(0.473)	0.008	0.014
2 0.50	0.30		0.033	(0.467)	0.012	0.022
3 0.75	0.30		0.033	(0.462)	0.012	0.022
4 1.00	0.40		0.044	(0.456)	0.016	0.029
5 1.25	0.30		0.033	(0.451)	0.012	0.022
6 1.50	0.30		0.033	(0.445)	0.012	0.022
7 1.75	0.30		0.033	(0.440)	0.012	0.022
8 2.00	0.40		0.044	(0.435)	0.016	0.029
9 2.25	0.40		0.044	(0.430)	0.016	0.029
10 2.50	0.40		0.044	(0.424)	0.016	0.029
11 2.75	0.50		0.056	(0.419)	0.019	0.036
12 3.00	0.50		0.056	(0.414)	0.019	0.036
13 3.25	0.50		0.056	(0.409)	0.019	0.036
14 3.50	0.50		0.056	(0.404)	0.019	0.036
15 3.75	0.50		0.056	(0.399)	0.019	0.036
16 4.00	0.60		0.067	(0.394)	0.023	0.043
17 4.25	0.60		0.067	(0.389)	0.023	0.043
18 4.50	0.70		0.078	(0.384)	0.027	0.051
19 4.75	0.70		0.078	(0.379)	0.027	0.051
20 5.00	0.80		0.089	(0.374)	0.031	0.058
21 5.25	0.60		0.067	(0.369)	0.023	0.043
22 5.50	0.70		0.078	(0.364)	0.027	0.051
23 5.75	0.80		0.089	(0.360)	0.031	0.058
24 6.00	0.80		0.089	(0.355)	0.031	0.058
25 6.25	0.90		0.100	(0.350)	0.035	0.065
26 6.50	0.90		0.100	(0.345)	0.035	0.065
27 6.75	1.00		0.111	(0.341)	0.039	0.072
28 7.00	1.00		0.111	(0.336)	0.039	0.072
29 7.25	1.00		0.111	(0.332)	0.039	0.072
30 7.50	1.10		0.122	(0.327)	0.043	0.079
31 7.75	1.20		0.133	(0.323)	0.047	0.087
32 8.00	1.30		0.144	(0.318)	0.051	0.094
33 8.25	1.50		0.167	(0.314)	0.058	0.108
34 8.50	1.50		0.167	(0.309)	0.058	0.108
35 8.75	1.60		0.178	(0.305)	0.062	0.116
36 9.00	1.70		0.189	(0.301)	0.066	0.123
37 9.25	1.90		0.211	(0.296)	0.074	0.137
38 9.50	2.00		0.222	(0.292)	0.078	0.144
39 9.75	2.10		0.233	(0.288)	0.082	0.152
40 10.00	2.20		0.245	(0.284)	0.086	0.159
41 10.25	1.50		0.167	(0.280)	0.058	0.108
42 10.50	1.50		0.167	(0.276)	0.058	0.108
43 10.75	2.00		0.222	(0.272)	0.078	0.144
44 11.00	2.00		0.222	(0.268)	0.078	0.144
45 11.25	1.90		0.211	(0.264)	0.074	0.137
46 11.50	1.90		0.211	(0.260)	0.074	0.137
47 11.75	1.70		0.189	(0.256)	0.066	0.123
48 12.00	1.80		0.200	(0.252)	0.070	0.130
49 12.25	2.50		0.278	(0.249)	0.097	0.181
50 12.50	2.60		0.289	(0.245)	0.101	0.188
51 12.75	2.80		0.311	(0.241)	0.109	0.202
52 13.00	2.90		0.322	(0.237)	0.113	0.209
53 13.25	3.40		0.378	(0.234)	0.132	0.246
54 13.50	3.40		0.378	(0.230)	0.132	0.246
55 13.75	2.30		0.256	(0.227)	0.089	0.166
56 14.00	2.30		0.256	(0.223)	0.089	0.166
57 14.25	2.70		0.300	(0.220)	0.105	0.195

58	14.50	2.60	0.289	(0.217)	0.101	0.188
59	14.75	2.60	0.289	(0.213)	0.101	0.188
60	15.00	2.50	0.278	(0.210)	0.097	0.181
61	15.25	2.40	0.267	(0.207)	0.093	0.173
62	15.50	2.30	0.256	(0.204)	0.089	0.166
63	15.75	1.90	0.211	(0.201)	0.074	0.137
64	16.00	1.90	0.211	(0.198)	0.074	0.137
65	16.25	0.40	0.044	(0.194)	0.016	0.029
66	16.50	0.40	0.044	(0.192)	0.016	0.029
67	16.75	0.30	0.033	(0.189)	0.012	0.022
68	17.00	0.30	0.033	(0.186)	0.012	0.022
69	17.25	0.50	0.056	(0.183)	0.019	0.036
70	17.50	0.50	0.056	(0.180)	0.019	0.036
71	17.75	0.50	0.056	(0.178)	0.019	0.036
72	18.00	0.40	0.044	(0.175)	0.016	0.029
73	18.25	0.40	0.044	(0.172)	0.016	0.029
74	18.50	0.40	0.044	(0.170)	0.016	0.029
75	18.75	0.30	0.033	(0.167)	0.012	0.022
76	19.00	0.20	0.022	(0.165)	0.008	0.014
77	19.25	0.30	0.033	(0.163)	0.012	0.022
78	19.50	0.40	0.044	(0.160)	0.016	0.029
79	19.75	0.30	0.033	(0.158)	0.012	0.022
80	20.00	0.20	0.022	(0.156)	0.008	0.014
81	20.25	0.30	0.033	(0.154)	0.012	0.022
82	20.50	0.30	0.033	(0.152)	0.012	0.022
83	20.75	0.30	0.033	(0.150)	0.012	0.022
84	21.00	0.20	0.022	(0.148)	0.008	0.014
85	21.25	0.30	0.033	(0.147)	0.012	0.022
86	21.50	0.20	0.022	(0.145)	0.008	0.014
87	21.75	0.30	0.033	(0.143)	0.012	0.022
88	22.00	0.20	0.022	(0.142)	0.008	0.014
89	22.25	0.30	0.033	(0.140)	0.012	0.022
90	22.50	0.20	0.022	(0.139)	0.008	0.014
91	22.75	0.20	0.022	(0.138)	0.008	0.014
92	23.00	0.20	0.022	(0.137)	0.008	0.014
93	23.25	0.20	0.022	(0.136)	0.008	0.014
94	23.50	0.20	0.022	(0.135)	0.008	0.014
95	23.75	0.20	0.022	(0.134)	0.008	0.014
96	24.00	0.20	0.022	(0.134)	0.008	0.014

(Loss Rate Not Used)

Sum = 100.0

Sum = 7.2

Flood volume = Effective rainfall 1.81 (In)
times area 5.1(Ac.) / [(In) / (Ft.)] = 0.8 (Ac.Ft)
Total soil loss = 0.97 (In)
Total soil loss = 0.413 (Ac.Ft)
Total rainfall = 2.78 (In)
Flood volume = 33433.9 Cubic Feet
Total soil loss = 18002.8 Cubic Feet

Peak flow rate of this hydrograph = 1.263 (CFS)

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24 - H O U R S T O R M
Run off Hydrograph

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0015	0.07	Q				
0+30	0.0038	0.11	Q				
0+45	0.0061	0.11	Q				
1+ 0	0.0092	0.15	Q				
1+15	0.0115	0.11	Q				
1+30	0.0138	0.11	Q				
1+45	0.0161	0.11	Q				
2+ 0	0.0192	0.15	QV				
2+15	0.0223	0.15	QV				
2+30	0.0253	0.15	QV				
2+45	0.0292	0.19	QV				
3+ 0	0.0330	0.19	QV				
3+15	0.0368	0.19	QV				
3+30	0.0407	0.19	Q V				
3+45	0.0445	0.19	Q V				
4+ 0	0.0491	0.22	Q V				
4+15	0.0537	0.22	Q V				
4+30	0.0591	0.26	Q V				
4+45	0.0645	0.26	Q V				

5+ 0	0.0706	0.30	Q V					
5+15	0.0752	0.22	Q V					
5+30	0.0806	0.26	Q V					
5+45	0.0867	0.30	Q V					
6+ 0	0.0929	0.30	Q V					
6+15	0.0998	0.33	Q V					
6+30	0.1067	0.33	Q V					
6+45	0.1144	0.37	Q V					
7+ 0	0.1220	0.37	Q V					
7+15	0.1297	0.37	Q V					
7+30	0.1382	0.41	Q V					
7+45	0.1474	0.45	Q V					
8+ 0	0.1573	0.48	Q V					
8+15	0.1689	0.56	Q V					
8+30	0.1804	0.56	Q V					
8+45	0.1927	0.59	Q V					
9+ 0	0.2057	0.63	Q V					
9+15	0.2203	0.71	Q V					
9+30	0.2356	0.74	Q V					
9+45	0.2518	0.78	Q V					
10+ 0	0.2686	0.82	Q V					
10+15	0.2802	0.56	Q V					
10+30	0.2917	0.56	Q V					
10+45	0.3070	0.74	Q V					
11+ 0	0.3224	0.74	Q V					
11+15	0.3369	0.71	Q V					
11+30	0.3515	0.71	Q V					
11+45	0.3646	0.63	Q V					
12+ 0	0.3784	0.67	Q V					
12+15	0.3976	0.93	Q V					
12+30	0.4175	0.97	Q V					
12+45	0.4390	1.04	Q V					
13+ 0	0.4613	1.08	Q V					
13+15	0.4874	1.26	Q V					
13+30	0.5135	1.26	Q V					
13+45	0.5311	0.85	Q V					
14+ 0	0.5488	0.85	Q V					
14+15	0.5695	1.00	Q V					
14+30	0.5895	0.97	Q V					
14+45	0.6094	0.97	Q V					
15+ 0	0.6286	0.93	Q V					
15+15	0.6470	0.89	Q V					
15+30	0.6647	0.85	Q V					
15+45	0.6793	0.71	Q V					
16+ 0	0.6939	0.71	Q V					
16+15	0.6969	0.15	Q V					
16+30	0.7000	0.15	Q V					
16+45	0.7023	0.11	Q V					
17+ 0	0.7046	0.11	Q V					
17+15	0.7084	0.19	Q V					
17+30	0.7123	0.19	Q V					
17+45	0.7161	0.19	Q V					
18+ 0	0.7192	0.15	Q V					
18+15	0.7223	0.15	Q V					
18+30	0.7253	0.15	Q V					
18+45	0.7276	0.11	Q V					
19+ 0	0.7292	0.07	Q V					
19+15	0.7315	0.11	Q V					
19+30	0.7345	0.15	Q V					
19+45	0.7368	0.11	Q V					
20+ 0	0.7384	0.07	Q V					
20+15	0.7407	0.11	Q V					
20+30	0.7430	0.11	Q V					
20+45	0.7453	0.11	Q V					
21+ 0	0.7468	0.07	Q V					
21+15	0.7491	0.11	Q V					
21+30	0.7506	0.07	Q V					
21+45	0.7530	0.11	Q V					
22+ 0	0.7545	0.07	Q V					
22+15	0.7568	0.11	Q V					
22+30	0.7583	0.07	Q V					
22+45	0.7599	0.07	Q V					
23+ 0	0.7614	0.07	Q V					
23+15	0.7629	0.07	Q V					
23+30	0.7645	0.07	Q V					
23+45	0.7660	0.07	Q V					
24+ 0	0.7675	0.07	Q V					

Unit Hydrograph Analyses

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Study date 07/22/19 File: DMAB10EXIST110.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION

10-YR 1-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.025 Hr.
Lag time = 1.52 Min.
25% of lag time = 0.38 Min.
40% of lag time = 0.61 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]
5.10	0.49	2.49

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	1.33	6.78

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 0.835(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.835(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.500
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.500	0.281	1.000	0.281
					Sum (F)	= 0.281

Area averaged mean soil loss (F) (In/Hr) = 0.281
Minimum soil loss rate ((In/Hr)) = 0.140

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	327.873	59.371
2	0.167	655.747	35.647
3	0.250	983.620	4.982
		Sum = 100.000	Sum= 5.140

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

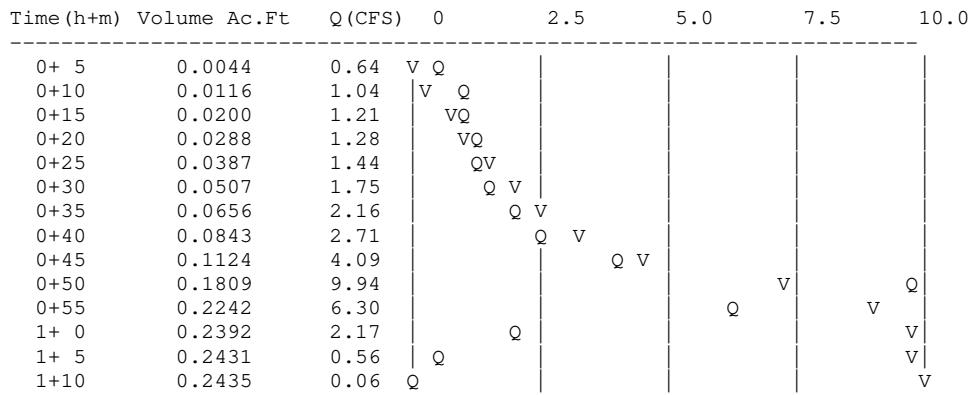
Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate (In./Hr) Max Low	Effective (In/Hr)
1	0.08	4.20	0.421 (0.281)	0.210
2	0.17	4.30	0.431 (0.281)	0.215
3	0.25	5.00	0.501 (0.281)	0.250
4	0.33	5.00	0.501 (0.281)	0.250
5	0.42	5.80	0.581 0.281	0.300
6	0.50	6.50	0.651 0.281	0.370
7	0.58	7.40	0.741 0.281	0.461
8	0.67	8.60	0.862 0.281	0.581
9	0.75	12.30	1.232 0.281	0.951
10	0.83	29.10	2.916 0.281	2.635
11	0.92	6.80	0.681 0.281	0.400
12	1.00	5.00	0.501 (0.281)	0.250
		(Loss Rate Not Used)		
		Sum = 100.0		Sum = 6.9

Flood volume = Effective rainfall 0.57(In)
times area 5.1(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)
Total soil loss = 0.26(In)
Total soil loss = 0.111(Ac.Ft)
Total rainfall = 0.83(In)
Flood volume = 10607.3 Cubic Feet
Total soil loss = 4850.2 Cubic Feet

Peak flow rate of this hydrograph = 9.937(CFS)

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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))



Unit Hydrograph Analyses

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Study date 07/22/19 File: DMAB10EXIST310.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION

10-YR 3-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.025 Hr.
Lag time = 1.52 Min.
25% of lag time = 0.38 Min.
40% of lag time = 0.61 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]
5.10	0.87	4.42

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	2.09	10.66

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 1.370(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.370(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.500
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.500	0.281	1.000	0.281
					Sum (F)	= 0.281

Area averaged mean soil loss (F) (In/Hr) = 0.281
Minimum soil loss rate ((In/Hr)) = 0.140

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	327.873	59.371	3.052
2 0.167	655.747	35.647	1.832
3 0.250	983.620	4.982	0.256
		Sum = 100.000	Sum= 5.140

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	0.214	(0.281) 0.107	0.107
2	0.17	1.30	0.214	(0.281) 0.107	0.107
3	0.25	1.10	0.181	(0.281) 0.090	0.090
4	0.33	1.50	0.247	(0.281) 0.123	0.123
5	0.42	1.50	0.247	(0.281) 0.123	0.123
6	0.50	1.80	0.296	(0.281) 0.148	0.148
7	0.58	1.50	0.247	(0.281) 0.123	0.123
8	0.67	1.80	0.296	(0.281) 0.148	0.148
9	0.75	1.80	0.296	(0.281) 0.148	0.148
10	0.83	1.50	0.247	(0.281) 0.123	0.123
11	0.92	1.60	0.263	(0.281) 0.131	0.131
12	1.00	1.80	0.296	(0.281) 0.148	0.148
13	1.08	2.20	0.362	(0.281) 0.181	0.181
14	1.17	2.20	0.362	(0.281) 0.181	0.181
15	1.25	2.20	0.362	(0.281) 0.181	0.181
16	1.33	2.00	0.329	(0.281) 0.164	0.164
17	1.42	2.60	0.427	(0.281) 0.214	0.214
18	1.50	2.70	0.444	(0.281) 0.222	0.222
19	1.58	2.40	0.394	(0.281) 0.197	0.197
20	1.67	2.70	0.444	(0.281) 0.222	0.222
21	1.75	3.30	0.542	(0.281) 0.271	0.271
22	1.83	3.10	0.509	(0.281) 0.255	0.255
23	1.92	2.90	0.477	(0.281) 0.238	0.238
24	2.00	3.00	0.493	(0.281) 0.247	0.247
25	2.08	3.10	0.509	(0.281) 0.255	0.255
26	2.17	4.20	0.690	0.281 (0.345)	0.409
27	2.25	5.00	0.822	0.281 (0.411)	0.541
28	2.33	3.50	0.575	0.281 (0.288)	0.294
29	2.42	6.80	1.118	0.281 (0.559)	0.837
30	2.50	7.30	1.200	0.281 (0.600)	0.919
31	2.58	8.20	1.348	0.281 (0.674)	1.067
32	2.67	5.90	0.970	0.281 (0.485)	0.689
33	2.75	2.00	0.329	(0.281) 0.164	0.164
34	2.83	1.80	0.296	(0.281) 0.148	0.148
35	2.92	1.80	0.296	(0.281) 0.148	0.148
36	3.00	0.60	0.099	(0.281) 0.049	0.049

(Loss Rate Not Used)

Sum = 100.0 Sum = 9.6

Flood volume = Effective rainfall 0.80 (In)
times area 5.1 (Ac.) / [(In)/(Ft.)] = 0.3 (Ac.Ft)
Total soil loss = 0.57 (In)
Total soil loss = 0.242 (Ac.Ft)
Total rainfall = 1.37 (In)
Flood volume = 14828.1 Cubic Feet
Total soil loss = 10526.1 Cubic Feet

Peak flow rate of this hydrograph = 5.155 (CFS)

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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	2.5	5.0	7.5	10.0
0+ 5	0.0022	0.33	VQ					
0+10	0.0058	0.52	V Q					
0+15	0.0093	0.50	Q					
0+20	0.0132	0.57	VQ					
0+25	0.0175	0.63	Q					
0+30	0.0224	0.71	Q					
0+35	0.0271	0.68	QV					
0+40	0.0320	0.72	QV					
0+45	0.0372	0.75	QV					
0+50	0.0419	0.69	Q V					
0+55	0.0465	0.67	Q V					
1+ 0	0.0515	0.72	Q V					
1+ 5	0.0574	0.86	Q V					
1+10	0.0637	0.92	Q V					
1+15	0.0701	0.93	Q V					
1+20	0.0762	0.88	Q V					
1+25	0.0831	1.00	Q V					
1+30	0.0907	1.11	Q V					
1+35	0.0980	1.06	Q V					
1+40	0.1056	1.10	Q V					
1+45	0.1144	1.29	Q V					
1+50	0.1236	1.33	Q V					
1+55	0.1323	1.26	Q V					
2+ 0	0.1410	1.25	Q V					
2+ 5	0.1499	1.29	Q V					
2+10	0.1621	1.78	Q V					
2+15	0.1791	2.47	Q V					
2+20	0.1928	1.99	Q V					
2+25	0.2151	3.23	Q V					
2+30	0.2455	4.41	Q V					
2+35	0.2810	5.16	Q V					
2+40	0.3106	4.29	Q V					
2+45	0.3246	2.04	Q V					
2+50	0.3310	0.93	Q V					
2+55	0.3363	0.76	Q V					
3+ 0	0.3394	0.46	Q V					
3+ 5	0.3403	0.13	Q V					
3+10	0.3404	0.01	Q V					

Unit Hydrograph Analyses

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Study date 07/22/19 File: DMAB10EXIST610.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION

10-YR 6-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.025 Hr.
Lag time = 1.52 Min.
25% of lag time = 0.38 Min.
40% of lag time = 0.61 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]
5.10	1.21	6.17

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	2.86	14.59

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 1.889(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.889(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.500
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.500	0.281	1.000	0.281
					Sum (F)	= 0.281

Area averaged mean soil loss (F) (In/Hr) = 0.281
Minimum soil loss rate ((In/Hr)) = 0.140

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

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	327.873	59.371	3.052
2 0.167	655.747	35.647	1.832
3 0.250	983.620	4.982	0.256
		Sum = 100.000	Sum= 5.140

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	0.113	(0.281) 0.057	0.057
2	0.17	0.60	0.136	(0.281) 0.068	0.068
3	0.25	0.60	0.136	(0.281) 0.068	0.068
4	0.33	0.60	0.136	(0.281) 0.068	0.068
5	0.42	0.60	0.136	(0.281) 0.068	0.068
6	0.50	0.70	0.159	(0.281) 0.079	0.079
7	0.58	0.70	0.159	(0.281) 0.079	0.079
8	0.67	0.70	0.159	(0.281) 0.079	0.079
9	0.75	0.70	0.159	(0.281) 0.079	0.079
10	0.83	0.70	0.159	(0.281) 0.079	0.079
11	0.92	0.70	0.159	(0.281) 0.079	0.079
12	1.00	0.80	0.181	(0.281) 0.091	0.091
13	1.08	0.80	0.181	(0.281) 0.091	0.091
14	1.17	0.80	0.181	(0.281) 0.091	0.091
15	1.25	0.80	0.181	(0.281) 0.091	0.091
16	1.33	0.80	0.181	(0.281) 0.091	0.091
17	1.42	0.80	0.181	(0.281) 0.091	0.091
18	1.50	0.80	0.181	(0.281) 0.091	0.091
19	1.58	0.80	0.181	(0.281) 0.091	0.091
20	1.67	0.80	0.181	(0.281) 0.091	0.091
21	1.75	0.80	0.181	(0.281) 0.091	0.091
22	1.83	0.80	0.181	(0.281) 0.091	0.091
23	1.92	0.80	0.181	(0.281) 0.091	0.091
24	2.00	0.90	0.204	(0.281) 0.102	0.102
25	2.08	0.80	0.181	(0.281) 0.091	0.091
26	2.17	0.90	0.204	(0.281) 0.102	0.102
27	2.25	0.90	0.204	(0.281) 0.102	0.102
28	2.33	0.90	0.204	(0.281) 0.102	0.102
29	2.42	0.90	0.204	(0.281) 0.102	0.102
30	2.50	0.90	0.204	(0.281) 0.102	0.102
31	2.58	0.90	0.204	(0.281) 0.102	0.102
32	2.67	0.90	0.204	(0.281) 0.102	0.102
33	2.75	1.00	0.227	(0.281) 0.113	0.113
34	2.83	1.00	0.227	(0.281) 0.113	0.113
35	2.92	1.00	0.227	(0.281) 0.113	0.113
36	3.00	1.00	0.227	(0.281) 0.113	0.113
37	3.08	1.00	0.227	(0.281) 0.113	0.113
38	3.17	1.10	0.249	(0.281) 0.125	0.125
39	3.25	1.10	0.249	(0.281) 0.125	0.125
40	3.33	1.10	0.249	(0.281) 0.125	0.125
41	3.42	1.20	0.272	(0.281) 0.136	0.136
42	3.50	1.30	0.295	(0.281) 0.147	0.147
43	3.58	1.40	0.317	(0.281) 0.159	0.159
44	3.67	1.40	0.317	(0.281) 0.159	0.159
45	3.75	1.50	0.340	(0.281) 0.170	0.170
46	3.83	1.50	0.340	(0.281) 0.170	0.170
47	3.92	1.60	0.363	(0.281) 0.181	0.181
48	4.00	1.60	0.363	(0.281) 0.181	0.181
49	4.08	1.70	0.385	(0.281) 0.193	0.193
50	4.17	1.80	0.408	(0.281) 0.204	0.204
51	4.25	1.90	0.431	(0.281) 0.215	0.215
52	4.33	2.00	0.453	(0.281) 0.227	0.227
53	4.42	2.10	0.476	(0.281) 0.238	0.238
54	4.50	2.10	0.476	(0.281) 0.238	0.238
55	4.58	2.20	0.499	(0.281) 0.249	0.249

56	4.67	2.30	0.521	(0.281)	0.261	0.261
57	4.75	2.40	0.544	(0.281)	0.272	0.272
58	4.83	2.40	0.544	(0.281)	0.272	0.272
59	4.92	2.50	0.567	0.281	(0.283)	0.286
60	5.00	2.60	0.589	0.281	(0.295)	0.308
61	5.08	3.10	0.703	0.281	(0.351)	0.422
62	5.17	3.60	0.816	0.281	(0.408)	0.535
63	5.25	3.90	0.884	0.281	(0.442)	0.603
64	5.33	4.20	0.952	0.281	(0.476)	0.671
65	5.42	4.70	1.065	0.281	(0.533)	0.784
66	5.50	5.60	1.269	0.281	(0.635)	0.988
67	5.58	1.90	0.431	(0.281)	0.215	0.215
68	5.67	0.90	0.204	(0.281)	0.102	0.102
69	5.75	0.60	0.136	(0.281)	0.068	0.068
70	5.83	0.50	0.113	(0.281)	0.057	0.057
71	5.92	0.30	0.068	(0.281)	0.034	0.034
72	6.00	0.20	0.045	(0.281)	0.023	0.023

(Loss Rate Not Used)

Sum = 100.0

Sum = 12.5

Flood volume = Effective rainfall 1.04 (In)

times area 5.1(Ac.)/[(In)/(Ft.)] = 0.4 (Ac.Ft)

Total soil loss = 0.85 (In)

Total soil loss = 0.360 (Ac.Ft)

Total rainfall = 1.89 (In)

Flood volume = 19296.3 Cubic Feet

Total soil loss = 15670.9 Cubic Feet

Peak flow rate of this hydrograph = 4.627 (CFS)

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6 - H O U R S T O R M
Runoff Hydrograph

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	0.0012	0.17	Q				
0+10	0.0033	0.31	VQ				
0+15	0.0057	0.35	VQ				
0+20	0.0081	0.35	VQ				
0+25	0.0105	0.35	VQ				
0+30	0.0132	0.38	Q				
0+35	0.0160	0.41	Q				
0+40	0.0188	0.41	Q				
0+45	0.0216	0.41	Q				
0+50	0.0244	0.41	QV				
0+55	0.0272	0.41	QV				
1+ 0	0.0303	0.44	QV				
1+ 5	0.0335	0.46	Q V				
1+10	0.0367	0.47	Q V				
1+15	0.0399	0.47	Q V				
1+20	0.0431	0.47	Q V				
1+25	0.0463	0.47	Q V				
1+30	0.0495	0.47	Q V				
1+35	0.0527	0.47	Q V				
1+40	0.0559	0.47	Q V				
1+45	0.0591	0.47	Q V				
1+50	0.0624	0.47	Q V				
1+55	0.0656	0.47	Q V				
2+ 0	0.0690	0.50	Q V				
2+ 5	0.0724	0.49	Q V				
2+10	0.0758	0.50	Q V				
2+15	0.0794	0.52	Q V				
2+20	0.0830	0.52	Q V				
2+25	0.0867	0.52	Q V				
2+30	0.0903	0.52	Q V				
2+35	0.0939	0.52	Q V				
2+40	0.0975	0.52	Q V				
2+45	0.1013	0.56	Q V				
2+50	0.1053	0.58	Q V				
2+55	0.1093	0.58	Q V				
3+ 0	0.1134	0.58	Q V				
3+ 5	0.1174	0.58	Q V				
3+10	0.1216	0.62	Q V				
3+15	0.1260	0.64	Q V				
3+20	0.1304	0.64	Q V				
3+25	0.1351	0.68	Q V				

3+30	0.1401	0.73	Q	V				
3+35	0.1456	0.79	Q	V				
3+40	0.1512	0.81	Q	V				
3+45	0.1570	0.85	Q	V				
3+50	0.1630	0.87	Q	V				
3+55	0.1693	0.91	Q	V				
4+ 0	0.1757	0.93	Q	V				
4+ 5	0.1823	0.97	Q	V				
4+10	0.1894	1.02	Q	V				
4+15	0.1968	1.08	Q	V				
4+20	0.2047	1.14	Q	V				
4+25	0.2129	1.20	Q	V				
4+30	0.2213	1.22	Q	V				
4+35	0.2300	1.26	Q	V				
4+40	0.2390	1.31	Q	V				
4+45	0.2485	1.37	Q	V				
4+50	0.2581	1.40	Q	V				
4+55	0.2680	1.44	Q	V				
5+ 0	0.2786	1.53	Q	V				
5+ 5	0.2919	1.93	Q	V				
5+10	0.3090	2.49	Q	V				
5+15	0.3292	2.93	Q	V				
5+20	0.3518	3.29	Q	V				
5+25	0.3778	3.78	Q	V				
5+30	0.4097	4.63	Q	V				
5+35	0.4281	2.67	Q	V				
5+40	0.4347	0.96	Q	V				
5+45	0.4378	0.45	Q	V				
5+50	0.4400	0.32	Q	V				
5+55	0.4416	0.23	Q	V				
6+ 0	0.4426	0.15	Q	V				
6+ 5	0.4429	0.05	Q	V				
6+10	0.4430	0.01	Q	V				

Unit Hydrograph Analyses

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Study date 07/22/19 File: DMAB10EXIST2410.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION

10-YR 24-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.025 Hr.
Lag time = 1.52 Min.
25% of lag time = 0.38 Min.
40% of lag time = 0.61 Min.
Unit time = 15.00 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]
5.10	2.05	10.45

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	5.16	26.32

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 3.329(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.329(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.500
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.500	0.281	1.000	0.281
					Sum (F)	= 0.281

Area averaged mean soil loss (F) (In/Hr) = 0.281
Minimum soil loss rate ((In/Hr)) = 0.140

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	983.620	100.000 Sum = 100.000	5.140 Sum= 5.140

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 0.25	0.20	0.027	(0.496) 0.013	0.013
2 0.50	0.30	0.040	(0.490) 0.020	0.020
3 0.75	0.30	0.040	(0.485) 0.020	0.020
4 1.00	0.40	0.053	(0.479) 0.027	0.027
5 1.25	0.30	0.040	(0.473) 0.020	0.020
6 1.50	0.30	0.040	(0.468) 0.020	0.020
7 1.75	0.30	0.040	(0.462) 0.020	0.020
8 2.00	0.40	0.053	(0.457) 0.027	0.027
9 2.25	0.40	0.053	(0.451) 0.027	0.027
10 2.50	0.40	0.053	(0.446) 0.027	0.027
11 2.75	0.50	0.067	(0.440) 0.033	0.033
12 3.00	0.50	0.067	(0.435) 0.033	0.033
13 3.25	0.50	0.067	(0.429) 0.033	0.033
14 3.50	0.50	0.067	(0.424) 0.033	0.033
15 3.75	0.50	0.067	(0.419) 0.033	0.033
16 4.00	0.60	0.080	(0.413) 0.040	0.040
17 4.25	0.60	0.080	(0.408) 0.040	0.040
18 4.50	0.70	0.093	(0.403) 0.047	0.047
19 4.75	0.70	0.093	(0.398) 0.047	0.047
20 5.00	0.80	0.107	(0.393) 0.053	0.053
21 5.25	0.60	0.080	(0.388) 0.040	0.040
22 5.50	0.70	0.093	(0.382) 0.047	0.047
23 5.75	0.80	0.107	(0.377) 0.053	0.053
24 6.00	0.80	0.107	(0.372) 0.053	0.053
25 6.25	0.90	0.120	(0.368) 0.060	0.060
26 6.50	0.90	0.120	(0.363) 0.060	0.060
27 6.75	1.00	0.133	(0.358) 0.067	0.067
28 7.00	1.00	0.133	(0.353) 0.067	0.067
29 7.25	1.00	0.133	(0.348) 0.067	0.067
30 7.50	1.10	0.146	(0.343) 0.073	0.073
31 7.75	1.20	0.160	(0.339) 0.080	0.080
32 8.00	1.30	0.173	(0.334) 0.087	0.087
33 8.25	1.50	0.200	(0.329) 0.100	0.100
34 8.50	1.50	0.200	(0.325) 0.100	0.100
35 8.75	1.60	0.213	(0.320) 0.107	0.107
36 9.00	1.70	0.226	(0.316) 0.113	0.113
37 9.25	1.90	0.253	(0.311) 0.127	0.127
38 9.50	2.00	0.266	(0.307) 0.133	0.133
39 9.75	2.10	0.280	(0.302) 0.140	0.140
40 10.00	2.20	0.293	(0.298) 0.146	0.146
41 10.25	1.50	0.200	(0.294) 0.100	0.100
42 10.50	1.50	0.200	(0.290) 0.100	0.100
43 10.75	2.00	0.266	(0.285) 0.133	0.133
44 11.00	2.00	0.266	(0.281) 0.133	0.133
45 11.25	1.90	0.253	(0.277) 0.127	0.127
46 11.50	1.90	0.253	(0.273) 0.127	0.127
47 11.75	1.70	0.226	(0.269) 0.113	0.113
48 12.00	1.80	0.240	(0.265) 0.120	0.120
49 12.25	2.50	0.333	(0.261) 0.166	0.166
50 12.50	2.60	0.346	(0.257) 0.173	0.173
51 12.75	2.80	0.373	(0.253) 0.186	0.186
52 13.00	2.90	0.386	(0.249) 0.193	0.193
53 13.25	3.40	0.453	(0.246) 0.226	0.226
54 13.50	3.40	0.453	(0.242) 0.226	0.226
55 13.75	2.30	0.306	(0.238) 0.153	0.153
56 14.00	2.30	0.306	(0.235) 0.153	0.153
57 14.25	2.70	0.360	(0.231) 0.180	0.180

58	14.50	2.60	0.346	(0.227)	0.173	0.173
59	14.75	2.60	0.346	(0.224)	0.173	0.173
60	15.00	2.50	0.333	(0.221)	0.166	0.166
61	15.25	2.40	0.320	(0.217)	0.160	0.160
62	15.50	2.30	0.306	(0.214)	0.153	0.153
63	15.75	1.90	0.253	(0.211)	0.127	0.127
64	16.00	1.90	0.253	(0.207)	0.127	0.127
65	16.25	0.40	0.053	(0.204)	0.027	0.027
66	16.50	0.40	0.053	(0.201)	0.027	0.027
67	16.75	0.30	0.040	(0.198)	0.020	0.020
68	17.00	0.30	0.040	(0.195)	0.020	0.020
69	17.25	0.50	0.067	(0.192)	0.033	0.033
70	17.50	0.50	0.067	(0.189)	0.033	0.033
71	17.75	0.50	0.067	(0.186)	0.033	0.033
72	18.00	0.40	0.053	(0.184)	0.027	0.027
73	18.25	0.40	0.053	(0.181)	0.027	0.027
74	18.50	0.40	0.053	(0.178)	0.027	0.027
75	18.75	0.30	0.040	(0.176)	0.020	0.020
76	19.00	0.20	0.027	(0.173)	0.013	0.013
77	19.25	0.30	0.040	(0.171)	0.020	0.020
78	19.50	0.40	0.053	(0.168)	0.027	0.027
79	19.75	0.30	0.040	(0.166)	0.020	0.020
80	20.00	0.20	0.027	(0.164)	0.013	0.013
81	20.25	0.30	0.040	(0.162)	0.020	0.020
82	20.50	0.30	0.040	(0.160)	0.020	0.020
83	20.75	0.30	0.040	(0.158)	0.020	0.020
84	21.00	0.20	0.027	(0.156)	0.013	0.013
85	21.25	0.30	0.040	(0.154)	0.020	0.020
86	21.50	0.20	0.027	(0.152)	0.013	0.013
87	21.75	0.30	0.040	(0.150)	0.020	0.020
88	22.00	0.20	0.027	(0.149)	0.013	0.013
89	22.25	0.30	0.040	(0.147)	0.020	0.020
90	22.50	0.20	0.027	(0.146)	0.013	0.013
91	22.75	0.20	0.027	(0.145)	0.013	0.013
92	23.00	0.20	0.027	(0.144)	0.013	0.013
93	23.25	0.20	0.027	(0.143)	0.013	0.013
94	23.50	0.20	0.027	(0.142)	0.013	0.013
95	23.75	0.20	0.027	(0.141)	0.013	0.013
96	24.00	0.20	0.027	(0.141)	0.013	0.013

(Loss Rate Not Used)

Sum = 100.0

Sum = 6.7

Flood volume = Effective rainfall 1.66 (In)
times area 5.1(Ac.) / [(In) / (Ft.)] = 0.7 (Ac.Ft)
Total soil loss = 1.66 (In)
Total soil loss = 0.708 (Ac.Ft)
Total rainfall = 3.33 (In)
Flood volume = 30819.0 Cubic Feet
Total soil loss = 30819.0 Cubic Feet

Peak flow rate of this hydrograph = 1.164 (CFS)

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24 - H O U R S T O R M
Run off Hydrograph

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0014	0.07	Q				
0+30	0.0035	0.10	Q				
0+45	0.0057	0.10	Q				
1+ 0	0.0085	0.14	Q				
1+15	0.0106	0.10	Q				
1+30	0.0127	0.10	Q				
1+45	0.0149	0.10	Q				
2+ 0	0.0177	0.14	Q				
2+15	0.0205	0.14	QV				
2+30	0.0233	0.14	QV				
2+45	0.0269	0.17	QV				
3+ 0	0.0304	0.17	QV				
3+15	0.0340	0.17	QV				
3+30	0.0375	0.17	Q V				
3+45	0.0410	0.17	Q V				
4+ 0	0.0453	0.21	Q V				
4+15	0.0495	0.21	Q V				
4+30	0.0545	0.24	Q V				
4+45	0.0594	0.24	Q V				

5+ 0	0.0651	0.27	Q V					
5+15	0.0693	0.21	Q V					
5+30	0.0743	0.24	Q V					
5+45	0.0799	0.27	Q V					
6+ 0	0.0856	0.27	Q V					
6+15	0.0920	0.31	Q V					
6+30	0.0983	0.31	Q V					
6+45	0.1054	0.34	Q V					
7+ 0	0.1125	0.34	Q V					
7+15	0.1196	0.34	Q V					
7+30	0.1274	0.38	Q V					
7+45	0.1358	0.41	Q V					
8+ 0	0.1450	0.45	Q V					
8+15	0.1557	0.51	Q V					
8+30	0.1663	0.51	Q V					
8+45	0.1776	0.55	Q V					
9+ 0	0.1896	0.58	Q V					
9+15	0.2031	0.65	Q V					
9+30	0.2172	0.68	Q V					
9+45	0.2321	0.72	Q V					
10+ 0	0.2476	0.75	Q V					
10+15	0.2582	0.51	Q V					
10+30	0.2689	0.51	Q V					
10+45	0.2830	0.68	Q V					
11+ 0	0.2972	0.68	Q V					
11+15	0.3106	0.65	Q V					
11+30	0.3240	0.65	Q V					
11+45	0.3361	0.58	Q V					
12+ 0	0.3488	0.62	Q V					
12+15	0.3665	0.86	Q V					
12+30	0.3849	0.89	Q V					
12+45	0.4047	0.96	Q V					
13+ 0	0.4252	0.99	Q V					
13+15	0.4493	1.16	Q V					
13+30	0.4733	1.16	Q V					
13+45	0.4896	0.79	Q V					
14+ 0	0.5059	0.79	Q V					
14+15	0.5250	0.92	Q V					
14+30	0.5434	0.89	Q V					
14+45	0.5618	0.89	Q V					
15+ 0	0.5794	0.86	Q V					
15+15	0.5964	0.82	Q V					
15+30	0.6127	0.79	Q V					
15+45	0.6261	0.65	Q V					
16+ 0	0.6396	0.65	Q V					
16+15	0.6424	0.14	Q V					
16+30	0.6452	0.14	Q V					
16+45	0.6474	0.10	Q V					
17+ 0	0.6495	0.10	Q V					
17+15	0.6530	0.17	Q V					
17+30	0.6566	0.17	Q V					
17+45	0.6601	0.17	Q V					
18+ 0	0.6629	0.14	Q V					
18+15	0.6658	0.14	Q V					
18+30	0.6686	0.14	Q V					
18+45	0.6707	0.10	Q V					
19+ 0	0.6721	0.07	Q V					
19+15	0.6743	0.10	Q V					
19+30	0.6771	0.14	Q V					
19+45	0.6792	0.10	Q V					
20+ 0	0.6806	0.07	Q V					
20+15	0.6827	0.10	Q V					
20+30	0.6849	0.10	Q V					
20+45	0.6870	0.10	Q V					
21+ 0	0.6884	0.07	Q V					
21+15	0.6905	0.10	Q V					
21+30	0.6919	0.07	Q V					
21+45	0.6941	0.10	Q V					
22+ 0	0.6955	0.07	Q V					
22+15	0.6976	0.10	Q V					
22+30	0.6990	0.07	Q V					
22+45	0.7004	0.07	Q V					
23+ 0	0.7018	0.07	Q V					
23+15	0.7033	0.07	Q V					
23+30	0.7047	0.07	Q V					
23+45	0.7061	0.07	Q V					
24+ 0	0.7075	0.07	Q V					

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAB10PROP110.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA B
10-YR 1-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.019 Hr.
Lag time = 1.14 Min.
25% of lag time = 0.29 Min.
40% of lag time = 0.46 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]
5.10	0.49	2.49

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	1.33	6.78

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 0.835(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.835(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.690
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.690	0.194	1.000	0.194
					Sum (F)	= 0.194

Area averaged mean soil loss (F) (In/Hr) = 0.194
Minimum soil loss rate ((In/Hr)) = 0.097

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.350

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	437.165	67.483	3.469
2 0.167	874.329	32.517	1.671
	Sum = 100.000	Sum=	5.140

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	4.20	0.421	(0.194) 0.147	0.274
2 0.17	4.30	0.431	(0.194) 0.151	0.280
3 0.25	5.00	0.501	(0.194) 0.175	0.326
4 0.33	5.00	0.501	(0.194) 0.175	0.326
5 0.42	5.80	0.581	0.194 (0.203)	0.388
6 0.50	6.50	0.651	0.194 (0.228)	0.458
7 0.58	7.40	0.741	0.194 (0.260)	0.548
8 0.67	8.60	0.862	0.194 (0.302)	0.668
9 0.75	12.30	1.232	0.194 (0.431)	1.039
10 0.83	29.10	2.916	0.194 (1.020)	2.722
11 0.92	6.80	0.681	0.194 (0.238)	0.488
12 1.00	5.00	0.501	(0.194) 0.175	0.326

(Loss Rate Not Used)

Sum = 100.0 Sum = 7.8

Flood volume = Effective rainfall 0.65 (In)
times area 5.1 (Ac.) / [(In) / (Ft.)] = 0.3 (Ac.Ft)
Total soil loss = 0.18 (In)
Total soil loss = 0.077 (Ac.Ft)
Total rainfall = 0.83 (In)
Flood volume = 12095.5 Cubic Feet
Total soil loss = 3362.0 Cubic Feet

Peak flow rate of this hydrograph = 11.184 (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	5.0	10.0	15.0	20.0
0+ 5	0.0065	0.95	VQ				
0+10	0.0164	1.43	Q				
0+15	0.0274	1.60	Q				
0+20	0.0389	1.67	Q V				
0+25	0.0519	1.89	Q V				
0+30	0.0673	2.24	Q V				
0+35	0.0857	2.67	Q V				
0+40	0.1080	3.23	Q V				
0+45	0.1405	4.72	Q V				
0+50	0.2175	11.18				V	
0+55	0.2605	6.24		Q		V	
1+ 0	0.2739	1.95	Q				V
1+ 5	0.2777	0.54	Q				V

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAB10PROP310.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA B
10-YR 3-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.019 Hr.
Lag time = 1.14 Min.
25% of lag time = 0.29 Min.
40% of lag time = 0.46 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]
5.10	0.87	4.42

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	2.09	10.66

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 1.370(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.370(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.690
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.690	0.194	1.000	0.194
					Sum (F)	= 0.194

Area averaged mean soil loss (F) (In/Hr) = 0.194
Minimum soil loss rate ((In/Hr)) = 0.097

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.350

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	437.165	67.483	3.469
2 0.167	874.329	32.517	1.671
		Sum = 100.000	Sum= 5.140

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	0.214	(0.194) 0.075	0.139
2	0.17	1.30	0.214	(0.194) 0.075	0.139
3	0.25	1.10	0.181	(0.194) 0.063	0.118
4	0.33	1.50	0.247	(0.194) 0.086	0.160
5	0.42	1.50	0.247	(0.194) 0.086	0.160
6	0.50	1.80	0.296	(0.194) 0.104	0.192
7	0.58	1.50	0.247	(0.194) 0.086	0.160
8	0.67	1.80	0.296	(0.194) 0.104	0.192
9	0.75	1.80	0.296	(0.194) 0.104	0.192
10	0.83	1.50	0.247	(0.194) 0.086	0.160
11	0.92	1.60	0.263	(0.194) 0.092	0.171
12	1.00	1.80	0.296	(0.194) 0.104	0.192
13	1.08	2.20	0.362	(0.194) 0.127	0.235
14	1.17	2.20	0.362	(0.194) 0.127	0.235
15	1.25	2.20	0.362	(0.194) 0.127	0.235
16	1.33	2.00	0.329	(0.194) 0.115	0.214
17	1.42	2.60	0.427	(0.194) 0.150	0.278
18	1.50	2.70	0.444	(0.194) 0.155	0.288
19	1.58	2.40	0.394	(0.194) 0.138	0.256
20	1.67	2.70	0.444	(0.194) 0.155	0.288
21	1.75	3.30	0.542	(0.194) 0.190	0.353
22	1.83	3.10	0.509	(0.194) 0.178	0.331
23	1.92	2.90	0.477	(0.194) 0.167	0.310
24	2.00	3.00	0.493	(0.194) 0.173	0.320
25	2.08	3.10	0.509	(0.194) 0.178	0.331
26	2.17	4.20	0.690	0.194 (0.242)	0.497
27	2.25	5.00	0.822	0.194 (0.288)	0.628
28	2.33	3.50	0.575	0.194 (0.201)	0.382
29	2.42	6.80	1.118	0.194 (0.391)	0.924
30	2.50	7.30	1.200	0.194 (0.420)	1.006
31	2.58	8.20	1.348	0.194 (0.472)	1.154
32	2.67	5.90	0.970	0.194 (0.339)	0.776
33	2.75	2.00	0.329	(0.194) 0.115	0.214
34	2.83	1.80	0.296	(0.194) 0.104	0.192
35	2.92	1.80	0.296	(0.194) 0.104	0.192
36	3.00	0.60	0.099	(0.194) 0.035	0.064

(Loss Rate Not Used)

Sum = 100.0 Sum = 11.7

Flood volume = Effective rainfall 0.97 (In)
times area 5.1 (Ac.) / [(In) / (Ft.)] = 0.4 (Ac.Ft)
Total soil loss = 0.40 (In)
Total soil loss = 0.168 (Ac.Ft)
Total rainfall = 1.37 (In)
Flood volume = 18019.0 Cubic Feet
Total soil loss = 7335.2 Cubic Feet

Peak flow rate of this hydrograph = 5.687 (CFS)

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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 2.5 5.0 7.5 10.0

0+ 5	0.0033	0.48	VQ
0+10	0.0082	0.71	V Q
0+15	0.0126	0.64	VQ
0+20	0.0178	0.75	V Q
0+25	0.0235	0.82	VQ
0+30	0.0299	0.94	VQ
0+35	0.0360	0.88	Q
0+40	0.0424	0.94	QV
0+45	0.0492	0.99	QV
0+50	0.0553	0.88	Q V
0+55	0.0612	0.86	Q V
1+ 0	0.0678	0.95	Q V
1+ 5	0.0756	1.14	Q V
1+10	0.0839	1.21	Q V
1+15	0.0923	1.21	Q V
1+20	0.1001	1.13	Q V
1+25	0.1092	1.32	Q V
1+30	0.1193	1.47	Q V
1+35	0.1287	1.37	Q V
1+40	0.1386	1.43	Q V
1+45	0.1503	1.71	Q V
1+50	0.1623	1.74	Q V
1+55	0.1735	1.63	Q V
2+ 0	0.1847	1.63	Q V
2+ 5	0.1963	1.69	Q V
2+10	0.2120	2.28	Q V
2+15	0.2327	3.01	Q V
2+20	0.2491	2.37	Q V
2+25	0.2756	3.84	Q V
2+30	0.3103	5.04	Q V
2+35	0.3494	5.69	Q V
2+40	0.3813	4.62	Q V
2+45	0.3953	2.04	Q V
2+50	0.4024	1.02	Q V
2+55	0.4092	0.99	Q V
3+ 0	0.4129	0.54	Q V
3+ 5	0.4137	0.11	Q V

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAB10PROP610.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA B
10-YR 6-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.019 Hr.
Lag time = 1.14 Min.
25% of lag time = 0.29 Min.
40% of lag time = 0.46 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]
5.10	1.21	6.17

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	2.86	14.59

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 1.889(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.889(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.690
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.690	0.194	1.000	0.194
					Sum (F)	= 0.194

Area averaged mean soil loss (F) (In/Hr) = 0.194
Minimum soil loss rate ((In/Hr)) = 0.097

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.350

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	437.165	67.483	3.469
2 0.167	874.329	32.517	1.671
	Sum = 100.000	Sum=	5.140

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	0.113	(0.194) 0.040	0.074
2	0.17	0.60	0.136	(0.194) 0.048	0.088
3	0.25	0.60	0.136	(0.194) 0.048	0.088
4	0.33	0.60	0.136	(0.194) 0.048	0.088
5	0.42	0.60	0.136	(0.194) 0.048	0.088
6	0.50	0.70	0.159	(0.194) 0.056	0.103
7	0.58	0.70	0.159	(0.194) 0.056	0.103
8	0.67	0.70	0.159	(0.194) 0.056	0.103
9	0.75	0.70	0.159	(0.194) 0.056	0.103
10	0.83	0.70	0.159	(0.194) 0.056	0.103
11	0.92	0.70	0.159	(0.194) 0.056	0.103
12	1.00	0.80	0.181	(0.194) 0.063	0.118
13	1.08	0.80	0.181	(0.194) 0.063	0.118
14	1.17	0.80	0.181	(0.194) 0.063	0.118
15	1.25	0.80	0.181	(0.194) 0.063	0.118
16	1.33	0.80	0.181	(0.194) 0.063	0.118
17	1.42	0.80	0.181	(0.194) 0.063	0.118
18	1.50	0.80	0.181	(0.194) 0.063	0.118
19	1.58	0.80	0.181	(0.194) 0.063	0.118
20	1.67	0.80	0.181	(0.194) 0.063	0.118
21	1.75	0.80	0.181	(0.194) 0.063	0.118
22	1.83	0.80	0.181	(0.194) 0.063	0.118
23	1.92	0.80	0.181	(0.194) 0.063	0.118
24	2.00	0.90	0.204	(0.194) 0.071	0.133
25	2.08	0.80	0.181	(0.194) 0.063	0.118
26	2.17	0.90	0.204	(0.194) 0.071	0.133
27	2.25	0.90	0.204	(0.194) 0.071	0.133
28	2.33	0.90	0.204	(0.194) 0.071	0.133
29	2.42	0.90	0.204	(0.194) 0.071	0.133
30	2.50	0.90	0.204	(0.194) 0.071	0.133
31	2.58	0.90	0.204	(0.194) 0.071	0.133
32	2.67	0.90	0.204	(0.194) 0.071	0.133
33	2.75	1.00	0.227	(0.194) 0.079	0.147
34	2.83	1.00	0.227	(0.194) 0.079	0.147
35	2.92	1.00	0.227	(0.194) 0.079	0.147
36	3.00	1.00	0.227	(0.194) 0.079	0.147
37	3.08	1.00	0.227	(0.194) 0.079	0.147
38	3.17	1.10	0.249	(0.194) 0.087	0.162
39	3.25	1.10	0.249	(0.194) 0.087	0.162
40	3.33	1.10	0.249	(0.194) 0.087	0.162
41	3.42	1.20	0.272	(0.194) 0.095	0.177
42	3.50	1.30	0.295	(0.194) 0.103	0.192
43	3.58	1.40	0.317	(0.194) 0.111	0.206
44	3.67	1.40	0.317	(0.194) 0.111	0.206
45	3.75	1.50	0.340	(0.194) 0.119	0.221
46	3.83	1.50	0.340	(0.194) 0.119	0.221
47	3.92	1.60	0.363	(0.194) 0.127	0.236
48	4.00	1.60	0.363	(0.194) 0.127	0.236
49	4.08	1.70	0.385	(0.194) 0.135	0.250
50	4.17	1.80	0.408	(0.194) 0.143	0.265
51	4.25	1.90	0.431	(0.194) 0.151	0.280
52	4.33	2.00	0.453	(0.194) 0.159	0.295
53	4.42	2.10	0.476	(0.194) 0.167	0.309
54	4.50	2.10	0.476	(0.194) 0.167	0.309
55	4.58	2.20	0.499	(0.194) 0.175	0.324
56	4.67	2.30	0.521	(0.194) 0.182	0.339

57	4.75	2.40	0.544	(0.194)	0.190	0.354
58	4.83	2.40	0.544	(0.194)	0.190	0.354
59	4.92	2.50	0.567	0.194	(0.198)	0.373
60	5.00	2.60	0.589	0.194	(0.206)	0.396
61	5.08	3.10	0.703	0.194	(0.246)	0.509
62	5.17	3.60	0.816	0.194	(0.286)	0.622
63	5.25	3.90	0.884	0.194	(0.309)	0.690
64	5.33	4.20	0.952	0.194	(0.333)	0.758
65	5.42	4.70	1.065	0.194	(0.373)	0.872
66	5.50	5.60	1.269	0.194	(0.444)	1.076
67	5.58	1.90	0.431	(0.194)	0.151	0.280
68	5.67	0.90	0.204	(0.194)	0.071	0.133
69	5.75	0.60	0.136	(0.194)	0.048	0.088
70	5.83	0.50	0.113	(0.194)	0.040	0.074
71	5.92	0.30	0.068	(0.194)	0.024	0.044
72	6.00	0.20	0.045	(0.194)	0.016	0.029

(Loss Rate Not Used)

Sum = 100.0

Sum = 15.6

Flood volume = Effective rainfall 1.30 (In)

times area 5.1(Ac.)/[(In)/(Ft.)] = 0.6 (Ac.Ft)

Total soil loss = 0.59 (In)

Total soil loss = 0.251 (Ac.Ft)

Total rainfall = 1.89 (In)

Flood volume = 24035.4 Cubic Feet

Total soil loss = 10931.8 Cubic Feet

Peak flow rate of this hydrograph = 5.191 (CFS)

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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	2.5	5.0	7.5	10.0
0+ 5	0.0018	0.26	VQ				
0+10	0.0047	0.43	VQ				
0+15	0.0079	0.45	VQ				
0+20	0.0110	0.45	VQ				
0+25	0.0141	0.45	Q				
0+30	0.0176	0.51	VQ				
0+35	0.0212	0.53	VQ				
0+40	0.0249	0.53	VQ				
0+45	0.0286	0.53	Q				
0+50	0.0322	0.53	Q				
0+55	0.0359	0.53	Q				
1+ 0	0.0399	0.58	Q				
1+ 5	0.0440	0.61	QV				
1+10	0.0482	0.61	QV				
1+15	0.0524	0.61	QV				
1+20	0.0566	0.61	Q V				
1+25	0.0607	0.61	Q V				
1+30	0.0649	0.61	Q V				
1+35	0.0691	0.61	Q V				
1+40	0.0733	0.61	Q V				
1+45	0.0774	0.61	Q V				
1+50	0.0816	0.61	Q V				
1+55	0.0858	0.61	Q V				
2+ 0	0.0903	0.66	Q V				
2+ 5	0.0946	0.63	Q V				
2+10	0.0992	0.66	Q V				
2+15	0.1039	0.68	Q V				
2+20	0.1086	0.68	Q V				
2+25	0.1133	0.68	Q V				
2+30	0.1180	0.68	Q V				
2+35	0.1227	0.68	Q V				
2+40	0.1274	0.68	Q V				
2+45	0.1324	0.73	Q V				
2+50	0.1376	0.76	Q V				
2+55	0.1428	0.76	Q V				
3+ 0	0.1481	0.76	Q V				
3+ 5	0.1533	0.76	Q V				
3+10	0.1588	0.81	Q V				
3+15	0.1646	0.83	Q V				
3+20	0.1703	0.83	Q V				
3+25	0.1764	0.88	Q V				
3+30	0.1830	0.96	Q V				

3+35	0.1902	1.04	Q	V				
3+40	0.1975	1.06	Q	V				
3+45	0.2051	1.11	Q	V				
3+50	0.2129	1.14	Q	V				
3+55	0.2211	1.19	Q	V				
4+ 0	0.2295	1.21	Q	V				
4+ 5	0.2382	1.26	Q	V				
4+10	0.2474	1.34	Q	V				
4+15	0.2571	1.41	Q	V				
4+20	0.2674	1.49	Q	V				
4+25	0.2782	1.57	Q	V				
4+30	0.2892	1.59	Q	V				
4+35	0.3005	1.64	Q	V				
4+40	0.3123	1.72	Q	V				
4+45	0.3246	1.79	Q	V				
4+50	0.3372	1.82	Q	V				
4+55	0.3502	1.89	Q	V				
5+ 0	0.3639	2.00	Q	V				
5+ 5	0.3806	2.43	Q	V				
5+10	0.4014	3.01	Q	V				
5+15	0.4250	3.44	Q	V				
5+20	0.4511	3.79	Q	V				
5+25	0.4807	4.29	Q	V				
5+30	0.5164	5.19	Q	V				
5+35	0.5355	2.77	Q	V				
5+40	0.5419	0.93	Q	V				
5+45	0.5455	0.53	Q	V				
5+50	0.5483	0.40	Q	V				
5+55	0.5502	0.28	Q	V				
6+ 0	0.5514	0.18	Q	V				
6+ 5	0.5518	0.05	Q	V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAB10PROP2410.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA B
10-YR 24-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.019 Hr.
Lag time = 1.14 Min.
25% of lag time = 0.29 Min.
40% of lag time = 0.46 Min.
Unit time = 15.00 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]
5.10	2.05	10.45

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	5.16	26.32

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 3.329(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.329(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.690
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.690	0.194	1.000	0.194
					Sum (F)	= 0.194

Area averaged mean soil loss (F) (In/Hr) = 0.194
Minimum soil loss rate ((In/Hr)) = 0.097

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.350

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	1311.494	100.000 Sum = 100.000	5.140 Sum= 5.140

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	0.25	0.20	0.027	(0.342) 0.009	0.017
2	0.50	0.30	0.040	(0.338) 0.014	0.026
3	0.75	0.30	0.040	(0.334) 0.014	0.026
4	1.00	0.40	0.053	(0.330) 0.019	0.035
5	1.25	0.30	0.040	(0.326) 0.014	0.026
6	1.50	0.30	0.040	(0.322) 0.014	0.026
7	1.75	0.30	0.040	(0.318) 0.014	0.026
8	2.00	0.40	0.053	(0.315) 0.019	0.035
9	2.25	0.40	0.053	(0.311) 0.019	0.035
10	2.50	0.40	0.053	(0.307) 0.019	0.035
11	2.75	0.50	0.067	(0.303) 0.023	0.043
12	3.00	0.50	0.067	(0.300) 0.023	0.043
13	3.25	0.50	0.067	(0.296) 0.023	0.043
14	3.50	0.50	0.067	(0.292) 0.023	0.043
15	3.75	0.50	0.067	(0.288) 0.023	0.043
16	4.00	0.60	0.080	(0.285) 0.028	0.052
17	4.25	0.60	0.080	(0.281) 0.028	0.052
18	4.50	0.70	0.093	(0.278) 0.033	0.061
19	4.75	0.70	0.093	(0.274) 0.033	0.061
20	5.00	0.80	0.107	(0.271) 0.037	0.069
21	5.25	0.60	0.080	(0.267) 0.028	0.052
22	5.50	0.70	0.093	(0.264) 0.033	0.061
23	5.75	0.80	0.107	(0.260) 0.037	0.069
24	6.00	0.80	0.107	(0.257) 0.037	0.069
25	6.25	0.90	0.120	(0.253) 0.042	0.078
26	6.50	0.90	0.120	(0.250) 0.042	0.078
27	6.75	1.00	0.133	(0.247) 0.047	0.087
28	7.00	1.00	0.133	(0.243) 0.047	0.087
29	7.25	1.00	0.133	(0.240) 0.047	0.087
30	7.50	1.10	0.146	(0.237) 0.051	0.095
31	7.75	1.20	0.160	(0.233) 0.056	0.104
32	8.00	1.30	0.173	(0.230) 0.061	0.113
33	8.25	1.50	0.200	(0.227) 0.070	0.130
34	8.50	1.50	0.200	(0.224) 0.070	0.130
35	8.75	1.60	0.213	(0.221) 0.075	0.139
36	9.00	1.70	0.226	(0.218) 0.079	0.147
37	9.25	1.90	0.253	(0.214) 0.089	0.164
38	9.50	2.00	0.266	(0.211) 0.093	0.173
39	9.75	2.10	0.280	(0.208) 0.098	0.182
40	10.00	2.20	0.293	(0.205) 0.103	0.190
41	10.25	1.50	0.200	(0.202) 0.070	0.130
42	10.50	1.50	0.200	(0.200) 0.070	0.130
43	10.75	2.00	0.266	(0.197) 0.093	0.173
44	11.00	2.00	0.266	(0.194) 0.093	0.173
45	11.25	1.90	0.253	(0.191) 0.089	0.164
46	11.50	1.90	0.253	(0.188) 0.089	0.164
47	11.75	1.70	0.226	(0.185) 0.079	0.147
48	12.00	1.80	0.240	(0.183) 0.084	0.156
49	12.25	2.50	0.333	(0.180) 0.117	0.216
50	12.50	2.60	0.346	(0.177) 0.121	0.225
51	12.75	2.80	0.373	(0.174) 0.131	0.242
52	13.00	2.90	0.386	(0.172) 0.135	0.251
53	13.25	3.40	0.453	(0.169) 0.158	0.294
54	13.50	3.40	0.453	(0.167) 0.158	0.294
55	13.75	2.30	0.306	(0.164) 0.107	0.199
56	14.00	2.30	0.306	(0.162) 0.107	0.199
57	14.25	2.70	0.360	(0.159) 0.126	0.234

58	14.50	2.60	0.346	(0.157)	0.121	0.225
59	14.75	2.60	0.346	(0.154)	0.121	0.225
60	15.00	2.50	0.333	(0.152)	0.117	0.216
61	15.25	2.40	0.320	(0.150)	0.112	0.208
62	15.50	2.30	0.306	(0.147)	0.107	0.199
63	15.75	1.90	0.253	(0.145)	0.089	0.164
64	16.00	1.90	0.253	(0.143)	0.089	0.164
65	16.25	0.40	0.053	(0.141)	0.019	0.035
66	16.50	0.40	0.053	(0.139)	0.019	0.035
67	16.75	0.30	0.040	(0.136)	0.014	0.026
68	17.00	0.30	0.040	(0.134)	0.014	0.026
69	17.25	0.50	0.067	(0.132)	0.023	0.043
70	17.50	0.50	0.067	(0.130)	0.023	0.043
71	17.75	0.50	0.067	(0.128)	0.023	0.043
72	18.00	0.40	0.053	(0.127)	0.019	0.035
73	18.25	0.40	0.053	(0.125)	0.019	0.035
74	18.50	0.40	0.053	(0.123)	0.019	0.035
75	18.75	0.30	0.040	(0.121)	0.014	0.026
76	19.00	0.20	0.027	(0.119)	0.009	0.017
77	19.25	0.30	0.040	(0.118)	0.014	0.026
78	19.50	0.40	0.053	(0.116)	0.019	0.035
79	19.75	0.30	0.040	(0.114)	0.014	0.026
80	20.00	0.20	0.027	(0.113)	0.009	0.017
81	20.25	0.30	0.040	(0.111)	0.014	0.026
82	20.50	0.30	0.040	(0.110)	0.014	0.026
83	20.75	0.30	0.040	(0.109)	0.014	0.026
84	21.00	0.20	0.027	(0.107)	0.009	0.017
85	21.25	0.30	0.040	(0.106)	0.014	0.026
86	21.50	0.20	0.027	(0.105)	0.009	0.017
87	21.75	0.30	0.040	(0.104)	0.014	0.026
88	22.00	0.20	0.027	(0.103)	0.009	0.017
89	22.25	0.30	0.040	(0.102)	0.014	0.026
90	22.50	0.20	0.027	(0.101)	0.009	0.017
91	22.75	0.20	0.027	(0.100)	0.009	0.017
92	23.00	0.20	0.027	(0.099)	0.009	0.017
93	23.25	0.20	0.027	(0.098)	0.009	0.017
94	23.50	0.20	0.027	(0.098)	0.009	0.017
95	23.75	0.20	0.027	(0.097)	0.009	0.017
96	24.00	0.20	0.027	(0.097)	0.009	0.017

(Loss Rate Not Used)

Sum = 100.0

Sum = 8.7

Flood volume = Effective rainfall 2.16 (In)
times area 5.1 (Ac.) / [(In) / (Ft.)] = 0.9 (Ac.Ft)
Total soil loss = 1.17 (In)
Total soil loss = 0.495 (Ac.Ft)
Total rainfall = 3.33 (In)
Flood volume = 40064.7 Cubic Feet
Total soil loss = 21573.3 Cubic Feet

Peak flow rate of this hydrograph = 1.514 (CFS)

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24 - H O U R S T O R M
Run off Hydrograph

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0018	0.09	Q				
0+30	0.0046	0.13	Q				
0+45	0.0074	0.13	Q				
1+ 0	0.0110	0.18	Q				
1+15	0.0138	0.13	Q				
1+30	0.0166	0.13	Q				
1+45	0.0193	0.13	Q				
2+ 0	0.0230	0.18	QV				
2+15	0.0267	0.18	QV				
2+30	0.0304	0.18	QV				
2+45	0.0350	0.22	QV				
3+ 0	0.0395	0.22	QV				
3+15	0.0441	0.22	QV				
3+30	0.0487	0.22	Q V				
3+45	0.0533	0.22	Q V				
4+ 0	0.0589	0.27	QV				
4+15	0.0644	0.27	QV				
4+30	0.0708	0.31	Q V				
4+45	0.0773	0.31	Q V				

5+ 0	0.0846	0.36	Q V					
5+15	0.0901	0.27	Q V					
5+30	0.0966	0.31	Q V					
5+45	0.1039	0.36	Q V					
6+ 0	0.1113	0.36	Q V					
6+15	0.1196	0.40	Q V					
6+30	0.1278	0.40	Q V					
6+45	0.1370	0.45	Q V					
7+ 0	0.1462	0.45	Q V					
7+15	0.1554	0.45	Q V					
7+30	0.1656	0.49	Q V					
7+45	0.1766	0.53	Q V					
8+ 0	0.1886	0.58	Q V					
8+15	0.2023	0.67	Q V					
8+30	0.2161	0.67	Q V					
8+45	0.2309	0.71	Q V					
9+ 0	0.2465	0.76	Q V					
9+15	0.2640	0.85	Q V					
9+30	0.2824	0.89	Q V					
9+45	0.3017	0.93	Q V					
10+ 0	0.3219	0.98	Q V					
10+15	0.3357	0.67	Q V					
10+30	0.3495	0.67	Q V					
10+45	0.3679	0.89	Q V					
11+ 0	0.3863	0.89	Q V					
11+15	0.4038	0.85	Q V					
11+30	0.4212	0.85	Q V					
11+45	0.4369	0.76	Q V					
12+ 0	0.4534	0.80	Q V					
12+15	0.4764	1.11	Q V					
12+30	0.5003	1.16	Q V					
12+45	0.5261	1.25	Q V					
13+ 0	0.5528	1.29	Q V					
13+15	0.5840	1.51	Q V					
13+30	0.6153	1.51	Q V					
13+45	0.6365	1.02	Q V					
14+ 0	0.6576	1.02	Q V					
14+15	0.6825	1.20	Q V					
14+30	0.7064	1.16	Q V					
14+45	0.7303	1.16	Q V					
15+ 0	0.7533	1.11	Q V					
15+15	0.7754	1.07	Q V					
15+30	0.7965	1.02	Q V					
15+45	0.8140	0.85	Q V					
16+ 0	0.8315	0.85	Q V					
16+15	0.8351	0.18	Q V					
16+30	0.8388	0.18	Q V					
16+45	0.8416	0.13	Q V					
17+ 0	0.8443	0.13	Q V					
17+15	0.8489	0.22	Q V					
17+30	0.8535	0.22	Q V					
17+45	0.8581	0.22	Q V					
18+ 0	0.8618	0.18	Q V					
18+15	0.8655	0.18	Q V					
18+30	0.8692	0.18	Q V					
18+45	0.8719	0.13	Q V					
19+ 0	0.8738	0.09	Q V					
19+15	0.8765	0.13	Q V					
19+30	0.8802	0.18	Q V					
19+45	0.8830	0.13	Q V					
20+ 0	0.8848	0.09	Q V					
20+15	0.8876	0.13	Q V					
20+30	0.8903	0.13	Q V					
20+45	0.8931	0.13	Q V					
21+ 0	0.8949	0.09	Q V					
21+15	0.8977	0.13	Q V					
21+30	0.8995	0.09	Q V					
21+45	0.9023	0.13	Q V					
22+ 0	0.9041	0.09	Q V					
22+15	0.9069	0.13	Q V					
22+30	0.9087	0.09	Q V					
22+45	0.9106	0.09	Q V					
23+ 0	0.9124	0.09	Q V					
23+15	0.9142	0.09	Q V					
23+30	0.9161	0.09	Q V					
23+45	0.9179	0.09	Q V					
24+ 0	0.9198	0.09	Q V					V

Unit Hydrograph Analyses

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Study date 07/22/19 File: DMAB100EXIST1100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION

100-YR 1-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.025 Hr.
Lag time = 1.52 Min.
25% of lag time = 0.38 Min.
40% of lag time = 0.61 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]
5.10	0.49	2.49

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	1.33	6.78

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 1.330(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.330(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.500
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.500	0.281	1.000	0.281
					Sum (F)	= 0.281

Area averaged mean soil loss (F) (In/Hr) = 0.281
Minimum soil loss rate ((In/Hr)) = 0.140

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	327.873	59.371
2	0.167	655.747	35.647
3	0.250	983.620	4.982
		Sum = 100.000	Sum= 5.140

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

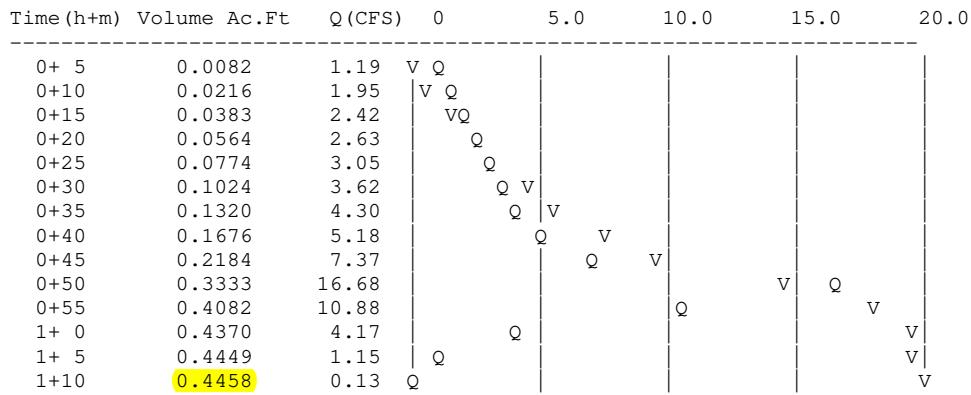
Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate (In./Hr) Max Low	Effective (In/Hr)
1	0.08	4.20	0.670	0.281 (0.335)	0.389
2	0.17	4.30	0.686	0.281 (0.343)	0.405
3	0.25	5.00	0.798	0.281 (0.399)	0.517
4	0.33	5.00	0.798	0.281 (0.399)	0.517
5	0.42	5.80	0.926	0.281 (0.463)	0.645
6	0.50	6.50	1.037	0.281 (0.519)	0.756
7	0.58	7.40	1.181	0.281 (0.590)	0.900
8	0.67	8.60	1.372	0.281 (0.686)	1.092
9	0.75	12.30	1.963	0.281 (0.981)	1.682
10	0.83	29.10	4.644	0.281 (2.322)	4.363
11	0.92	6.80	1.085	0.281 (0.543)	0.804
12	1.00	5.00	0.798	0.281 (0.399)	0.517
		(Loss Rate Not Used)			
		Sum = 100.0		Sum = 12.6	

Flood volume = Effective rainfall 1.05(In)
times area 5.1(Ac.)/[(In)/(Ft.)] = 0.4(Ac.Ft)
Total soil loss = 0.28(In)
Total soil loss = 0.119(Ac.Ft)
Total rainfall = 1.33(In)
Flood volume = 19420.1 Cubic Feet
Total soil loss = 5201.0 Cubic Feet

Peak flow rate of this hydrograph = 16.685(CFS)

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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))



Unit Hydrograph Analyses

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Study date 07/22/19 File: DMAB100EXIST3100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION

100-YR 3-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.025 Hr.
Lag time = 1.52 Min.
25% of lag time = 0.38 Min.
40% of lag time = 0.61 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]
5.10	0.87	4.42

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	2.09	10.66

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 2.090(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.090(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.500
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.500	0.281	1.000	0.281
					Sum (F)	= 0.281

Area averaged mean soil loss (F) (In/Hr) = 0.281
Minimum soil loss rate ((In/Hr)) = 0.140

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	327.873	59.371	3.052
2 0.167	655.747	35.647	1.832
3 0.250	983.620	4.982	0.256
		Sum = 100.000	Sum= 5.140

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	0.326	(0.281) 0.163	0.163
2	0.17	1.30	0.326	(0.281) 0.163	0.163
3	0.25	1.10	0.276	(0.281) 0.138	0.138
4	0.33	1.50	0.376	(0.281) 0.188	0.188
5	0.42	1.50	0.376	(0.281) 0.188	0.188
6	0.50	1.80	0.451	(0.281) 0.226	0.226
7	0.58	1.50	0.376	(0.281) 0.188	0.188
8	0.67	1.80	0.451	(0.281) 0.226	0.226
9	0.75	1.80	0.451	(0.281) 0.226	0.226
10	0.83	1.50	0.376	(0.281) 0.188	0.188
11	0.92	1.60	0.401	(0.281) 0.201	0.201
12	1.00	1.80	0.451	(0.281) 0.226	0.226
13	1.08	2.20	0.552	(0.281) 0.276	0.276
14	1.17	2.20	0.552	(0.281) 0.276	0.276
15	1.25	2.20	0.552	(0.281) 0.276	0.276
16	1.33	2.00	0.502	(0.281) 0.251	0.251
17	1.42	2.60	0.652	0.281 (0.326)	0.371
18	1.50	2.70	0.677	0.281 (0.339)	0.396
19	1.58	2.40	0.602	0.281 (0.301)	0.321
20	1.67	2.70	0.677	0.281 (0.339)	0.396
21	1.75	3.30	0.828	0.281 (0.414)	0.547
22	1.83	3.10	0.777	0.281 (0.389)	0.497
23	1.92	2.90	0.727	0.281 (0.364)	0.446
24	2.00	3.00	0.752	0.281 (0.376)	0.471
25	2.08	3.10	0.777	0.281 (0.389)	0.497
26	2.17	4.20	1.053	0.281 (0.527)	0.772
27	2.25	5.00	1.254	0.281 (0.627)	0.973
28	2.33	3.50	0.878	0.281 (0.439)	0.597
29	2.42	6.80	1.705	0.281 (0.853)	1.424
30	2.50	7.30	1.831	0.281 (0.915)	1.550
31	2.58	8.20	2.057	0.281 (1.028)	1.776
32	2.67	5.90	1.480	0.281 (0.740)	1.199
33	2.75	2.00	0.502	(0.281) 0.251	0.251
34	2.83	1.80	0.451	(0.281) 0.226	0.226
35	2.92	1.80	0.451	(0.281) 0.226	0.226
36	3.00	0.60	0.150	(0.281) 0.075	0.075

(Loss Rate Not Used)

Sum = 100.0 Sum = 16.4

Flood volume = Effective rainfall 1.37 (In)
times area 5.1 (Ac.) / [(In)/(Ft.)] = 0.6 (Ac.Ft)
Total soil loss = 0.72 (In)
Total soil loss = 0.307 (Ac.Ft)
Total rainfall = 2.09 (In)
Flood volume = 25314.5 Cubic Feet
Total soil loss = 13376.8 Cubic Feet

Peak flow rate of this hydrograph = 8.627 (CFS)

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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	2.5	5.0	7.5	10.0
0+ 5	0.0034	0.50	VQ					
0+10	0.0089	0.80	V Q					
0+15	0.0142	0.76	V Q					
0+20	0.0201	0.87	V Q					
0+25	0.0267	0.95	V Q					
0+30	0.0342	1.08	V Q					
0+35	0.0413	1.04	V Q					
0+40	0.0488	1.09	VQ					
0+45	0.0568	1.15	VQ					
0+50	0.0640	1.05	Q					
0+55	0.0709	1.02	Q					
1+ 0	0.0786	1.11	QV					
1+ 5	0.0876	1.31	QV					
1+10	0.0972	1.41	QV					
1+15	0.1070	1.42	Q V					
1+20	0.1163	1.34	Q V					
1+25	0.1277	1.66	Q V					
1+30	0.1412	1.95	Q V					
1+35	0.1536	1.80	Q V					
1+40	0.1667	1.90	Q V					
1+45	0.1837	2.48	Q V					
1+50	0.2018	2.62	Q V					
1+55	0.2184	2.41	Q V					
2+ 0	0.2348	2.38	Q V					
2+ 5	0.2520	2.49	Q V					
2+10	0.2753	3.39	Q V					
2+15	0.3064	4.51	Q V					
2+20	0.3326	3.80	Q V					
2+25	0.3718	5.69	Q V					
2+30	0.4235	7.50	Q V					
2+35	0.4829	8.63	Q V					
2+40	0.5332	7.31	Q V					
2+45	0.5568	3.42	Q V					
2+50	0.5668	1.46	Q V					
2+55	0.5748	1.17	Q V					
3+ 0	0.5797	0.70	Q V					
3+ 5	0.5810	0.20	Q V					
3+10	0.5811	0.02	Q V					

Unit Hydrograph Analyses

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Study date 07/22/19 File: DMAB100EXIST6100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION

100-YR 6-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.025 Hr.
Lag time = 1.52 Min.
25% of lag time = 0.38 Min.
40% of lag time = 0.61 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]
5.10	1.21	6.17

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	2.86	14.59

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 2.860(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.860(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.500
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.500	0.281	1.000	0.281
					Sum (F)	= 0.281

Area averaged mean soil loss (F) (In/Hr) = 0.281
Minimum soil loss rate ((In/Hr)) = 0.140

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

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	327.873	59.371	3.052
2 0.167	655.747	35.647	1.832
3 0.250	983.620	4.982	0.256
		Sum = 100.000	Sum= 5.140

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	0.172	(0.281) 0.086	0.086
2	0.17	0.60	0.206	(0.281) 0.103	0.103
3	0.25	0.60	0.206	(0.281) 0.103	0.103
4	0.33	0.60	0.206	(0.281) 0.103	0.103
5	0.42	0.60	0.206	(0.281) 0.103	0.103
6	0.50	0.70	0.240	(0.281) 0.120	0.120
7	0.58	0.70	0.240	(0.281) 0.120	0.120
8	0.67	0.70	0.240	(0.281) 0.120	0.120
9	0.75	0.70	0.240	(0.281) 0.120	0.120
10	0.83	0.70	0.240	(0.281) 0.120	0.120
11	0.92	0.70	0.240	(0.281) 0.120	0.120
12	1.00	0.80	0.275	(0.281) 0.137	0.137
13	1.08	0.80	0.275	(0.281) 0.137	0.137
14	1.17	0.80	0.275	(0.281) 0.137	0.137
15	1.25	0.80	0.275	(0.281) 0.137	0.137
16	1.33	0.80	0.275	(0.281) 0.137	0.137
17	1.42	0.80	0.275	(0.281) 0.137	0.137
18	1.50	0.80	0.275	(0.281) 0.137	0.137
19	1.58	0.80	0.275	(0.281) 0.137	0.137
20	1.67	0.80	0.275	(0.281) 0.137	0.137
21	1.75	0.80	0.275	(0.281) 0.137	0.137
22	1.83	0.80	0.275	(0.281) 0.137	0.137
23	1.92	0.80	0.275	(0.281) 0.137	0.137
24	2.00	0.90	0.309	(0.281) 0.154	0.154
25	2.08	0.80	0.275	(0.281) 0.137	0.137
26	2.17	0.90	0.309	(0.281) 0.154	0.154
27	2.25	0.90	0.309	(0.281) 0.154	0.154
28	2.33	0.90	0.309	(0.281) 0.154	0.154
29	2.42	0.90	0.309	(0.281) 0.154	0.154
30	2.50	0.90	0.309	(0.281) 0.154	0.154
31	2.58	0.90	0.309	(0.281) 0.154	0.154
32	2.67	0.90	0.309	(0.281) 0.154	0.154
33	2.75	1.00	0.343	(0.281) 0.172	0.172
34	2.83	1.00	0.343	(0.281) 0.172	0.172
35	2.92	1.00	0.343	(0.281) 0.172	0.172
36	3.00	1.00	0.343	(0.281) 0.172	0.172
37	3.08	1.00	0.343	(0.281) 0.172	0.172
38	3.17	1.10	0.378	(0.281) 0.189	0.189
39	3.25	1.10	0.378	(0.281) 0.189	0.189
40	3.33	1.10	0.378	(0.281) 0.189	0.189
41	3.42	1.20	0.412	(0.281) 0.206	0.206
42	3.50	1.30	0.446	(0.281) 0.223	0.223
43	3.58	1.40	0.480	(0.281) 0.240	0.240
44	3.67	1.40	0.480	(0.281) 0.240	0.240
45	3.75	1.50	0.515	(0.281) 0.257	0.257
46	3.83	1.50	0.515	(0.281) 0.257	0.257
47	3.92	1.60	0.549	(0.281) 0.275	0.275
48	4.00	1.60	0.549	(0.281) 0.275	0.275
49	4.08	1.70	0.583	0.281 (0.292)	0.302
50	4.17	1.80	0.618	0.281 (0.309)	0.337
51	4.25	1.90	0.652	0.281 (0.326)	0.371
52	4.33	2.00	0.686	0.281 (0.343)	0.405
53	4.42	2.10	0.721	0.281 (0.360)	0.440
54	4.50	2.10	0.721	0.281 (0.360)	0.440
55	4.58	2.20	0.755	0.281 (0.378)	0.474

56	4.67	2.30	0.789	0.281	(0.395)	0.508
57	4.75	2.40	0.824	0.281	(0.412)	0.543
58	4.83	2.40	0.824	0.281	(0.412)	0.543
59	4.92	2.50	0.858	0.281	(0.429)	0.577
60	5.00	2.60	0.892	0.281	(0.446)	0.611
61	5.08	3.10	1.064	0.281	(0.532)	0.783
62	5.17	3.60	1.235	0.281	(0.618)	0.955
63	5.25	3.90	1.338	0.281	(0.669)	1.058
64	5.33	4.20	1.441	0.281	(0.721)	1.160
65	5.42	4.70	1.613	0.281	(0.807)	1.332
66	5.50	5.60	1.922	0.281	(0.961)	1.641
67	5.58	1.90	0.652	0.281	(0.326)	0.371
68	5.67	0.90	0.309	(0.281)	0.154	0.154
69	5.75	0.60	0.206	(0.281)	0.103	0.103
70	5.83	0.50	0.172	(0.281)	0.086	0.086
71	5.92	0.30	0.103	(0.281)	0.051	0.051
72	6.00	0.20	0.069	(0.281)	0.034	0.034

(Loss Rate Not Used)

Sum = 100.0

Sum = 20.9

Flood volume = Effective rainfall 1.74 (In)

times area 5.1(Ac.)/[(In)/(Ft.)] = 0.7(Ac.Ft)

Total soil loss = 1.12 (In)

Total soil loss = 0.475 (Ac.Ft)

Total rainfall = 2.86 (In)

Flood volume = 32268.9 Cubic Feet

Total soil loss = 20677.4 Cubic Feet

Peak flow rate of this hydrograph = 7.749 (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	2.5	5.0	7.5	10.0
0+ 5	0.0018	0.26	VQ				
0+10	0.0051	0.47	VQ				
0+15	0.0087	0.53	V Q				
0+20	0.0123	0.53	V Q				
0+25	0.0160	0.53	V Q				
0+30	0.0200	0.58	VQ				
0+35	0.0242	0.61	VQ				
0+40	0.0284	0.62	VQ				
0+45	0.0327	0.62	VQ				
0+50	0.0370	0.62	VQ				
0+55	0.0412	0.62	Q				
1+ 0	0.0458	0.67	Q				
1+ 5	0.0507	0.70	Q				
1+10	0.0555	0.71	Q				
1+15	0.0604	0.71	QV				
1+20	0.0652	0.71	QV				
1+25	0.0701	0.71	QV				
1+30	0.0750	0.71	Q V				
1+35	0.0798	0.71	Q V				
1+40	0.0847	0.71	Q V				
1+45	0.0896	0.71	Q V				
1+50	0.0944	0.71	Q V				
1+55	0.0993	0.71	Q V				
2+ 0	0.1045	0.76	Q V				
2+ 5	0.1096	0.74	Q V				
2+10	0.1148	0.76	Q V				
2+15	0.1203	0.79	Q V				
2+20	0.1257	0.79	Q V				
2+25	0.1312	0.79	Q V				
2+30	0.1367	0.79	Q V				
2+35	0.1421	0.79	Q V				
2+40	0.1476	0.79	Q V				
2+45	0.1534	0.85	Q V				
2+50	0.1595	0.88	Q V				
2+55	0.1656	0.88	Q V				
3+ 0	0.1716	0.88	Q V				
3+ 5	0.1777	0.88	Q V				
3+10	0.1842	0.93	Q V				
3+15	0.1908	0.97	Q V				
3+20	0.1975	0.97	Q V				
3+25	0.2046	1.02	Q V				

3+30	0.2122	1.11	Q	V				
3+35	0.2204	1.20	Q	V				
3+40	0.2289	1.23	Q	V				
3+45	0.2378	1.29	Q	V				
3+50	0.2468	1.32	Q	V				
3+55	0.2563	1.38	Q	V				
4+ 0	0.2660	1.41	Q	V				
4+ 5	0.2763	1.50	Q	V				
4+10	0.2877	1.65	Q	V				
4+15	0.3003	1.83	Q	V				
4+20	0.3141	2.00	Q	V				
4+25	0.3291	2.18	Q	V				
4+30	0.3446	2.25	Q	V				
4+35	0.3609	2.37	Q	V				
4+40	0.3784	2.53	Q	V				
4+45	0.3971	2.71	Q	V				
4+50	0.4162	2.78	Q	V				
4+55	0.4362	2.90	Q	V				
5+ 0	0.4573	3.06	Q	V				
5+ 5	0.4825	3.66	Q	V				
5+10	0.5135	4.51	Q	V				
5+15	0.5492	5.18	Q	V				
5+20	0.5886	5.73	Q	V				
5+25	0.6331	6.47	Q	V				
5+30	0.6865	7.75	Q	V				
5+35	0.7174	4.48	Q	V				
5+40	0.7282	1.57	Q	V				
5+45	0.7330	0.69	Q	V				
5+50	0.7363	0.49	Q	V				
5+55	0.7387	0.34	Q	V				
6+ 0	0.7402	0.22	Q	V				
6+ 5	0.7407	0.08	Q	V				
6+10	0.7408	0.01	Q	V				

Unit Hydrograph Analyses

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Study date 07/22/19 File: DMAB100EXIST24100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION

100-YR 24-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.025 Hr.
Lag time = 1.52 Min.
25% of lag time = 0.38 Min.
40% of lag time = 0.61 Min.
Unit time = 15.00 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]
5.10	2.05	10.45

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	5.16	26.32

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 5.160(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 5.160(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.500
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.500	0.281	1.000	0.281
					Sum (F)	= 0.281

Area averaged mean soil loss (F) (In/Hr) = 0.281
Minimum soil loss rate ((In/Hr)) = 0.140

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	983.620	100.000 Sum = 100.000	5.140 Sum= 5.140

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	0.25	0.20	0.041	(0.496) 0.021	0.021
2	0.50	0.30	0.062	(0.490) 0.031	0.031
3	0.75	0.30	0.062	(0.485) 0.031	0.031
4	1.00	0.40	0.083	(0.479) 0.041	0.041
5	1.25	0.30	0.062	(0.473) 0.031	0.031
6	1.50	0.30	0.062	(0.468) 0.031	0.031
7	1.75	0.30	0.062	(0.462) 0.031	0.031
8	2.00	0.40	0.083	(0.457) 0.041	0.041
9	2.25	0.40	0.083	(0.451) 0.041	0.041
10	2.50	0.40	0.083	(0.446) 0.041	0.041
11	2.75	0.50	0.103	(0.440) 0.052	0.052
12	3.00	0.50	0.103	(0.435) 0.052	0.052
13	3.25	0.50	0.103	(0.429) 0.052	0.052
14	3.50	0.50	0.103	(0.424) 0.052	0.052
15	3.75	0.50	0.103	(0.419) 0.052	0.052
16	4.00	0.60	0.124	(0.413) 0.062	0.062
17	4.25	0.60	0.124	(0.408) 0.062	0.062
18	4.50	0.70	0.144	(0.403) 0.072	0.072
19	4.75	0.70	0.144	(0.398) 0.072	0.072
20	5.00	0.80	0.165	(0.393) 0.083	0.083
21	5.25	0.60	0.124	(0.388) 0.062	0.062
22	5.50	0.70	0.144	(0.382) 0.072	0.072
23	5.75	0.80	0.165	(0.377) 0.083	0.083
24	6.00	0.80	0.165	(0.372) 0.083	0.083
25	6.25	0.90	0.186	(0.368) 0.093	0.093
26	6.50	0.90	0.186	(0.363) 0.093	0.093
27	6.75	1.00	0.206	(0.358) 0.103	0.103
28	7.00	1.00	0.206	(0.353) 0.103	0.103
29	7.25	1.00	0.206	(0.348) 0.103	0.103
30	7.50	1.10	0.227	(0.343) 0.114	0.114
31	7.75	1.20	0.248	(0.339) 0.124	0.124
32	8.00	1.30	0.268	(0.334) 0.134	0.134
33	8.25	1.50	0.310	(0.329) 0.155	0.155
34	8.50	1.50	0.310	(0.325) 0.155	0.155
35	8.75	1.60	0.330	(0.320) 0.165	0.165
36	9.00	1.70	0.351	(0.316) 0.175	0.175
37	9.25	1.90	0.392	(0.311) 0.196	0.196
38	9.50	2.00	0.413	(0.307) 0.206	0.206
39	9.75	2.10	0.433	(0.302) 0.217	0.217
40	10.00	2.20	0.454	(0.298) 0.227	0.227
41	10.25	1.50	0.310	(0.294) 0.155	0.155
42	10.50	1.50	0.310	(0.290) 0.155	0.155
43	10.75	2.00	0.413	(0.285) 0.206	0.206
44	11.00	2.00	0.413	(0.281) 0.206	0.206
45	11.25	1.90	0.392	(0.277) 0.196	0.196
46	11.50	1.90	0.392	(0.273) 0.196	0.196
47	11.75	1.70	0.351	(0.269) 0.175	0.175
48	12.00	1.80	0.372	(0.265) 0.186	0.186
49	12.25	2.50	0.516	(0.261) 0.258	0.258
50	12.50	2.60	0.537	0.257 (0.268)	0.280
51	12.75	2.80	0.578	0.253 (0.289)	0.325
52	13.00	2.90	0.599	0.249 (0.299)	0.349
53	13.25	3.40	0.702	0.246 (0.351)	0.456
54	13.50	3.40	0.702	0.242 (0.351)	0.460
55	13.75	2.30	0.475	(0.238) 0.237	0.237
56	14.00	2.30	0.475	0.235 (0.237)	0.240
57	14.25	2.70	0.557	0.231 (0.279)	0.326

58	14.50	2.60	0.537	0.227	(0.268)	0.309
59	14.75	2.60	0.537	0.224	(0.268)	0.313
60	15.00	2.50	0.516	0.221	(0.258)	0.295
61	15.25	2.40	0.495	0.217	(0.248)	0.278
62	15.50	2.30	0.475	0.214	(0.237)	0.261
63	15.75	1.90	0.392	(0.211)	0.196	0.196
64	16.00	1.90	0.392	(0.207)	0.196	0.196
65	16.25	0.40	0.083	(0.204)	0.041	0.041
66	16.50	0.40	0.083	(0.201)	0.041	0.041
67	16.75	0.30	0.062	(0.198)	0.031	0.031
68	17.00	0.30	0.062	(0.195)	0.031	0.031
69	17.25	0.50	0.103	(0.192)	0.052	0.052
70	17.50	0.50	0.103	(0.189)	0.052	0.052
71	17.75	0.50	0.103	(0.186)	0.052	0.052
72	18.00	0.40	0.083	(0.184)	0.041	0.041
73	18.25	0.40	0.083	(0.181)	0.041	0.041
74	18.50	0.40	0.083	(0.178)	0.041	0.041
75	18.75	0.30	0.062	(0.176)	0.031	0.031
76	19.00	0.20	0.041	(0.173)	0.021	0.021
77	19.25	0.30	0.062	(0.171)	0.031	0.031
78	19.50	0.40	0.083	(0.168)	0.041	0.041
79	19.75	0.30	0.062	(0.166)	0.031	0.031
80	20.00	0.20	0.041	(0.164)	0.021	0.021
81	20.25	0.30	0.062	(0.162)	0.031	0.031
82	20.50	0.30	0.062	(0.160)	0.031	0.031
83	20.75	0.30	0.062	(0.158)	0.031	0.031
84	21.00	0.20	0.041	(0.156)	0.021	0.021
85	21.25	0.30	0.062	(0.154)	0.031	0.031
86	21.50	0.20	0.041	(0.152)	0.021	0.021
87	21.75	0.30	0.062	(0.150)	0.031	0.031
88	22.00	0.20	0.041	(0.149)	0.021	0.021
89	22.25	0.30	0.062	(0.147)	0.031	0.031
90	22.50	0.20	0.041	(0.146)	0.021	0.021
91	22.75	0.20	0.041	(0.145)	0.021	0.021
92	23.00	0.20	0.041	(0.144)	0.021	0.021
93	23.25	0.20	0.041	(0.143)	0.021	0.021
94	23.50	0.20	0.041	(0.142)	0.021	0.021
95	23.75	0.20	0.041	(0.141)	0.021	0.021
96	24.00	0.20	0.041	(0.141)	0.021	0.021

(Loss Rate Not Used)

Sum = 100.0

Sum = 10.9

Flood volume = Effective rainfall 2.71 (In)
times area 5.1(Ac.) / [(In) / (Ft.)] = 1.2 (Ac.Ft)
Total soil loss = 2.45 (In)
Total soil loss = 1.039 (Ac.Ft)
Total rainfall = 5.16 (In)
Flood volume = 50254.9 Cubic Feet
Total soil loss = 45271.2 Cubic Feet

Peak flow rate of this hydrograph = 2.365 (CFS)

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24 - H O U R S T O R M
Run off Hydrograph

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0022	0.11	Q				
0+30	0.0055	0.16	Q				
0+45	0.0088	0.16	Q				
1+ 0	0.0132	0.21	Q				
1+15	0.0164	0.16	Q				
1+30	0.0197	0.16	Q				
1+45	0.0230	0.16	Q				
2+ 0	0.0274	0.21	Q				
2+15	0.0318	0.21	QV				
2+30	0.0362	0.21	QV				
2+45	0.0417	0.27	Q				
3+ 0	0.0471	0.27	Q				
3+15	0.0526	0.27	Q				
3+30	0.0581	0.27	QV				
3+45	0.0636	0.27	QV				
4+ 0	0.0702	0.32	QV				
4+15	0.0768	0.32	QV				
4+30	0.0844	0.37	QV				
4+45	0.0921	0.37	Q V				

5+ 0	0.1009	0.42	Q V					
5+15	0.1075	0.32	Q V					
5+30	0.1151	0.37	Q V					
5+45	0.1239	0.42	Q V					
6+ 0	0.1327	0.42	Q V					
6+15	0.1425	0.48	Q V					
6+30	0.1524	0.48	Q V					
6+45	0.1634	0.53	Q V					
7+ 0	0.1743	0.53	Q V					
7+15	0.1853	0.53	Q V					
7+30	0.1974	0.58	Q V					
7+45	0.2105	0.64	Q V					
8+ 0	0.2248	0.69	Q V					
8+15	0.2412	0.80	Q V					
8+30	0.2577	0.80	Q V					
8+45	0.2752	0.85	Q V					
9+ 0	0.2939	0.90	Q V					
9+15	0.3147	1.01	Q V					
9+30	0.3366	1.06	Q V					
9+45	0.3596	1.11	Q V					
10+ 0	0.3838	1.17	Q V					
10+15	0.4002	0.80	Q V					
10+30	0.4167	0.80	Q V					
10+45	0.4386	1.06	Q V					
11+ 0	0.4605	1.06	Q V					
11+15	0.4814	1.01	Q V					
11+30	0.5022	1.01	Q V					
11+45	0.5208	0.90	Q V					
12+ 0	0.5406	0.96	Q V					
12+15	0.5680	1.33	Q V					
12+30	0.5977	1.44	Q V					
12+45	0.6322	1.67	Q V					
13+ 0	0.6693	1.80	Q V					
13+15	0.7178	2.35	Q V					
13+30	0.7666	2.36	Q V					
13+45	0.7918	1.22	Q V					
14+ 0	0.8174	1.23	Q V					
14+15	0.8520	1.68	Q V					
14+30	0.8849	1.59	Q V					
14+45	0.9181	1.61	Q V					
15+ 0	0.9495	1.52	Q V					
15+15	0.9790	1.43	Q V					
15+30	1.0068	1.34	Q V					
15+45	1.0276	1.01	Q V					
16+ 0	1.0484	1.01	Q V					
16+15	1.0528	0.21	Q V					
16+30	1.0572	0.21	Q V					
16+45	1.0605	0.16	Q V					
17+ 0	1.0638	0.16	Q V					
17+15	1.0693	0.27	Q V					
17+30	1.0747	0.27	Q V					
17+45	1.0802	0.27	Q V					
18+ 0	1.0846	0.21	Q V					
18+15	1.0890	0.21	Q V					
18+30	1.0934	0.21	Q V					
18+45	1.0967	0.16	Q V					
19+ 0	1.0989	0.11	Q V					
19+15	1.1022	0.16	Q V					
19+30	1.1065	0.21	Q V					
19+45	1.1098	0.16	Q V					
20+ 0	1.1120	0.11	Q V					
20+15	1.1153	0.16	Q V					
20+30	1.1186	0.16	Q V					
20+45	1.1219	0.16	Q V					
21+ 0	1.1241	0.11	Q V					
21+15	1.1274	0.16	Q V					
21+30	1.1296	0.11	Q V					
21+45	1.1329	0.16	Q V					
22+ 0	1.1351	0.11	Q V					
22+15	1.1383	0.16	Q V					
22+30	1.1405	0.11	Q V					
22+45	1.1427	0.11	Q V					
23+ 0	1.1449	0.11	Q V					
23+15	1.1471	0.11	Q V					
23+30	1.1493	0.11	Q V					
23+45	1.1515	0.11	Q V					
24+ 0	1.1537	0.11	Q V					

Unit Hydrograph Analyses

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

PROPOSED CONDITION, DMA B

100-YR 1-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.019 Hr.
Lag time = 1.14 Min.
25% of lag time = 0.29 Min.
40% of lag time = 0.46 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]
5.10	0.49	2.49

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	1.33	6.78

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 1.330(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.330(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.690
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.690	0.194	1.000	0.194
					Sum (F)	= 0.194

Area averaged mean soil loss (F) (In/Hr) = 0.194
Minimum soil loss rate ((In/Hr)) = 0.097

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.350

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	437.165	67.483	3.469
2 0.167	874.329	32.517	1.671
	Sum = 100.000	Sum=	5.140

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	4.20	0.670	0.194 (0.235)	0.477
2 0.17	4.30	0.686	0.194 (0.240)	0.493
3 0.25	5.00	0.798	0.194 (0.279)	0.604
4 0.33	5.00	0.798	0.194 (0.279)	0.604
5 0.42	5.80	0.926	0.194 (0.324)	0.732
6 0.50	6.50	1.037	0.194 (0.363)	0.844
7 0.58	7.40	1.181	0.194 (0.413)	0.987
8 0.67	8.60	1.372	0.194 (0.480)	1.179
9 0.75	12.30	1.963	0.194 (0.687)	1.769
10 0.83	29.10	4.644	0.194 (1.625)	4.451
11 0.92	6.80	1.085	0.194 (0.380)	0.892
12 1.00	5.00	0.798	0.194 (0.279)	0.604

(Loss Rate Not Used)

Sum = 100.0 Sum = 13.6

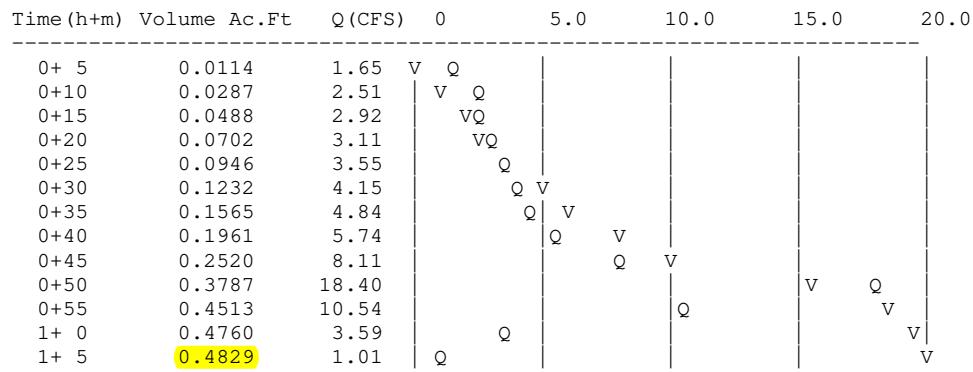
Flood volume = Effective rainfall 1.14 (In)
times area 5.1(Ac.)/[(In)/(Ft.)] = 0.5 (Ac.Ft)
Total soil loss = 0.19 (In)
Total soil loss = 0.082 (Ac.Ft)
Total rainfall = 1.33 (In)
Flood volume = 21037.2 Cubic Feet
Total soil loss = 3584.0 Cubic Feet

Peak flow rate of this hydrograph = 18.404 (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))



Unit Hydrograph Analyses

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

PROPOSED CONDITION, DMA B

100-YR 3-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.019 Hr.
Lag time = 1.14 Min.
25% of lag time = 0.29 Min.
40% of lag time = 0.46 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]
5.10	0.87	4.42

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	2.09	10.66

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 2.090(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.090(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.690
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.690	0.194	1.000	0.194
					Sum (F)	= 0.194

Area averaged mean soil loss (F) (In/Hr) = 0.194
Minimum soil loss rate ((In/Hr)) = 0.097

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.350

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	437.165	67.483	3.469
2 0.167	874.329	32.517	1.671
		Sum = 100.000	Sum= 5.140

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	0.326	(0.194) 0.114	0.212
2	0.17	1.30	0.326	(0.194) 0.114	0.212
3	0.25	1.10	0.276	(0.194) 0.097	0.179
4	0.33	1.50	0.376	(0.194) 0.132	0.245
5	0.42	1.50	0.376	(0.194) 0.132	0.245
6	0.50	1.80	0.451	(0.194) 0.158	0.293
7	0.58	1.50	0.376	(0.194) 0.132	0.245
8	0.67	1.80	0.451	(0.194) 0.158	0.293
9	0.75	1.80	0.451	(0.194) 0.158	0.293
10	0.83	1.50	0.376	(0.194) 0.132	0.245
11	0.92	1.60	0.401	(0.194) 0.140	0.261
12	1.00	1.80	0.451	(0.194) 0.158	0.293
13	1.08	2.20	0.552	(0.194) 0.193	0.359
14	1.17	2.20	0.552	(0.194) 0.193	0.359
15	1.25	2.20	0.552	(0.194) 0.193	0.359
16	1.33	2.00	0.502	(0.194) 0.176	0.326
17	1.42	2.60	0.652	0.194 (0.228)	0.458
18	1.50	2.70	0.677	0.194 (0.237)	0.484
19	1.58	2.40	0.602	0.194 (0.211)	0.408
20	1.67	2.70	0.677	0.194 (0.237)	0.484
21	1.75	3.30	0.828	0.194 (0.290)	0.634
22	1.83	3.10	0.777	0.194 (0.272)	0.584
23	1.92	2.90	0.727	0.194 (0.255)	0.534
24	2.00	3.00	0.752	0.194 (0.263)	0.559
25	2.08	3.10	0.777	0.194 (0.272)	0.584
26	2.17	4.20	1.053	0.194 (0.369)	0.860
27	2.25	5.00	1.254	0.194 (0.439)	1.060
28	2.33	3.50	0.878	0.194 (0.307)	0.684
29	2.42	6.80	1.705	0.194 (0.597)	1.512
30	2.50	7.30	1.831	0.194 (0.641)	1.637
31	2.58	8.20	2.057	0.194 (0.720)	1.863
32	2.67	5.90	1.480	0.194 (0.518)	1.286
33	2.75	2.00	0.502	(0.194) 0.176	0.326
34	2.83	1.80	0.451	(0.194) 0.158	0.293
35	2.92	1.80	0.451	(0.194) 0.158	0.293
36	3.00	0.60	0.150	(0.194) 0.053	0.098

(Loss Rate Not Used)

Sum = 100.0 Sum = 19.1

Flood volume = Effective rainfall 1.59 (In)
times area 5.1 (Ac.) / [(In) / (Ft.)] = 0.7 (Ac.Ft)
Total soil loss = 0.50 (In)
Total soil loss = 0.213 (Ac.Ft)
Total rainfall = 2.09 (In)
Flood volume = 29403.2 Cubic Feet
Total soil loss = 9288.1 Cubic Feet

Peak flow rate of this hydrograph = 9.203 (CFS)

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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 2.5 5.0 7.5 10.0

0+ 5	0.0051	0.74	V Q				
0+10	0.0126	1.09	V Q				
0+15	0.0193	0.98	V Q				
0+20	0.0272	1.15	V Q				
0+25	0.0359	1.26	V Q				
0+30	0.0457	1.43	V Q				
0+35	0.0549	1.34	V Q				
0+40	0.0647	1.43	V Q				
0+45	0.0751	1.51	V Q				
0+50	0.0844	1.34	VQ				
0+55	0.0934	1.31	Q				
1+ 0	0.1034	1.45	QV				
1+ 5	0.1154	1.74	Q				
1+10	0.1281	1.84	Q				
1+15	0.1408	1.84	QV				
1+20	0.1527	1.73	Q V				
1+25	0.1674	2.14	QV				
1+30	0.1843	2.44	QV				
1+35	0.1996	2.23	Q V				
1+40	0.2158	2.36	Q V				
1+45	0.2366	3.01	Q V				
1+50	0.2578	3.09	Q V				
1+55	0.2773	2.83	Q V				
2+ 0	0.2968	2.83	Q V				
2+ 5	0.3172	2.96	Q V				
2+10	0.3445	3.96	Q V				
2+15	0.3797	5.12	Q V				
2+20	0.4083	4.15	Q V				
2+25	0.4523	6.39	Q V				
2+30	0.5088	8.21	Q V				
2+35	0.5722	9.20	Q V				
2+40	0.6244	7.58	Q V				
2+45	0.6470	3.28	Q V				
2+50	0.6578	1.56	Q V				
2+55	0.6682	1.51	Q V				
3+ 0	0.6739	0.83	Q V				
3+ 5	0.6750	0.16	Q V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAB100PROP6100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

PROPOSED CONDITION, DMA B
100-YR 6-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.019 Hr.
Lag time = 1.14 Min.
25% of lag time = 0.29 Min.
40% of lag time = 0.46 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]
5.10	1.21	6.17

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	2.86	14.59

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 2.860(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.860(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.690
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.690	0.194	1.000	0.194
					Sum (F)	= 0.194

Area averaged mean soil loss (F) (In/Hr) = 0.194
Minimum soil loss rate ((In/Hr)) = 0.097

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.350

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	437.165	67.483	3.469
2 0.167	874.329	32.517	1.671
		Sum = 100.000	Sum= 5.140

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	0.172	(0.194) 0.060	0.112
2	0.17	0.60	0.206	(0.194) 0.072	0.134
3	0.25	0.60	0.206	(0.194) 0.072	0.134
4	0.33	0.60	0.206	(0.194) 0.072	0.134
5	0.42	0.60	0.206	(0.194) 0.072	0.134
6	0.50	0.70	0.240	(0.194) 0.084	0.156
7	0.58	0.70	0.240	(0.194) 0.084	0.156
8	0.67	0.70	0.240	(0.194) 0.084	0.156
9	0.75	0.70	0.240	(0.194) 0.084	0.156
10	0.83	0.70	0.240	(0.194) 0.084	0.156
11	0.92	0.70	0.240	(0.194) 0.084	0.156
12	1.00	0.80	0.275	(0.194) 0.096	0.178
13	1.08	0.80	0.275	(0.194) 0.096	0.178
14	1.17	0.80	0.275	(0.194) 0.096	0.178
15	1.25	0.80	0.275	(0.194) 0.096	0.178
16	1.33	0.80	0.275	(0.194) 0.096	0.178
17	1.42	0.80	0.275	(0.194) 0.096	0.178
18	1.50	0.80	0.275	(0.194) 0.096	0.178
19	1.58	0.80	0.275	(0.194) 0.096	0.178
20	1.67	0.80	0.275	(0.194) 0.096	0.178
21	1.75	0.80	0.275	(0.194) 0.096	0.178
22	1.83	0.80	0.275	(0.194) 0.096	0.178
23	1.92	0.80	0.275	(0.194) 0.096	0.178
24	2.00	0.90	0.309	(0.194) 0.108	0.201
25	2.08	0.80	0.275	(0.194) 0.096	0.178
26	2.17	0.90	0.309	(0.194) 0.108	0.201
27	2.25	0.90	0.309	(0.194) 0.108	0.201
28	2.33	0.90	0.309	(0.194) 0.108	0.201
29	2.42	0.90	0.309	(0.194) 0.108	0.201
30	2.50	0.90	0.309	(0.194) 0.108	0.201
31	2.58	0.90	0.309	(0.194) 0.108	0.201
32	2.67	0.90	0.309	(0.194) 0.108	0.201
33	2.75	1.00	0.343	(0.194) 0.120	0.223
34	2.83	1.00	0.343	(0.194) 0.120	0.223
35	2.92	1.00	0.343	(0.194) 0.120	0.223
36	3.00	1.00	0.343	(0.194) 0.120	0.223
37	3.08	1.00	0.343	(0.194) 0.120	0.223
38	3.17	1.10	0.378	(0.194) 0.132	0.245
39	3.25	1.10	0.378	(0.194) 0.132	0.245
40	3.33	1.10	0.378	(0.194) 0.132	0.245
41	3.42	1.20	0.412	(0.194) 0.144	0.268
42	3.50	1.30	0.446	(0.194) 0.156	0.290
43	3.58	1.40	0.480	(0.194) 0.168	0.312
44	3.67	1.40	0.480	(0.194) 0.168	0.312
45	3.75	1.50	0.515	(0.194) 0.180	0.335
46	3.83	1.50	0.515	(0.194) 0.180	0.335
47	3.92	1.60	0.549	(0.194) 0.192	0.357
48	4.00	1.60	0.549	(0.194) 0.192	0.357
49	4.08	1.70	0.583	0.194 (0.204)	0.390
50	4.17	1.80	0.618	0.194 (0.216)	0.424
51	4.25	1.90	0.652	0.194 (0.228)	0.458
52	4.33	2.00	0.686	0.194 (0.240)	0.493
53	4.42	2.10	0.721	0.194 (0.252)	0.527
54	4.50	2.10	0.721	0.194 (0.252)	0.527
55	4.58	2.20	0.755	0.194 (0.264)	0.561
56	4.67	2.30	0.789	0.194 (0.276)	0.596

57	4.75	2.40	0.824	0.194	(0.288)	0.630
58	4.83	2.40	0.824	0.194	(0.288)	0.630
59	4.92	2.50	0.858	0.194	(0.300)	0.664
60	5.00	2.60	0.892	0.194	(0.312)	0.699
61	5.08	3.10	1.064	0.194	(0.372)	0.870
62	5.17	3.60	1.235	0.194	(0.432)	1.042
63	5.25	3.90	1.338	0.194	(0.468)	1.145
64	5.33	4.20	1.441	0.194	(0.504)	1.248
65	5.42	4.70	1.613	0.194	(0.565)	1.419
66	5.50	5.60	1.922	0.194	(0.673)	1.728
67	5.58	1.90	0.652	0.194	(0.228)	0.458
68	5.67	0.90	0.309	(0.194)	0.108	0.201
69	5.75	0.60	0.206	(0.194)	0.072	0.134
70	5.83	0.50	0.172	(0.194)	0.060	0.112
71	5.92	0.30	0.103	(0.194)	0.036	0.067
72	6.00	0.20	0.069	(0.194)	0.024	0.045

(Loss Rate Not Used)

Sum = 100.0

Sum = 25.0

Flood volume = Effective rainfall 2.08 (In)

times area 5.1(Ac.)/[(In)/(Ft.)] = 0.9 (Ac.Ft)

Total soil loss = 0.78 (In)

Total soil loss = 0.330 (Ac.Ft)

Total rainfall = 2.86 (In)

Flood volume = 38561.9 Cubic Feet

Total soil loss = 14384.3 Cubic Feet

Peak flow rate of this hydrograph = 8.371 (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	2.5	5.0	7.5	10.0
0+ 5	0.0027	0.39	VQ				
0+10	0.0071	0.65	V Q				
0+15	0.0119	0.69	V Q				
0+20	0.0166	0.69	V Q				
0+25	0.0214	0.69	V Q				
0+30	0.0266	0.77	V Q				
0+35	0.0322	0.80	V Q				
0+40	0.0377	0.80	V Q				
0+45	0.0432	0.80	V Q				
0+50	0.0488	0.80	VQ				
0+55	0.0543	0.80	VQ				
1+ 0	0.0604	0.88	VQ				
1+ 5	0.0667	0.92	Q				
1+10	0.0730	0.92	Q				
1+15	0.0793	0.92	Q				
1+20	0.0856	0.92	Q				
1+25	0.0920	0.92	QV				
1+30	0.0983	0.92	QV				
1+35	0.1046	0.92	QV				
1+40	0.1109	0.92	Q V				
1+45	0.1172	0.92	Q V				
1+50	0.1236	0.92	Q V				
1+55	0.1299	0.92	Q V				
2+ 0	0.1367	1.00	Q V				
2+ 5	0.1433	0.96	Q V				
2+10	0.1502	1.00	Q V				
2+15	0.1573	1.03	Q V				
2+20	0.1644	1.03	Q V				
2+25	0.1715	1.03	Q V				
2+30	0.1786	1.03	Q V				
2+35	0.1857	1.03	Q V				
2+40	0.1928	1.03	Q V				
2+45	0.2005	1.11	Q V				
2+50	0.2084	1.15	Q V				
2+55	0.2163	1.15	Q V				
3+ 0	0.2242	1.15	Q V				
3+ 5	0.2321	1.15	Q V				
3+10	0.2405	1.22	Q V				
3+15	0.2492	1.26	Q V				
3+20	0.2579	1.26	Q V				
3+25	0.2671	1.34	Q V				
3+30	0.2771	1.45	Q V				

3+35	0.2879	1.57	Q	V			
3+40	0.2990	1.61	Q	V			
3+45	0.3106	1.68	Q	V			
3+50	0.3224	1.72	Q	V			
3+55	0.3348	1.80	Q	V			
4+ 0	0.3475	1.84	Q	V			
4+ 5	0.3609	1.95	Q	V			
4+10	0.3755	2.12	Q	V			
4+15	0.3914	2.30	Q	V			
4+20	0.4084	2.48	Q	V			
4+25	0.4267	2.65	Q	V			
4+30	0.4454	2.71	Q	V			
4+35	0.4649	2.83	Q	V			
4+40	0.4856	3.01	Q	V			
4+45	0.5075	3.18	Q	V			
4+50	0.5298	3.24	Q	V			
4+55	0.5529	3.36	Q	V			
5+ 0	0.5773	3.54	Q	V			
5+ 5	0.6061	4.19	Q	V			
5+10	0.6410	5.07	Q	V			
5+15	0.6804	5.72	Q	V			
5+20	0.7234	6.24	Q	V			
5+25	0.7717	7.01	Q	V			
5+30	0.8294	8.37	Q	V			
5+35	0.8602	4.48	Q	V			
5+40	0.8703	1.46	Q	V			
5+45	0.8758	0.80	Q	V			
5+50	0.8800	0.61	Q	V			
5+55	0.8829	0.42	Q	V			
6+ 0	0.8847	0.27	Q	V			
6+ 5	0.8853	0.07	Q	V			

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAB100PROP24100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

PROPOSED CONDITION, DMA B
100-YR 24-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 5.10(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.10(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 461.00(Ft.)
Length along longest watercourse measured to centroid = 391.00(Ft.)
Length along longest watercourse = 0.087 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 19.00(Ft.)
Slope along watercourse = 217.6139 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.019 Hr.
Lag time = 1.14 Min.
25% of lag time = 0.29 Min.
40% of lag time = 0.46 Min.
Unit time = 15.00 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]
5.10	2.05	10.45

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
5.10	5.16	26.32

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 5.160(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 5.160(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.100	56.00	0.690
Total Area Entered	=	5.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.690	0.194	1.000	0.194
					Sum (F)	= 0.194

Area averaged mean soil loss (F) (In/Hr) = 0.194
Minimum soil loss rate ((In/Hr)) = 0.097

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.350

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	1311.494	100.000 Sum = 100.000	5.140 Sum= 5.140

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	0.25	0.20	0.041	(0.342) 0.014	0.027
2	0.50	0.30	0.062	(0.338) 0.022	0.040
3	0.75	0.30	0.062	(0.334) 0.022	0.040
4	1.00	0.40	0.083	(0.330) 0.029	0.054
5	1.25	0.30	0.062	(0.326) 0.022	0.040
6	1.50	0.30	0.062	(0.322) 0.022	0.040
7	1.75	0.30	0.062	(0.318) 0.022	0.040
8	2.00	0.40	0.083	(0.315) 0.029	0.054
9	2.25	0.40	0.083	(0.311) 0.029	0.054
10	2.50	0.40	0.083	(0.307) 0.029	0.054
11	2.75	0.50	0.103	(0.303) 0.036	0.067
12	3.00	0.50	0.103	(0.300) 0.036	0.067
13	3.25	0.50	0.103	(0.296) 0.036	0.067
14	3.50	0.50	0.103	(0.292) 0.036	0.067
15	3.75	0.50	0.103	(0.288) 0.036	0.067
16	4.00	0.60	0.124	(0.285) 0.043	0.080
17	4.25	0.60	0.124	(0.281) 0.043	0.080
18	4.50	0.70	0.144	(0.278) 0.051	0.094
19	4.75	0.70	0.144	(0.274) 0.051	0.094
20	5.00	0.80	0.165	(0.271) 0.058	0.107
21	5.25	0.60	0.124	(0.267) 0.043	0.080
22	5.50	0.70	0.144	(0.264) 0.051	0.094
23	5.75	0.80	0.165	(0.260) 0.058	0.107
24	6.00	0.80	0.165	(0.257) 0.058	0.107
25	6.25	0.90	0.186	(0.253) 0.065	0.121
26	6.50	0.90	0.186	(0.250) 0.065	0.121
27	6.75	1.00	0.206	(0.247) 0.072	0.134
28	7.00	1.00	0.206	(0.243) 0.072	0.134
29	7.25	1.00	0.206	(0.240) 0.072	0.134
30	7.50	1.10	0.227	(0.237) 0.079	0.148
31	7.75	1.20	0.248	(0.233) 0.087	0.161
32	8.00	1.30	0.268	(0.230) 0.094	0.174
33	8.25	1.50	0.310	(0.227) 0.108	0.201
34	8.50	1.50	0.310	(0.224) 0.108	0.201
35	8.75	1.60	0.330	(0.221) 0.116	0.215
36	9.00	1.70	0.351	(0.218) 0.123	0.228
37	9.25	1.90	0.392	(0.214) 0.137	0.255
38	9.50	2.00	0.413	(0.211) 0.144	0.268
39	9.75	2.10	0.433	(0.208) 0.152	0.282
40	10.00	2.20	0.454	(0.205) 0.159	0.295
41	10.25	1.50	0.310	(0.202) 0.108	0.201
42	10.50	1.50	0.310	(0.200) 0.108	0.201
43	10.75	2.00	0.413	(0.197) 0.144	0.268
44	11.00	2.00	0.413	(0.194) 0.144	0.268
45	11.25	1.90	0.392	(0.191) 0.137	0.255
46	11.50	1.90	0.392	(0.188) 0.137	0.255
47	11.75	1.70	0.351	(0.185) 0.123	0.228
48	12.00	1.80	0.372	(0.183) 0.130	0.241
49	12.25	2.50	0.516	0.180 (0.181)	0.336
50	12.50	2.60	0.537	0.177 (0.188)	0.360
51	12.75	2.80	0.578	0.174 (0.202)	0.403
52	13.00	2.90	0.599	0.172 (0.209)	0.427
53	13.25	3.40	0.702	0.169 (0.246)	0.533
54	13.50	3.40	0.702	0.167 (0.246)	0.535
55	13.75	2.30	0.475	0.164 (0.166)	0.311
56	14.00	2.30	0.475	0.162 (0.166)	0.313
57	14.25	2.70	0.557	0.159 (0.195)	0.398

58	14.50	2.60	0.537	0.157	(0.188)	0.380
59	14.75	2.60	0.537	0.154	(0.188)	0.382
60	15.00	2.50	0.516	0.152	(0.181)	0.364
61	15.25	2.40	0.495	0.150	(0.173)	0.346
62	15.50	2.30	0.475	0.147	(0.166)	0.327
63	15.75	1.90	0.392	(0.145)	0.137	0.255
64	16.00	1.90	0.392	(0.143)	0.137	0.255
65	16.25	0.40	0.083	(0.141)	0.029	0.054
66	16.50	0.40	0.083	(0.139)	0.029	0.054
67	16.75	0.30	0.062	(0.136)	0.022	0.040
68	17.00	0.30	0.062	(0.134)	0.022	0.040
69	17.25	0.50	0.103	(0.132)	0.036	0.067
70	17.50	0.50	0.103	(0.130)	0.036	0.067
71	17.75	0.50	0.103	(0.128)	0.036	0.067
72	18.00	0.40	0.083	(0.127)	0.029	0.054
73	18.25	0.40	0.083	(0.125)	0.029	0.054
74	18.50	0.40	0.083	(0.123)	0.029	0.054
75	18.75	0.30	0.062	(0.121)	0.022	0.040
76	19.00	0.20	0.041	(0.119)	0.014	0.027
77	19.25	0.30	0.062	(0.118)	0.022	0.040
78	19.50	0.40	0.083	(0.116)	0.029	0.054
79	19.75	0.30	0.062	(0.114)	0.022	0.040
80	20.00	0.20	0.041	(0.113)	0.014	0.027
81	20.25	0.30	0.062	(0.111)	0.022	0.040
82	20.50	0.30	0.062	(0.110)	0.022	0.040
83	20.75	0.30	0.062	(0.109)	0.022	0.040
84	21.00	0.20	0.041	(0.107)	0.014	0.027
85	21.25	0.30	0.062	(0.106)	0.022	0.040
86	21.50	0.20	0.041	(0.105)	0.014	0.027
87	21.75	0.30	0.062	(0.104)	0.022	0.040
88	22.00	0.20	0.041	(0.103)	0.014	0.027
89	22.25	0.30	0.062	(0.102)	0.022	0.040
90	22.50	0.20	0.041	(0.101)	0.014	0.027
91	22.75	0.20	0.041	(0.100)	0.014	0.027
92	23.00	0.20	0.041	(0.099)	0.014	0.027
93	23.25	0.20	0.041	(0.098)	0.014	0.027
94	23.50	0.20	0.041	(0.098)	0.014	0.027
95	23.75	0.20	0.041	(0.097)	0.014	0.027
96	24.00	0.20	0.041	(0.097)	0.014	0.027

(Loss Rate Not Used)

Sum = 100.0

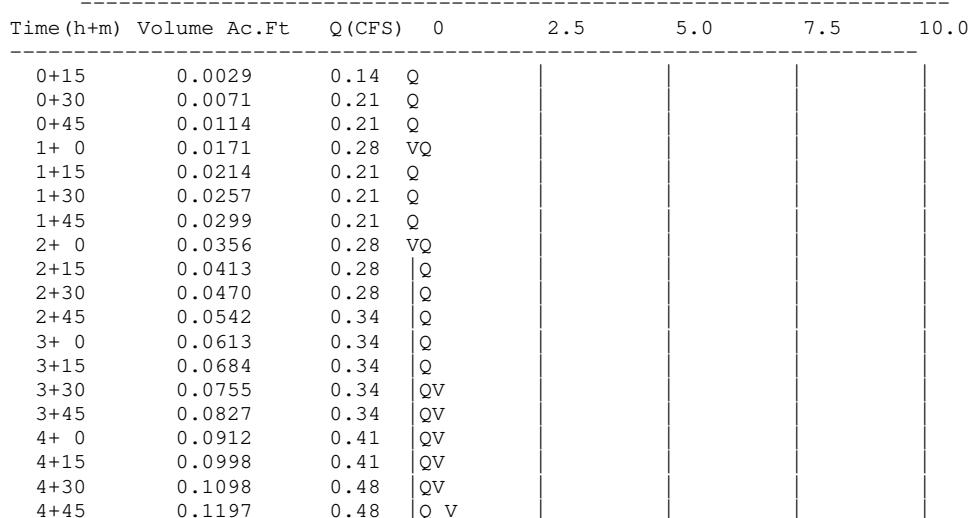
Sum = 13.8

Flood volume = Effective rainfall 3.46 (In)
times area 5.1 (Ac.) / [(In) / (Ft.)] = 1.5 (Ac.Ft)
Total soil loss = 1.70 (In)
Total soil loss = 0.724 (Ac.Ft)
Total rainfall = 5.16 (In)
Flood volume = 63991.4 Cubic Feet
Total soil loss = 31534.7 Cubic Feet

Peak flow rate of this hydrograph = 2.752 (CFS)

+++++
24 - H O U R S T O R M
Run off Hydrograph

Hydrograph in 15 Minute intervals ((CFS))



5+ 0	0.1311	0.55	QV					
5+15	0.1397	0.41	Q V					
5+30	0.1497	0.48	Q V					
5+45	0.1611	0.55	Q V					
6+ 0	0.1725	0.55	Q V					
6+15	0.1853	0.62	Q V					
6+30	0.1981	0.62	Q V					
6+45	0.2124	0.69	Q V					
7+ 0	0.2266	0.69	Q V					
7+15	0.2409	0.69	Q V					
7+30	0.2566	0.76	Q V					
7+45	0.2737	0.83	Q V					
8+ 0	0.2922	0.90	Q V					
8+15	0.3136	1.03	Q V					
8+30	0.3350	1.03	Q V					
8+45	0.3578	1.10	Q V					
9+ 0	0.3820	1.17	Q V					
9+15	0.4091	1.31	Q V					
9+30	0.4376	1.38	Q V					
9+45	0.4675	1.45	Q V					
10+ 0	0.4989	1.52	Q V					
10+15	0.5203	1.03	Q V					
10+30	0.5417	1.03	Q V					
10+45	0.5702	1.38	Q V					
11+ 0	0.5987	1.38	Q V					
11+15	0.6258	1.31	Q V					
11+30	0.6528	1.31	Q V					
11+45	0.6771	1.17	Q V					
12+ 0	0.7027	1.24	Q V					
12+15	0.7385	1.73	Q V					
12+30	0.7767	1.85	Q V					
12+45	0.8195	2.07	Q V					
13+ 0	0.8649	2.19	Q V					
13+15	0.9214	2.74	Q V					
13+30	0.9783	2.75	Q V					
13+45	1.0113	1.60	Q V					
14+ 0	1.0446	1.61	Q V					
14+15	1.0869	2.05	Q V					
14+30	1.1272	1.95	Q V					
14+45	1.1678	1.97	Q V					
15+ 0	1.2065	1.87	Q V					
15+15	1.2433	1.78	Q V					
15+30	1.2780	1.68	Q V					
15+45	1.3051	1.31	Q V					
16+ 0	1.3322	1.31	Q V					
16+15	1.3379	0.28	Q V					
16+30	1.3436	0.28	Q V					
16+45	1.3479	0.21	Q V					
17+ 0	1.3522	0.21	Q V					
17+15	1.3593	0.34	Q V					
17+30	1.3664	0.34	Q V					
17+45	1.3735	0.34	Q V					
18+ 0	1.3792	0.28	Q V					
18+15	1.3849	0.28	Q V					
18+30	1.3906	0.28	Q V					
18+45	1.3949	0.21	Q V					
19+ 0	1.3978	0.14	Q V					
19+15	1.4020	0.21	Q V					
19+30	1.4077	0.28	Q V					
19+45	1.4120	0.21	Q V					
20+ 0	1.4149	0.14	Q V					
20+15	1.4192	0.21	Q V					
20+30	1.4234	0.21	Q V					
20+45	1.4277	0.21	Q V					
21+ 0	1.4306	0.14	Q V					
21+15	1.4348	0.21	Q V					
21+30	1.4377	0.14	Q V					
21+45	1.4420	0.21	Q V					
22+ 0	1.4448	0.14	Q V					
22+15	1.4491	0.21	Q V					
22+30	1.4519	0.14	Q V					
22+45	1.4548	0.14	Q V					
23+ 0	1.4576	0.14	Q V					
23+15	1.4605	0.14	Q V					
23+30	1.4633	0.14	Q V					
23+45	1.4662	0.14	Q V					
24+ 0	1.4690	0.14	Q V					

APPENDIX B

EXISTING AND PROPOSED

UNIT HYDROGRAPH CALCULATIONS

DMA C

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC5EXIST15.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
EXISTING CONDITION, DMA C
5-YR 1-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.045 Hr.
Lag time = 2.72 Min.
25% of lag time = 0.68 Min.
40% of lag time = 1.09 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]
7.50	0.49	3.67

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	1.33	9.98

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 0.686(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.686(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.500
Total Area Entered =	7.50(Ac.)	

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.500	0.388	1.000	0.388
				Sum (F)	=	0.388

Area averaged mean soil loss (F) (In/Hr) = 0.388
Minimum soil loss rate ((In/Hr)) = 0.194

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	183.771	40.452
2	0.167	367.541	44.515
3	0.250	551.312	9.487
4	0.333	735.082	3.846
5	0.417	918.853	1.700
		Sum = 100.000	Sum= 7.559

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	4.20	0.346	(0.388) 0.173	0.173
2	0.17	4.30	0.354	(0.388) 0.177	0.177
3	0.25	5.00	0.412	(0.388) 0.206	0.206
4	0.33	5.00	0.412	(0.388) 0.206	0.206
5	0.42	5.80	0.477	(0.388) 0.239	0.239
6	0.50	6.50	0.535	(0.388) 0.268	0.268
7	0.58	7.40	0.609	(0.388) 0.305	0.305
8	0.67	8.60	0.708	(0.388) 0.354	0.354
9	0.75	12.30	1.012	0.388 (0.506)	0.624
10	0.83	29.10	2.395	0.388 (1.198)	2.007
11	0.92	6.80	0.560	(0.388) 0.280	0.280
12	1.00	5.00	0.412	(0.388) 0.206	0.206

(Loss Rate Not Used)

Sum = 100.0 Sum = 5.0

Flood volume = Effective rainfall 0.42 (In)

times area 7.5 (Ac.) / [(In)/(Ft.)] = 0.3 (Ac.Ft)

Total soil loss = 0.27 (In)

Total soil loss = 0.166 (Ac.Ft)

Total rainfall = 0.69 (In)

Flood volume = 11441.0 Cubic Feet

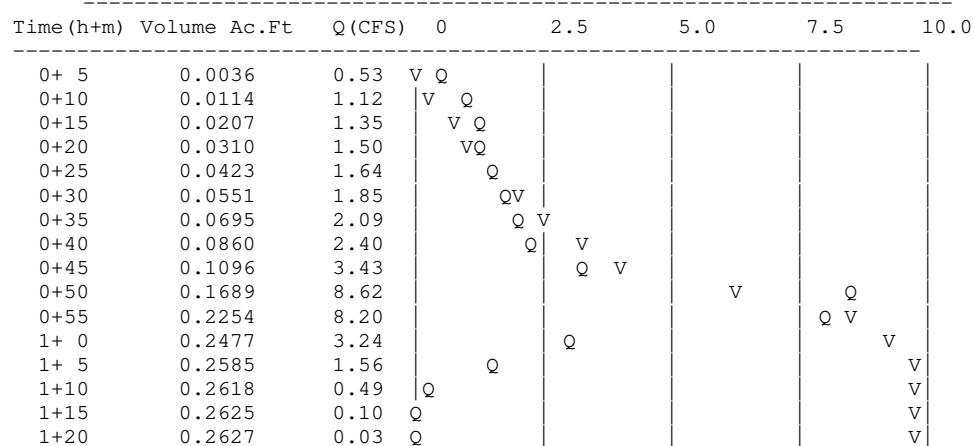
Total soil loss = 7233.6 Cubic Feet

Peak flow rate of this hydrograph = 8.618 (CFS)

+++++ 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))



Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC5EXIST35.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
EXISTING CONDITION, DMA C
5-YR 3-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.045 Hr.
Lag time = 2.72 Min.
25% of lag time = 0.68 Min.
40% of lag time = 1.09 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]
7.50	0.87	6.50

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	2.09	15.67

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 1.153(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.153(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.500
Total Area Entered	=	7.50(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.500	0.388	1.000	0.388
				Sum (F)	=	0.388

Area averaged mean soil loss (F) (In/Hr) = 0.388
Minimum soil loss rate ((In/Hr)) = 0.194

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	183.771	40.452	3.058
2 0.167	367.541	44.515	3.365
3 0.250	551.312	9.487	0.717
4 0.333	735.082	3.846	0.291
5 0.417	918.853	1.700	0.128
	Sum = 100.000	Sum=	7.559

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	0.180	(0.388) 0.090	0.090
2	0.17	1.30	0.180	(0.388) 0.090	0.090
3	0.25	1.10	0.152	(0.388) 0.076	0.076
4	0.33	1.50	0.207	(0.388) 0.104	0.104
5	0.42	1.50	0.207	(0.388) 0.104	0.104
6	0.50	1.80	0.249	(0.388) 0.124	0.124
7	0.58	1.50	0.207	(0.388) 0.104	0.104
8	0.67	1.80	0.249	(0.388) 0.124	0.124
9	0.75	1.80	0.249	(0.388) 0.124	0.124
10	0.83	1.50	0.207	(0.388) 0.104	0.104
11	0.92	1.60	0.221	(0.388) 0.111	0.111
12	1.00	1.80	0.249	(0.388) 0.124	0.124
13	1.08	2.20	0.304	(0.388) 0.152	0.152
14	1.17	2.20	0.304	(0.388) 0.152	0.152
15	1.25	2.20	0.304	(0.388) 0.152	0.152
16	1.33	2.00	0.277	(0.388) 0.138	0.138
17	1.42	2.60	0.360	(0.388) 0.180	0.180
18	1.50	2.70	0.373	(0.388) 0.187	0.187
19	1.58	2.40	0.332	(0.388) 0.166	0.166
20	1.67	2.70	0.373	(0.388) 0.187	0.187
21	1.75	3.30	0.456	(0.388) 0.228	0.228
22	1.83	3.10	0.429	(0.388) 0.214	0.214
23	1.92	2.90	0.401	(0.388) 0.201	0.201
24	2.00	3.00	0.415	(0.388) 0.207	0.207
25	2.08	3.10	0.429	(0.388) 0.214	0.214
26	2.17	4.20	0.581	(0.388) 0.290	0.290
27	2.25	5.00	0.692	(0.388) 0.346	0.346
28	2.33	3.50	0.484	(0.388) 0.242	0.242
29	2.42	6.80	0.941	0.388 (0.470)	0.552
30	2.50	7.30	1.010	0.388 (0.505)	0.621
31	2.58	8.20	1.134	0.388 (0.567)	0.746
32	2.67	5.90	0.816	0.388 (0.408)	0.428
33	2.75	2.00	0.277	(0.388) 0.138	0.138
34	2.83	1.80	0.249	(0.388) 0.124	0.124
35	2.92	1.80	0.249	(0.388) 0.124	0.124
36	3.00	0.60	0.083	(0.388) 0.041	0.041

(Loss Rate Not Used)

Sum = 100.0 Sum = 7.3

Flood volume = Effective rainfall 0.61 (In)
times area 7.5 (Ac.) / [(In)/(Ft.)] = 0.4 (Ac.Ft)
Total soil loss = 0.54 (In)
Total soil loss = 0.340 (Ac.Ft)
Total rainfall = 1.15 (In)
Flood volume = 16591.4 Cubic Feet
Total soil loss = 14789.6 Cubic Feet

Peak flow rate of this hydrograph = 4.885 (CFS)

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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	2.5	5.0	7.5	10.0
0+ 5	0.0019		0.28	VQ				
0+10	0.0059		0.58	V Q				
0+15	0.0100		0.60	VQ				
0+20	0.0146		0.66	VQ				
0+25	0.0198		0.76	VQ				
0+30	0.0256		0.84	VQ				
0+35	0.0314		0.85	Q				
0+40	0.0374		0.86	Q				
0+45	0.0437		0.92	QV				
0+50	0.0497		0.87	Q V				
0+55	0.0554		0.83	Q V				
1+ 0	0.0615		0.88	Q V				
1+ 5	0.0685		1.01	Q V				
1+10	0.0761		1.11	Q V				
1+15	0.0840		1.14	Q V				
1+20	0.0916		1.10	Q V				
1+25	0.0997		1.19	Q V				
1+30	0.1090		1.34	Q V				
1+35	0.1181		1.33	Q V				
1+40	0.1273		1.33	Q V				
1+45	0.1378		1.52	Q V				
1+50	0.1490		1.63	Q V				
1+55	0.1599		1.57	Q V				
2+ 0	0.1706		1.55	Q V				
2+ 5	0.1815		1.59	Q V				
2+10	0.1942		1.85	Q V				
2+15	0.2099		2.28	Q V				
2+20	0.2251		2.20	Q V				
2+25	0.2448		2.86	Q V				
2+30	0.2728		4.07	Q V				
2+35	0.3065		4.88	Q V				
2+40	0.3372		4.46	Q V				
2+45	0.3554		2.65	Q V				
2+50	0.3654		1.45	Q V				
2+55	0.3731		1.12	Q V				
3+ 0	0.3781		0.73	Q V				
3+ 5	0.3801		0.28	Q V				
3+10	0.3807		0.08	Q V				
3+15	0.3808		0.03	Q V				
3+20	0.3809		0.01	Q V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC5EXIST65.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
EXISTING CONDITION, DMA C
5-YR 6-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.045 Hr.
Lag time = 2.72 Min.
25% of lag time = 0.68 Min.
40% of lag time = 1.09 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]
7.50	1.21	9.07

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	2.86	21.45

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 1.596(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.596(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.500
Total Area Entered	=	7.50(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.500	0.388	1.000	0.388
				Sum (F)	=	0.388

Area averaged mean soil loss (F) (In/Hr) = 0.388
Minimum soil loss rate ((In/Hr)) = 0.194

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

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	183.771	40.452	3.058
2 0.167	367.541	44.515	3.365
3 0.250	551.312	9.487	0.717
4 0.333	735.082	3.846	0.291
5 0.417	918.853	1.700	0.128
	Sum = 100.000	Sum=	7.559

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	0.096	(0.388) 0.048	0.048
2	0.17	0.60	0.115	(0.388) 0.057	0.057
3	0.25	0.60	0.115	(0.388) 0.057	0.057
4	0.33	0.60	0.115	(0.388) 0.057	0.057
5	0.42	0.60	0.115	(0.388) 0.057	0.057
6	0.50	0.70	0.134	(0.388) 0.067	0.067
7	0.58	0.70	0.134	(0.388) 0.067	0.067
8	0.67	0.70	0.134	(0.388) 0.067	0.067
9	0.75	0.70	0.134	(0.388) 0.067	0.067
10	0.83	0.70	0.134	(0.388) 0.067	0.067
11	0.92	0.70	0.134	(0.388) 0.067	0.067
12	1.00	0.80	0.153	(0.388) 0.077	0.077
13	1.08	0.80	0.153	(0.388) 0.077	0.077
14	1.17	0.80	0.153	(0.388) 0.077	0.077
15	1.25	0.80	0.153	(0.388) 0.077	0.077
16	1.33	0.80	0.153	(0.388) 0.077	0.077
17	1.42	0.80	0.153	(0.388) 0.077	0.077
18	1.50	0.80	0.153	(0.388) 0.077	0.077
19	1.58	0.80	0.153	(0.388) 0.077	0.077
20	1.67	0.80	0.153	(0.388) 0.077	0.077
21	1.75	0.80	0.153	(0.388) 0.077	0.077
22	1.83	0.80	0.153	(0.388) 0.077	0.077
23	1.92	0.80	0.153	(0.388) 0.077	0.077
24	2.00	0.90	0.172	(0.388) 0.086	0.086
25	2.08	0.80	0.153	(0.388) 0.077	0.077
26	2.17	0.90	0.172	(0.388) 0.086	0.086
27	2.25	0.90	0.172	(0.388) 0.086	0.086
28	2.33	0.90	0.172	(0.388) 0.086	0.086
29	2.42	0.90	0.172	(0.388) 0.086	0.086
30	2.50	0.90	0.172	(0.388) 0.086	0.086
31	2.58	0.90	0.172	(0.388) 0.086	0.086
32	2.67	0.90	0.172	(0.388) 0.086	0.086
33	2.75	1.00	0.192	(0.388) 0.096	0.096
34	2.83	1.00	0.192	(0.388) 0.096	0.096
35	2.92	1.00	0.192	(0.388) 0.096	0.096
36	3.00	1.00	0.192	(0.388) 0.096	0.096
37	3.08	1.00	0.192	(0.388) 0.096	0.096
38	3.17	1.10	0.211	(0.388) 0.105	0.105
39	3.25	1.10	0.211	(0.388) 0.105	0.105
40	3.33	1.10	0.211	(0.388) 0.105	0.105
41	3.42	1.20	0.230	(0.388) 0.115	0.115
42	3.50	1.30	0.249	(0.388) 0.125	0.125
43	3.58	1.40	0.268	(0.388) 0.134	0.134
44	3.67	1.40	0.268	(0.388) 0.134	0.134
45	3.75	1.50	0.287	(0.388) 0.144	0.144
46	3.83	1.50	0.287	(0.388) 0.144	0.144
47	3.92	1.60	0.307	(0.388) 0.153	0.153
48	4.00	1.60	0.307	(0.388) 0.153	0.153
49	4.08	1.70	0.326	(0.388) 0.163	0.163
50	4.17	1.80	0.345	(0.388) 0.172	0.172
51	4.25	1.90	0.364	(0.388) 0.182	0.182
52	4.33	2.00	0.383	(0.388) 0.192	0.192
53	4.42	2.10	0.402	(0.388) 0.201	0.201

54	4.50	2.10	0.402	(-0.388)	0.201	0.201
55	4.58	2.20	0.421	(-0.388)	0.211	0.211
56	4.67	2.30	0.441	(-0.388)	0.220	0.220
57	4.75	2.40	0.460	(-0.388)	0.230	0.230
58	4.83	2.40	0.460	(-0.388)	0.230	0.230
59	4.92	2.50	0.479	(-0.388)	0.239	0.239
60	5.00	2.60	0.498	(-0.388)	0.249	0.249
61	5.08	3.10	0.594	(-0.388)	0.297	0.297
62	5.17	3.60	0.690	(-0.388)	0.345	0.345
63	5.25	3.90	0.747	(-0.388)	0.374	0.374
64	5.33	4.20	0.805	0.388	(-0.402)	0.416
65	5.42	4.70	0.900	0.388	(-0.450)	0.512
66	5.50	5.60	1.073	0.388	(-0.536)	0.685
67	5.58	1.90	0.364	(-0.388)	0.182	0.182
68	5.67	0.90	0.172	(-0.388)	0.086	0.086
69	5.75	0.60	0.115	(-0.388)	0.057	0.057
70	5.83	0.50	0.096	(-0.388)	0.048	0.048
71	5.92	0.30	0.057	(-0.388)	0.029	0.029
72	6.00	0.20	0.038	(-0.388)	0.019	0.019

(Loss Rate Not Used)

Sum = 100.0 Sum = 9.8

Flood volume = Effective rainfall 0.82 (In)
times area 7.5 (Ac.)/[(In)/(Ft.)] = 0.5 (Ac.Ft)
Total soil loss = 0.78 (In)
Total soil loss = 0.487 (Ac.Ft)
Total rainfall = 1.60 (In)
Flood volume = 22239.6 Cubic Feet
Total soil loss = 21223.2 Cubic Feet

Peak flow rate of this hydrograph = 4.270 (CFS)

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6 - H O U R S T O R M
Run off Hydrograph

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	0.15	Q				
0+10	0.0033	0.34	VQ				
0+15	0.0061	0.40	VQ				
0+20	0.0090	0.42	VQ				
0+25	0.0120	0.43	VQ				
0+30	0.0152	0.46	Q				
0+35	0.0186	0.50	Q				
0+40	0.0221	0.50	VQ				
0+45	0.0256	0.51	Q				
0+50	0.0291	0.51	Q				
0+55	0.0326	0.51	Q				
1+ 0	0.0363	0.54	Q				
1+ 5	0.0402	0.57	QV				
1+10	0.0441	0.58	QV				
1+15	0.0481	0.58	QV				
1+20	0.0521	0.58	Q V				
1+25	0.0561	0.58	Q V				
1+30	0.0601	0.58	Q V				
1+35	0.0641	0.58	Q V				
1+40	0.0681	0.58	Q V				
1+45	0.0721	0.58	Q V				
1+50	0.0761	0.58	Q V				
1+55	0.0800	0.58	Q V				
2+ 0	0.0842	0.61	Q V				
2+ 5	0.0885	0.61	Q V				
2+10	0.0927	0.62	Q V				
2+15	0.0971	0.64	Q V				
2+20	0.1016	0.65	Q V				
2+25	0.1061	0.65	Q V				
2+30	0.1106	0.65	Q V				
2+35	0.1151	0.65	Q V				
2+40	0.1196	0.65	Q V				
2+45	0.1242	0.68	Q V				
2+50	0.1292	0.71	Q V				
2+55	0.1341	0.72	Q V				
3+ 0	0.1391	0.72	Q V				
3+ 5	0.1441	0.72	Q V				
3+10	0.1493	0.75	Q V				
3+15	0.1547	0.79	Q V				

3+20	0.1601	0.79	Q	V				
3+25	0.1658	0.82	Q	V				
3+30	0.1719	0.89	Q	V				
3+35	0.1785	0.96	Q	V				
3+40	0.1854	1.00	Q	V				
3+45	0.1926	1.04	Q	V				
3+50	0.2000	1.07	Q	V				
3+55	0.2076	1.11	Q	V				
4+ 0	0.2155	1.15	Q	V				
4+ 5	0.2237	1.18	Q	V				
4+10	0.2323	1.25	Q	V				
4+15	0.2413	1.32	Q	V				
4+20	0.2509	1.39	Q	V				
4+25	0.2610	1.46	Q	V				
4+30	0.2713	1.51	Q	V				
4+35	0.2820	1.55	Q	V				
4+40	0.2931	1.61	Q	V				
4+45	0.3047	1.68	Q	V				
4+50	0.3165	1.72	Q	V				
4+55	0.3287	1.76	Q	V				
5+ 0	0.3412	1.83	Q	V				
5+ 5	0.3551	2.01	Q	V				
5+10	0.3712	2.33	Q	V				
5+15	0.3892	2.62	Q	V				
5+20	0.4092	2.90	Q	V				
5+25	0.4324	3.37	Q	V				
5+30	0.4618	4.27	Q	V				
5+35	0.4852	3.40	Q	V				
5+40	0.4960	1.57	Q	V				
5+45	0.5020	0.86	Q	V				
5+50	0.5057	0.54	Q	V				
5+55	0.5080	0.34	Q	V				
6+ 0	0.5095	0.22	Q	V				
6+ 5	0.5103	0.11	Q	V				
6+10	0.5105	0.03	Q	V				
6+15	0.5105	0.01	Q	V				
6+20	0.5106	0.00	Q	V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC5EXIST245.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
EXISTING CONDITION, DMA C
5-YR 24-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.045 Hr.
Lag time = 2.72 Min.
25% of lag time = 0.68 Min.
40% of lag time = 1.09 Min.
Unit time = 15.00 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]
7.50	2.05	15.37

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	5.16	38.70

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 2.778(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.778(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.500
Total Area Entered	=	7.50(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.500	0.388	1.000	0.388
				Sum (F)	=	0.388

Area averaged mean soil loss (F) (In/Hr) = 0.388
Minimum soil loss rate ((In/Hr)) = 0.194

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	551.312	73.291	5.540
2 0.500	1102.623	26.709	2.019
		Sum = 100.000	Sum= 7.559

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	0.25	0.20	0.022	(0.686) 0.011	0.011
2	0.50	0.30	0.033	(0.678) 0.017	0.017
3	0.75	0.30	0.033	(0.670) 0.017	0.017
4	1.00	0.40	0.044	(0.662) 0.022	0.022
5	1.25	0.30	0.033	(0.654) 0.017	0.017
6	1.50	0.30	0.033	(0.646) 0.017	0.017
7	1.75	0.30	0.033	(0.639) 0.017	0.017
8	2.00	0.40	0.044	(0.631) 0.022	0.022
9	2.25	0.40	0.044	(0.623) 0.022	0.022
10	2.50	0.40	0.044	(0.616) 0.022	0.022
11	2.75	0.50	0.056	(0.608) 0.028	0.028
12	3.00	0.50	0.056	(0.601) 0.028	0.028
13	3.25	0.50	0.056	(0.593) 0.028	0.028
14	3.50	0.50	0.056	(0.586) 0.028	0.028
15	3.75	0.50	0.056	(0.579) 0.028	0.028
16	4.00	0.60	0.067	(0.571) 0.033	0.033
17	4.25	0.60	0.067	(0.564) 0.033	0.033
18	4.50	0.70	0.078	(0.557) 0.039	0.039
19	4.75	0.70	0.078	(0.550) 0.039	0.039
20	5.00	0.80	0.089	(0.543) 0.044	0.044
21	5.25	0.60	0.067	(0.536) 0.033	0.033
22	5.50	0.70	0.078	(0.529) 0.039	0.039
23	5.75	0.80	0.089	(0.522) 0.044	0.044
24	6.00	0.80	0.089	(0.515) 0.044	0.044
25	6.25	0.90	0.100	(0.508) 0.050	0.050
26	6.50	0.90	0.100	(0.501) 0.050	0.050
27	6.75	1.00	0.111	(0.494) 0.056	0.056
28	7.00	1.00	0.111	(0.488) 0.056	0.056
29	7.25	1.00	0.111	(0.481) 0.056	0.056
30	7.50	1.10	0.122	(0.475) 0.061	0.061
31	7.75	1.20	0.133	(0.468) 0.067	0.067
32	8.00	1.30	0.144	(0.462) 0.072	0.072
33	8.25	1.50	0.167	(0.455) 0.083	0.083
34	8.50	1.50	0.167	(0.449) 0.083	0.083
35	8.75	1.60	0.178	(0.443) 0.089	0.089
36	9.00	1.70	0.189	(0.436) 0.094	0.094
37	9.25	1.90	0.211	(0.430) 0.106	0.106
38	9.50	2.00	0.222	(0.424) 0.111	0.111
39	9.75	2.10	0.233	(0.418) 0.117	0.117
40	10.00	2.20	0.244	(0.412) 0.122	0.122
41	10.25	1.50	0.167	(0.406) 0.083	0.083
42	10.50	1.50	0.167	(0.400) 0.083	0.083
43	10.75	2.00	0.222	(0.394) 0.111	0.111
44	11.00	2.00	0.222	(0.389) 0.111	0.111
45	11.25	1.90	0.211	(0.383) 0.106	0.106
46	11.50	1.90	0.211	(0.377) 0.106	0.106
47	11.75	1.70	0.189	(0.372) 0.094	0.094
48	12.00	1.80	0.200	(0.366) 0.100	0.100
49	12.25	2.50	0.278	(0.361) 0.139	0.139
50	12.50	2.60	0.289	(0.355) 0.144	0.144
51	12.75	2.80	0.311	(0.350) 0.156	0.156
52	13.00	2.90	0.322	(0.345) 0.161	0.161
53	13.25	3.40	0.378	(0.339) 0.189	0.189
54	13.50	3.40	0.378	(0.334) 0.189	0.189
55	13.75	2.30	0.256	(0.329) 0.128	0.128
56	14.00	2.30	0.256	(0.324) 0.128	0.128

57	14.25	2.70	0.300	(0.319)	0.150	0.150
58	14.50	2.60	0.289	(0.314)	0.144	0.144
59	14.75	2.60	0.289	(0.310)	0.144	0.144
60	15.00	2.50	0.278	(0.305)	0.139	0.139
61	15.25	2.40	0.267	(0.300)	0.133	0.133
62	15.50	2.30	0.256	(0.296)	0.128	0.128
63	15.75	1.90	0.211	(0.291)	0.106	0.106
64	16.00	1.90	0.211	(0.287)	0.106	0.106
65	16.25	0.40	0.044	(0.282)	0.022	0.022
66	16.50	0.40	0.044	(0.278)	0.022	0.022
67	16.75	0.30	0.033	(0.274)	0.017	0.017
68	17.00	0.30	0.033	(0.270)	0.017	0.017
69	17.25	0.50	0.056	(0.266)	0.028	0.028
70	17.50	0.50	0.056	(0.262)	0.028	0.028
71	17.75	0.50	0.056	(0.258)	0.028	0.028
72	18.00	0.40	0.044	(0.254)	0.022	0.022
73	18.25	0.40	0.044	(0.250)	0.022	0.022
74	18.50	0.40	0.044	(0.246)	0.022	0.022
75	18.75	0.30	0.033	(0.243)	0.017	0.017
76	19.00	0.20	0.022	(0.239)	0.011	0.011
77	19.25	0.30	0.033	(0.236)	0.017	0.017
78	19.50	0.40	0.044	(0.233)	0.022	0.022
79	19.75	0.30	0.033	(0.230)	0.017	0.017
80	20.00	0.20	0.022	(0.226)	0.011	0.011
81	20.25	0.30	0.033	(0.223)	0.017	0.017
82	20.50	0.30	0.033	(0.221)	0.017	0.017
83	20.75	0.30	0.033	(0.218)	0.017	0.017
84	21.00	0.20	0.022	(0.215)	0.011	0.011
85	21.25	0.30	0.033	(0.213)	0.017	0.017
86	21.50	0.20	0.022	(0.210)	0.011	0.011
87	21.75	0.30	0.033	(0.208)	0.017	0.017
88	22.00	0.20	0.022	(0.206)	0.011	0.011
89	22.25	0.30	0.033	(0.204)	0.017	0.017
90	22.50	0.20	0.022	(0.202)	0.011	0.011
91	22.75	0.20	0.022	(0.200)	0.011	0.011
92	23.00	0.20	0.022	(0.198)	0.011	0.011
93	23.25	0.20	0.022	(0.197)	0.011	0.011
94	23.50	0.20	0.022	(0.196)	0.011	0.011
95	23.75	0.20	0.022	(0.195)	0.011	0.011
96	24.00	0.20	0.022	(0.194)	0.011	0.011

(Loss Rate Not Used)

Sum = 100.0

Sum = 5.6

Flood volume = Effective rainfall 1.39 (In)

times area 7.5 (Ac.) / [(In) / (Ft.)] = 0.9 (Ac.Ft)

Total soil loss = 1.39 (In)

Total soil loss = 0.868 (Ac.Ft)

Total rainfall = 2.78 (In)

Flood volume = 37820.9 Cubic Feet

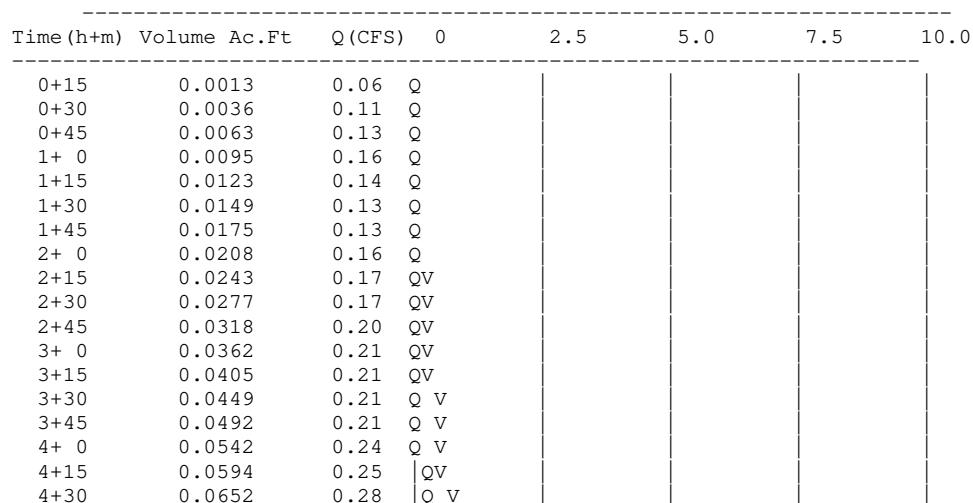
Total soil loss = 37820.9 Cubic Feet

Peak flow rate of this hydrograph = 1.429 (CFS)

+++++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 15 Minute intervals ((CFS))



4+45	0.0713	0.29	Q	V
5+ 0	0.0780	0.32	Q	V
5+15	0.0837	0.27	Q	V
5+30	0.0895	0.28	Q	V
5+45	0.0963	0.32	Q	V
6+ 0	0.1032	0.34	Q	V
6+15	0.1108	0.37	Q	V
6+30	0.1186	0.38	Q	V
6+45	0.1271	0.41	Q	V
7+ 0	0.1357	0.42	Q	V
7+15	0.1444	0.42	Q	V
7+30	0.1537	0.45	Q	V
7+45	0.1639	0.49	Q	V
8+ 0	0.1750	0.54	Q	V
8+15	0.1875	0.61	Q	V
8+30	0.2006	0.63	Q	V
8+45	0.2142	0.66	Q	V
9+ 0	0.2287	0.70	Q	V
9+15	0.2448	0.78	Q	V
9+30	0.2619	0.83	Q	V
9+45	0.2799	0.87	Q	V
10+ 0	0.2988	0.91	Q	V
10+15	0.3134	0.71	Q	V
10+30	0.3265	0.63	Q	V
10+45	0.3427	0.78	Q	V
11+ 0	0.3600	0.84	Q	V
11+15	0.3768	0.81	Q	V
11+30	0.3933	0.80	Q	V
11+45	0.4085	0.74	Q	V
12+ 0	0.4239	0.75	Q	V
12+15	0.4440	0.97	Q	V
12+30	0.4663	1.08	Q	V
12+45	0.4901	1.15	Q	V
13+ 0	0.5151	1.21	Q	V
13+15	0.5435	1.37	Q	V
13+30	0.5730	1.43	Q	V
13+45	0.5955	1.09	Q	V
14+ 0	0.6155	0.97	Q	V
14+15	0.6380	1.09	Q	V
14+30	0.6608	1.10	Q	V
14+45	0.6834	1.09	Q	V
15+ 0	0.7053	1.06	Q	V
15+15	0.7264	1.02	Q	V
15+30	0.7466	0.98	Q	V
15+45	0.7640	0.84	Q	V
16+ 0	0.7805	0.80	Q	V
16+15	0.7874	0.34	Q	V
16+30	0.7909	0.17	Q	V
16+45	0.7938	0.14	Q	V
17+ 0	0.7964	0.13	Q	V
17+15	0.8002	0.19	Q	V
17+30	0.8046	0.21	Q	V
17+45	0.8089	0.21	Q	V
18+ 0	0.8126	0.18	Q	V
18+15	0.8161	0.17	Q	V
18+30	0.8196	0.17	Q	V
18+45	0.8224	0.14	Q	V
19+ 0	0.8244	0.10	Q	V
19+15	0.8267	0.11	Q	V
19+30	0.8300	0.16	Q	V
19+45	0.8328	0.14	Q	V
20+ 0	0.8348	0.10	Q	V
20+15	0.8372	0.11	Q	V
20+30	0.8398	0.13	Q	V
20+45	0.8424	0.13	Q	V
21+ 0	0.8443	0.10	Q	V
21+15	0.8467	0.11	Q	V
21+30	0.8487	0.10	Q	V
21+45	0.8511	0.11	Q	V
22+ 0	0.8530	0.10	Q	V
22+15	0.8554	0.11	Q	V
22+30	0.8574	0.10	Q	V
22+45	0.8591	0.08	Q	V
23+ 0	0.8608	0.08	Q	V
23+15	0.8626	0.08	Q	V
23+30	0.8643	0.08	Q	V
23+45	0.8660	0.08	Q	V
24+ 0	0.8678	0.08	Q	V
24+15	0.8682	0.02	Q	V

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC5PROP15.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA C
5-YR 1-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.034 Hr.
Lag time = 2.04 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 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]
7.50	0.49	3.67

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	1.33	9.98

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 0.686(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.686(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.760
Total Area Entered =	7.50(Ac.)	

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.760	0.223	1.000	0.223
					Sum (F) =	0.223

Area averaged mean soil loss (F) (In/Hr) = 0.223
Minimum soil loss rate ((In/Hr)) = 0.112

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.290

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	245.027	50.239
2	0.167	490.055	40.364
3	0.250	735.082	7.184
4	0.333	980.109	2.213
		Sum = 100.000	Sum= 7.559

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

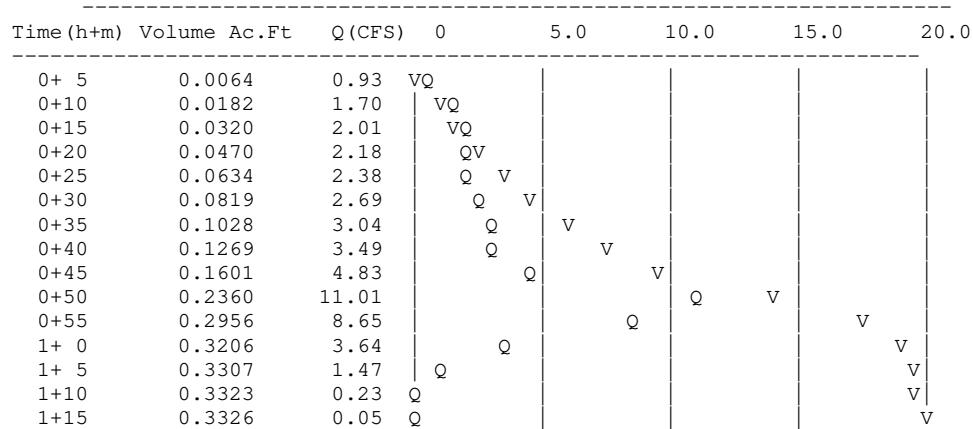
Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate (In./Hr) Max Low	Effective (In/Hr)
1	0.08	4.20	0.346	(0.223) 0.100	0.245
2	0.17	4.30	0.354	(0.223) 0.103	0.251
3	0.25	5.00	0.412	(0.223) 0.119	0.292
4	0.33	5.00	0.412	(0.223) 0.119	0.292
5	0.42	5.80	0.477	(0.223) 0.138	0.339
6	0.50	6.50	0.535	(0.223) 0.155	0.380
7	0.58	7.40	0.609	(0.223) 0.177	0.432
8	0.67	8.60	0.708	(0.223) 0.205	0.503
9	0.75	12.30	1.012	0.223 (0.294)	0.789
10	0.83	29.10	2.395	0.223 (0.695)	2.172
11	0.92	6.80	0.560	(0.223) 0.162	0.397
12	1.00	5.00	0.412	(0.223) 0.119	0.292
		(Loss Rate Not Used)			
		Sum = 100.0		Sum = 6.4	

Flood volume = Effective rainfall 0.53 (In)
times area 7.5 (Ac.) / [(In)/(Ft.)] = 0.3 (Ac.Ft)
Total soil loss = 0.15 (In)
Total soil loss = 0.096 (Ac.Ft)
Total rainfall = 0.69 (In)
Flood volume = 14488.7 Cubic Feet
Total soil loss = 4185.9 Cubic Feet

Peak flow rate of this hydrograph = 11.008 (CFS)

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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))



Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC5PROP35.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA C
5-YR 3-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.034 Hr.
Lag time = 2.04 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 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]
7.50	0.87	6.50

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	2.09	15.67

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 1.153(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.153(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.760
Total Area Entered =	7.50(Ac.)	

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.760	0.223	1.000	0.223
					Sum (F) =	0.223

Area averaged mean soil loss (F) (In/Hr) = 0.223
Minimum soil loss rate ((In/Hr)) = 0.112

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.290

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	245.027	50.239	3.797
2 0.167	490.055	40.364	3.051
3 0.250	735.082	7.184	0.543
4 0.333	980.109	2.213	0.167
		Sum = 100.000	Sum= 7.559

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	0.180	(0.223) 0.052	0.128
2 0.17	1.30	0.180	(0.223) 0.052	0.128
3 0.25	1.10	0.152	(0.223) 0.044	0.108
4 0.33	1.50	0.207	(0.223) 0.060	0.147
5 0.42	1.50	0.207	(0.223) 0.060	0.147
6 0.50	1.80	0.249	(0.223) 0.072	0.177
7 0.58	1.50	0.207	(0.223) 0.060	0.147
8 0.67	1.80	0.249	(0.223) 0.072	0.177
9 0.75	1.80	0.249	(0.223) 0.072	0.177
10 0.83	1.50	0.207	(0.223) 0.060	0.147
11 0.92	1.60	0.221	(0.223) 0.064	0.157
12 1.00	1.80	0.249	(0.223) 0.072	0.177
13 1.08	2.20	0.304	(0.223) 0.088	0.216
14 1.17	2.20	0.304	(0.223) 0.088	0.216
15 1.25	2.20	0.304	(0.223) 0.088	0.216
16 1.33	2.00	0.277	(0.223) 0.080	0.196
17 1.42	2.60	0.360	(0.223) 0.104	0.255
18 1.50	2.70	0.373	(0.223) 0.108	0.265
19 1.58	2.40	0.332	(0.223) 0.096	0.236
20 1.67	2.70	0.373	(0.223) 0.108	0.265
21 1.75	3.30	0.456	(0.223) 0.132	0.324
22 1.83	3.10	0.429	(0.223) 0.124	0.304
23 1.92	2.90	0.401	(0.223) 0.116	0.285
24 2.00	3.00	0.415	(0.223) 0.120	0.295
25 2.08	3.10	0.429	(0.223) 0.124	0.304
26 2.17	4.20	0.581	(0.223) 0.168	0.412
27 2.25	5.00	0.692	(0.223) 0.201	0.491
28 2.33	3.50	0.484	(0.223) 0.140	0.344
29 2.42	6.80	0.941	0.223 (0.273)	0.717
30 2.50	7.30	1.010	0.223 (0.293)	0.787
31 2.58	8.20	1.134	0.223 (0.329)	0.911
32 2.67	5.90	0.816	0.223 (0.237)	0.593
33 2.75	2.00	0.277	(0.223) 0.080	0.196
34 2.83	1.80	0.249	(0.223) 0.072	0.177
35 2.92	1.80	0.249	(0.223) 0.072	0.177
36 3.00	0.60	0.083	(0.223) 0.024	0.059
		(Loss Rate Not Used)		
		Sum = 100.0		Sum = 10.1

Flood volume = Effective rainfall 0.84 (In)
times area 7.5 (Ac.) / [(In) / (Ft.)] = 0.5 (Ac.Ft)
Total soil loss = 0.31 (In)
Total soil loss = 0.196 (Ac.Ft)
Total rainfall = 1.15 (In)
Flood volume = 22822.2 Cubic Feet
Total soil loss = 8558.7 Cubic Feet

Peak flow rate of this hydrograph = 6.310 (CFS)

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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	2.5	5.0	7.5	10.0
0+ 5	0.0033		0.49	VQ				
0+10	0.0094		0.87	V Q				
0+15	0.0154		0.87	V Q				
0+20	0.0221		0.98	V Q				
0+25	0.0296		1.09	V Q				
0+30	0.0380		1.22	V Q				
0+35	0.0463		1.20	VQ				
0+40	0.0548		1.24	Q				
0+45	0.0639		1.32	VQ				
0+50	0.0723		1.22	QV				
0+55	0.0804		1.17	Q V				
1+ 0	0.0891		1.26	QV				
1+ 5	0.0992		1.47	Q V				
1+10	0.1103		1.60	Q V				
1+15	0.1215		1.63	Q V				
1+20	0.1322		1.56	Q V				
1+25	0.1441		1.72	Q V				
1+30	0.1574		1.93	Q V				
1+35	0.1703		1.88	Q V				
1+40	0.1835		1.91	Q V				
1+45	0.1987		2.21	Q V				
1+50	0.2148		2.33	Q V				
1+55	0.2301		2.23	Q V				
2+ 0	0.2453		2.21	Q V				
2+ 5	0.2609		2.26	Q V				
2+10	0.2795		2.70	Q V				
2+15	0.3025		3.34	Q V				
2+20	0.3238		3.08	Q V				
2+25	0.3521		4.11	Q V				
2+30	0.3896		5.45	Q V				
2+35	0.4330		6.31	Q V				
2+40	0.4715		5.58	Q V				
2+45	0.4934		3.18	Q V				
2+50	0.5054		1.75	Q V				
2+55	0.5152		1.42	Q V				
3+ 0	0.5213		0.89	Q V				
3+ 5	0.5234		0.31	Q V				
3+10	0.5239		0.06	Q V				
3+15	0.5239		0.01	Q V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC5PROP65.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA C
5-YR 6-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.034 Hr.
Lag time = 2.04 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 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]
7.50	1.21	9.07

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	2.86	21.45

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 1.596(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.596(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.760
Total Area Entered =	7.50(Ac.)	

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.760	0.223	1.000	0.223
					Sum (F) =	0.223

Area averaged mean soil loss (F) (In/Hr) = 0.223
Minimum soil loss rate ((In/Hr)) = 0.112

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.290

U n i t H y d r o g r a p h
V A L L E Y S-C u r v e

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	245.027	50.239	3.797
2 0.167	490.055	40.364	3.051
3 0.250	735.082	7.184	0.543
4 0.333	980.109	2.213	0.167
		Sum = 100.000	Sum= 7.559

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	0.096	(0.223) 0.028	0.068
2 0.17	0.60	0.115	(0.223) 0.033	0.082
3 0.25	0.60	0.115	(0.223) 0.033	0.082
4 0.33	0.60	0.115	(0.223) 0.033	0.082
5 0.42	0.60	0.115	(0.223) 0.033	0.082
6 0.50	0.70	0.134	(0.223) 0.039	0.095
7 0.58	0.70	0.134	(0.223) 0.039	0.095
8 0.67	0.70	0.134	(0.223) 0.039	0.095
9 0.75	0.70	0.134	(0.223) 0.039	0.095
10 0.83	0.70	0.134	(0.223) 0.039	0.095
11 0.92	0.70	0.134	(0.223) 0.039	0.095
12 1.00	0.80	0.153	(0.223) 0.044	0.109
13 1.08	0.80	0.153	(0.223) 0.044	0.109
14 1.17	0.80	0.153	(0.223) 0.044	0.109
15 1.25	0.80	0.153	(0.223) 0.044	0.109
16 1.33	0.80	0.153	(0.223) 0.044	0.109
17 1.42	0.80	0.153	(0.223) 0.044	0.109
18 1.50	0.80	0.153	(0.223) 0.044	0.109
19 1.58	0.80	0.153	(0.223) 0.044	0.109
20 1.67	0.80	0.153	(0.223) 0.044	0.109
21 1.75	0.80	0.153	(0.223) 0.044	0.109
22 1.83	0.80	0.153	(0.223) 0.044	0.109
23 1.92	0.80	0.153	(0.223) 0.044	0.109
24 2.00	0.90	0.172	(0.223) 0.050	0.122
25 2.08	0.80	0.153	(0.223) 0.044	0.109
26 2.17	0.90	0.172	(0.223) 0.050	0.122
27 2.25	0.90	0.172	(0.223) 0.050	0.122
28 2.33	0.90	0.172	(0.223) 0.050	0.122
29 2.42	0.90	0.172	(0.223) 0.050	0.122
30 2.50	0.90	0.172	(0.223) 0.050	0.122
31 2.58	0.90	0.172	(0.223) 0.050	0.122
32 2.67	0.90	0.172	(0.223) 0.050	0.122
33 2.75	1.00	0.192	(0.223) 0.056	0.136
34 2.83	1.00	0.192	(0.223) 0.056	0.136
35 2.92	1.00	0.192	(0.223) 0.056	0.136
36 3.00	1.00	0.192	(0.223) 0.056	0.136
37 3.08	1.00	0.192	(0.223) 0.056	0.136
38 3.17	1.10	0.211	(0.223) 0.061	0.150
39 3.25	1.10	0.211	(0.223) 0.061	0.150
40 3.33	1.10	0.211	(0.223) 0.061	0.150
41 3.42	1.20	0.230	(0.223) 0.067	0.163
42 3.50	1.30	0.249	(0.223) 0.072	0.177
43 3.58	1.40	0.268	(0.223) 0.078	0.190
44 3.67	1.40	0.268	(0.223) 0.078	0.190
45 3.75	1.50	0.287	(0.223) 0.083	0.204
46 3.83	1.50	0.287	(0.223) 0.083	0.204
47 3.92	1.60	0.307	(0.223) 0.089	0.218
48 4.00	1.60	0.307	(0.223) 0.089	0.218
49 4.08	1.70	0.326	(0.223) 0.094	0.231
50 4.17	1.80	0.345	(0.223) 0.100	0.245
51 4.25	1.90	0.364	(0.223) 0.106	0.258
52 4.33	2.00	0.383	(0.223) 0.111	0.272
53 4.42	2.10	0.402	(0.223) 0.117	0.286
54 4.50	2.10	0.402	(0.223) 0.117	0.286

55	4.58	2.20	0.421	(-0.223)	0.122	0.299
56	4.67	2.30	0.441	(-0.223)	0.128	0.313
57	4.75	2.40	0.460	(-0.223)	0.133	0.326
58	4.83	2.40	0.460	(-0.223)	0.133	0.326
59	4.92	2.50	0.479	(-0.223)	0.139	0.340
60	5.00	2.60	0.498	(-0.223)	0.144	0.354
61	5.08	3.10	0.594	(-0.223)	0.172	0.422
62	5.17	3.60	0.690	(-0.223)	0.200	0.490
63	5.25	3.90	0.747	(-0.223)	0.217	0.530
64	5.33	4.20	0.805	0.223	(-0.233)	0.582
65	5.42	4.70	0.900	0.223	(-0.261)	0.677
66	5.50	5.60	1.073	0.223	(-0.311)	0.850
67	5.58	1.90	0.364	(-0.223)	0.106	0.258
68	5.67	0.90	0.172	(-0.223)	0.050	0.122
69	5.75	0.60	0.115	(-0.223)	0.033	0.082
70	5.83	0.50	0.096	(-0.223)	0.028	0.068
71	5.92	0.30	0.057	(-0.223)	0.017	0.041
72	6.00	0.20	0.038	(-0.223)	0.011	0.027

(Loss Rate Not Used)

Sum = 100.0

Sum = 13.7

Flood volume = Effective rainfall 1.14 (In)

times area 7.5(Ac.)/[(In)/(Ft.)] = 0.7(Ac.Ft)

Total soil loss = 0.45 (In)

Total soil loss = 0.282 (Ac.Ft)

Total rainfall = 1.60 (In)

Flood volume = 31167.7 Cubic Feet

Total soil loss = 12295.0 Cubic Feet

Peak flow rate of this hydrograph = 5.700 (CFS)

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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	2.5	5.0	7.5	10.0
0+ 5	0.0018	0.26	VQ				
0+10	0.0053	0.52	V Q				
0+15	0.0095	0.60	V Q				
0+20	0.0137	0.61	V Q				
0+25	0.0179	0.62	VQ				
0+30	0.0225	0.67	VQ				
0+35	0.0274	0.71	VQ				
0+40	0.0324	0.72	VQ				
0+45	0.0373	0.72	Q				
0+50	0.0423	0.72	Q				
0+55	0.0473	0.72	Q				
1+ 0	0.0526	0.77	VQ				
1+ 5	0.0582	0.81	Q				
1+10	0.0638	0.82	Q				
1+15	0.0695	0.82	Q				
1+20	0.0752	0.82	QV				
1+25	0.0808	0.82	QV				
1+30	0.0865	0.82	QV				
1+35	0.0922	0.82	Q V				
1+40	0.0978	0.82	Q V				
1+45	0.1035	0.82	Q V				
1+50	0.1092	0.82	Q V				
1+55	0.1148	0.82	Q V				
2+ 0	0.1209	0.87	Q V				
2+ 5	0.1268	0.86	Q V				
2+10	0.1329	0.88	Q V				
2+15	0.1392	0.92	Q V				
2+20	0.1456	0.92	Q V				
2+25	0.1519	0.93	Q V				
2+30	0.1583	0.93	Q V				
2+35	0.1647	0.93	Q V				
2+40	0.1711	0.93	Q V				
2+45	0.1778	0.98	Q V				
2+50	0.1848	1.02	Q V				
2+55	0.1919	1.03	Q V				
3+ 0	0.1990	1.03	Q V				
3+ 5	0.2061	1.03	Q V				
3+10	0.2135	1.08	Q V				
3+15	0.2212	1.12	Q V				
3+20	0.2290	1.13	Q V				

3+25	0.2371	1.18	Q	V				
3+30	0.2459	1.28	Q	V				
3+35	0.2554	1.38	Q	V				
3+40	0.2653	1.43	Q	V				
3+45	0.2755	1.49	Q	V				
3+50	0.2861	1.53	Q	V				
3+55	0.2970	1.59	Q	V				
4+ 0	0.3083	1.64	Q	V				
4+ 5	0.3200	1.70	Q	V				
4+10	0.3323	1.79	Q	V				
4+15	0.3453	1.89	Q	V				
4+20	0.3591	1.99	Q	V				
4+25	0.3735	2.10	Q	V				
4+30	0.3883	2.15	Q	V				
4+35	0.4035	2.21	Q	V				
4+40	0.4194	2.30	Q	V				
4+45	0.4360	2.41	Q	V				
4+50	0.4529	2.46	Q	V				
4+55	0.4702	2.52	Q	V				
5+ 0	0.4882	2.61	Q	V				
5+ 5	0.5083	2.92	Q	V				
5+10	0.5317	3.40	Q	V				
5+15	0.5579	3.80	Q	V				
5+20	0.5866	4.17	Q	V				
5+25	0.6191	4.72	Q	V				
5+30	0.6583	5.70	Q	V				
5+35	0.6862	4.04	Q	V				
5+40	0.6988	1.83	Q	V				
5+45	0.7054	0.97	Q	V				
5+50	0.7097	0.62	Q	V				
5+55	0.7126	0.43	Q	V				
6+ 0	0.7145	0.28	Q	V				
6+ 5	0.7153	0.12	Q	V				
6+10	0.7155	0.02	Q	V				
6+15	0.7155	0.00	Q	V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC5PROP245.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA C
5-YR 24-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.034 Hr.
Lag time = 2.04 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 Min.
Unit time = 15.00 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]
7.50	2.05	15.37

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	5.16	38.70

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 2.778(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.778(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.760
Total Area Entered	=	7.50(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.760	0.223	1.000	0.223
					Sum (F)	= 0.223

Area averaged mean soil loss (F) (In/Hr) = 0.223
Minimum soil loss rate ((In/Hr)) = 0.112

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.290

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 0.250	735.082	79.543	6.012
2 0.500	1470.164	20.457	1.546
		Sum = 100.000	Sum= 7.559

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	0.25	0.20	0.022	(0.394) 0.006	0.016
2	0.50	0.30	0.033	(0.389) 0.010	0.024
3	0.75	0.30	0.033	(0.385) 0.010	0.024
4	1.00	0.40	0.044	(0.380) 0.013	0.032
5	1.25	0.30	0.033	(0.376) 0.010	0.024
6	1.50	0.30	0.033	(0.371) 0.010	0.024
7	1.75	0.30	0.033	(0.367) 0.010	0.024
8	2.00	0.40	0.044	(0.363) 0.013	0.032
9	2.25	0.40	0.044	(0.358) 0.013	0.032
10	2.50	0.40	0.044	(0.354) 0.013	0.032
11	2.75	0.50	0.056	(0.349) 0.016	0.039
12	3.00	0.50	0.056	(0.345) 0.016	0.039
13	3.25	0.50	0.056	(0.341) 0.016	0.039
14	3.50	0.50	0.056	(0.337) 0.016	0.039
15	3.75	0.50	0.056	(0.332) 0.016	0.039
16	4.00	0.60	0.067	(0.328) 0.019	0.047
17	4.25	0.60	0.067	(0.324) 0.019	0.047
18	4.50	0.70	0.078	(0.320) 0.023	0.055
19	4.75	0.70	0.078	(0.316) 0.023	0.055
20	5.00	0.80	0.089	(0.312) 0.026	0.063
21	5.25	0.60	0.067	(0.308) 0.019	0.047
22	5.50	0.70	0.078	(0.304) 0.023	0.055
23	5.75	0.80	0.089	(0.300) 0.026	0.063
24	6.00	0.80	0.089	(0.296) 0.026	0.063
25	6.25	0.90	0.100	(0.292) 0.029	0.071
26	6.50	0.90	0.100	(0.288) 0.029	0.071
27	6.75	1.00	0.111	(0.284) 0.032	0.079
28	7.00	1.00	0.111	(0.280) 0.032	0.079
29	7.25	1.00	0.111	(0.276) 0.032	0.079
30	7.50	1.10	0.122	(0.273) 0.035	0.087
31	7.75	1.20	0.133	(0.269) 0.039	0.095
32	8.00	1.30	0.144	(0.265) 0.042	0.103
33	8.25	1.50	0.167	(0.262) 0.048	0.118
34	8.50	1.50	0.167	(0.258) 0.048	0.118
35	8.75	1.60	0.178	(0.254) 0.052	0.126
36	9.00	1.70	0.189	(0.251) 0.055	0.134
37	9.25	1.90	0.211	(0.247) 0.061	0.150
38	9.50	2.00	0.222	(0.244) 0.064	0.158
39	9.75	2.10	0.233	(0.240) 0.068	0.166
40	10.00	2.20	0.244	(0.237) 0.071	0.174
41	10.25	1.50	0.167	(0.233) 0.048	0.118
42	10.50	1.50	0.167	(0.230) 0.048	0.118
43	10.75	2.00	0.222	(0.227) 0.064	0.158
44	11.00	2.00	0.222	(0.223) 0.064	0.158
45	11.25	1.90	0.211	(0.220) 0.061	0.150
46	11.50	1.90	0.211	(0.217) 0.061	0.150
47	11.75	1.70	0.189	(0.214) 0.055	0.134
48	12.00	1.80	0.200	(0.210) 0.058	0.142
49	12.25	2.50	0.278	(0.207) 0.081	0.197
50	12.50	2.60	0.289	(0.204) 0.084	0.205
51	12.75	2.80	0.311	(0.201) 0.090	0.221
52	13.00	2.90	0.322	(0.198) 0.093	0.229
53	13.25	3.40	0.378	(0.195) 0.110	0.268
54	13.50	3.40	0.378	(0.192) 0.110	0.268
55	13.75	2.30	0.256	(0.189) 0.074	0.181
56	14.00	2.30	0.256	(0.186) 0.074	0.181

57	14.25	2.70	0.300	(0.183)	0.087	0.213
58	14.50	2.60	0.289	(0.181)	0.084	0.205
59	14.75	2.60	0.289	(0.178)	0.084	0.205
60	15.00	2.50	0.278	(0.175)	0.081	0.197
61	15.25	2.40	0.267	(0.172)	0.077	0.189
62	15.50	2.30	0.256	(0.170)	0.074	0.181
63	15.75	1.90	0.211	(0.167)	0.061	0.150
64	16.00	1.90	0.211	(0.165)	0.061	0.150
65	16.25	0.40	0.044	(0.162)	0.013	0.032
66	16.50	0.40	0.044	(0.160)	0.013	0.032
67	16.75	0.30	0.033	(0.157)	0.010	0.024
68	17.00	0.30	0.033	(0.155)	0.010	0.024
69	17.25	0.50	0.056	(0.153)	0.016	0.039
70	17.50	0.50	0.056	(0.150)	0.016	0.039
71	17.75	0.50	0.056	(0.148)	0.016	0.039
72	18.00	0.40	0.044	(0.146)	0.013	0.032
73	18.25	0.40	0.044	(0.144)	0.013	0.032
74	18.50	0.40	0.044	(0.142)	0.013	0.032
75	18.75	0.30	0.033	(0.140)	0.010	0.024
76	19.00	0.20	0.022	(0.138)	0.006	0.016
77	19.25	0.30	0.033	(0.136)	0.010	0.024
78	19.50	0.40	0.044	(0.134)	0.013	0.032
79	19.75	0.30	0.033	(0.132)	0.010	0.024
80	20.00	0.20	0.022	(0.130)	0.006	0.016
81	20.25	0.30	0.033	(0.128)	0.010	0.024
82	20.50	0.30	0.033	(0.127)	0.010	0.024
83	20.75	0.30	0.033	(0.125)	0.010	0.024
84	21.00	0.20	0.022	(0.124)	0.006	0.016
85	21.25	0.30	0.033	(0.122)	0.010	0.024
86	21.50	0.20	0.022	(0.121)	0.006	0.016
87	21.75	0.30	0.033	(0.119)	0.010	0.024
88	22.00	0.20	0.022	(0.118)	0.006	0.016
89	22.25	0.30	0.033	(0.117)	0.010	0.024
90	22.50	0.20	0.022	(0.116)	0.006	0.016
91	22.75	0.20	0.022	(0.115)	0.006	0.016
92	23.00	0.20	0.022	(0.114)	0.006	0.016
93	23.25	0.20	0.022	(0.113)	0.006	0.016
94	23.50	0.20	0.022	(0.113)	0.006	0.016
95	23.75	0.20	0.022	(0.112)	0.006	0.016
96	24.00	0.20	0.022	(0.112)	0.006	0.016

(Loss Rate Not Used)

Sum = 100.0

Sum = 7.9

Flood volume = Effective rainfall 1.97 (In)

times area 7.5(Ac.)/[(In)/(Ft.)] = 1.2 (Ac.Ft)

Total soil loss = 0.81 (In)

Total soil loss = 0.504 (Ac.Ft)

Total rainfall = 2.78 (In)

Flood volume = 53705.7 Cubic Feet

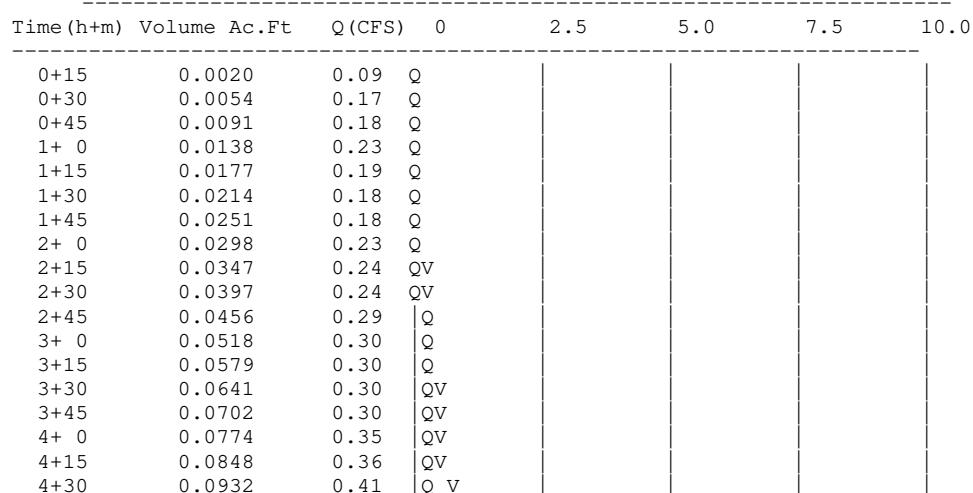
Total soil loss = 21936.1 Cubic Feet

Peak flow rate of this hydrograph = 2.029 (CFS)

+++++H O U R S T O R M ++++++

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 15 Minute intervals ((CFS))



4+45	0.1018	0.42	Q V					
5+ 0	0.1114	0.47	Q V					
5+15	0.1193	0.38	Q V					
5+30	0.1277	0.41	Q V					
5+45	0.1373	0.47	Q V					
6+ 0	0.1472	0.48	Q V					
6+15	0.1580	0.52	Q V					
6+30	0.1691	0.54	Q V					
6+45	0.1812	0.58	Q V					
7+ 0	0.1935	0.60	Q V					
7+15	0.2058	0.60	Q V					
7+30	0.2192	0.64	Q V					
7+45	0.2337	0.70	Q V					
8+ 0	0.2495	0.76	Q V					
8+15	0.2675	0.87	Q V					
8+30	0.2860	0.90	Q V					
8+45	0.3054	0.94	Q V					
9+ 0	0.3261	1.00	Q V					
9+15	0.3491	1.11	Q V					
9+30	0.3735	1.18	Q V					
9+45	0.3991	1.24	Q V					
10+ 0	0.4260	1.30	Q V					
10+15	0.4462	0.98	Q V					
10+30	0.4647	0.90	Q V					
10+45	0.4881	1.13	Q V					
11+ 0	0.5128	1.19	Q V					
11+15	0.5365	1.15	Q V					
11+30	0.5599	1.13	Q V					
11+45	0.5813	1.04	Q V					
12+ 0	0.6033	1.06	Q V					
12+15	0.6323	1.41	Q V					
12+30	0.6641	1.54	Q V					
12+45	0.6982	1.65	Q V					
13+ 0	0.7337	1.72	Q V					
13+15	0.7743	1.97	Q V					
13+30	0.8162	2.03	Q V					
13+45	0.8474	1.51	Q V					
14+ 0	0.8757	1.37	Q V					
14+15	0.9080	1.56	Q V					
14+30	0.9403	1.56	Q V					
14+45	0.9724	1.55	Q V					
15+ 0	1.0035	1.50	Q V					
15+15	1.0333	1.44	Q V					
15+30	1.0619	1.38	Q V					
15+45	1.0863	1.18	Q V					
16+ 0	1.1098	1.13	Q V					
16+15	1.1185	0.42	Q V					
16+30	1.1234	0.24	Q V					
16+45	1.1274	0.19	Q V					
17+ 0	1.1311	0.18	Q V					
17+15	1.1367	0.27	Q V					
17+30	1.1429	0.30	Q V					
17+45	1.1490	0.30	Q V					
18+ 0	1.1542	0.25	Q V					
18+15	1.1592	0.24	Q V					
18+30	1.1641	0.24	Q V					
18+45	1.1680	0.19	Q V					
19+ 0	1.1708	0.13	Q V					
19+15	1.1742	0.17	Q V					
19+30	1.1789	0.23	Q V					
19+45	1.1828	0.19	Q V					
20+ 0	1.1856	0.13	Q V					
20+15	1.1890	0.17	Q V					
20+30	1.1927	0.18	Q V					
20+45	1.1964	0.18	Q V					
21+ 0	1.1991	0.13	Q V					
21+15	1.2026	0.17	Q V					
21+30	1.2053	0.13	Q V					
21+45	1.2087	0.17	Q V					
22+ 0	1.2114	0.13	Q V					
22+15	1.2149	0.17	Q V					
22+30	1.2176	0.13	Q V					
22+45	1.2201	0.12	Q V					
23+ 0	1.2225	0.12	Q V					
23+15	1.2250	0.12	Q V					
23+30	1.2275	0.12	Q V					
23+45	1.2299	0.12	Q V					
24+ 0	1.2324	0.12	Q V					
24+15	1.2329	0.02	Q V					

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC10EXIST110.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
EXISTING CONDITION, DMA C
10-YR 1-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.045 Hr.
Lag time = 2.72 Min.
25% of lag time = 0.68 Min.
40% of lag time = 1.09 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]
7.50	0.49	3.67

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	1.33	9.98

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 0.835(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.835(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.500
Total Area Entered	=	7.50(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.500	0.281	1.000	0.281
					Sum (F)	= 0.281

Area averaged mean soil loss (F) (In/Hr) = 0.281
Minimum soil loss rate ((In/Hr)) = 0.140

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	183.771	40.452
2	0.167	367.541	44.515
3	0.250	551.312	9.487
4	0.333	735.082	3.846
5	0.417	918.853	1.700
		Sum = 100.000	Sum= 7.559

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	4.20	0.421	(0.281) 0.210	0.210
2	0.17	4.30	0.431	(0.281) 0.215	0.215
3	0.25	5.00	0.501	(0.281) 0.250	0.250
4	0.33	5.00	0.501	(0.281) 0.250	0.250
5	0.42	5.80	0.581	0.281 (0.291)	0.300
6	0.50	6.50	0.651	0.281 (0.326)	0.370
7	0.58	7.40	0.741	0.281 (0.371)	0.460
8	0.67	8.60	0.862	0.281 (0.431)	0.581
9	0.75	12.30	1.232	0.281 (0.616)	0.951
10	0.83	29.10	2.916	0.281 (1.458)	2.635
11	0.92	6.80	0.681	0.281 (0.341)	0.400
12	1.00	5.00	0.501	(0.281) 0.250	0.250

(Loss Rate Not Used)

Sum = 100.0 Sum = 6.9

Flood volume = Effective rainfall 0.57 (In)

times area 7.5 (Ac.) / [(In)/(Ft.)] = 0.4 (Ac.Ft)

Total soil loss = 0.26 (In)

Total soil loss = 0.164 (Ac.Ft)

Total rainfall = 0.83 (In)

Flood volume = 15598.6 Cubic Feet

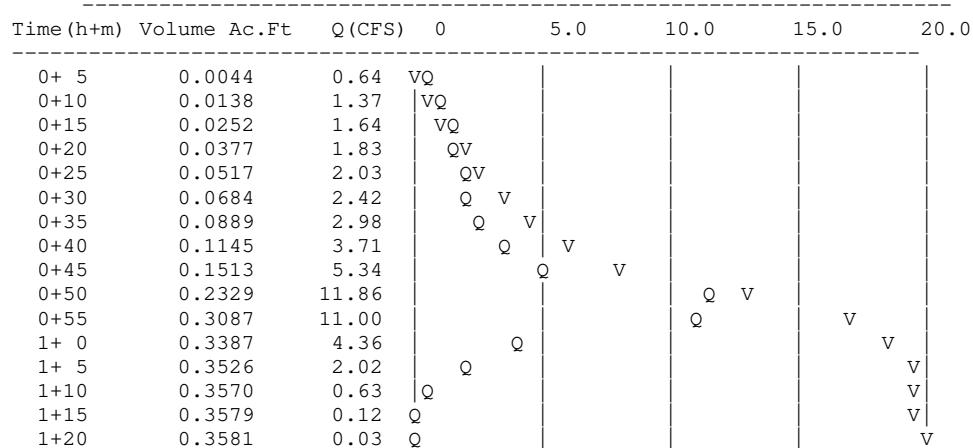
Total soil loss = 7132.6 Cubic Feet

Peak flow rate of this hydrograph = 11.861 (CFS)

+++++ 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))



Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC10EXIST310.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
EXISTING CONDITION, DMA C
10-YR 3-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.045 Hr.
Lag time = 2.72 Min.
25% of lag time = 0.68 Min.
40% of lag time = 1.09 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]
7.50	0.87	6.50

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	2.09	15.67

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 1.370(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.370(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.500
Total Area Entered	=	7.50(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.500	0.281	1.000	0.281
					Sum (F)	= 0.281

Area averaged mean soil loss (F) (In/Hr) = 0.281
Minimum soil loss rate ((In/Hr)) = 0.140

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	183.771	40.452	3.058
2 0.167	367.541	44.515	3.365
3 0.250	551.312	9.487	0.717
4 0.333	735.082	3.846	0.291
5 0.417	918.853	1.700	0.128
	Sum = 100.000	Sum=	7.559

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	0.214	(0.281) 0.107	0.107
2	0.17	1.30	0.214	(0.281) 0.107	0.107
3	0.25	1.10	0.181	(0.281) 0.090	0.090
4	0.33	1.50	0.247	(0.281) 0.123	0.123
5	0.42	1.50	0.247	(0.281) 0.123	0.123
6	0.50	1.80	0.296	(0.281) 0.148	0.148
7	0.58	1.50	0.247	(0.281) 0.123	0.123
8	0.67	1.80	0.296	(0.281) 0.148	0.148
9	0.75	1.80	0.296	(0.281) 0.148	0.148
10	0.83	1.50	0.247	(0.281) 0.123	0.123
11	0.92	1.60	0.263	(0.281) 0.131	0.131
12	1.00	1.80	0.296	(0.281) 0.148	0.148
13	1.08	2.20	0.362	(0.281) 0.181	0.181
14	1.17	2.20	0.362	(0.281) 0.181	0.181
15	1.25	2.20	0.362	(0.281) 0.181	0.181
16	1.33	2.00	0.329	(0.281) 0.164	0.164
17	1.42	2.60	0.427	(0.281) 0.214	0.214
18	1.50	2.70	0.444	(0.281) 0.222	0.222
19	1.58	2.40	0.394	(0.281) 0.197	0.197
20	1.67	2.70	0.444	(0.281) 0.222	0.222
21	1.75	3.30	0.542	(0.281) 0.271	0.271
22	1.83	3.10	0.509	(0.281) 0.255	0.255
23	1.92	2.90	0.477	(0.281) 0.238	0.238
24	2.00	3.00	0.493	(0.281) 0.247	0.247
25	2.08	3.10	0.509	(0.281) 0.255	0.255
26	2.17	4.20	0.690	0.281 (0.345)	0.409
27	2.25	5.00	0.822	0.281 (0.411)	0.541
28	2.33	3.50	0.575	0.281 (0.288)	0.294
29	2.42	6.80	1.118	0.281 (0.559)	0.837
30	2.50	7.30	1.200	0.281 (0.600)	0.919
31	2.58	8.20	1.348	0.281 (0.674)	1.067
32	2.67	5.90	0.970	0.281 (0.485)	0.689
33	2.75	2.00	0.329	(0.281) 0.164	0.164
34	2.83	1.80	0.296	(0.281) 0.148	0.148
35	2.92	1.80	0.296	(0.281) 0.148	0.148
36	3.00	0.60	0.099	(0.281) 0.049	0.049

(Loss Rate Not Used)

Sum = 100.0 Sum = 9.6

Flood volume = Effective rainfall 0.80 (In)
times area 7.5 (Ac.) / [(In)/(Ft.)] = 0.5 (Ac.Ft)
Total soil loss = 0.57 (In)
Total soil loss = 0.355 (Ac.Ft)
Total rainfall = 1.37 (In)
Flood volume = 21805.7 Cubic Feet
Total soil loss = 15479.4 Cubic Feet

Peak flow rate of this hydrograph = 7.111 (CFS)

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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	2.5	5.0	7.5	10.0
0+ 5	0.0023		0.33	VQ				
0+10	0.0070		0.69	V Q				
0+15	0.0119		0.71	V Q				
0+20	0.0173		0.79	V Q				
0+25	0.0235		0.90	V Q				
0+30	0.0304		1.00	VQ				
0+35	0.0374		1.01	V Q				
0+40	0.0444		1.03	VQ				
0+45	0.0520		1.10	Q				
0+50	0.0591		1.04	Q				
0+55	0.0659		0.98	Q V				
1+ 0	0.0731		1.05	QV				
1+ 5	0.0813		1.20	Q V				
1+10	0.0904		1.32	Q V				
1+15	0.0997		1.35	Q V				
1+20	0.1088		1.31	Q V				
1+25	0.1185		1.41	Q V				
1+30	0.1295		1.59	Q V				
1+35	0.1403		1.57	Q V				
1+40	0.1512		1.59	Q V				
1+45	0.1637		1.81	Q V				
1+50	0.1770		1.94	Q V				
1+55	0.1899		1.87	Q V				
2+ 0	0.2026		1.85	Q V				
2+ 5	0.2157		1.89	Q V				
2+10	0.2321		2.39	Q V				
2+15	0.2550		3.32	Q V				
2+20	0.2764		3.12	Q V				
2+25	0.3046		4.09	Q V				
2+30	0.3463		6.05	Q V				
2+35	0.3952		7.11	Q V				
2+40	0.4410		6.64	Q V				
2+45	0.4682		3.96	Q V				
2+50	0.4815		1.93	Q V				
2+55	0.4912		1.41	Q V				
3+ 0	0.4973		0.89	Q V				
3+ 5	0.4996		0.34	Q V				
3+10	0.5003		0.10	Q V				
3+15	0.5005		0.03	Q V				
3+20	0.5006		0.01	Q V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC10EXIST610.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
EXISTING CONDITION, DMA C
10-YR 6-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.045 Hr.
Lag time = 2.72 Min.
25% of lag time = 0.68 Min.
40% of lag time = 1.09 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]
7.50	1.21	9.07

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	2.86	21.45

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 1.889(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.889(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.500
Total Area Entered	=	7.50(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.500	0.281	1.000	0.281
					Sum (F)	= 0.281

Area averaged mean soil loss (F) (In/Hr) = 0.281
Minimum soil loss rate ((In/Hr)) = 0.140

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

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	183.771	40.452	3.058
2 0.167	367.541	44.515	3.365
3 0.250	551.312	9.487	0.717
4 0.333	735.082	3.846	0.291
5 0.417	918.853	1.700	0.128
	Sum = 100.000	Sum=	7.559

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	0.113	(0.281) 0.057	0.057
2	0.17	0.60	0.136	(0.281) 0.068	0.068
3	0.25	0.60	0.136	(0.281) 0.068	0.068
4	0.33	0.60	0.136	(0.281) 0.068	0.068
5	0.42	0.60	0.136	(0.281) 0.068	0.068
6	0.50	0.70	0.159	(0.281) 0.079	0.079
7	0.58	0.70	0.159	(0.281) 0.079	0.079
8	0.67	0.70	0.159	(0.281) 0.079	0.079
9	0.75	0.70	0.159	(0.281) 0.079	0.079
10	0.83	0.70	0.159	(0.281) 0.079	0.079
11	0.92	0.70	0.159	(0.281) 0.079	0.079
12	1.00	0.80	0.181	(0.281) 0.091	0.091
13	1.08	0.80	0.181	(0.281) 0.091	0.091
14	1.17	0.80	0.181	(0.281) 0.091	0.091
15	1.25	0.80	0.181	(0.281) 0.091	0.091
16	1.33	0.80	0.181	(0.281) 0.091	0.091
17	1.42	0.80	0.181	(0.281) 0.091	0.091
18	1.50	0.80	0.181	(0.281) 0.091	0.091
19	1.58	0.80	0.181	(0.281) 0.091	0.091
20	1.67	0.80	0.181	(0.281) 0.091	0.091
21	1.75	0.80	0.181	(0.281) 0.091	0.091
22	1.83	0.80	0.181	(0.281) 0.091	0.091
23	1.92	0.80	0.181	(0.281) 0.091	0.091
24	2.00	0.90	0.204	(0.281) 0.102	0.102
25	2.08	0.80	0.181	(0.281) 0.091	0.091
26	2.17	0.90	0.204	(0.281) 0.102	0.102
27	2.25	0.90	0.204	(0.281) 0.102	0.102
28	2.33	0.90	0.204	(0.281) 0.102	0.102
29	2.42	0.90	0.204	(0.281) 0.102	0.102
30	2.50	0.90	0.204	(0.281) 0.102	0.102
31	2.58	0.90	0.204	(0.281) 0.102	0.102
32	2.67	0.90	0.204	(0.281) 0.102	0.102
33	2.75	1.00	0.227	(0.281) 0.113	0.113
34	2.83	1.00	0.227	(0.281) 0.113	0.113
35	2.92	1.00	0.227	(0.281) 0.113	0.113
36	3.00	1.00	0.227	(0.281) 0.113	0.113
37	3.08	1.00	0.227	(0.281) 0.113	0.113
38	3.17	1.10	0.249	(0.281) 0.125	0.125
39	3.25	1.10	0.249	(0.281) 0.125	0.125
40	3.33	1.10	0.249	(0.281) 0.125	0.125
41	3.42	1.20	0.272	(0.281) 0.136	0.136
42	3.50	1.30	0.295	(0.281) 0.147	0.147
43	3.58	1.40	0.317	(0.281) 0.159	0.159
44	3.67	1.40	0.317	(0.281) 0.159	0.159
45	3.75	1.50	0.340	(0.281) 0.170	0.170
46	3.83	1.50	0.340	(0.281) 0.170	0.170
47	3.92	1.60	0.363	(0.281) 0.181	0.181
48	4.00	1.60	0.363	(0.281) 0.181	0.181
49	4.08	1.70	0.385	(0.281) 0.193	0.193
50	4.17	1.80	0.408	(0.281) 0.204	0.204
51	4.25	1.90	0.431	(0.281) 0.215	0.215
52	4.33	2.00	0.453	(0.281) 0.227	0.227
53	4.42	2.10	0.476	(0.281) 0.238	0.238

54	4.50	2.10	0.476	(0.281)	0.238	0.238
55	4.58	2.20	0.499	(0.281)	0.249	0.249
56	4.67	2.30	0.521	(0.281)	0.261	0.261
57	4.75	2.40	0.544	(0.281)	0.272	0.272
58	4.83	2.40	0.544	(0.281)	0.272	0.272
59	4.92	2.50	0.567	0.281	(0.283)	0.286
60	5.00	2.60	0.589	0.281	(0.295)	0.308
61	5.08	3.10	0.703	0.281	(0.351)	0.422
62	5.17	3.60	0.816	0.281	(0.408)	0.535
63	5.25	3.90	0.884	0.281	(0.442)	0.603
64	5.33	4.20	0.952	0.281	(0.476)	0.671
65	5.42	4.70	1.065	0.281	(0.533)	0.784
66	5.50	5.60	1.269	0.281	(0.635)	0.988
67	5.58	1.90	0.431	(0.281)	0.215	0.215
68	5.67	0.90	0.204	(0.281)	0.102	0.102
69	5.75	0.60	0.136	(0.281)	0.068	0.068
70	5.83	0.50	0.113	(0.281)	0.057	0.057
71	5.92	0.30	0.068	(0.281)	0.034	0.034
72	6.00	0.20	0.045	(0.281)	0.023	0.023

(Loss Rate Not Used)

Sum = 100.0

Sum = 12.5

Flood volume = Effective rainfall 1.04 (In)

times area 7.5 (Ac.)/[(In)/(Ft.)] = 0.7 (Ac.Ft)

Total soil loss = 0.85 (In)

Total soil loss = 0.529 (Ac.Ft)

Total rainfall = 1.89 (In)

Flood volume = 28376.6 Cubic Feet

Total soil loss = 23045.3 Cubic Feet

Peak flow rate of this hydrograph = 6.389 (CFS)

+++++H O U R S T O R M ++++++

Run off 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	0.0012	0.17 Q					
0+10	0.0039	0.40 VQ					
0+15	0.0072	0.48 VQ					
0+20	0.0107	0.50 V Q					
0+25	0.0142	0.51 V Q					
0+30	0.0180	0.55 VQ					
0+35	0.0220	0.59 VQ					
0+40	0.0261	0.60 VQ					
0+45	0.0303	0.60 VQ					
0+50	0.0344	0.60 Q					
0+55	0.0385	0.60 Q					
1+ 0	0.0429	0.63 Q					
1+ 5	0.0475	0.67 Q					
1+10	0.0522	0.68 QV					
1+15	0.0569	0.68 QV					
1+20	0.0617	0.69 QV					
1+25	0.0664	0.69 Q V					
1+30	0.0711	0.69 Q V					
1+35	0.0758	0.69 Q V					
1+40	0.0805	0.69 Q V					
1+45	0.0853	0.69 Q V					
1+50	0.0900	0.69 Q V					
1+55	0.0947	0.69 Q V					
2+ 0	0.0997	0.72 Q V					
2+ 5	0.1047	0.72 Q V					
2+10	0.1097	0.73 Q V					
2+15	0.1149	0.76 Q V					
2+20	0.1202	0.77 Q V					
2+25	0.1255	0.77 Q V					
2+30	0.1308	0.77 Q V					
2+35	0.1361	0.77 Q V					
2+40	0.1414	0.77 Q V					
2+45	0.1470	0.81 Q V					
2+50	0.1528	0.84 Q V					
2+55	0.1587	0.85 Q V					
3+ 0	0.1646	0.86 Q V					
3+ 5	0.1705	0.86 Q V					
3+10	0.1766	0.89 Q V					
3+15	0.1830	0.93 Q v					

3+20	0.1895	0.94	Q	V				
3+25	0.1962	0.98	Q	V				
3+30	0.2034	1.05	Q	V				
3+35	0.2112	1.13	Q	V				
3+40	0.2194	1.18	Q	V				
3+45	0.2278	1.23	Q	V				
3+50	0.2366	1.27	Q	V				
3+55	0.2456	1.32	Q	V				
4+ 0	0.2550	1.36	Q	V				
4+ 5	0.2646	1.40	Q	V				
4+10	0.2748	1.48	Q	V				
4+15	0.2855	1.56	Q	V				
4+20	0.2969	1.64	Q	V				
4+25	0.3088	1.73	Q	V				
4+30	0.3210	1.78	Q	V				
4+35	0.3336	1.83	Q	V				
4+40	0.3468	1.91	Q	V				
4+45	0.3604	1.99	Q	V				
4+50	0.3745	2.04	Q	V				
4+55	0.3889	2.09	Q	V				
5+ 0	0.4041	2.21	Q	V				
5+ 5	0.4224	2.65	Q	V				
5+10	0.4457	3.40	Q	V				
5+15	0.4738	4.07	Q	V				
5+20	0.5057	4.63	Q	V				
5+25	0.5422	5.30	Q	V				
5+30	0.5862	6.39	Q	V				
5+35	0.6194	4.82	Q	V				
5+40	0.6336	2.06	Q	V				
5+45	0.6411	1.09	Q	V				
5+50	0.6457	0.67	Q	V				
5+55	0.6485	0.40	Q	V				
6+ 0	0.6502	0.26	Q	V				
6+ 5	0.6511	0.13	Q	V				
6+10	0.6513	0.03	Q	V				
6+15	0.6514	0.01	Q	V				
6+20	0.6514	0.00	Q	V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC10EXIST2410.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
EXISTING CONDITION, DMA C
10-YR 24-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
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Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.045 Hr.
Lag time = 2.72 Min.
25% of lag time = 0.68 Min.
40% of lag time = 1.09 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]
7.50	2.05	15.37

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	5.16	38.70

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 3.329(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.329(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.500
Total Area Entered	=	7.50(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.500	0.281	1.000	0.281
					Sum (F)	= 0.281

Area averaged mean soil loss (F) (In/Hr) = 0.281
Minimum soil loss rate ((In/Hr)) = 0.140

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

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	183.771	40.452	3.058
2 0.167	367.541	44.515	3.365
3 0.250	551.312	9.487	0.717
4 0.333	735.082	3.846	0.291
5 0.417	918.853	1.700	0.128
	Sum = 100.000	Sum=	7.559

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	0.027	(0.498) 0.013	0.013
2	0.17	0.07	0.027	(0.496) 0.013	0.013
3	0.25	0.07	0.027	(0.494) 0.013	0.013
4	0.33	0.10	0.040	(0.492) 0.020	0.020
5	0.42	0.10	0.040	(0.490) 0.020	0.020
6	0.50	0.10	0.040	(0.488) 0.020	0.020
7	0.58	0.10	0.040	(0.487) 0.020	0.020
8	0.67	0.10	0.040	(0.485) 0.020	0.020
9	0.75	0.10	0.040	(0.483) 0.020	0.020
10	0.83	0.13	0.053	(0.481) 0.027	0.027
11	0.92	0.13	0.053	(0.479) 0.027	0.027
12	1.00	0.13	0.053	(0.477) 0.027	0.027
13	1.08	0.10	0.040	(0.475) 0.020	0.020
14	1.17	0.10	0.040	(0.473) 0.020	0.020
15	1.25	0.10	0.040	(0.471) 0.020	0.020
16	1.33	0.10	0.040	(0.470) 0.020	0.020
17	1.42	0.10	0.040	(0.468) 0.020	0.020
18	1.50	0.10	0.040	(0.466) 0.020	0.020
19	1.58	0.10	0.040	(0.464) 0.020	0.020
20	1.67	0.10	0.040	(0.462) 0.020	0.020
21	1.75	0.10	0.040	(0.460) 0.020	0.020
22	1.83	0.13	0.053	(0.458) 0.027	0.027
23	1.92	0.13	0.053	(0.457) 0.027	0.027
24	2.00	0.13	0.053	(0.455) 0.027	0.027
25	2.08	0.13	0.053	(0.453) 0.027	0.027
26	2.17	0.13	0.053	(0.451) 0.027	0.027
27	2.25	0.13	0.053	(0.449) 0.027	0.027
28	2.33	0.13	0.053	(0.447) 0.027	0.027
29	2.42	0.13	0.053	(0.446) 0.027	0.027
30	2.50	0.13	0.053	(0.444) 0.027	0.027
31	2.58	0.17	0.067	(0.442) 0.033	0.033
32	2.67	0.17	0.067	(0.440) 0.033	0.033
33	2.75	0.17	0.067	(0.438) 0.033	0.033
34	2.83	0.17	0.067	(0.436) 0.033	0.033
35	2.92	0.17	0.067	(0.435) 0.033	0.033
36	3.00	0.17	0.067	(0.433) 0.033	0.033
37	3.08	0.17	0.067	(0.431) 0.033	0.033
38	3.17	0.17	0.067	(0.429) 0.033	0.033
39	3.25	0.17	0.067	(0.427) 0.033	0.033
40	3.33	0.17	0.067	(0.426) 0.033	0.033
41	3.42	0.17	0.067	(0.424) 0.033	0.033
42	3.50	0.17	0.067	(0.422) 0.033	0.033
43	3.58	0.17	0.067	(0.420) 0.033	0.033
44	3.67	0.17	0.067	(0.419) 0.033	0.033
45	3.75	0.17	0.067	(0.417) 0.033	0.033
46	3.83	0.20	0.080	(0.415) 0.040	0.040
47	3.92	0.20	0.080	(0.413) 0.040	0.040
48	4.00	0.20	0.080	(0.412) 0.040	0.040
49	4.08	0.20	0.080	(0.410) 0.040	0.040
50	4.17	0.20	0.080	(0.408) 0.040	0.040
51	4.25	0.20	0.080	(0.406) 0.040	0.040
52	4.33	0.23	0.093	(0.405) 0.047	0.047
53	4.42	0.23	0.093	(0.403) 0.047	0.047

54	4.50	0.23	0.093	(-0.401)	0.047	0.047
55	4.58	0.23	0.093	(-0.399)	0.047	0.047
56	4.67	0.23	0.093	(-0.398)	0.047	0.047
57	4.75	0.23	0.093	(-0.396)	0.047	0.047
58	4.83	0.27	0.107	(-0.394)	0.053	0.053
59	4.92	0.27	0.107	(-0.393)	0.053	0.053
60	5.00	0.27	0.107	(-0.391)	0.053	0.053
61	5.08	0.20	0.080	(-0.389)	0.040	0.040
62	5.17	0.20	0.080	(-0.388)	0.040	0.040
63	5.25	0.20	0.080	(-0.386)	0.040	0.040
64	5.33	0.23	0.093	(-0.384)	0.047	0.047
65	5.42	0.23	0.093	(-0.382)	0.047	0.047
66	5.50	0.23	0.093	(-0.381)	0.047	0.047
67	5.58	0.27	0.107	(-0.379)	0.053	0.053
68	5.67	0.27	0.107	(-0.377)	0.053	0.053
69	5.75	0.27	0.107	(-0.376)	0.053	0.053
70	5.83	0.27	0.107	(-0.374)	0.053	0.053
71	5.92	0.27	0.107	(-0.372)	0.053	0.053
72	6.00	0.27	0.107	(-0.371)	0.053	0.053
73	6.08	0.30	0.120	(-0.369)	0.060	0.060
74	6.17	0.30	0.120	(-0.368)	0.060	0.060
75	6.25	0.30	0.120	(-0.366)	0.060	0.060
76	6.33	0.30	0.120	(-0.364)	0.060	0.060
77	6.42	0.30	0.120	(-0.363)	0.060	0.060
78	6.50	0.30	0.120	(-0.361)	0.060	0.060
79	6.58	0.33	0.133	(-0.359)	0.067	0.067
80	6.67	0.33	0.133	(-0.358)	0.067	0.067
81	6.75	0.33	0.133	(-0.356)	0.067	0.067
82	6.83	0.33	0.133	(-0.355)	0.067	0.067
83	6.92	0.33	0.133	(-0.353)	0.067	0.067
84	7.00	0.33	0.133	(-0.351)	0.067	0.067
85	7.08	0.33	0.133	(-0.350)	0.067	0.067
86	7.17	0.33	0.133	(-0.348)	0.067	0.067
87	7.25	0.33	0.133	(-0.347)	0.067	0.067
88	7.33	0.37	0.146	(-0.345)	0.073	0.073
89	7.42	0.37	0.146	(-0.343)	0.073	0.073
90	7.50	0.37	0.146	(-0.342)	0.073	0.073
91	7.58	0.40	0.160	(-0.340)	0.080	0.080
92	7.67	0.40	0.160	(-0.339)	0.080	0.080
93	7.75	0.40	0.160	(-0.337)	0.080	0.080
94	7.83	0.43	0.173	(-0.336)	0.087	0.087
95	7.92	0.43	0.173	(-0.334)	0.087	0.087
96	8.00	0.43	0.173	(-0.332)	0.087	0.087
97	8.08	0.50	0.200	(-0.331)	0.100	0.100
98	8.17	0.50	0.200	(-0.329)	0.100	0.100
99	8.25	0.50	0.200	(-0.328)	0.100	0.100
100	8.33	0.50	0.200	(-0.326)	0.100	0.100
101	8.42	0.50	0.200	(-0.325)	0.100	0.100
102	8.50	0.50	0.200	(-0.323)	0.100	0.100
103	8.58	0.53	0.213	(-0.322)	0.107	0.107
104	8.67	0.53	0.213	(-0.320)	0.107	0.107
105	8.75	0.53	0.213	(-0.319)	0.107	0.107
106	8.83	0.57	0.226	(-0.317)	0.113	0.113
107	8.92	0.57	0.226	(-0.316)	0.113	0.113
108	9.00	0.57	0.226	(-0.314)	0.113	0.113
109	9.08	0.63	0.253	(-0.313)	0.127	0.127
110	9.17	0.63	0.253	(-0.311)	0.127	0.127
111	9.25	0.63	0.253	(-0.310)	0.127	0.127
112	9.33	0.67	0.266	(-0.308)	0.133	0.133
113	9.42	0.67	0.266	(-0.307)	0.133	0.133
114	9.50	0.67	0.266	(-0.305)	0.133	0.133
115	9.58	0.70	0.280	(-0.304)	0.140	0.140
116	9.67	0.70	0.280	(-0.302)	0.140	0.140
117	9.75	0.70	0.280	(-0.301)	0.140	0.140
118	9.83	0.73	0.293	(-0.300)	0.146	0.146
119	9.92	0.73	0.293	(-0.298)	0.146	0.146
120	10.00	0.73	0.293	(-0.297)	0.146	0.146
121	10.08	0.50	0.200	(-0.295)	0.100	0.100
122	10.17	0.50	0.200	(-0.294)	0.100	0.100
123	10.25	0.50	0.200	(-0.292)	0.100	0.100
124	10.33	0.50	0.200	(-0.291)	0.100	0.100
125	10.42	0.50	0.200	(-0.290)	0.100	0.100
126	10.50	0.50	0.200	(-0.288)	0.100	0.100
127	10.58	0.67	0.266	(-0.287)	0.133	0.133
128	10.67	0.67	0.266	(-0.285)	0.133	0.133
129	10.75	0.67	0.266	(-0.284)	0.133	0.133
130	10.83	0.67	0.266	(-0.283)	0.133	0.133
131	10.92	0.67	0.266	(-0.281)	0.133	0.133
132	11.00	0.67	0.266	(-0.280)	0.133	0.133

133	11.08	0.63	0.253	(-0.278)	0.127	0.127
134	11.17	0.63	0.253	(-0.277)	0.127	0.127
135	11.25	0.63	0.253	(-0.276)	0.127	0.127
136	11.33	0.63	0.253	(-0.274)	0.127	0.127
137	11.42	0.63	0.253	(-0.273)	0.127	0.127
138	11.50	0.63	0.253	(-0.272)	0.127	0.127
139	11.58	0.57	0.226	(-0.270)	0.113	0.113
140	11.67	0.57	0.226	(-0.269)	0.113	0.113
141	11.75	0.57	0.226	(-0.268)	0.113	0.113
142	11.83	0.60	0.240	(-0.266)	0.120	0.120
143	11.92	0.60	0.240	(-0.265)	0.120	0.120
144	12.00	0.60	0.240	(-0.264)	0.120	0.120
145	12.08	0.83	0.333	(-0.262)	0.166	0.166
146	12.17	0.83	0.333	(-0.261)	0.166	0.166
147	12.25	0.83	0.333	(-0.260)	0.166	0.166
148	12.33	0.87	0.346	(-0.258)	0.173	0.173
149	12.42	0.87	0.346	(-0.257)	0.173	0.173
150	12.50	0.87	0.346	(-0.256)	0.173	0.173
151	12.58	0.93	0.373	(-0.254)	0.186	0.186
152	12.67	0.93	0.373	(-0.253)	0.186	0.186
153	12.75	0.93	0.373	(-0.252)	0.186	0.186
154	12.83	0.97	0.386	(-0.251)	0.193	0.193
155	12.92	0.97	0.386	(-0.249)	0.193	0.193
156	13.00	0.97	0.386	(-0.248)	0.193	0.193
157	13.08	1.13	0.453	(-0.247)	0.226	0.226
158	13.17	1.13	0.453	(-0.246)	0.226	0.226
159	13.25	1.13	0.453	(-0.244)	0.226	0.226
160	13.33	1.13	0.453	(-0.243)	0.226	0.226
161	13.42	1.13	0.453	(-0.242)	0.226	0.226
162	13.50	1.13	0.453	(-0.241)	0.226	0.226
163	13.58	0.77	0.306	(-0.239)	0.153	0.153
164	13.67	0.77	0.306	(-0.238)	0.153	0.153
165	13.75	0.77	0.306	(-0.237)	0.153	0.153
166	13.83	0.77	0.306	(-0.236)	0.153	0.153
167	13.92	0.77	0.306	(-0.235)	0.153	0.153
168	14.00	0.77	0.306	(-0.233)	0.153	0.153
169	14.08	0.90	0.360	(-0.232)	0.180	0.180
170	14.17	0.90	0.360	(-0.231)	0.180	0.180
171	14.25	0.90	0.360	(-0.230)	0.180	0.180
172	14.33	0.87	0.346	(-0.229)	0.173	0.173
173	14.42	0.87	0.346	(-0.227)	0.173	0.173
174	14.50	0.87	0.346	(-0.226)	0.173	0.173
175	14.58	0.87	0.346	(-0.225)	0.173	0.173
176	14.67	0.87	0.346	(-0.224)	0.173	0.173
177	14.75	0.87	0.346	(-0.223)	0.173	0.173
178	14.83	0.83	0.333	(-0.222)	0.166	0.166
179	14.92	0.83	0.333	(-0.221)	0.166	0.166
180	15.00	0.83	0.333	(-0.219)	0.166	0.166
181	15.08	0.80	0.320	(-0.218)	0.160	0.160
182	15.17	0.80	0.320	(-0.217)	0.160	0.160
183	15.25	0.80	0.320	(-0.216)	0.160	0.160
184	15.33	0.77	0.306	(-0.215)	0.153	0.153
185	15.42	0.77	0.306	(-0.214)	0.153	0.153
186	15.50	0.77	0.306	(-0.213)	0.153	0.153
187	15.58	0.63	0.253	(-0.212)	0.127	0.127
188	15.67	0.63	0.253	(-0.211)	0.127	0.127
189	15.75	0.63	0.253	(-0.210)	0.127	0.127
190	15.83	0.63	0.253	(-0.208)	0.127	0.127
191	15.92	0.63	0.253	(-0.207)	0.127	0.127
192	16.00	0.63	0.253	(-0.206)	0.127	0.127
193	16.08	0.13	0.053	(-0.205)	0.027	0.027
194	16.17	0.13	0.053	(-0.204)	0.027	0.027
195	16.25	0.13	0.053	(-0.203)	0.027	0.027
196	16.33	0.13	0.053	(-0.202)	0.027	0.027
197	16.42	0.13	0.053	(-0.201)	0.027	0.027
198	16.50	0.13	0.053	(-0.200)	0.027	0.027
199	16.58	0.10	0.040	(-0.199)	0.020	0.020
200	16.67	0.10	0.040	(-0.198)	0.020	0.020
201	16.75	0.10	0.040	(-0.197)	0.020	0.020
202	16.83	0.10	0.040	(-0.196)	0.020	0.020
203	16.92	0.10	0.040	(-0.195)	0.020	0.020
204	17.00	0.10	0.040	(-0.194)	0.020	0.020
205	17.08	0.17	0.067	(-0.193)	0.033	0.033
206	17.17	0.17	0.067	(-0.192)	0.033	0.033
207	17.25	0.17	0.067	(-0.191)	0.033	0.033
208	17.33	0.17	0.067	(-0.190)	0.033	0.033
209	17.42	0.17	0.067	(-0.189)	0.033	0.033
210	17.50	0.17	0.067	(-0.188)	0.033	0.033
211	17.58	0.17	0.067	(-0.187)	0.033	0.033

212	17.67	0.17	0.067	(0.186)	0.033	0.033
213	17.75	0.17	0.067	(0.185)	0.033	0.033
214	17.83	0.13	0.053	(0.185)	0.027	0.027
215	17.92	0.13	0.053	(0.184)	0.027	0.027
216	18.00	0.13	0.053	(0.183)	0.027	0.027
217	18.08	0.13	0.053	(0.182)	0.027	0.027
218	18.17	0.13	0.053	(0.181)	0.027	0.027
219	18.25	0.13	0.053	(0.180)	0.027	0.027
220	18.33	0.13	0.053	(0.179)	0.027	0.027
221	18.42	0.13	0.053	(0.178)	0.027	0.027
222	18.50	0.13	0.053	(0.177)	0.027	0.027
223	18.58	0.10	0.040	(0.177)	0.020	0.020
224	18.67	0.10	0.040	(0.176)	0.020	0.020
225	18.75	0.10	0.040	(0.175)	0.020	0.020
226	18.83	0.07	0.027	(0.174)	0.013	0.013
227	18.92	0.07	0.027	(0.173)	0.013	0.013
228	19.00	0.07	0.027	(0.172)	0.013	0.013
229	19.08	0.10	0.040	(0.172)	0.020	0.020
230	19.17	0.10	0.040	(0.171)	0.020	0.020
231	19.25	0.10	0.040	(0.170)	0.020	0.020
232	19.33	0.13	0.053	(0.169)	0.027	0.027
233	19.42	0.13	0.053	(0.168)	0.027	0.027
234	19.50	0.13	0.053	(0.168)	0.027	0.027
235	19.58	0.10	0.040	(0.167)	0.020	0.020
236	19.67	0.10	0.040	(0.166)	0.020	0.020
237	19.75	0.10	0.040	(0.165)	0.020	0.020
238	19.83	0.07	0.027	(0.165)	0.013	0.013
239	19.92	0.07	0.027	(0.164)	0.013	0.013
240	20.00	0.07	0.027	(0.163)	0.013	0.013
241	20.08	0.10	0.040	(0.162)	0.020	0.020
242	20.17	0.10	0.040	(0.162)	0.020	0.020
243	20.25	0.10	0.040	(0.161)	0.020	0.020
244	20.33	0.10	0.040	(0.160)	0.020	0.020
245	20.42	0.10	0.040	(0.160)	0.020	0.020
246	20.50	0.10	0.040	(0.159)	0.020	0.020
247	20.58	0.10	0.040	(0.158)	0.020	0.020
248	20.67	0.10	0.040	(0.158)	0.020	0.020
249	20.75	0.10	0.040	(0.157)	0.020	0.020
250	20.83	0.07	0.027	(0.156)	0.013	0.013
251	20.92	0.07	0.027	(0.156)	0.013	0.013
252	21.00	0.07	0.027	(0.155)	0.013	0.013
253	21.08	0.10	0.040	(0.154)	0.020	0.020
254	21.17	0.10	0.040	(0.154)	0.020	0.020
255	21.25	0.10	0.040	(0.153)	0.020	0.020
256	21.33	0.07	0.027	(0.153)	0.013	0.013
257	21.42	0.07	0.027	(0.152)	0.013	0.013
258	21.50	0.07	0.027	(0.152)	0.013	0.013
259	21.58	0.10	0.040	(0.151)	0.020	0.020
260	21.67	0.10	0.040	(0.150)	0.020	0.020
261	21.75	0.10	0.040	(0.150)	0.020	0.020
262	21.83	0.07	0.027	(0.149)	0.013	0.013
263	21.92	0.07	0.027	(0.149)	0.013	0.013
264	22.00	0.07	0.027	(0.148)	0.013	0.013
265	22.08	0.10	0.040	(0.148)	0.020	0.020
266	22.17	0.10	0.040	(0.147)	0.020	0.020
267	22.25	0.10	0.040	(0.147)	0.020	0.020
268	22.33	0.07	0.027	(0.146)	0.013	0.013
269	22.42	0.07	0.027	(0.146)	0.013	0.013
270	22.50	0.07	0.027	(0.146)	0.013	0.013
271	22.58	0.07	0.027	(0.145)	0.013	0.013
272	22.67	0.07	0.027	(0.145)	0.013	0.013
273	22.75	0.07	0.027	(0.144)	0.013	0.013
274	22.83	0.07	0.027	(0.144)	0.013	0.013
275	22.92	0.07	0.027	(0.144)	0.013	0.013
276	23.00	0.07	0.027	(0.143)	0.013	0.013
277	23.08	0.07	0.027	(0.143)	0.013	0.013
278	23.17	0.07	0.027	(0.143)	0.013	0.013
279	23.25	0.07	0.027	(0.142)	0.013	0.013
280	23.33	0.07	0.027	(0.142)	0.013	0.013
281	23.42	0.07	0.027	(0.142)	0.013	0.013
282	23.50	0.07	0.027	(0.141)	0.013	0.013
283	23.58	0.07	0.027	(0.141)	0.013	0.013
284	23.67	0.07	0.027	(0.141)	0.013	0.013
285	23.75	0.07	0.027	(0.141)	0.013	0.013
286	23.83	0.07	0.027	(0.141)	0.013	0.013
287	23.92	0.07	0.027	(0.141)	0.013	0.013
288	24.00	0.07	0.027	(0.140)	0.013	0.013

(Loss Rate Not Used)

Sum = 100.0 Sum = 20.0

Flood volume = Effective rainfall 1.66 (In)
 times area 7.5 (Ac.) / [(In) / (Ft.)] = 1.0 (Ac.Ft)
 Total soil loss = 1.66 (In)
 Total soil loss = 1.040 (Ac.Ft)
 Total rainfall = 3.33 (In)
 Flood volume = 45321.9 Cubic Feet
 Total soil loss = 45321.9 Cubic Feet

Peak flow rate of this hydrograph = 1.712 (CFS)

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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	0.0003	0.04	Q				
0+10	0.0009	0.09	Q				
0+15	0.0015	0.10	Q				
0+20	0.0023	0.12	Q				
0+25	0.0033	0.14	Q				
0+30	0.0044	0.15	Q				
0+35	0.0054	0.15	Q				
0+40	0.0064	0.15	Q				
0+45	0.0075	0.15	Q				
0+50	0.0087	0.17	Q				
0+55	0.0100	0.19	Q				
1+ 0	0.0114	0.20	Q				
1+ 5	0.0126	0.18	Q				
1+10	0.0137	0.16	Q				
1+15	0.0147	0.15	Q				
1+20	0.0158	0.15	Q				
1+25	0.0168	0.15	Q				
1+30	0.0179	0.15	Q				
1+35	0.0189	0.15	Q				
1+40	0.0200	0.15	Q				
1+45	0.0210	0.15	Q				
1+50	0.0222	0.17	Q				
1+55	0.0235	0.19	Q				
2+ 0	0.0249	0.20	Q				
2+ 5	0.0263	0.20	QV				
2+10	0.0277	0.20	QV				
2+15	0.0290	0.20	QV				
2+20	0.0304	0.20	QV				
2+25	0.0318	0.20	QV				
2+30	0.0332	0.20	QV				
2+35	0.0347	0.22	QV				
2+40	0.0364	0.24	QV				
2+45	0.0381	0.25	QV				
2+50	0.0399	0.25	Q				
2+55	0.0416	0.25	Q				
3+ 0	0.0433	0.25	Q				
3+ 5	0.0451	0.25	Q				
3+10	0.0468	0.25	Q				
3+15	0.0485	0.25	Q				
3+20	0.0503	0.25	Q				
3+25	0.0520	0.25	Q				
3+30	0.0537	0.25	QV				
3+35	0.0555	0.25	QV				
3+40	0.0572	0.25	QV				
3+45	0.0589	0.25	QV				
3+50	0.0608	0.27	QV				
3+55	0.0628	0.29	QV				
4+ 0	0.0649	0.30	QV				
4+ 5	0.0670	0.30	QV				
4+10	0.0690	0.30	QV				
4+15	0.0711	0.30	QV				
4+20	0.0733	0.32	QV				
4+25	0.0757	0.34	QV				
4+30	0.0781	0.35	Q V				
4+35	0.0806	0.35	Q V				
4+40	0.0830	0.35	Q V				
4+45	0.0854	0.35	Q V				
4+50	0.0880	0.37	Q V				
4+55	0.0907	0.40	Q V				
5+ 0	0.0935	0.40	Q V				

5+ 5	0.0959	0.36	Q	V
5+10	0.0981	0.32	Q	V
5+15	0.1002	0.31	Q	V
5+20	0.1025	0.32	Q	V
5+25	0.1049	0.34	Q	V
5+30	0.1073	0.35	Q	V
5+35	0.1098	0.37	Q	V
5+40	0.1126	0.40	Q	V
5+45	0.1153	0.40	Q	V
5+50	0.1181	0.40	Q	V
5+55	0.1208	0.40	Q	V
6+ 0	0.1236	0.40	Q	V
6+ 5	0.1265	0.42	Q	V
6+10	0.1296	0.45	Q	V
6+15	0.1327	0.45	Q	V
6+20	0.1358	0.45	Q	V
6+25	0.1389	0.45	Q	V
6+30	0.1421	0.45	Q	V
6+35	0.1453	0.47	Q	V
6+40	0.1487	0.50	Q	V
6+45	0.1522	0.50	Q	V
6+50	0.1557	0.50	Q	V
6+55	0.1591	0.50	Q	V
7+ 0	0.1626	0.50	Q	V
7+ 5	0.1661	0.50	Q	V
7+10	0.1695	0.50	Q	V
7+15	0.1730	0.50	Q	V
7+20	0.1766	0.52	Q	V
7+25	0.1804	0.55	Q	V
7+30	0.1842	0.55	Q	V
7+35	0.1881	0.57	Q	V
7+40	0.1922	0.60	Q	V
7+45	0.1964	0.60	Q	V
7+50	0.2007	0.62	Q	V
7+55	0.2051	0.65	Q	V
8+ 0	0.2096	0.65	Q	V
8+ 5	0.2144	0.69	Q	V
8+10	0.2195	0.74	Q	V
8+15	0.2247	0.75	Q	V
8+20	0.2298	0.75	Q	V
8+25	0.2350	0.76	Q	V
8+30	0.2402	0.76	Q	V
8+35	0.2456	0.78	Q	V
8+40	0.2511	0.80	Q	V
8+45	0.2566	0.80	Q	V
8+50	0.2623	0.83	Q	V
8+55	0.2681	0.85	Q	V
9+ 0	0.2740	0.85	Q	V
9+ 5	0.2802	0.90	Q	V
9+10	0.2867	0.94	Q	V
9+15	0.2932	0.95	Q	V
9+20	0.2999	0.98	Q	V
9+25	0.3068	1.00	Q	V
9+30	0.3137	1.00	Q	V
9+35	0.3208	1.03	Q	V
9+40	0.3280	1.05	Q	V
9+45	0.3353	1.05	Q	V
9+50	0.3427	1.08	Q	V
9+55	0.3503	1.10	Q	V
10+ 0	0.3579	1.11	Q	V
10+ 5	0.3646	0.96	Q	V
10+10	0.3701	0.81	Q	V
10+15	0.3755	0.77	Q	V
10+20	0.3807	0.76	Q	V
10+25	0.3859	0.76	Q	V
10+30	0.3911	0.76	Q	V
10+35	0.3970	0.86	Q	V
10+40	0.4037	0.97	Q	V
10+45	0.4105	0.99	Q	V
10+50	0.4174	1.00	Q	V
10+55	0.4244	1.01	Q	V
11+ 0	0.4313	1.01	Q	V
11+ 5	0.4381	0.99	Q	V
11+10	0.4447	0.96	Q	V
11+15	0.4514	0.96	Q	V
11+20	0.4580	0.96	Q	V
11+25	0.4645	0.96	Q	V
11+30	0.4711	0.96	Q	V
11+35	0.4774	0.92	Q	V

11+40	0.4834	0.87	Q	V			
11+45	0.4894	0.86	Q	V			
11+50	0.4954	0.88	Q	V			
11+55	0.5016	0.90	Q	V			
12+ 0	0.5078	0.90	Q	V			
12+ 5	0.5151	1.05	Q	V			
12+10	0.5234	1.21	Q	V			
12+15	0.5319	1.24	Q	V			
12+20	0.5407	1.27	Q	V			
12+25	0.5496	1.30	Q	V			
12+30	0.5586	1.31	Q	V			
12+35	0.5679	1.35	Q	V			
12+40	0.5775	1.39	Q	V			
12+45	0.5872	1.40	Q	V			
12+50	0.5970	1.43	Q	V			
12+55	0.6070	1.45	Q	V			
13+ 0	0.6171	1.46	Q	V			
13+ 5	0.6278	1.56	Q	V			
13+10	0.6394	1.67	Q	V			
13+15	0.6511	1.70	Q	V			
13+20	0.6628	1.71	Q	V			
13+25	0.6746	1.71	Q	V			
13+30	0.6864	1.71	Q	V			
13+35	0.6967	1.49	Q	V			
13+40	0.7052	1.24	Q	V			
13+45	0.7134	1.19	Q	V			
13+50	0.7214	1.17	Q	V			
13+55	0.7294	1.16	Q	V			
14+ 0	0.7374	1.16	Q	V			
14+ 5	0.7459	1.24	Q	V			
14+10	0.7551	1.33	Q	V			
14+15	0.7644	1.35	Q	V			
14+20	0.7736	1.34	Q	V			
14+25	0.7826	1.32	Q	V			
14+30	0.7917	1.31	Q	V			
14+35	0.8007	1.31	Q	V			
14+40	0.8097	1.31	Q	V			
14+45	0.8187	1.31	Q	V			
14+50	0.8276	1.29	Q	V			
14+55	0.8363	1.27	Q	V			
15+ 0	0.8450	1.26	Q	V			
15+ 5	0.8536	1.24	Q	V			
15+10	0.8619	1.22	Q	V			
15+15	0.8703	1.21	Q	V			
15+20	0.8785	1.19	Q	V			
15+25	0.8865	1.17	Q	V			
15+30	0.8945	1.16	Q	V			
15+35	0.9019	1.08	Q	V			
15+40	0.9087	0.99	Q	V			
15+45	0.9154	0.97	Q	V			
15+50	0.9220	0.96	Q	V			
15+55	0.9286	0.96	Q	V			
16+ 0	0.9352	0.96	Q	V			
16+ 5	0.9397	0.65	Q	V			
16+10	0.9418	0.31	Q	V			
16+15	0.9435	0.24	Q	V			
16+20	0.9450	0.21	Q	V			
16+25	0.9464	0.20	Q	V			
16+30	0.9478	0.20	Q	V			
16+35	0.9490	0.18	Q	V			
16+40	0.9501	0.16	Q	V			
16+45	0.9512	0.15	Q	V			
16+50	0.9522	0.15	Q	V			
16+55	0.9532	0.15	Q	V			
17+ 0	0.9543	0.15	Q	V			
17+ 5	0.9556	0.19	Q	V			
17+10	0.9572	0.24	Q	V			
17+15	0.9589	0.25	Q	V			
17+20	0.9606	0.25	Q	V			
17+25	0.9624	0.25	Q	V			
17+30	0.9641	0.25	Q	V			
17+35	0.9658	0.25	Q	V			
17+40	0.9676	0.25	Q	V			
17+45	0.9693	0.25	Q	V			
17+50	0.9709	0.23	Q	V			
17+55	0.9724	0.21	Q	V			
18+ 0	0.9738	0.20	Q	V			
18+ 5	0.9752	0.20	Q	V			
18+10	0.9765	0.20	Q	V			

18+15	0.9779	0.20	Q			V
18+20	0.9793	0.20	Q			V
18+25	0.9807	0.20	Q			V
18+30	0.9821	0.20	Q			V
18+35	0.9833	0.18	Q			V
18+40	0.9844	0.16	Q			V
18+45	0.9855	0.15	Q			V
18+50	0.9864	0.13	Q			V
18+55	0.9871	0.11	Q			V
19+ 0	0.9879	0.10	Q			V
19+ 5	0.9887	0.12	Q			V
19+10	0.9897	0.14	Q			V
19+15	0.9907	0.15	Q			V
19+20	0.9919	0.17	Q			V
19+25	0.9932	0.19	Q			V
19+30	0.9946	0.20	Q			V
19+35	0.9958	0.18	Q			V
19+40	0.9969	0.16	Q			V
19+45	0.9980	0.15	Q			V
19+50	0.9989	0.13	Q			V
19+55	0.9996	0.11	Q			V
20+ 0	1.0003	0.10	Q			V
20+ 5	1.0012	0.12	Q			V
20+10	1.0022	0.14	Q			V
20+15	1.0032	0.15	Q			V
20+20	1.0042	0.15	Q			V
20+25	1.0053	0.15	Q			V
20+30	1.0063	0.15	Q			V
20+35	1.0073	0.15	Q			V
20+40	1.0084	0.15	Q			V
20+45	1.0094	0.15	Q			V
20+50	1.0103	0.13	Q			V
20+55	1.0111	0.11	Q			V
21+ 0	1.0118	0.10	Q			V
21+ 5	1.0126	0.12	Q			V
21+10	1.0136	0.14	Q			V
21+15	1.0146	0.15	Q			V
21+20	1.0155	0.13	Q			V
21+25	1.0163	0.11	Q			V
21+30	1.0170	0.10	Q			V
21+35	1.0178	0.12	Q			V
21+40	1.0188	0.14	Q			V
21+45	1.0198	0.15	Q			V
21+50	1.0207	0.13	Q			V
21+55	1.0215	0.11	Q			V
22+ 0	1.0222	0.10	Q			V
22+ 5	1.0230	0.12	Q			V
22+10	1.0240	0.14	Q			V
22+15	1.0250	0.15	Q			V
22+20	1.0259	0.13	Q			V
22+25	1.0267	0.11	Q			V
22+30	1.0274	0.10	Q			V
22+35	1.0281	0.10	Q			V
22+40	1.0288	0.10	Q			V
22+45	1.0295	0.10	Q			V
22+50	1.0302	0.10	Q			V
22+55	1.0309	0.10	Q			V
23+ 0	1.0316	0.10	Q			V
23+ 5	1.0322	0.10	Q			V
23+10	1.0329	0.10	Q			V
23+15	1.0336	0.10	Q			V
23+20	1.0343	0.10	Q			V
23+25	1.0350	0.10	Q			V
23+30	1.0357	0.10	Q			V
23+35	1.0364	0.10	Q			V
23+40	1.0371	0.10	Q			V
23+45	1.0378	0.10	Q			V
23+50	1.0385	0.10	Q			V
23+55	1.0392	0.10	Q			V
24+ 0	1.0399	0.10	Q			V
24+ 5	1.0403	0.06	Q			V
24+10	1.0404	0.02	Q			V
24+15	1.0404	0.01	Q			V
24+20	1.0404	0.00	Q			V

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC10PROP110.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA C
10-YR 1-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.034 Hr.
Lag time = 2.04 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 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]
7.50	0.49	3.67

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	1.33	9.98

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 0.835(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.835(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.760
Total Area Entered	=	7.50(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.760	0.161	1.000	0.161
					Sum (F)	= 0.161

Area averaged mean soil loss (F) (In/Hr) = 0.161
Minimum soil loss rate ((In/Hr)) = 0.081

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.290

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	245.027	50.239
2	0.167	490.055	40.364
3	0.250	735.082	7.184
4	0.333	980.109	2.213
		Sum = 100.000	Sum= 7.559

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	4.20	0.421	(0.161) 0.122	0.299
2	0.17	4.30	0.431	(0.161) 0.125	0.306
3	0.25	5.00	0.501	(0.161) 0.145	0.356
4	0.33	5.00	0.501	(0.161) 0.145	0.356
5	0.42	5.80	0.581	0.161 (0.169)	0.420
6	0.50	6.50	0.651	0.161 (0.189)	0.490
7	0.58	7.40	0.741	0.161 (0.215)	0.580
8	0.67	8.60	0.862	0.161 (0.250)	0.700
9	0.75	12.30	1.232	0.161 (0.357)	1.071
10	0.83	29.10	2.916	0.161 (0.846)	2.754
11	0.92	6.80	0.681	0.161 (0.198)	0.520
12	1.00	5.00	0.501	(0.161) 0.145	0.356
			(Loss Rate Not Used)		
		Sum = 100.0		Sum = 8.2	

Flood volume = Effective rainfall 0.68 (In)
times area 7.5 (Ac.) / [(In)/(Ft.)] = 0.4 (Ac.Ft)
Total soil loss = 0.15 (In)
Total soil loss = 0.094 (Ac.Ft)
Total rainfall = 0.83 (In)

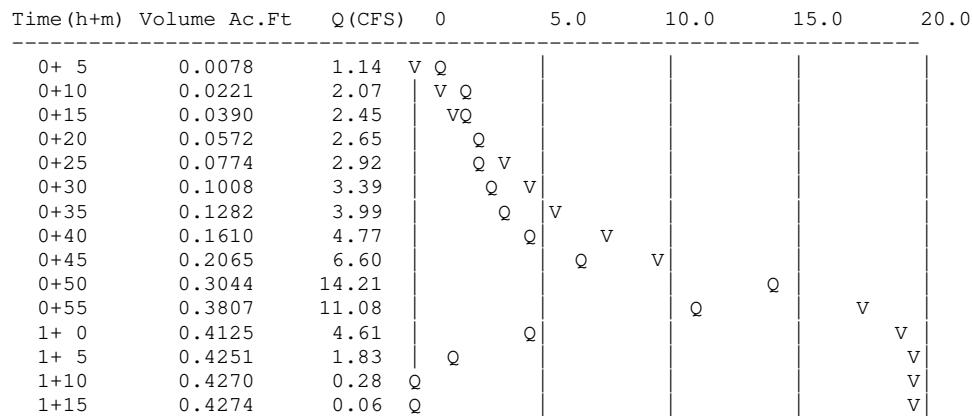
Flood volume = 18618.6 Cubic Feet

Total soil loss = 4112.6 Cubic Feet

Peak flow rate of this hydrograph = 14.211 (CFS)

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1 - H O U R S T O R M
Run off Hydrograph

Hydrograph in 5 Minute intervals ((CFS))



Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC10PROP310.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA C
10-YR 3-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.034 Hr.
Lag time = 2.04 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 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]
7.50	0.87	6.50

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	2.09	15.67

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 1.370(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.370(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.760
Total Area Entered =	7.50(Ac.)	

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.760	0.161	1.000	0.161
					Sum (F) =	0.161

Area averaged mean soil loss (F) (In/Hr) = 0.161
Minimum soil loss rate ((In/Hr)) = 0.081

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.290

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	245.027	50.239	3.797
2 0.167	490.055	40.364	3.051
3 0.250	735.082	7.184	0.543
4 0.333	980.109	2.213	0.167
		Sum = 100.000	Sum= 7.559

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	0.214	(0.161) 0.062	0.152
2 0.17	1.30	0.214	(0.161) 0.062	0.152
3 0.25	1.10	0.181	(0.161) 0.052	0.128
4 0.33	1.50	0.247	(0.161) 0.071	0.175
5 0.42	1.50	0.247	(0.161) 0.071	0.175
6 0.50	1.80	0.296	(0.161) 0.086	0.210
7 0.58	1.50	0.247	(0.161) 0.071	0.175
8 0.67	1.80	0.296	(0.161) 0.086	0.210
9 0.75	1.80	0.296	(0.161) 0.086	0.210
10 0.83	1.50	0.247	(0.161) 0.071	0.175
11 0.92	1.60	0.263	(0.161) 0.076	0.187
12 1.00	1.80	0.296	(0.161) 0.086	0.210
13 1.08	2.20	0.362	(0.161) 0.105	0.257
14 1.17	2.20	0.362	(0.161) 0.105	0.257
15 1.25	2.20	0.362	(0.161) 0.105	0.257
16 1.33	2.00	0.329	(0.161) 0.095	0.233
17 1.42	2.60	0.427	(0.161) 0.124	0.303
18 1.50	2.70	0.444	(0.161) 0.129	0.315
19 1.58	2.40	0.394	(0.161) 0.114	0.280
20 1.67	2.70	0.444	(0.161) 0.129	0.315
21 1.75	3.30	0.542	(0.161) 0.157	0.385
22 1.83	3.10	0.509	(0.161) 0.148	0.362
23 1.92	2.90	0.477	(0.161) 0.138	0.338
24 2.00	3.00	0.493	(0.161) 0.143	0.350
25 2.08	3.10	0.509	(0.161) 0.148	0.362
26 2.17	4.20	0.690	0.161 (0.200)	0.529
27 2.25	5.00	0.822	0.161 (0.238)	0.660
28 2.33	3.50	0.575	0.161 (0.167)	0.414
29 2.42	6.80	1.118	0.161 (0.324)	0.956
30 2.50	7.30	1.200	0.161 (0.348)	1.038
31 2.58	8.20	1.348	0.161 (0.391)	1.186
32 2.67	5.90	0.970	0.161 (0.281)	0.808
33 2.75	2.00	0.329	(0.161) 0.095	0.233
34 2.83	1.80	0.296	(0.161) 0.086	0.210
35 2.92	1.80	0.296	(0.161) 0.086	0.210
36 3.00	0.60	0.099	(0.161) 0.029	0.070
		(Loss Rate Not Used)		
		Sum = 100.0		Sum = 12.5

Flood volume = Effective rainfall 1.04 (In)
times area 7.5 (Ac.) / [(In) / (Ft.)] = 0.7 (Ac.Ft)
Total soil loss = 0.33 (In)
Total soil loss = 0.206 (Ac.Ft)
Total rainfall = 1.37 (In)
Flood volume = 28331.4 Cubic Feet
Total soil loss = 8953.7 Cubic Feet

Peak flow rate of this hydrograph = 8.265 (CFS)

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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	2.5	5.0	7.5	10.0
0+ 5	0.0040		0.58	V Q				
0+10	0.0111		1.04	V Q				
0+15	0.0182		1.03	V Q				
0+20	0.0263		1.16	V Q				
0+25	0.0352		1.29	V Q				
0+30	0.0452		1.45	V Q				
0+35	0.0550		1.43	V Q				
0+40	0.0652		1.48	VQ				
0+45	0.0760		1.57	V Q				
0+50	0.0860		1.45	Q				
0+55	0.0956		1.39	Q				
1+ 0	0.1059		1.50	QV				
1+ 5	0.1179		1.75	QV				
1+10	0.1310		1.90	QV				
1+15	0.1443		1.93	QV				
1+20	0.1571		1.85	Q V				
1+25	0.1712		2.05	Q V				
1+30	0.1870		2.29	Q V				
1+35	0.2023		2.23	Q V				
1+40	0.2180		2.27	Q V				
1+45	0.2361		2.63	Q V				
1+50	0.2552		2.77	Q V				
1+55	0.2734		2.65	Q V				
2+ 0	0.2915		2.62	Q V				
2+ 5	0.3100		2.69	Q V				
2+10	0.3331		3.36	Q V				
2+15	0.3633		4.38	Q V				
2+20	0.3904		3.94	Q V				
2+25	0.4272		5.34	Q V				
2+30	0.4768		7.20	Q V				
2+35	0.5337		8.26	Q V				
2+40	0.5848		7.42	Q V				
2+45	0.6135		4.17	Q V				
2+50	0.6283		2.15	Q V				
2+55	0.6400		1.70	Q V				
3+ 0	0.6473		1.06	Q V				
3+ 5	0.6498		0.36	Q V				
3+10	0.6503		0.07	Q V				
3+15	0.6504		0.01	Q V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC10PROP610.out

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

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English Units used in output format

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PROPOSED CONDITION, DMA C
10-YR 6-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

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Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.034 Hr.
Lag time = 2.04 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 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]
7.50	1.21	9.07

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	2.86	21.45

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 1.889(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.889(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.760
Total Area Entered	=	7.50(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.760	0.161	1.000	0.161
					Sum (F)	= 0.161

Area averaged mean soil loss (F) (In/Hr) = 0.161
Minimum soil loss rate ((In/Hr)) = 0.081

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.290

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
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2 0.167	490.055	40.364	3.051
3 0.250	735.082	7.184	0.543
4 0.333	980.109	2.213	0.167
	Sum = 100.000	Sum=	7.559

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	0.113	(0.161) 0.033	0.080
2 0.17	0.60	0.136	(0.161) 0.039	0.097
3 0.25	0.60	0.136	(0.161) 0.039	0.097
4 0.33	0.60	0.136	(0.161) 0.039	0.097
5 0.42	0.60	0.136	(0.161) 0.039	0.097
6 0.50	0.70	0.159	(0.161) 0.046	0.113
7 0.58	0.70	0.159	(0.161) 0.046	0.113
8 0.67	0.70	0.159	(0.161) 0.046	0.113
9 0.75	0.70	0.159	(0.161) 0.046	0.113
10 0.83	0.70	0.159	(0.161) 0.046	0.113
11 0.92	0.70	0.159	(0.161) 0.046	0.113
12 1.00	0.80	0.181	(0.161) 0.053	0.129
13 1.08	0.80	0.181	(0.161) 0.053	0.129
14 1.17	0.80	0.181	(0.161) 0.053	0.129
15 1.25	0.80	0.181	(0.161) 0.053	0.129
16 1.33	0.80	0.181	(0.161) 0.053	0.129
17 1.42	0.80	0.181	(0.161) 0.053	0.129
18 1.50	0.80	0.181	(0.161) 0.053	0.129
19 1.58	0.80	0.181	(0.161) 0.053	0.129
20 1.67	0.80	0.181	(0.161) 0.053	0.129
21 1.75	0.80	0.181	(0.161) 0.053	0.129
22 1.83	0.80	0.181	(0.161) 0.053	0.129
23 1.92	0.80	0.181	(0.161) 0.053	0.129
24 2.00	0.90	0.204	(0.161) 0.059	0.145
25 2.08	0.80	0.181	(0.161) 0.053	0.129
26 2.17	0.90	0.204	(0.161) 0.059	0.145
27 2.25	0.90	0.204	(0.161) 0.059	0.145
28 2.33	0.90	0.204	(0.161) 0.059	0.145
29 2.42	0.90	0.204	(0.161) 0.059	0.145
30 2.50	0.90	0.204	(0.161) 0.059	0.145
31 2.58	0.90	0.204	(0.161) 0.059	0.145
32 2.67	0.90	0.204	(0.161) 0.059	0.145
33 2.75	1.00	0.227	(0.161) 0.066	0.161
34 2.83	1.00	0.227	(0.161) 0.066	0.161
35 2.92	1.00	0.227	(0.161) 0.066	0.161
36 3.00	1.00	0.227	(0.161) 0.066	0.161
37 3.08	1.00	0.227	(0.161) 0.066	0.161
38 3.17	1.10	0.249	(0.161) 0.072	0.177
39 3.25	1.10	0.249	(0.161) 0.072	0.177
40 3.33	1.10	0.249	(0.161) 0.072	0.177
41 3.42	1.20	0.272	(0.161) 0.079	0.193
42 3.50	1.30	0.295	(0.161) 0.085	0.209
43 3.58	1.40	0.317	(0.161) 0.092	0.225
44 3.67	1.40	0.317	(0.161) 0.092	0.225
45 3.75	1.50	0.340	(0.161) 0.099	0.241
46 3.83	1.50	0.340	(0.161) 0.099	0.241
47 3.92	1.60	0.363	(0.161) 0.105	0.257
48 4.00	1.60	0.363	(0.161) 0.105	0.257
49 4.08	1.70	0.385	(0.161) 0.112	0.274
50 4.17	1.80	0.408	(0.161) 0.118	0.290
51 4.25	1.90	0.431	(0.161) 0.125	0.306
52 4.33	2.00	0.453	(0.161) 0.131	0.322
53 4.42	2.10	0.476	(0.161) 0.138	0.338
54 4.50	2.10	0.476	(0.161) 0.138	0.338

55	4.58	2.20	0.499	(-0.161)	0.145	0.354
56	4.67	2.30	0.521	(-0.161)	0.151	0.370
57	4.75	2.40	0.544	(-0.161)	0.158	0.386
58	4.83	2.40	0.544	(-0.161)	0.158	0.386
59	4.92	2.50	0.567	0.161	(-0.164)	0.405
60	5.00	2.60	0.589	0.161	(-0.171)	0.428
61	5.08	3.10	0.703	0.161	(-0.204)	0.541
62	5.17	3.60	0.816	0.161	(-0.237)	0.655
63	5.25	3.90	0.884	0.161	(-0.256)	0.723
64	5.33	4.20	0.952	0.161	(-0.276)	0.791
65	5.42	4.70	1.065	0.161	(-0.309)	0.904
66	5.50	5.60	1.269	0.161	(-0.368)	1.108
67	5.58	1.90	0.431	(-0.161)	0.125	0.306
68	5.67	0.90	0.204	(-0.161)	0.059	0.145
69	5.75	0.60	0.136	(-0.161)	0.039	0.097
70	5.83	0.50	0.113	(-0.161)	0.033	0.080
71	5.92	0.30	0.068	(-0.161)	0.020	0.048
72	6.00	0.20	0.045	(-0.161)	0.013	0.032

(Loss Rate Not Used)

Sum = 100.0

Sum = 16.8

Flood volume = Effective rainfall 1.40 (In)

times area 7.5(Ac.)/[(In)/(Ft.)] = 0.9(Ac.Ft)

Total soil loss = 0.49 (In)

Total soil loss = 0.306 (Ac.Ft)

Total rainfall = 1.89 (In)

Flood volume = 38083.4 Cubic Feet

Total soil loss = 13338.5 Cubic Feet

Peak flow rate of this hydrograph = 7.519 (CFS)

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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	2.5	5.0	7.5	10.0
0+ 5	0.0021	0.31	VQ				
0+10	0.0063	0.61	V Q				
0+15	0.0112	0.71	V Q				
0+20	0.0162	0.73	V Q				
0+25	0.0212	0.73	V Q				
0+30	0.0267	0.79	V Q				
0+35	0.0325	0.84	V Q				
0+40	0.0383	0.85	V Q				
0+45	0.0442	0.85	VQ				
0+50	0.0500	0.85	VQ				
0+55	0.0559	0.85	VQ				
1+ 0	0.0622	0.91	VQ				
1+ 5	0.0688	0.96	Q				
1+10	0.0755	0.97	Q				
1+15	0.0822	0.97	Q				
1+20	0.0889	0.97	QV				
1+25	0.0956	0.97	QV				
1+30	0.1023	0.97	QV				
1+35	0.1090	0.97	QV				
1+40	0.1157	0.97	Q V				
1+45	0.1224	0.97	Q V				
1+50	0.1291	0.97	Q V				
1+55	0.1359	0.97	Q V				
2+ 0	0.1430	1.03	Q V				
2+ 5	0.1500	1.02	Q V				
2+10	0.1572	1.04	Q V				
2+15	0.1647	1.09	Q V				
2+20	0.1722	1.09	Q V				
2+25	0.1798	1.10	Q V				
2+30	0.1873	1.10	Q V				
2+35	0.1948	1.10	Q V				
2+40	0.2024	1.10	Q V				
2+45	0.2104	1.16	Q V				
2+50	0.2187	1.21	Q V				
2+55	0.2270	1.21	Q V				
3+ 0	0.2354	1.22	Q V				
3+ 5	0.2438	1.22	Q V				
3+10	0.2526	1.28	Q V				
3+15	0.2617	1.33	Q V				
3+20	0.2709	1.34	Q V				

3+25	0.2806	1.40	Q	V				
3+30	0.2910	1.51	Q	V				
3+35	0.3022	1.63	Q	V				
3+40	0.3138	1.69	Q	V				
3+45	0.3260	1.76	Q	V				
3+50	0.3385	1.81	Q	V				
3+55	0.3514	1.88	Q	V				
4+ 0	0.3648	1.94	Q	V				
4+ 5	0.3786	2.01	Q	V				
4+10	0.3932	2.12	Q	V				
4+15	0.4086	2.24	Q	V				
4+20	0.4248	2.36	Q	V				
4+25	0.4419	2.48	Q	V				
4+30	0.4594	2.54	Q	V				
4+35	0.4774	2.61	Q	V				
4+40	0.4962	2.73	Q	V				
4+45	0.5158	2.85	Q	V				
4+50	0.5358	2.91	Q	V				
4+55	0.5564	2.99	Q	V				
5+ 0	0.5780	3.14	Q	V				
5+ 5	0.6031	3.65	Q	V				
5+10	0.6337	4.44	Q	V				
5+15	0.6689	5.11	Q	V				
5+20	0.7078	5.66	Q	V				
5+25	0.7516	6.35	Q	V				
5+30	0.8034	7.52	Q	V				
5+35	0.8389	5.17	Q	V				
5+40	0.8543	2.24	Q	V				
5+45	0.8623	1.16	Q	V				
5+50	0.8674	0.73	Q	V				
5+55	0.8708	0.51	Q	V				
6+ 0	0.8731	0.33	Q	V				
6+ 5	0.8741	0.14	Q	V				
6+10	0.8742	0.03	Q	V				
6+15	0.8743	0.01	Q	V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC10PROP2410.out

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

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BY PRASAD KASTURI, JULY 2019

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Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
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Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.034 Hr.
Lag time = 2.04 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 Min.
Unit time = 15.00 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]
7.50	2.05	15.37

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	5.16	38.70

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 3.329(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.329(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.760
Total Area Entered	=	7.50(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.760	0.161	1.000	0.161
					Sum (F)	= 0.161

Area averaged mean soil loss (F) (In/Hr) = 0.161
Minimum soil loss rate ((In/Hr)) = 0.081

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.290

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	735.082	79.543	6.012
2 0.500	1470.164	20.457	1.546
		Sum = 100.000	Sum= 7.559

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	0.25	0.20	0.027	(0.285) 0.008	0.019
2	0.50	0.30	0.040	(0.282) 0.012	0.028
3	0.75	0.30	0.040	(0.278) 0.012	0.028
4	1.00	0.40	0.053	(0.275) 0.015	0.038
5	1.25	0.30	0.040	(0.272) 0.012	0.028
6	1.50	0.30	0.040	(0.269) 0.012	0.028
7	1.75	0.30	0.040	(0.265) 0.012	0.028
8	2.00	0.40	0.053	(0.262) 0.015	0.038
9	2.25	0.40	0.053	(0.259) 0.015	0.038
10	2.50	0.40	0.053	(0.256) 0.015	0.038
11	2.75	0.50	0.067	(0.253) 0.019	0.047
12	3.00	0.50	0.067	(0.250) 0.019	0.047
13	3.25	0.50	0.067	(0.247) 0.019	0.047
14	3.50	0.50	0.067	(0.244) 0.019	0.047
15	3.75	0.50	0.067	(0.241) 0.019	0.047
16	4.00	0.60	0.080	(0.237) 0.023	0.057
17	4.25	0.60	0.080	(0.234) 0.023	0.057
18	4.50	0.70	0.093	(0.231) 0.027	0.066
19	4.75	0.70	0.093	(0.229) 0.027	0.066
20	5.00	0.80	0.107	(0.226) 0.031	0.076
21	5.25	0.60	0.080	(0.223) 0.023	0.057
22	5.50	0.70	0.093	(0.220) 0.027	0.066
23	5.75	0.80	0.107	(0.217) 0.031	0.076
24	6.00	0.80	0.107	(0.214) 0.031	0.076
25	6.25	0.90	0.120	(0.211) 0.035	0.085
26	6.50	0.90	0.120	(0.208) 0.035	0.085
27	6.75	1.00	0.133	(0.206) 0.039	0.095
28	7.00	1.00	0.133	(0.203) 0.039	0.095
29	7.25	1.00	0.133	(0.200) 0.039	0.095
30	7.50	1.10	0.146	(0.197) 0.042	0.104
31	7.75	1.20	0.160	(0.195) 0.046	0.113
32	8.00	1.30	0.173	(0.192) 0.050	0.123
33	8.25	1.50	0.200	(0.189) 0.058	0.142
34	8.50	1.50	0.200	(0.187) 0.058	0.142
35	8.75	1.60	0.213	(0.184) 0.062	0.151
36	9.00	1.70	0.226	(0.181) 0.066	0.161
37	9.25	1.90	0.253	(0.179) 0.073	0.180
38	9.50	2.00	0.266	(0.176) 0.077	0.189
39	9.75	2.10	0.280	(0.174) 0.081	0.199
40	10.00	2.20	0.293	(0.171) 0.085	0.208
41	10.25	1.50	0.200	(0.169) 0.058	0.142
42	10.50	1.50	0.200	(0.166) 0.058	0.142
43	10.75	2.00	0.266	(0.164) 0.077	0.189
44	11.00	2.00	0.266	(0.162) 0.077	0.189
45	11.25	1.90	0.253	(0.159) 0.073	0.180
46	11.50	1.90	0.253	(0.157) 0.073	0.180
47	11.75	1.70	0.226	(0.154) 0.066	0.161
48	12.00	1.80	0.240	(0.152) 0.070	0.170
49	12.25	2.50	0.333	(0.150) 0.097	0.236
50	12.50	2.60	0.346	(0.148) 0.100	0.246
51	12.75	2.80	0.373	(0.145) 0.108	0.265
52	13.00	2.90	0.386	(0.143) 0.112	0.274
53	13.25	3.40	0.453	(0.141) 0.131	0.321
54	13.50	3.40	0.453	(0.139) 0.131	0.321
55	13.75	2.30	0.306	(0.137) 0.089	0.217
56	14.00	2.30	0.306	(0.135) 0.089	0.217

57	14.25	2.70	0.360	(0.133)	0.104	0.255
58	14.50	2.60	0.346	(0.131)	0.100	0.246
59	14.75	2.60	0.346	(0.129)	0.100	0.246
60	15.00	2.50	0.333	(0.127)	0.097	0.236
61	15.25	2.40	0.320	(0.125)	0.093	0.227
62	15.50	2.30	0.306	(0.123)	0.089	0.217
63	15.75	1.90	0.253	(0.121)	0.073	0.180
64	16.00	1.90	0.253	(0.119)	0.073	0.180
65	16.25	0.40	0.053	(0.117)	0.015	0.038
66	16.50	0.40	0.053	(0.116)	0.015	0.038
67	16.75	0.30	0.040	(0.114)	0.012	0.028
68	17.00	0.30	0.040	(0.112)	0.012	0.028
69	17.25	0.50	0.067	(0.110)	0.019	0.047
70	17.50	0.50	0.067	(0.109)	0.019	0.047
71	17.75	0.50	0.067	(0.107)	0.019	0.047
72	18.00	0.40	0.053	(0.106)	0.015	0.038
73	18.25	0.40	0.053	(0.104)	0.015	0.038
74	18.50	0.40	0.053	(0.102)	0.015	0.038
75	18.75	0.30	0.040	(0.101)	0.012	0.028
76	19.00	0.20	0.027	(0.100)	0.008	0.019
77	19.25	0.30	0.040	(0.098)	0.012	0.028
78	19.50	0.40	0.053	(0.097)	0.015	0.038
79	19.75	0.30	0.040	(0.095)	0.012	0.028
80	20.00	0.20	0.027	(0.094)	0.008	0.019
81	20.25	0.30	0.040	(0.093)	0.012	0.028
82	20.50	0.30	0.040	(0.092)	0.012	0.028
83	20.75	0.30	0.040	(0.091)	0.012	0.028
84	21.00	0.20	0.027	(0.089)	0.008	0.019
85	21.25	0.30	0.040	(0.088)	0.012	0.028
86	21.50	0.20	0.027	(0.087)	0.008	0.019
87	21.75	0.30	0.040	(0.086)	0.012	0.028
88	22.00	0.20	0.027	(0.086)	0.008	0.019
89	22.25	0.30	0.040	(0.085)	0.012	0.028
90	22.50	0.20	0.027	(0.084)	0.008	0.019
91	22.75	0.20	0.027	(0.083)	0.008	0.019
92	23.00	0.20	0.027	(0.083)	0.008	0.019
93	23.25	0.20	0.027	(0.082)	0.008	0.019
94	23.50	0.20	0.027	(0.081)	0.008	0.019
95	23.75	0.20	0.027	(0.081)	0.008	0.019
96	24.00	0.20	0.027	(0.081)	0.008	0.019

(Loss Rate Not Used)

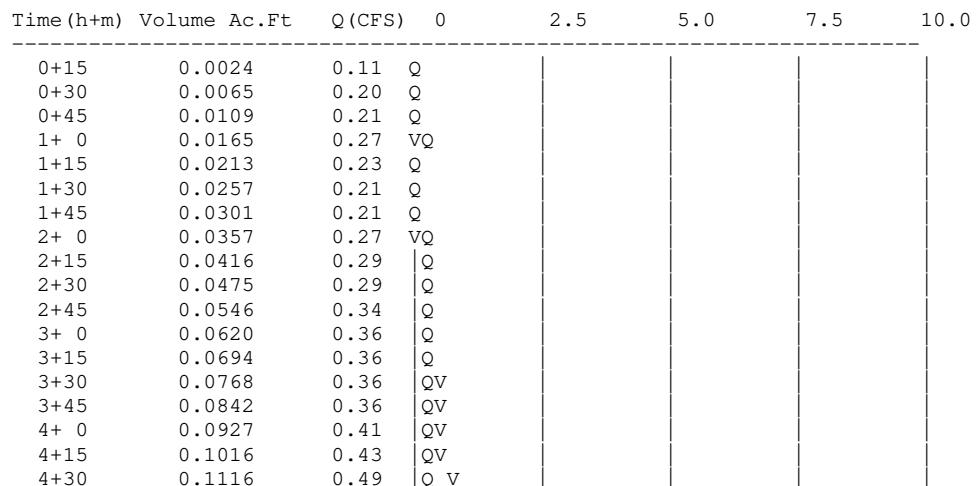
Sum = 100.0 Sum = 9.5

Flood volume = Effective rainfall 2.36 (In)
times area 7.5 (Ac.) / [(In) / (Ft.)] = 1.5 (Ac.Ft)
Total soil loss = 0.97 (In)
Total soil loss = 0.603 (Ac.Ft)
Total rainfall = 3.33 (In)
Flood volume = 64357.1 Cubic Feet
Total soil loss = 26286.7 Cubic Feet

Peak flow rate of this hydrograph = 2.431 (CFS)

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24 - H O U R S T O R M
Run off Hydrograph

Hydrograph in 15 Minute intervals ((CFS))



4+45	0.1220	0.50	QV					
5+ 0	0.1335	0.56	QV					
5+15	0.1430	0.46	Q V					
5+30	0.1530	0.49	Q V					
5+45	0.1645	0.56	Q V					
6+ 0	0.1764	0.57	Q V					
6+15	0.1893	0.63	Q V					
6+30	0.2026	0.64	Q V					
6+45	0.2171	0.70	Q V					
7+ 0	0.2319	0.72	Q V					
7+15	0.2467	0.72	Q V					
7+30	0.2626	0.77	Q V					
7+45	0.2800	0.84	Q V					
8+ 0	0.2989	0.91	Q V					
8+15	0.3205	1.04	Q V					
8+30	0.3427	1.07	Q V					
8+45	0.3660	1.13	Q V					
9+ 0	0.3908	1.20	Q V					
9+15	0.4183	1.33	Q V					
9+30	0.4475	1.42	Q V					
9+45	0.4783	1.49	Q V					
10+ 0	0.5105	1.56	Q V					
10+15	0.5347	1.18	Q V					
10+30	0.5569	1.07	Q V					
10+45	0.5849	1.36	Q V					
11+ 0	0.6145	1.43	Q V					
11+15	0.6429	1.37	Q V					
11+30	0.6709	1.36	Q V					
11+45	0.6966	1.24	Q V					
12+ 0	0.7229	1.27	Q V					
12+15	0.7578	1.69	Q V					
12+30	0.7959	1.84	Q V					
12+45	0.8366	1.97	Q V					
13+ 0	0.8792	2.06	Q V					
13+15	0.9279	2.36	Q V					
13+30	0.9781	2.43	Q V					
13+45	1.0154	1.81	Q V					
14+ 0	1.0494	1.64	Q V					
14+15	1.0881	1.87	Q V					
14+30	1.1268	1.87	Q V					
14+45	1.1652	1.86	Q V					
15+ 0	1.2025	1.80	Q V					
15+15	1.2382	1.73	Q V					
15+30	1.2725	1.66	Q V					
15+45	1.3018	1.42	Q V					
16+ 0	1.3299	1.36	Q V					
16+15	1.3403	0.51	Q V					
16+30	1.3462	0.29	Q V					
16+45	1.3509	0.23	Q V					
17+ 0	1.3554	0.21	Q V					
17+15	1.3622	0.33	Q V					
17+30	1.3695	0.36	Q V					
17+45	1.3769	0.36	Q V					
18+ 0	1.3831	0.30	Q V					
18+15	1.3891	0.29	Q V					
18+30	1.3950	0.29	Q V					
18+45	1.3997	0.23	Q V					
19+ 0	1.4030	0.16	Q V					
19+15	1.4071	0.20	Q V					
19+30	1.4127	0.27	Q V					
19+45	1.4174	0.23	Q V					
20+ 0	1.4207	0.16	Q V					
20+15	1.4248	0.20	Q V					
20+30	1.4293	0.21	Q V					
20+45	1.4337	0.21	Q V					
21+ 0	1.4369	0.16	Q V					
21+15	1.4411	0.20	Q V					
21+30	1.4443	0.16	Q V					
21+45	1.4485	0.20	Q V					
22+ 0	1.4517	0.16	Q V					
22+15	1.4558	0.20	Q V					
22+30	1.4591	0.16	Q V					
22+45	1.4621	0.14	Q V					
23+ 0	1.4650	0.14	Q V					
23+15	1.4680	0.14	Q V					
23+30	1.4709	0.14	Q V					
23+45	1.4739	0.14	Q V					
24+ 0	1.4768	0.14	Q V					
24+15	1.4774	0.03	Q V					

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC100EXIST1100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION, DMA C

100-YR 1-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.045 Hr.
Lag time = 2.72 Min.
25% of lag time = 0.68 Min.
40% of lag time = 1.09 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]
7.50	0.49	3.67

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	1.33	9.98

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 1.330(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.330(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.500
Total Area Entered	=	7.50(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.500	0.281	1.000	0.281
					Sum (F)	= 0.281

Area averaged mean soil loss (F) (In/Hr) = 0.281
Minimum soil loss rate ((In/Hr)) = 0.140

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	183.771	40.452
2	0.167	367.541	44.515
3	0.250	551.312	9.487
4	0.333	735.082	3.846
5	0.417	918.853	1.700
		Sum = 100.000	Sum= 7.559

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	4.20	0.670	0.281 (0.335)	0.389
2	0.17	4.30	0.686	0.281 (0.343)	0.405
3	0.25	5.00	0.798	0.281 (0.399)	0.517
4	0.33	5.00	0.798	0.281 (0.399)	0.517
5	0.42	5.80	0.926	0.281 (0.463)	0.645
6	0.50	6.50	1.037	0.281 (0.519)	0.756
7	0.58	7.40	1.181	0.281 (0.590)	0.900
8	0.67	8.60	1.372	0.281 (0.686)	1.092
9	0.75	12.30	1.963	0.281 (0.981)	1.682
10	0.83	29.10	4.644	0.281 (2.322)	4.363
11	0.92	6.80	1.085	0.281 (0.543)	0.804
12	1.00	5.00	0.798	0.281 (0.399)	0.517

(Loss Rate Not Used)

Sum = 100.0 Sum = 12.6

Flood volume = Effective rainfall 1.05 (In)

times area 7.5 (Ac.) / [(In)/(Ft.)] = 0.7 (Ac.Ft)

Total soil loss = 0.28 (In)

Total soil loss = 0.176 (Ac.Ft)

Total rainfall = 1.33 (In)

Flood volume = 28558.2 Cubic Feet

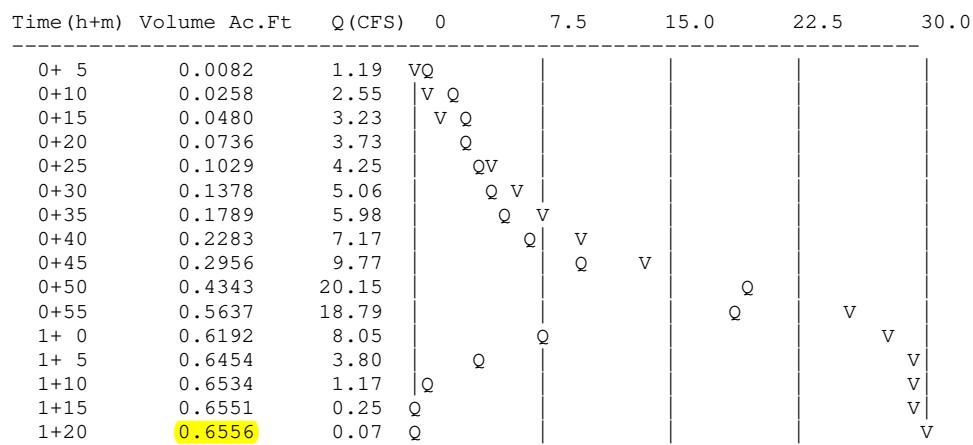
Total soil loss = 7648.6 Cubic Feet

Peak flow rate of this hydrograph = 20.152 (CFS)

+++++ 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))



Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC100EXIST3100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION, DMA C

100-YR 3-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.045 Hr.
Lag time = 2.72 Min.
25% of lag time = 0.68 Min.
40% of lag time = 1.09 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]
7.50	0.87	6.50

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	2.09	15.67

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 2.090(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.090(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.500
Total Area Entered =	7.50(Ac.)	

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.500	0.281	1.000	0.281
					Sum (F) =	0.281

Area averaged mean soil loss (F) (In/Hr) = 0.281
Minimum soil loss rate ((In/Hr)) = 0.140

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit (CFS)
1 0.083	183.771	40.452	3.058
2 0.167	367.541	44.515	3.365
3 0.250	551.312	9.487	0.717
4 0.333	735.082	3.846	0.291
5 0.417	918.853	1.700	0.128
	Sum = 100.000	Sum=	7.559

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)		Effective (In/Hr)
				Max		
1	0.08	1.30	0.326	(0.281)	0.163	0.163
2	0.17	1.30	0.326	(0.281)	0.163	0.163
3	0.25	1.10	0.276	(0.281)	0.138	0.138
4	0.33	1.50	0.376	(0.281)	0.188	0.188
5	0.42	1.50	0.376	(0.281)	0.188	0.188
6	0.50	1.80	0.451	(0.281)	0.226	0.226
7	0.58	1.50	0.376	(0.281)	0.188	0.188
8	0.67	1.80	0.451	(0.281)	0.226	0.226
9	0.75	1.80	0.451	(0.281)	0.226	0.226
10	0.83	1.50	0.376	(0.281)	0.188	0.188
11	0.92	1.60	0.401	(0.281)	0.201	0.201
12	1.00	1.80	0.451	(0.281)	0.226	0.226
13	1.08	2.20	0.552	(0.281)	0.276	0.276
14	1.17	2.20	0.552	(0.281)	0.276	0.276
15	1.25	2.20	0.552	(0.281)	0.276	0.276
16	1.33	2.00	0.502	(0.281)	0.251	0.251
17	1.42	2.60	0.652	0.281	(0.326)	0.371
18	1.50	2.70	0.677	0.281	(0.339)	0.396
19	1.58	2.40	0.602	0.281	(0.301)	0.321
20	1.67	2.70	0.677	0.281	(0.339)	0.396
21	1.75	3.30	0.828	0.281	(0.414)	0.547
22	1.83	3.10	0.777	0.281	(0.389)	0.497
23	1.92	2.90	0.727	0.281	(0.364)	0.446
24	2.00	3.00	0.752	0.281	(0.376)	0.471
25	2.08	3.10	0.777	0.281	(0.389)	0.497
26	2.17	4.20	1.053	0.281	(0.527)	0.772
27	2.25	5.00	1.254	0.281	(0.627)	0.973
28	2.33	3.50	0.878	0.281	(0.439)	0.597
29	2.42	6.80	1.705	0.281	(0.853)	1.424
30	2.50	7.30	1.831	0.281	(0.915)	1.550
31	2.58	8.20	2.056	0.281	(1.028)	1.776
32	2.67	5.90	1.480	0.281	(0.740)	1.199
33	2.75	2.00	0.502	(0.281)	0.251	0.251
34	2.83	1.80	0.451	(0.281)	0.226	0.226
35	2.92	1.80	0.451	(0.281)	0.226	0.226
36	3.00	0.60	0.150	(0.281)	0.075	0.075

$S_{1m} = 100.0$ $S_{1m} = 16.4$

Flood volume = Effective rainfall 1.37 (In)

$$\text{flow volume} = \text{effective rainfall} \times (\text{in}) \times \text{area}$$

Total soil loss = 0.72 (In)

Total soil loss = 0.452 (Ac.Ft)

Total rainfall = 2.09 (In)

Flood volume = 37226.7 Cubic Feet

Total soil loss = 19671.7 Cubic Feet

Peak flow rate of this hydrograph = 11.970 (CFS)

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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	0.0034		0.50	Q				
0+10	0.0106		1.05	V Q				
0+15	0.0181		1.09	V Q				
0+20	0.0264		1.20	VQ				
0+25	0.0359		1.38	VQ				
0+30	0.0464		1.52	VQ				
0+35	0.0570		1.54	VQ				
0+40	0.0678		1.56	Q				
0+45	0.0793		1.68	Q				
0+50	0.0902		1.58	QV				
0+55	0.1005		1.50	Q V				
1+ 0	0.1115		1.60	Q V				
1+ 5	0.1241		1.83	Q V				
1+10	0.1380		2.02	Q V				
1+15	0.1522		2.06	Q V				
1+20	0.1660		2.00	Q V				
1+25	0.1818		2.29	Q V				
1+30	0.2008		2.76	Q V				
1+35	0.2193		2.69	Q V				
1+40	0.2380		2.72	Q V				
1+45	0.2614		3.40	Q V				
1+50	0.2875		3.79	Q V				
1+55	0.3122		3.59	Q V				
2+ 0	0.3364		3.51	Q V				
2+ 5	0.3615		3.64	Q V				
2+10	0.3929		4.57	Q V				
2+15	0.4351		6.13	Q V				
2+20	0.4755		5.86	Q V				
2+25	0.5261		7.35	Q V				
2+30	0.5974		10.35	Q V				
2+35	0.6798		11.97	Q V				
2+40	0.7573		11.25	Q V				
2+45	0.8035		6.71	Q V				
2+50	0.8249		3.11	Q V				
2+55	0.8401		2.21	Q V				
3+ 0	0.8496		1.38	Q V				
3+ 5	0.8532		0.51	Q V				
3+10	0.8542		0.15	Q V				
3+15	0.8545		0.05	Q V				
3+20	0.8546		0.01	Q V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC100EXIST6100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION, DMA C

100-YR 6-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.045 Hr.
Lag time = 2.72 Min.
25% of lag time = 0.68 Min.
40% of lag time = 1.09 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]
7.50	1.21	9.07

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	2.86	21.45

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 2.860(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.860(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.500
Total Area Entered =	7.50(Ac.)	

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.500	0.281	1.000	0.281
					Sum (F) =	0.281

Area averaged mean soil loss (F) (In/Hr) = 0.281
Minimum soil loss rate ((In/Hr)) = 0.140

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

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	183.771	40.452	3.058
2 0.167	367.541	44.515	3.365
3 0.250	551.312	9.487	0.717
4 0.333	735.082	3.846	0.291
5 0.417	918.853	1.700	0.128
	Sum = 100.000	Sum=	7.559

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	0.172	(0.281) 0.086	0.086
2	0.17	0.60	0.206	(0.281) 0.103	0.103
3	0.25	0.60	0.206	(0.281) 0.103	0.103
4	0.33	0.60	0.206	(0.281) 0.103	0.103
5	0.42	0.60	0.206	(0.281) 0.103	0.103
6	0.50	0.70	0.240	(0.281) 0.120	0.120
7	0.58	0.70	0.240	(0.281) 0.120	0.120
8	0.67	0.70	0.240	(0.281) 0.120	0.120
9	0.75	0.70	0.240	(0.281) 0.120	0.120
10	0.83	0.70	0.240	(0.281) 0.120	0.120
11	0.92	0.70	0.240	(0.281) 0.120	0.120
12	1.00	0.80	0.275	(0.281) 0.137	0.137
13	1.08	0.80	0.275	(0.281) 0.137	0.137
14	1.17	0.80	0.275	(0.281) 0.137	0.137
15	1.25	0.80	0.275	(0.281) 0.137	0.137
16	1.33	0.80	0.275	(0.281) 0.137	0.137
17	1.42	0.80	0.275	(0.281) 0.137	0.137
18	1.50	0.80	0.275	(0.281) 0.137	0.137
19	1.58	0.80	0.275	(0.281) 0.137	0.137
20	1.67	0.80	0.275	(0.281) 0.137	0.137
21	1.75	0.80	0.275	(0.281) 0.137	0.137
22	1.83	0.80	0.275	(0.281) 0.137	0.137
23	1.92	0.80	0.275	(0.281) 0.137	0.137
24	2.00	0.90	0.309	(0.281) 0.154	0.154
25	2.08	0.80	0.275	(0.281) 0.137	0.137
26	2.17	0.90	0.309	(0.281) 0.154	0.154
27	2.25	0.90	0.309	(0.281) 0.154	0.154
28	2.33	0.90	0.309	(0.281) 0.154	0.154
29	2.42	0.90	0.309	(0.281) 0.154	0.154
30	2.50	0.90	0.309	(0.281) 0.154	0.154
31	2.58	0.90	0.309	(0.281) 0.154	0.154
32	2.67	0.90	0.309	(0.281) 0.154	0.154
33	2.75	1.00	0.343	(0.281) 0.172	0.172
34	2.83	1.00	0.343	(0.281) 0.172	0.172
35	2.92	1.00	0.343	(0.281) 0.172	0.172
36	3.00	1.00	0.343	(0.281) 0.172	0.172
37	3.08	1.00	0.343	(0.281) 0.172	0.172
38	3.17	1.10	0.378	(0.281) 0.189	0.189
39	3.25	1.10	0.378	(0.281) 0.189	0.189
40	3.33	1.10	0.378	(0.281) 0.189	0.189
41	3.42	1.20	0.412	(0.281) 0.206	0.206
42	3.50	1.30	0.446	(0.281) 0.223	0.223
43	3.58	1.40	0.480	(0.281) 0.240	0.240
44	3.67	1.40	0.480	(0.281) 0.240	0.240
45	3.75	1.50	0.515	(0.281) 0.257	0.257
46	3.83	1.50	0.515	(0.281) 0.257	0.257
47	3.92	1.60	0.549	(0.281) 0.275	0.275
48	4.00	1.60	0.549	(0.281) 0.275	0.275
49	4.08	1.70	0.583	0.281 (0.292)	0.302
50	4.17	1.80	0.618	0.281 (0.309)	0.337
51	4.25	1.90	0.652	0.281 (0.326)	0.371
52	4.33	2.00	0.686	0.281 (0.343)	0.405
53	4.42	2.10	0.721	0.281 (0.360)	0.440

54	4.50	2.10	0.721	0.281	(0.360)	0.440
55	4.58	2.20	0.755	0.281	(0.378)	0.474
56	4.67	2.30	0.789	0.281	(0.395)	0.508
57	4.75	2.40	0.824	0.281	(0.412)	0.543
58	4.83	2.40	0.824	0.281	(0.412)	0.543
59	4.92	2.50	0.858	0.281	(0.429)	0.577
60	5.00	2.60	0.892	0.281	(0.446)	0.611
61	5.08	3.10	1.064	0.281	(0.532)	0.783
62	5.17	3.60	1.235	0.281	(0.618)	0.955
63	5.25	3.90	1.338	0.281	(0.669)	1.058
64	5.33	4.20	1.441	0.281	(0.721)	1.160
65	5.42	4.70	1.613	0.281	(0.806)	1.332
66	5.50	5.60	1.922	0.281	(0.961)	1.641
67	5.58	1.90	0.652	0.281	(0.326)	0.371
68	5.67	0.90	0.309	(0.281)	0.154	0.154
69	5.75	0.60	0.206	(0.281)	0.103	0.103
70	5.83	0.50	0.172	(0.281)	0.086	0.086
71	5.92	0.30	0.103	(0.281)	0.051	0.051
72	6.00	0.20	0.069	(0.281)	0.034	0.034

(Loss Rate Not Used)

Sum = 100.0

Sum = 20.9

Flood volume = Effective rainfall 1.74 (In)

times area 7.5(Ac.)/[(In)/(Ft.)] = 1.1(Ac.Ft)

Total soil loss = 1.12 (In)

Total soil loss = 0.698 (Ac.Ft)

Total rainfall = 2.86 (In)

Flood volume = 47453.8 Cubic Feet

Total soil loss = 30407.7 Cubic Feet

Peak flow rate of this hydrograph = 10.767 (CFS)

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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	0.0018	0.26	Q				
0+10	0.0060	0.60	VQ				
0+15	0.0109	0.72	VQ				
0+20	0.0162	0.76	VQ				
0+25	0.0215	0.78	VQ				
0+30	0.0273	0.83	Q				
0+35	0.0334	0.89	Q				
0+40	0.0396	0.90	Q				
0+45	0.0458	0.91	Q				
0+50	0.0521	0.91	Q				
0+55	0.0583	0.91	QV				
1+ 0	0.0650	0.96	QV				
1+ 5	0.0720	1.02	Q				
1+10	0.0791	1.03	Q				
1+15	0.0862	1.04	QV				
1+20	0.0934	1.04	QV				
1+25	0.1005	1.04	QV				
1+30	0.1077	1.04	QV				
1+35	0.1148	1.04	Q V				
1+40	0.1220	1.04	Q V				
1+45	0.1291	1.04	Q V				
1+50	0.1363	1.04	Q V				
1+55	0.1434	1.04	Q V				
2+ 0	0.1509	1.09	Q V				
2+ 5	0.1585	1.10	Q V				
2+10	0.1661	1.10	Q V				
2+15	0.1740	1.15	Q V				
2+20	0.1820	1.16	Q V				
2+25	0.1900	1.17	Q V				
2+30	0.1981	1.17	Q V				
2+35	0.2061	1.17	Q V				
2+40	0.2142	1.17	Q V				
2+45	0.2226	1.22	Q V				
2+50	0.2314	1.28	Q V				
2+55	0.2403	1.29	Q V				
3+ 0	0.2492	1.30	Q V				
3+ 5	0.2581	1.30	Q V				
3+10	0.2674	1.35	Q V				
3+15	0.2771	1.41	Q V				

3+20	0.2869	1.42	Q	V				
3+25	0.2971	1.48	Q	V				
3+30	0.3080	1.59	Q	V				
3+35	0.3198	1.71	Q	V				
3+40	0.3321	1.79	Q	V				
3+45	0.3449	1.86	Q	V				
3+50	0.3582	1.92	Q	V				
3+55	0.3719	1.99	Q	V				
4+ 0	0.3861	2.05	Q	V				
4+ 5	0.4009	2.15	Q	V				
4+10	0.4172	2.36	Q	V				
4+15	0.4351	2.60	Q	V				
4+20	0.4547	2.85	Q	V				
4+25	0.4762	3.11	Q	V				
4+30	0.4987	3.27	Q	V				
4+35	0.5222	3.41	Q	V				
4+40	0.5473	3.65	Q	V				
4+45	0.5741	3.90	Q	V				
4+50	0.6020	4.05	Q	V				
4+55	0.6309	4.19	Q	V				
5+ 0	0.6613	4.43	Q	V				
5+ 5	0.6964	5.09	Q	V				
5+10	0.7393	6.23	Q	V				
5+15	0.7894	7.26	Q	V				
5+20	0.8452	8.10	Q	V				
5+25	0.9080	9.12	Q	V				
5+30	0.9821	10.77	Q	V				
5+35	1.0378	8.09	Q	V				
5+40	1.0615	3.44	Q	V				
5+45	1.0735	1.75	Q	V				
5+50	1.0807	1.04	Q	V				
5+55	1.0849	0.61	Q	V				
6+ 0	1.0876	0.39	Q	V				
6+ 5	1.0889	0.19	Q	V				
6+10	1.0892	0.05	Q	V				
6+15	1.0894	0.02	Q	V				
6+20	1.0894	0.00	Q	V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC100EXIST24100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION, DMA C

100-YR 24-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.045 Hr.
Lag time = 2.72 Min.
25% of lag time = 0.68 Min.
40% of lag time = 1.09 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]
7.50	2.05	15.37

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	5.16	38.70

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 5.160(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 5.160(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.500
Total Area Entered	=	7.50(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.500	0.281	1.000	0.281
					Sum (F)	= 0.281

Area averaged mean soil loss (F) (In/Hr) = 0.281
Minimum soil loss rate ((In/Hr)) = 0.140

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	183.771	40.452	3.058
2 0.167	367.541	44.515	3.365
3 0.250	551.312	9.487	0.717
4 0.333	735.082	3.846	0.291
5 0.417	918.853	1.700	0.128
	Sum = 100.000	Sum=	7.559

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	0.041	(0.498) 0.021	0.021
2	0.17	0.07	0.041	(0.496) 0.021	0.021
3	0.25	0.07	0.041	(0.494) 0.021	0.021
4	0.33	0.10	0.062	(0.492) 0.031	0.031
5	0.42	0.10	0.062	(0.490) 0.031	0.031
6	0.50	0.10	0.062	(0.488) 0.031	0.031
7	0.58	0.10	0.062	(0.487) 0.031	0.031
8	0.67	0.10	0.062	(0.485) 0.031	0.031
9	0.75	0.10	0.062	(0.483) 0.031	0.031
10	0.83	0.13	0.083	(0.481) 0.041	0.041
11	0.92	0.13	0.083	(0.479) 0.041	0.041
12	1.00	0.13	0.083	(0.477) 0.041	0.041
13	1.08	0.10	0.062	(0.475) 0.031	0.031
14	1.17	0.10	0.062	(0.473) 0.031	0.031
15	1.25	0.10	0.062	(0.471) 0.031	0.031
16	1.33	0.10	0.062	(0.470) 0.031	0.031
17	1.42	0.10	0.062	(0.468) 0.031	0.031
18	1.50	0.10	0.062	(0.466) 0.031	0.031
19	1.58	0.10	0.062	(0.464) 0.031	0.031
20	1.67	0.10	0.062	(0.462) 0.031	0.031
21	1.75	0.10	0.062	(0.460) 0.031	0.031
22	1.83	0.13	0.083	(0.458) 0.041	0.041
23	1.92	0.13	0.083	(0.457) 0.041	0.041
24	2.00	0.13	0.083	(0.455) 0.041	0.041
25	2.08	0.13	0.083	(0.453) 0.041	0.041
26	2.17	0.13	0.083	(0.451) 0.041	0.041
27	2.25	0.13	0.083	(0.449) 0.041	0.041
28	2.33	0.13	0.083	(0.447) 0.041	0.041
29	2.42	0.13	0.083	(0.446) 0.041	0.041
30	2.50	0.13	0.083	(0.444) 0.041	0.041
31	2.58	0.17	0.103	(0.442) 0.052	0.052
32	2.67	0.17	0.103	(0.440) 0.052	0.052
33	2.75	0.17	0.103	(0.438) 0.052	0.052
34	2.83	0.17	0.103	(0.436) 0.052	0.052
35	2.92	0.17	0.103	(0.435) 0.052	0.052
36	3.00	0.17	0.103	(0.433) 0.052	0.052
37	3.08	0.17	0.103	(0.431) 0.052	0.052
38	3.17	0.17	0.103	(0.429) 0.052	0.052
39	3.25	0.17	0.103	(0.427) 0.052	0.052
40	3.33	0.17	0.103	(0.426) 0.052	0.052
41	3.42	0.17	0.103	(0.424) 0.052	0.052
42	3.50	0.17	0.103	(0.422) 0.052	0.052
43	3.58	0.17	0.103	(0.420) 0.052	0.052
44	3.67	0.17	0.103	(0.419) 0.052	0.052
45	3.75	0.17	0.103	(0.417) 0.052	0.052
46	3.83	0.20	0.124	(0.415) 0.062	0.062
47	3.92	0.20	0.124	(0.413) 0.062	0.062
48	4.00	0.20	0.124	(0.412) 0.062	0.062
49	4.08	0.20	0.124	(0.410) 0.062	0.062
50	4.17	0.20	0.124	(0.408) 0.062	0.062
51	4.25	0.20	0.124	(0.406) 0.062	0.062
52	4.33	0.23	0.144	(0.405) 0.072	0.072
53	4.42	0.23	0.144	(0.403) 0.072	0.072

54	4.50	0.23	0.144	(-0.401)	0.072	0.072
55	4.58	0.23	0.144	(-0.399)	0.072	0.072
56	4.67	0.23	0.144	(-0.398)	0.072	0.072
57	4.75	0.23	0.144	(-0.396)	0.072	0.072
58	4.83	0.27	0.165	(-0.394)	0.083	0.083
59	4.92	0.27	0.165	(-0.393)	0.083	0.083
60	5.00	0.27	0.165	(-0.391)	0.083	0.083
61	5.08	0.20	0.124	(-0.389)	0.062	0.062
62	5.17	0.20	0.124	(-0.388)	0.062	0.062
63	5.25	0.20	0.124	(-0.386)	0.062	0.062
64	5.33	0.23	0.144	(-0.384)	0.072	0.072
65	5.42	0.23	0.144	(-0.382)	0.072	0.072
66	5.50	0.23	0.144	(-0.381)	0.072	0.072
67	5.58	0.27	0.165	(-0.379)	0.083	0.083
68	5.67	0.27	0.165	(-0.377)	0.083	0.083
69	5.75	0.27	0.165	(-0.376)	0.083	0.083
70	5.83	0.27	0.165	(-0.374)	0.083	0.083
71	5.92	0.27	0.165	(-0.372)	0.083	0.083
72	6.00	0.27	0.165	(-0.371)	0.083	0.083
73	6.08	0.30	0.186	(-0.369)	0.093	0.093
74	6.17	0.30	0.186	(-0.368)	0.093	0.093
75	6.25	0.30	0.186	(-0.366)	0.093	0.093
76	6.33	0.30	0.186	(-0.364)	0.093	0.093
77	6.42	0.30	0.186	(-0.363)	0.093	0.093
78	6.50	0.30	0.186	(-0.361)	0.093	0.093
79	6.58	0.33	0.206	(-0.359)	0.103	0.103
80	6.67	0.33	0.206	(-0.358)	0.103	0.103
81	6.75	0.33	0.206	(-0.356)	0.103	0.103
82	6.83	0.33	0.206	(-0.355)	0.103	0.103
83	6.92	0.33	0.206	(-0.353)	0.103	0.103
84	7.00	0.33	0.206	(-0.351)	0.103	0.103
85	7.08	0.33	0.206	(-0.350)	0.103	0.103
86	7.17	0.33	0.206	(-0.348)	0.103	0.103
87	7.25	0.33	0.206	(-0.347)	0.103	0.103
88	7.33	0.37	0.227	(-0.345)	0.114	0.114
89	7.42	0.37	0.227	(-0.343)	0.114	0.114
90	7.50	0.37	0.227	(-0.342)	0.114	0.114
91	7.58	0.40	0.248	(-0.340)	0.124	0.124
92	7.67	0.40	0.248	(-0.339)	0.124	0.124
93	7.75	0.40	0.248	(-0.337)	0.124	0.124
94	7.83	0.43	0.268	(-0.336)	0.134	0.134
95	7.92	0.43	0.268	(-0.334)	0.134	0.134
96	8.00	0.43	0.268	(-0.332)	0.134	0.134
97	8.08	0.50	0.310	(-0.331)	0.155	0.155
98	8.17	0.50	0.310	(-0.329)	0.155	0.155
99	8.25	0.50	0.310	(-0.328)	0.155	0.155
100	8.33	0.50	0.310	(-0.326)	0.155	0.155
101	8.42	0.50	0.310	(-0.325)	0.155	0.155
102	8.50	0.50	0.310	(-0.323)	0.155	0.155
103	8.58	0.53	0.330	(-0.322)	0.165	0.165
104	8.67	0.53	0.330	(-0.320)	0.165	0.165
105	8.75	0.53	0.330	(-0.319)	0.165	0.165
106	8.83	0.57	0.351	(-0.317)	0.175	0.175
107	8.92	0.57	0.351	(-0.316)	0.175	0.175
108	9.00	0.57	0.351	(-0.314)	0.175	0.175
109	9.08	0.63	0.392	(-0.313)	0.196	0.196
110	9.17	0.63	0.392	(-0.311)	0.196	0.196
111	9.25	0.63	0.392	(-0.310)	0.196	0.196
112	9.33	0.67	0.413	(-0.308)	0.206	0.206
113	9.42	0.67	0.413	(-0.307)	0.206	0.206
114	9.50	0.67	0.413	(-0.305)	0.206	0.206
115	9.58	0.70	0.433	(-0.304)	0.217	0.217
116	9.67	0.70	0.433	(-0.302)	0.217	0.217
117	9.75	0.70	0.433	(-0.301)	0.217	0.217
118	9.83	0.73	0.454	(-0.300)	0.227	0.227
119	9.92	0.73	0.454	(-0.298)	0.227	0.227
120	10.00	0.73	0.454	(-0.297)	0.227	0.227
121	10.08	0.50	0.310	(-0.295)	0.155	0.155
122	10.17	0.50	0.310	(-0.294)	0.155	0.155
123	10.25	0.50	0.310	(-0.292)	0.155	0.155
124	10.33	0.50	0.310	(-0.291)	0.155	0.155
125	10.42	0.50	0.310	(-0.290)	0.155	0.155
126	10.50	0.50	0.310	(-0.288)	0.155	0.155
127	10.58	0.67	0.413	(-0.287)	0.206	0.206
128	10.67	0.67	0.413	(-0.285)	0.206	0.206
129	10.75	0.67	0.413	(-0.284)	0.206	0.206
130	10.83	0.67	0.413	(-0.283)	0.206	0.206
131	10.92	0.67	0.413	(-0.281)	0.206	0.206
132	11.00	0.67	0.413	(-0.280)	0.206	0.206

133	11.08	0.63	0.392	(-0.278)	0.196	0.196
134	11.17	0.63	0.392	(-0.277)	0.196	0.196
135	11.25	0.63	0.392	(-0.276)	0.196	0.196
136	11.33	0.63	0.392	(-0.274)	0.196	0.196
137	11.42	0.63	0.392	(-0.273)	0.196	0.196
138	11.50	0.63	0.392	(-0.272)	0.196	0.196
139	11.58	0.57	0.351	(-0.270)	0.175	0.175
140	11.67	0.57	0.351	(-0.269)	0.175	0.175
141	11.75	0.57	0.351	(-0.268)	0.175	0.175
142	11.83	0.60	0.372	(-0.266)	0.186	0.186
143	11.92	0.60	0.372	(-0.265)	0.186	0.186
144	12.00	0.60	0.372	(-0.264)	0.186	0.186
145	12.08	0.83	0.516	(-0.262)	0.258	0.258
146	12.17	0.83	0.516	(-0.261)	0.258	0.258
147	12.25	0.83	0.516	(-0.260)	0.258	0.258
148	12.33	0.87	0.537	0.258	(-0.268)	0.278
149	12.42	0.87	0.537	0.257	(-0.268)	0.280
150	12.50	0.87	0.537	0.256	(-0.268)	0.281
151	12.58	0.93	0.578	0.254	(-0.289)	0.323
152	12.67	0.93	0.578	0.253	(-0.289)	0.325
153	12.75	0.93	0.578	0.252	(-0.289)	0.326
154	12.83	0.97	0.599	0.251	(-0.299)	0.348
155	12.92	0.97	0.599	0.249	(-0.299)	0.349
156	13.00	0.97	0.599	0.248	(-0.299)	0.350
157	13.08	1.13	0.702	0.247	(-0.351)	0.455
158	13.17	1.13	0.702	0.246	(-0.351)	0.456
159	13.25	1.13	0.702	0.244	(-0.351)	0.457
160	13.33	1.13	0.702	0.243	(-0.351)	0.459
161	13.42	1.13	0.702	0.242	(-0.351)	0.460
162	13.50	1.13	0.702	0.241	(-0.351)	0.461
163	13.58	0.77	0.475	(-0.239)	0.237	0.237
164	13.67	0.77	0.475	(-0.238)	0.237	0.237
165	13.75	0.77	0.475	0.237	(-0.237)	0.238
166	13.83	0.77	0.475	0.236	(-0.237)	0.239
167	13.92	0.77	0.475	0.235	(-0.237)	0.240
168	14.00	0.77	0.475	0.233	(-0.237)	0.241
169	14.08	0.90	0.557	0.232	(-0.279)	0.325
170	14.17	0.90	0.557	0.231	(-0.279)	0.326
171	14.25	0.90	0.557	0.230	(-0.279)	0.327
172	14.33	0.87	0.537	0.229	(-0.268)	0.308
173	14.42	0.87	0.537	0.227	(-0.268)	0.309
174	14.50	0.87	0.537	0.226	(-0.268)	0.310
175	14.58	0.87	0.537	0.225	(-0.268)	0.311
176	14.67	0.87	0.537	0.224	(-0.268)	0.313
177	14.75	0.87	0.537	0.223	(-0.268)	0.314
178	14.83	0.83	0.516	0.222	(-0.258)	0.294
179	14.92	0.83	0.516	0.221	(-0.258)	0.295
180	15.00	0.83	0.516	0.219	(-0.258)	0.297
181	15.08	0.80	0.495	0.218	(-0.248)	0.277
182	15.17	0.80	0.495	0.217	(-0.248)	0.278
183	15.25	0.80	0.495	0.216	(-0.248)	0.279
184	15.33	0.77	0.475	0.215	(-0.237)	0.260
185	15.42	0.77	0.475	0.214	(-0.237)	0.261
186	15.50	0.77	0.475	0.213	(-0.237)	0.262
187	15.58	0.63	0.392	(-0.212)	0.196	0.196
188	15.67	0.63	0.392	(-0.211)	0.196	0.196
189	15.75	0.63	0.392	(-0.210)	0.196	0.196
190	15.83	0.63	0.392	(-0.208)	0.196	0.196
191	15.92	0.63	0.392	(-0.207)	0.196	0.196
192	16.00	0.63	0.392	(-0.206)	0.196	0.196
193	16.08	0.13	0.083	(-0.205)	0.041	0.041
194	16.17	0.13	0.083	(-0.204)	0.041	0.041
195	16.25	0.13	0.083	(-0.203)	0.041	0.041
196	16.33	0.13	0.083	(-0.202)	0.041	0.041
197	16.42	0.13	0.083	(-0.201)	0.041	0.041
198	16.50	0.13	0.083	(-0.200)	0.041	0.041
199	16.58	0.10	0.062	(-0.199)	0.031	0.031
200	16.67	0.10	0.062	(-0.198)	0.031	0.031
201	16.75	0.10	0.062	(-0.197)	0.031	0.031
202	16.83	0.10	0.062	(-0.196)	0.031	0.031
203	16.92	0.10	0.062	(-0.195)	0.031	0.031
204	17.00	0.10	0.062	(-0.194)	0.031	0.031
205	17.08	0.17	0.103	(-0.193)	0.052	0.052
206	17.17	0.17	0.103	(-0.192)	0.052	0.052
207	17.25	0.17	0.103	(-0.191)	0.052	0.052
208	17.33	0.17	0.103	(-0.190)	0.052	0.052
209	17.42	0.17	0.103	(-0.189)	0.052	0.052
210	17.50	0.17	0.103	(-0.188)	0.052	0.052
211	17.58	0.17	0.103	(-0.187)	0.052	0.052

212	17.67	0.17	0.103	(-0.186)	0.052	0.052
213	17.75	0.17	0.103	(-0.185)	0.052	0.052
214	17.83	0.13	0.083	(-0.185)	0.041	0.041
215	17.92	0.13	0.083	(-0.184)	0.041	0.041
216	18.00	0.13	0.083	(-0.183)	0.041	0.041
217	18.08	0.13	0.083	(-0.182)	0.041	0.041
218	18.17	0.13	0.083	(-0.181)	0.041	0.041
219	18.25	0.13	0.083	(-0.180)	0.041	0.041
220	18.33	0.13	0.083	(-0.179)	0.041	0.041
221	18.42	0.13	0.083	(-0.178)	0.041	0.041
222	18.50	0.13	0.083	(-0.177)	0.041	0.041
223	18.58	0.10	0.062	(-0.177)	0.031	0.031
224	18.67	0.10	0.062	(-0.176)	0.031	0.031
225	18.75	0.10	0.062	(-0.175)	0.031	0.031
226	18.83	0.07	0.041	(-0.174)	0.021	0.021
227	18.92	0.07	0.041	(-0.173)	0.021	0.021
228	19.00	0.07	0.041	(-0.172)	0.021	0.021
229	19.08	0.10	0.062	(-0.172)	0.031	0.031
230	19.17	0.10	0.062	(-0.171)	0.031	0.031
231	19.25	0.10	0.062	(-0.170)	0.031	0.031
232	19.33	0.13	0.083	(-0.169)	0.041	0.041
233	19.42	0.13	0.083	(-0.168)	0.041	0.041
234	19.50	0.13	0.083	(-0.168)	0.041	0.041
235	19.58	0.10	0.062	(-0.167)	0.031	0.031
236	19.67	0.10	0.062	(-0.166)	0.031	0.031
237	19.75	0.10	0.062	(-0.165)	0.031	0.031
238	19.83	0.07	0.041	(-0.165)	0.021	0.021
239	19.92	0.07	0.041	(-0.164)	0.021	0.021
240	20.00	0.07	0.041	(-0.163)	0.021	0.021
241	20.08	0.10	0.062	(-0.162)	0.031	0.031
242	20.17	0.10	0.062	(-0.162)	0.031	0.031
243	20.25	0.10	0.062	(-0.161)	0.031	0.031
244	20.33	0.10	0.062	(-0.160)	0.031	0.031
245	20.42	0.10	0.062	(-0.160)	0.031	0.031
246	20.50	0.10	0.062	(-0.159)	0.031	0.031
247	20.58	0.10	0.062	(-0.158)	0.031	0.031
248	20.67	0.10	0.062	(-0.158)	0.031	0.031
249	20.75	0.10	0.062	(-0.157)	0.031	0.031
250	20.83	0.07	0.041	(-0.156)	0.021	0.021
251	20.92	0.07	0.041	(-0.156)	0.021	0.021
252	21.00	0.07	0.041	(-0.155)	0.021	0.021
253	21.08	0.10	0.062	(-0.154)	0.031	0.031
254	21.17	0.10	0.062	(-0.154)	0.031	0.031
255	21.25	0.10	0.062	(-0.153)	0.031	0.031
256	21.33	0.07	0.041	(-0.153)	0.021	0.021
257	21.42	0.07	0.041	(-0.152)	0.021	0.021
258	21.50	0.07	0.041	(-0.152)	0.021	0.021
259	21.58	0.10	0.062	(-0.151)	0.031	0.031
260	21.67	0.10	0.062	(-0.150)	0.031	0.031
261	21.75	0.10	0.062	(-0.150)	0.031	0.031
262	21.83	0.07	0.041	(-0.149)	0.021	0.021
263	21.92	0.07	0.041	(-0.149)	0.021	0.021
264	22.00	0.07	0.041	(-0.148)	0.021	0.021
265	22.08	0.10	0.062	(-0.148)	0.031	0.031
266	22.17	0.10	0.062	(-0.147)	0.031	0.031
267	22.25	0.10	0.062	(-0.147)	0.031	0.031
268	22.33	0.07	0.041	(-0.146)	0.021	0.021
269	22.42	0.07	0.041	(-0.146)	0.021	0.021
270	22.50	0.07	0.041	(-0.146)	0.021	0.021
271	22.58	0.07	0.041	(-0.145)	0.021	0.021
272	22.67	0.07	0.041	(-0.145)	0.021	0.021
273	22.75	0.07	0.041	(-0.144)	0.021	0.021
274	22.83	0.07	0.041	(-0.144)	0.021	0.021
275	22.92	0.07	0.041	(-0.144)	0.021	0.021
276	23.00	0.07	0.041	(-0.143)	0.021	0.021
277	23.08	0.07	0.041	(-0.143)	0.021	0.021
278	23.17	0.07	0.041	(-0.143)	0.021	0.021
279	23.25	0.07	0.041	(-0.142)	0.021	0.021
280	23.33	0.07	0.041	(-0.142)	0.021	0.021
281	23.42	0.07	0.041	(-0.142)	0.021	0.021
282	23.50	0.07	0.041	(-0.141)	0.021	0.021
283	23.58	0.07	0.041	(-0.141)	0.021	0.021
284	23.67	0.07	0.041	(-0.141)	0.021	0.021
285	23.75	0.07	0.041	(-0.141)	0.021	0.021
286	23.83	0.07	0.041	(-0.141)	0.021	0.021
287	23.92	0.07	0.041	(-0.141)	0.021	0.021
288	24.00	0.07	0.041	(-0.140)	0.021	0.021

(Loss Rate Not Used)

Sum = 100.0

Sum = 32.6

Flood volume = Effective rainfall 2.71 (In)
 times area 7.5(Ac.)/[(In)/(Ft.)] = 1.7(Ac.Ft)
 Total soil loss = 2.45 (In)
 Total soil loss = 1.528(Ac.Ft)
 Total rainfall = 5.16 (In)
 Flood volume = 73904.5 Cubic Feet
 Total soil loss = 66574.4 Cubic Feet

Peak flow rate of this hydrograph = 3.480(CFS)

+++++H O U R S T O R M+++++

24 - H O U R S T O R M
Run off Hydrograph

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	0.0004	0.06	Q				
0+10	0.0013	0.13	Q				
0+15	0.0024	0.15	Q				
0+20	0.0036	0.19	Q				
0+25	0.0052	0.22	Q				
0+30	0.0068	0.23	Q				
0+35	0.0084	0.23	Q				
0+40	0.0100	0.23	Q				
0+45	0.0116	0.23	Q				
0+50	0.0134	0.27	VQ				
0+55	0.0155	0.30	VQ				
1+ 0	0.0176	0.31	VQ				
1+ 5	0.0195	0.28	VQ				
1+10	0.0212	0.25	Q				
1+15	0.0229	0.24	Q				
1+20	0.0245	0.24	Q				
1+25	0.0261	0.23	Q				
1+30	0.0277	0.23	Q				
1+35	0.0293	0.23	Q				
1+40	0.0309	0.23	Q				
1+45	0.0325	0.23	Q				
1+50	0.0344	0.27	VQ				
1+55	0.0364	0.30	VQ				
2+ 0	0.0386	0.31	VQ				
2+ 5	0.0407	0.31	VQ				
2+10	0.0429	0.31	Q				
2+15	0.0450	0.31	Q				
2+20	0.0472	0.31	Q				
2+25	0.0493	0.31	Q				
2+30	0.0515	0.31	Q				
2+35	0.0538	0.34	Q				
2+40	0.0564	0.38	Q				
2+45	0.0591	0.39	Q				
2+50	0.0618	0.39	Q				
2+55	0.0644	0.39	Q				
3+ 0	0.0671	0.39	Q				
3+ 5	0.0698	0.39	Q				
3+10	0.0725	0.39	Q				
3+15	0.0752	0.39	Q				
3+20	0.0779	0.39	Q				
3+25	0.0806	0.39	Q				
3+30	0.0833	0.39	Q				
3+35	0.0859	0.39	VQ				
3+40	0.0886	0.39	VQ				
3+45	0.0913	0.39	VQ				
3+50	0.0942	0.42	VQ				
3+55	0.0974	0.46	VQ				
4+ 0	0.1006	0.46	VQ				
4+ 5	0.1038	0.47	VQ				
4+10	0.1070	0.47	VQ				
4+15	0.1102	0.47	VQ				
4+20	0.1137	0.50	VQ				
4+25	0.1174	0.53	Q				
4+30	0.1211	0.54	Q				
4+35	0.1248	0.54	Q				
4+40	0.1286	0.55	VQ				
4+45	0.1324	0.55	VQ				
4+50	0.1363	0.58	VQ				
4+55	0.1406	0.61	VQ				
5+ 0	0.1448	0.62	VQ				

5+ 5	0.1487	0.56	Q V
5+10	0.1521	0.49	Q V
5+15	0.1554	0.48	Q V
5+20	0.1588	0.50	Q V
5+25	0.1625	0.53	Q V
5+30	0.1662	0.54	Q V
5+35	0.1702	0.58	Q V
5+40	0.1744	0.61	Q V
5+45	0.1787	0.62	Q V
5+50	0.1830	0.62	Q V
5+55	0.1873	0.62	Q V
6+ 0	0.1916	0.62	Q V
6+ 5	0.1961	0.66	Q V
6+10	0.2009	0.69	Q V
6+15	0.2057	0.70	Q V
6+20	0.2105	0.70	Q V
6+25	0.2153	0.70	Q V
6+30	0.2202	0.70	Q V
6+35	0.2252	0.73	Q V
6+40	0.2305	0.77	Q V
6+45	0.2359	0.78	Q V
6+50	0.2412	0.78	Q V
6+55	0.2466	0.78	Q V
7+ 0	0.2520	0.78	Q V
7+ 5	0.2574	0.78	Q V
7+10	0.2627	0.78	Q V
7+15	0.2681	0.78	Q V
7+20	0.2737	0.81	Q V
7+25	0.2795	0.85	Q V
7+30	0.2854	0.85	Q V
7+35	0.2915	0.89	Q V
7+40	0.2979	0.92	Q V
7+45	0.3043	0.93	Q V
7+50	0.3110	0.97	Q V
7+55	0.3179	1.00	Q V
8+ 0	0.3248	1.01	Q V
8+ 5	0.3323	1.08	Q V
8+10	0.3402	1.15	Q V
8+15	0.3482	1.16	Q V
8+20	0.3562	1.17	Q V
8+25	0.3643	1.17	Q V
8+30	0.3723	1.17	Q V
8+35	0.3806	1.20	Q V
8+40	0.3891	1.24	Q V
8+45	0.3977	1.24	Q V
8+50	0.4065	1.28	Q V
8+55	0.4156	1.32	Q V
9+ 0	0.4247	1.32	Q V
9+ 5	0.4342	1.39	Q V
9+10	0.4443	1.46	Q V
9+15	0.4544	1.47	Q V
9+20	0.4649	1.51	Q V
9+25	0.4755	1.55	Q V
9+30	0.4862	1.56	Q V
9+35	0.4972	1.59	Q V
9+40	0.5084	1.63	Q V
9+45	0.5197	1.63	Q V
9+50	0.5312	1.67	Q V
9+55	0.5429	1.71	Q V
10+ 0	0.5547	1.71	Q V
10+ 5	0.5650	1.49	Q V
10+10	0.5736	1.25	Q V
10+15	0.5819	1.20	Q V
10+20	0.5900	1.18	Q V
10+25	0.5981	1.17	Q V
10+30	0.6061	1.17	Q V
10+35	0.6153	1.33	Q V
10+40	0.6256	1.50	Q V
10+45	0.6362	1.54	Q V
10+50	0.6469	1.55	Q V
10+55	0.6577	1.56	Q V
11+ 0	0.6684	1.56	Q V
11+ 5	0.6790	1.53	Q V
11+10	0.6893	1.49	Q V
11+15	0.6995	1.49	Q V
11+20	0.7097	1.48	Q V
11+25	0.7199	1.48	Q V
11+30	0.7302	1.48	Q V
11+35	0.7399	1.42	Q V

11+40	0.7492	1.35		V				
11+45	0.7584	1.34	Q	V				
11+50	0.7678	1.36	Q	V				
11+55	0.7774	1.39	Q	V				
12+ 0	0.7870	1.40	Q	V				
12+ 5	0.7982	1.62	Q	V				
12+10	0.8111	1.87	Q	V				
12+15	0.8243	1.92	Q	V				
12+20	0.8381	2.00	Q	V				
12+25	0.8525	2.09	Q	V				
12+30	0.8670	2.11	Q	V				
12+35	0.8825	2.25	Q	V				
12+40	0.8990	2.40	Q	V				
12+45	0.9159	2.44	Q	V				
12+50	0.9332	2.53	Q	V				
12+55	0.9512	2.61	Q	V				
13+ 0	0.9694	2.63	Q	V				
13+ 5	0.9898	2.97	Q	V				
13+10	1.0127	3.32	Q	V				
13+15	1.0361	3.41	Q	V				
13+20	1.0599	3.45	Q	V				
13+25	1.0838	3.47	Q	V				
13+30	1.1078	3.48	Q	V				
13+35	1.1270	2.80	Q	V				
13+40	1.1412	2.05	Q	V				
13+45	1.1542	1.89	Q	V				
13+50	1.1668	1.83	Q	V				
13+55	1.1792	1.81	Q	V				
14+ 0	1.1918	1.82	Q	V				
14+ 5	1.2061	2.08	Q	V				
14+10	1.2224	2.37	Q	V				
14+15	1.2391	2.43	Q	V				
14+20	1.2557	2.40	Q	V				
14+25	1.2719	2.35	Q	V				
14+30	1.2881	2.35	Q	V				
14+35	1.3043	2.35	Q	V				
14+40	1.3205	2.36	Q	V				
14+45	1.3368	2.37	Q	V				
14+50	1.3527	2.31	Q	V				
14+55	1.3682	2.25	Q	V				
15+ 0	1.3837	2.24	Q	V				
15+ 5	1.3987	2.18	Q	V				
15+10	1.4133	2.12	Q	V				
15+15	1.4279	2.11	Q	V				
15+20	1.4420	2.05	Q	V				
15+25	1.4557	1.99	Q	V				
15+30	1.4694	1.98	Q	V				
15+35	1.4816	1.78	Q	V				
15+40	1.4924	1.56	Q	V				
15+45	1.5028	1.51	Q	V				
15+50	1.5130	1.49	Q	V				
15+55	1.5232	1.48	Q	V				
16+ 0	1.5335	1.48	Q	V				
16+ 5	1.5404	1.01	Q	V				
16+10	1.5438	0.49	Q	V				
16+15	1.5464	0.38	Q	V				
16+20	1.5487	0.33	Q	V				
16+25	1.5508	0.31	Q	V				
16+30	1.5530	0.31	Q	V				
16+35	1.5549	0.28	Q	V				
16+40	1.5566	0.25	Q	V				
16+45	1.5582	0.24	Q	V				
16+50	1.5598	0.24	Q	V				
16+55	1.5615	0.23	Q	V				
17+ 0	1.5631	0.23	Q	V				
17+ 5	1.5651	0.30	Q	V				
17+10	1.5676	0.37	Q	V				
17+15	1.5703	0.38	Q	V				
17+20	1.5729	0.39	Q	V				
17+25	1.5756	0.39	Q	V				
17+30	1.5783	0.39	Q	V				
17+35	1.5810	0.39	Q	V				
17+40	1.5837	0.39	Q	V				
17+45	1.5864	0.39	Q	V				
17+50	1.5888	0.36	Q	V				
17+55	1.5911	0.32	Q	V				
18+ 0	1.5933	0.32	Q	V				
18+ 5	1.5954	0.31	Q	V				
18+10	1.5976	0.31	Q	V				

18+15	1.5997	0.31	Q			V
18+20	1.6019	0.31	Q			V
18+25	1.6040	0.31	Q			V
18+30	1.6062	0.31	Q			V
18+35	1.6081	0.28	Q			V
18+40	1.6098	0.25	Q			V
18+45	1.6114	0.24	Q			V
18+50	1.6128	0.20	Q			V
18+55	1.6140	0.17	Q			V
19+ 0	1.6151	0.16	Q			V
19+ 5	1.6164	0.19	Q			V
19+10	1.6179	0.22	Q			V
19+15	1.6195	0.23	Q			V
19+20	1.6213	0.26	Q			V
19+25	1.6234	0.30	Q			V
19+30	1.6255	0.31	Q			V
19+35	1.6275	0.28	Q			V
19+40	1.6291	0.25	Q			V
19+45	1.6308	0.24	Q			V
19+50	1.6322	0.20	Q			V
19+55	1.6333	0.17	Q			V
20+ 0	1.6345	0.16	Q			V
20+ 5	1.6358	0.19	Q			V
20+10	1.6373	0.22	Q			V
20+15	1.6389	0.23	Q			V
20+20	1.6405	0.23	Q			V
20+25	1.6421	0.23	Q			V
20+30	1.6437	0.23	Q			V
20+35	1.6453	0.23	Q			V
20+40	1.6469	0.23	Q			V
20+45	1.6485	0.23	Q			V
20+50	1.6499	0.20	Q			V
20+55	1.6511	0.17	Q			V
21+ 0	1.6522	0.16	Q			V
21+ 5	1.6535	0.19	Q			V
21+10	1.6550	0.22	Q			V
21+15	1.6566	0.23	Q			V
21+20	1.6580	0.20	Q			V
21+25	1.6591	0.17	Q			V
21+30	1.6603	0.16	Q			V
21+35	1.6616	0.19	Q			V
21+40	1.6631	0.22	Q			V
21+45	1.6647	0.23	Q			V
21+50	1.6661	0.20	Q			V
21+55	1.6672	0.17	Q			V
22+ 0	1.6683	0.16	Q			V
22+ 5	1.6696	0.19	Q			V
22+10	1.6711	0.22	Q			V
22+15	1.6727	0.23	Q			V
22+20	1.6741	0.20	Q			V
22+25	1.6753	0.17	Q			V
22+30	1.6764	0.16	Q			V
22+35	1.6775	0.16	Q			V
22+40	1.6785	0.16	Q			V
22+45	1.6796	0.16	Q			V
22+50	1.6807	0.16	Q			V
22+55	1.6818	0.16	Q			V
23+ 0	1.6828	0.16	Q			V
23+ 5	1.6839	0.16	Q			V
23+10	1.6850	0.16	Q			V
23+15	1.6861	0.16	Q			V
23+20	1.6871	0.16	Q			V
23+25	1.6882	0.16	Q			V
23+30	1.6893	0.16	Q			V
23+35	1.6904	0.16	Q			V
23+40	1.6914	0.16	Q			V
23+45	1.6925	0.16	Q			V
23+50	1.6936	0.16	Q			V
23+55	1.6947	0.16	Q			V
24+ 0	1.6957	0.16	Q			V
24+ 5	1.6964	0.09	Q			V
24+10	1.6965	0.02	Q			V
24+15	1.6966	0.01	Q			V
24+20	1.6966	0.00	Q			V

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC100PROP1100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

PROPOSED CONDITION, DMA C

100-YR 1-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.034 Hr.
Lag time = 2.04 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 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]
7.50	0.49	3.67

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	1.33	9.98

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 1.330(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.330(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.760
Total Area Entered =	7.50(Ac.)	

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.760	0.161	1.000	0.161
					Sum (F) =	0.161

Area averaged mean soil loss (F) (In/Hr) = 0.161
Minimum soil loss rate ((In/Hr)) = 0.081

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.290

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	245.027	50.239
2	0.167	490.055	40.364
3	0.250	735.082	7.184
4	0.333	980.109	2.213
		Sum = 100.000	Sum= 7.559

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	4.20	0.670	0.161 (0.194)	0.509
2	0.17	4.30	0.686	0.161 (0.199)	0.525
3	0.25	5.00	0.798	0.161 (0.231)	0.637
4	0.33	5.00	0.798	0.161 (0.231)	0.637
5	0.42	5.80	0.926	0.161 (0.268)	0.764
6	0.50	6.50	1.037	0.161 (0.301)	0.876
7	0.58	7.40	1.181	0.161 (0.342)	1.020
8	0.67	8.60	1.372	0.161 (0.398)	1.211
9	0.75	12.30	1.963	0.161 (0.569)	1.802
10	0.83	29.10	4.644	0.161 (1.347)	4.483
11	0.92	6.80	1.085	0.161 (0.315)	0.924
12	1.00	5.00	0.798	0.161 (0.231)	0.637
		(Loss Rate Not Used)			
		Sum = 100.0		Sum = 14.0	

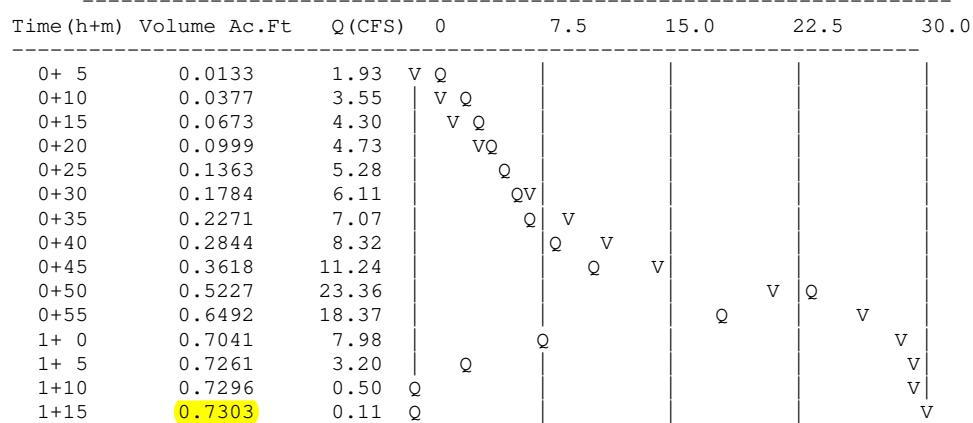
Flood volume = Effective rainfall 1.17 (In)
times area 7.5 (Ac.) / [(In)/(Ft.)] = 0.7 (Ac.Ft)
Total soil loss = 0.16 (In)
Total soil loss = 0.101 (Ac.Ft)
Total rainfall = 1.33 (In)

Flood volume = 31812.3 Cubic Feet
Total soil loss = 4394.5 Cubic Feet

Peak flow rate of this hydrograph = 23.359 (CFS)

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1 - H O U R S T O R M
Run off Hydrograph

Hydrograph in 5 Minute intervals ((CFS))



Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC100PROP3100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

PROPOSED CONDITION, DMA C

100-YR 3-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.034 Hr.
Lag time = 2.04 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 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]
7.50	0.87	6.50

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	2.09	15.67

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 2.090(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.090(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.760
Total Area Entered =	7.50(Ac.)	

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.760	0.161	1.000	0.161
					Sum (F) =	0.161

Area averaged mean soil loss (F) (In/Hr) = 0.161
Minimum soil loss rate ((In/Hr)) = 0.081

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.290

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	245.027	50.239	3.797
2 0.167	490.055	40.364	3.051
3 0.250	735.082	7.184	0.543
4 0.333	980.109	2.213	0.167
		Sum = 100.000	Sum= 7.559

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	0.326	(0.161) 0.095	0.231
2 0.17	1.30	0.326	(0.161) 0.095	0.231
3 0.25	1.10	0.276	(0.161) 0.080	0.196
4 0.33	1.50	0.376	(0.161) 0.109	0.267
5 0.42	1.50	0.376	(0.161) 0.109	0.267
6 0.50	1.80	0.451	(0.161) 0.131	0.321
7 0.58	1.50	0.376	(0.161) 0.109	0.267
8 0.67	1.80	0.451	(0.161) 0.131	0.321
9 0.75	1.80	0.451	(0.161) 0.131	0.321
10 0.83	1.50	0.376	(0.161) 0.109	0.267
11 0.92	1.60	0.401	(0.161) 0.116	0.285
12 1.00	1.80	0.451	(0.161) 0.131	0.321
13 1.08	2.20	0.552	(0.161) 0.160	0.392
14 1.17	2.20	0.552	(0.161) 0.160	0.392
15 1.25	2.20	0.552	(0.161) 0.160	0.392
16 1.33	2.00	0.502	(0.161) 0.145	0.356
17 1.42	2.60	0.652	0.161 (0.189)	0.491
18 1.50	2.70	0.677	0.161 (0.196)	0.516
19 1.58	2.40	0.602	0.161 (0.175)	0.440
20 1.67	2.70	0.677	0.161 (0.196)	0.516
21 1.75	3.30	0.828	0.161 (0.240)	0.666
22 1.83	3.10	0.777	0.161 (0.225)	0.616
23 1.92	2.90	0.727	0.161 (0.211)	0.566
24 2.00	3.00	0.752	0.161 (0.218)	0.591
25 2.08	3.10	0.777	0.161 (0.225)	0.616
26 2.17	4.20	1.053	0.161 (0.305)	0.892
27 2.25	5.00	1.254	0.161 (0.364)	1.093
28 2.33	3.50	0.878	0.161 (0.255)	0.716
29 2.42	6.80	1.705	0.161 (0.495)	1.544
30 2.50	7.30	1.831	0.161 (0.531)	1.669
31 2.58	8.20	2.056	0.161 (0.596)	1.895
32 2.67	5.90	1.480	0.161 (0.429)	1.318
33 2.75	2.00	0.502	(0.161) 0.145	0.356
34 2.83	1.80	0.451	(0.161) 0.131	0.321
35 2.92	1.80	0.451	(0.161) 0.131	0.321
36 3.00	0.60	0.150	(0.161) 0.044	0.107
		(Loss Rate Not Used)		
		Sum = 100.0		Sum = 20.1

Flood volume = Effective rainfall 1.67 (In)
times area 7.5 (Ac.) / [(In) / (Ft.)] = 1.0 (Ac.Ft)
Total soil loss = 0.42 (In)
Total soil loss = 0.261 (Ac.Ft)
Total rainfall = 2.09 (In)
Flood volume = 45544.4 Cubic Feet
Total soil loss = 11354.0 Cubic Feet

Peak flow rate of this hydrograph = 13.255 (CFS)

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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	0.0061		0.88	VQ				
0+10	0.0170		1.59	V Q				
0+15	0.0278		1.58	V Q				
0+20	0.0401		1.78	V Q				
0+25	0.0537		1.98	VQ				
0+30	0.0689		2.21	V Q				
0+35	0.0839		2.18	VQ				
0+40	0.0995		2.25	VQ				
0+45	0.1159		2.39	Q				
0+50	0.1312		2.21	QV				
0+55	0.1458		2.13	QV				
1+ 0	0.1616		2.29	Q V				
1+ 5	0.1799		2.67	QV				
1+10	0.1999		2.91	Q V				
1+15	0.2203		2.95	Q V				
1+20	0.2397		2.83	Q V				
1+25	0.2620		3.23	Q V				
1+30	0.2876		3.72	Q V				
1+35	0.3122		3.57	Q V				
1+40	0.3374		3.67	Q V				
1+45	0.3679		4.43	Q V				
1+50	0.4005		4.73	Q V				
1+55	0.4314		4.48	Q V				
2+ 0	0.4618		4.42	Q V				
2+ 5	0.4932		4.56	Q V				
2+10	0.5323		5.68	Q V				
2+15	0.5826		7.31	Q V				
2+20	0.6284		6.64	Q V				
2+25	0.6890		8.80	Q V				
2+30	0.7690		11.63	Q V				
2+35	0.8603		13.25	Q V				
2+40	0.9427		11.96	Q V				
2+45	0.9887		6.69	Q V				
2+50	1.0117		3.34	Q V				
2+55	1.0297		2.61	Q V				
3+ 0	1.0408		1.62	Q V				
3+ 5	1.0447		0.55	Q V				
3+10	1.0454		0.11	Q V				
3+15	1.0456		0.02	Q V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC100PROP6100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

PROPOSED CONDITION, DMA C

100-YR 6-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.034 Hr.
Lag time = 2.04 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 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]
7.50	1.21	9.07

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	2.86	21.45

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 2.860(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.860(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.760
Total Area Entered	=	7.50(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.760	0.161	1.000	0.161
					Sum (F)	= 0.161

Area averaged mean soil loss (F) (In/Hr) = 0.161
Minimum soil loss rate ((In/Hr)) = 0.081

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.290

U n i t H y d r o g r a p h
V A L L E Y S-C u r v e

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	245.027	50.239	3.797
2 0.167	490.055	40.364	3.051
3 0.250	735.082	7.184	0.543
4 0.333	980.109	2.213	0.167
		Sum = 100.000	Sum= 7.559

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	0.172	(0.161) 0.050	0.122
2 0.17	0.60	0.206	(0.161) 0.060	0.146
3 0.25	0.60	0.206	(0.161) 0.060	0.146
4 0.33	0.60	0.206	(0.161) 0.060	0.146
5 0.42	0.60	0.206	(0.161) 0.060	0.146
6 0.50	0.70	0.240	(0.161) 0.070	0.171
7 0.58	0.70	0.240	(0.161) 0.070	0.171
8 0.67	0.70	0.240	(0.161) 0.070	0.171
9 0.75	0.70	0.240	(0.161) 0.070	0.171
10 0.83	0.70	0.240	(0.161) 0.070	0.171
11 0.92	0.70	0.240	(0.161) 0.070	0.171
12 1.00	0.80	0.275	(0.161) 0.080	0.195
13 1.08	0.80	0.275	(0.161) 0.080	0.195
14 1.17	0.80	0.275	(0.161) 0.080	0.195
15 1.25	0.80	0.275	(0.161) 0.080	0.195
16 1.33	0.80	0.275	(0.161) 0.080	0.195
17 1.42	0.80	0.275	(0.161) 0.080	0.195
18 1.50	0.80	0.275	(0.161) 0.080	0.195
19 1.58	0.80	0.275	(0.161) 0.080	0.195
20 1.67	0.80	0.275	(0.161) 0.080	0.195
21 1.75	0.80	0.275	(0.161) 0.080	0.195
22 1.83	0.80	0.275	(0.161) 0.080	0.195
23 1.92	0.80	0.275	(0.161) 0.080	0.195
24 2.00	0.90	0.309	(0.161) 0.090	0.219
25 2.08	0.80	0.275	(0.161) 0.080	0.195
26 2.17	0.90	0.309	(0.161) 0.090	0.219
27 2.25	0.90	0.309	(0.161) 0.090	0.219
28 2.33	0.90	0.309	(0.161) 0.090	0.219
29 2.42	0.90	0.309	(0.161) 0.090	0.219
30 2.50	0.90	0.309	(0.161) 0.090	0.219
31 2.58	0.90	0.309	(0.161) 0.090	0.219
32 2.67	0.90	0.309	(0.161) 0.090	0.219
33 2.75	1.00	0.343	(0.161) 0.100	0.244
34 2.83	1.00	0.343	(0.161) 0.100	0.244
35 2.92	1.00	0.343	(0.161) 0.100	0.244
36 3.00	1.00	0.343	(0.161) 0.100	0.244
37 3.08	1.00	0.343	(0.161) 0.100	0.244
38 3.17	1.10	0.378	(0.161) 0.109	0.268
39 3.25	1.10	0.378	(0.161) 0.109	0.268
40 3.33	1.10	0.378	(0.161) 0.109	0.268
41 3.42	1.20	0.412	(0.161) 0.119	0.292
42 3.50	1.30	0.446	(0.161) 0.129	0.317
43 3.58	1.40	0.480	(0.161) 0.139	0.341
44 3.67	1.40	0.480	(0.161) 0.139	0.341
45 3.75	1.50	0.515	(0.161) 0.149	0.365
46 3.83	1.50	0.515	(0.161) 0.149	0.365
47 3.92	1.60	0.549	(0.161) 0.159	0.390
48 4.00	1.60	0.549	(0.161) 0.159	0.390
49 4.08	1.70	0.583	0.161 (0.169)	0.422
50 4.17	1.80	0.618	0.161 (0.179)	0.456
51 4.25	1.90	0.652	0.161 (0.189)	0.491
52 4.33	2.00	0.686	0.161 (0.199)	0.525
53 4.42	2.10	0.721	0.161 (0.209)	0.559
54 4.50	2.10	0.721	0.161 (0.209)	0.559

55	4.58	2.20	0.755	0.161	(0.219)	0.594
56	4.67	2.30	0.789	0.161	(0.229)	0.628
57	4.75	2.40	0.824	0.161	(0.239)	0.662
58	4.83	2.40	0.824	0.161	(0.239)	0.662
59	4.92	2.50	0.858	0.161	(0.249)	0.697
60	5.00	2.60	0.892	0.161	(0.259)	0.731
61	5.08	3.10	1.064	0.161	(0.309)	0.902
62	5.17	3.60	1.235	0.161	(0.358)	1.074
63	5.25	3.90	1.338	0.161	(0.388)	1.177
64	5.33	4.20	1.441	0.161	(0.418)	1.280
65	5.42	4.70	1.613	0.161	(0.468)	1.452
66	5.50	5.60	1.922	0.161	(0.557)	1.760
67	5.58	1.90	0.652	0.161	(0.189)	0.491
68	5.67	0.90	0.309	(0.161)	0.090	0.219
69	5.75	0.60	0.206	(0.161)	0.060	0.146
70	5.83	0.50	0.172	(0.161)	0.050	0.122
71	5.92	0.30	0.103	(0.161)	0.030	0.073
72	6.00	0.20	0.069	(0.161)	0.020	0.049

(Loss Rate Not Used)

Sum = 100.0

Sum = 26.6

Flood volume = Effective rainfall 2.21 (In)

times area 7.5(Ac.)/[(In)/(Ft.)] = 1.4 (Ac.Ft)

Total soil loss = 0.65 (In)

Total soil loss = 0.403 (Ac.Ft)

Total rainfall = 2.86 (In)

Flood volume = 60291.1 Cubic Feet

Total soil loss = 17570.4 Cubic Feet

Peak flow rate of this hydrograph = 12.012 (CFS)

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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	0.0032	0.46	Q				
0+10	0.0096	0.93	VQ				
0+15	0.0169	1.07	V Q				
0+20	0.0245	1.10	V Q				
0+25	0.0321	1.11	V Q				
0+30	0.0404	1.20	VQ				
0+35	0.0491	1.27	VQ				
0+40	0.0580	1.29	VQ				
0+45	0.0669	1.29	VQ				
0+50	0.0758	1.29	Q				
0+55	0.0847	1.29	Q				
1+ 0	0.0942	1.38	Q				
1+ 5	0.1042	1.46	QV				
1+10	0.1143	1.47	QV				
1+15	0.1245	1.47	QV				
1+20	0.1346	1.47	QV				
1+25	0.1448	1.47	Q V				
1+30	0.1549	1.47	Q V				
1+35	0.1651	1.47	Q V				
1+40	0.1752	1.47	Q V				
1+45	0.1854	1.47	Q V				
1+50	0.1956	1.47	Q V				
1+55	0.2057	1.47	Q V				
2+ 0	0.2165	1.57	Q V				
2+ 5	0.2272	1.55	Q V				
2+10	0.2380	1.58	Q V				
2+15	0.2494	1.65	Q V				
2+20	0.2608	1.65	Q V				
2+25	0.2722	1.66	Q V				
2+30	0.2836	1.66	Q V				
2+35	0.2950	1.66	Q V				
2+40	0.3065	1.66	Q V				
2+45	0.3185	1.75	Q V				
2+50	0.3311	1.83	Q V				
2+55	0.3438	1.84	Q V				
3+ 0	0.3564	1.84	Q V				
3+ 5	0.3691	1.84	Q V				
3+10	0.3825	1.94	Q V				
3+15	0.3963	2.01	Q V				
3+20	0.4102	2.02	Q V				

3+25	0.4248	2.12	Q	V			
3+30	0.4406	2.29	Q	V			
3+35	0.4576	2.47	Q	V			
3+40	0.4752	2.56	Q	V			
3+45	0.4936	2.67	Q	V			
3+50	0.5125	2.75	Q	V			
3+55	0.5321	2.85	Q	V			
4+ 0	0.5523	2.93	Q	V			
4+ 5	0.5734	3.07	Q	V			
4+10	0.5962	3.30	Q	V			
4+15	0.6206	3.55	Q	V			
4+20	0.6469	3.81	Q	V			
4+25	0.6749	4.07	Q	V			
4+30	0.7038	4.20	Q	V			
4+35	0.7338	4.35	Q	V			
4+40	0.7654	4.60	Q	V			
4+45	0.7988	4.85	Q	V			
4+50	0.8331	4.98	Q	V			
4+55	0.8685	5.13	Q	V			
5+ 0	0.9055	5.37	Q	V			
5+ 5	0.9478	6.15	Q	V			
5+10	0.9985	7.35	Q	V			
5+15	1.0560	8.36	Q	V			
5+20	1.1193	9.19	Q	V			
5+25	1.1899	10.24	Q	V			
5+30	1.2726	12.01	Q	V			
5+35	1.3294	8.24	Q	V			
5+40	1.3537	3.53	Q	V			
5+45	1.3660	1.79	Q	V			
5+50	1.3736	1.11	Q	V			
5+55	1.3789	0.77	Q	V			
6+ 0	1.3823	0.50	Q	V			
6+ 5	1.3838	0.21	Q	V			
6+10	1.3840	0.04	Q	V			
6+15	1.3841	0.01	Q	V			

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAC100PROP24100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

PROPOSED CONDITION, DMA C
100-YR 24-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 7.50(Ac.) = 0.012 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 7.50(Ac.) = 0.012 Sq. Mi.
Length along longest watercourse = 860.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.163 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 21.50(Ft.)
Slope along watercourse = 132.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.034 Hr.
Lag time = 2.04 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 Min.
Unit time = 15.00 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]
7.50	2.05	15.37

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
7.50	5.16	38.70

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 5.160(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 5.160(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
7.500	56.00	0.760
Total Area Entered	=	7.50(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.760	0.161	1.000	0.161
					Sum (F)	= 0.161

Area averaged mean soil loss (F) (In/Hr) = 0.161
Minimum soil loss rate ((In/Hr)) = 0.081

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.290

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	735.082	79.543	6.012
2 0.500	1470.164	20.457	1.546
		Sum = 100.000	Sum= 7.559

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	0.25	0.20	0.041	(0.285) 0.012	0.029
2	0.50	0.30	0.062	(0.282) 0.018	0.044
3	0.75	0.30	0.062	(0.278) 0.018	0.044
4	1.00	0.40	0.083	(0.275) 0.024	0.059
5	1.25	0.30	0.062	(0.272) 0.018	0.044
6	1.50	0.30	0.062	(0.269) 0.018	0.044
7	1.75	0.30	0.062	(0.265) 0.018	0.044
8	2.00	0.40	0.083	(0.262) 0.024	0.059
9	2.25	0.40	0.083	(0.259) 0.024	0.059
10	2.50	0.40	0.083	(0.256) 0.024	0.059
11	2.75	0.50	0.103	(0.253) 0.030	0.073
12	3.00	0.50	0.103	(0.250) 0.030	0.073
13	3.25	0.50	0.103	(0.247) 0.030	0.073
14	3.50	0.50	0.103	(0.244) 0.030	0.073
15	3.75	0.50	0.103	(0.241) 0.030	0.073
16	4.00	0.60	0.124	(0.237) 0.036	0.088
17	4.25	0.60	0.124	(0.234) 0.036	0.088
18	4.50	0.70	0.144	(0.231) 0.042	0.103
19	4.75	0.70	0.144	(0.229) 0.042	0.103
20	5.00	0.80	0.165	(0.226) 0.048	0.117
21	5.25	0.60	0.124	(0.223) 0.036	0.088
22	5.50	0.70	0.144	(0.220) 0.042	0.103
23	5.75	0.80	0.165	(0.217) 0.048	0.117
24	6.00	0.80	0.165	(0.214) 0.048	0.117
25	6.25	0.90	0.186	(0.211) 0.054	0.132
26	6.50	0.90	0.186	(0.208) 0.054	0.132
27	6.75	1.00	0.206	(0.206) 0.060	0.147
28	7.00	1.00	0.206	(0.203) 0.060	0.147
29	7.25	1.00	0.206	(0.200) 0.060	0.147
30	7.50	1.10	0.227	(0.197) 0.066	0.161
31	7.75	1.20	0.248	(0.195) 0.072	0.176
32	8.00	1.30	0.268	(0.192) 0.078	0.191
33	8.25	1.50	0.310	(0.189) 0.090	0.220
34	8.50	1.50	0.310	(0.187) 0.090	0.220
35	8.75	1.60	0.330	(0.184) 0.096	0.234
36	9.00	1.70	0.351	(0.181) 0.102	0.249
37	9.25	1.90	0.392	(0.179) 0.114	0.278
38	9.50	2.00	0.413	(0.176) 0.120	0.293
39	9.75	2.10	0.433	(0.174) 0.126	0.308
40	10.00	2.20	0.454	(0.171) 0.132	0.322
41	10.25	1.50	0.310	(0.169) 0.090	0.220
42	10.50	1.50	0.310	(0.166) 0.090	0.220
43	10.75	2.00	0.413	(0.164) 0.120	0.293
44	11.00	2.00	0.413	(0.162) 0.120	0.293
45	11.25	1.90	0.392	(0.159) 0.114	0.278
46	11.50	1.90	0.392	(0.157) 0.114	0.278
47	11.75	1.70	0.351	(0.154) 0.102	0.249
48	12.00	1.80	0.372	(0.152) 0.108	0.264
49	12.25	2.50	0.516	(0.150) 0.150	0.366
50	12.50	2.60	0.537	0.148 (0.156)	0.389
51	12.75	2.80	0.578	0.145 (0.168)	0.432
52	13.00	2.90	0.599	0.143 (0.174)	0.455
53	13.25	3.40	0.702	0.141 (0.204)	0.561
54	13.50	3.40	0.702	0.139 (0.204)	0.563
55	13.75	2.30	0.475	0.137 (0.138)	0.338
56	14.00	2.30	0.475	0.135 (0.138)	0.340

57	14.25	2.70	0.557	0.133	(0.162)	0.425
58	14.50	2.60	0.537	0.131	(0.156)	0.406
59	14.75	2.60	0.537	0.129	(0.156)	0.408
60	15.00	2.50	0.516	0.127	(0.150)	0.389
61	15.25	2.40	0.495	0.125	(0.144)	0.371
62	15.50	2.30	0.475	0.123	(0.138)	0.352
63	15.75	1.90	0.392	(0.121)	0.114	0.278
64	16.00	1.90	0.392	(0.119)	0.114	0.278
65	16.25	0.40	0.083	(0.117)	0.024	0.059
66	16.50	0.40	0.083	(0.116)	0.024	0.059
67	16.75	0.30	0.062	(0.114)	0.018	0.044
68	17.00	0.30	0.062	(0.112)	0.018	0.044
69	17.25	0.50	0.103	(0.110)	0.030	0.073
70	17.50	0.50	0.103	(0.109)	0.030	0.073
71	17.75	0.50	0.103	(0.107)	0.030	0.073
72	18.00	0.40	0.083	(0.106)	0.024	0.059
73	18.25	0.40	0.083	(0.104)	0.024	0.059
74	18.50	0.40	0.083	(0.102)	0.024	0.059
75	18.75	0.30	0.062	(0.101)	0.018	0.044
76	19.00	0.20	0.041	(0.100)	0.012	0.029
77	19.25	0.30	0.062	(0.098)	0.018	0.044
78	19.50	0.40	0.083	(0.097)	0.024	0.059
79	19.75	0.30	0.062	(0.095)	0.018	0.044
80	20.00	0.20	0.041	(0.094)	0.012	0.029
81	20.25	0.30	0.062	(0.093)	0.018	0.044
82	20.50	0.30	0.062	(0.092)	0.018	0.044
83	20.75	0.30	0.062	(0.091)	0.018	0.044
84	21.00	0.20	0.041	(0.089)	0.012	0.029
85	21.25	0.30	0.062	(0.088)	0.018	0.044
86	21.50	0.20	0.041	(0.087)	0.012	0.029
87	21.75	0.30	0.062	(0.086)	0.018	0.044
88	22.00	0.20	0.041	(0.086)	0.012	0.029
89	22.25	0.30	0.062	(0.085)	0.018	0.044
90	22.50	0.20	0.041	(0.084)	0.012	0.029
91	22.75	0.20	0.041	(0.083)	0.012	0.029
92	23.00	0.20	0.041	(0.083)	0.012	0.029
93	23.25	0.20	0.041	(0.082)	0.012	0.029
94	23.50	0.20	0.041	(0.081)	0.012	0.029
95	23.75	0.20	0.041	(0.081)	0.012	0.029
96	24.00	0.20	0.041	(0.081)	0.012	0.029

(Loss Rate Not Used)

Sum = 100.0

Sum = 15.0

Flood volume = Effective rainfall 3.75 (In)

times area 7.5 (Ac.) / [(In) / (Ft.)] = 2.3 (Ac.Ft)

Total soil loss = 1.41 (In)

Total soil loss = 0.884 (Ac.Ft)

Total rainfall = 5.16 (In)

Flood volume = 101975.5 Cubic Feet

Total soil loss = 38503.5 Cubic Feet

Peak flow rate of this hydrograph = 4.253 (CFS)

+++++H O U R S T O R M+++++

24 - H O U R S T O R M
Run off Hydrograph

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0036	0.18	Q				
0+30	0.0100	0.31	VQ				
0+45	0.0169	0.33	VQ				
1+ 0	0.0256	0.42	VQ				
1+15	0.0329	0.36	VQ				
1+30	0.0398	0.33	VQ				
1+45	0.0467	0.33	VQ				
2+ 0	0.0554	0.42	VQ				
2+15	0.0645	0.44	Q				
2+30	0.0737	0.44	Q				
2+45	0.0847	0.53	VQ				
3+ 0	0.0961	0.55	VQ				
3+15	0.1076	0.55	VQ				
3+30	0.1190	0.55	Q				
3+45	0.1305	0.55	Q				
4+ 0	0.1437	0.64	Q				
4+15	0.1575	0.66	Q				
4+30	0.1730	0.75	VQ				

4+45	0.1891	0.78	Q						
5+ 0	0.2069	0.86	Q						
5+15	0.2216	0.71	QV						
5+30	0.2371	0.75	QV						
5+45	0.2550	0.86	QV						
6+ 0	0.2733	0.89	QV						
6+15	0.2934	0.97	Q V						
6+30	0.3141	1.00	Q V						
6+45	0.3365	1.09	QV						
7+ 0	0.3594	1.11	Q V						
7+15	0.3823	1.11	Q V						
7+30	0.4070	1.20	Q V						
7+45	0.4340	1.31	Q V						
8+ 0	0.4633	1.42	Q V						
8+15	0.4967	1.62	Q V						
8+30	0.5311	1.66	Q V						
8+45	0.5672	1.75	Q V						
9+ 0	0.6057	1.86	Q V						
9+15	0.6482	2.06	Q V						
9+30	0.6936	2.19	Q V						
9+45	0.7412	2.30	Q V						
10+ 0	0.7911	2.42	Q V						
10+15	0.8287	1.82	Q V						
10+30	0.8631	1.66	Q V						
10+45	0.9065	2.10	Q V						
11+ 0	0.9523	2.22	Q V						
11+15	0.9963	2.13	Q V						
11+30	1.0398	2.11	Q V						
11+45	1.0797	1.93	Q V						
12+ 0	1.1204	1.97	Q V						
12+15	1.1744	2.61	Q V						
12+30	1.2344	2.91	Q V						
12+45	1.3006	3.20	Q V						
13+ 0	1.3710	3.41	Q V						
13+15	1.4552	4.08	Q V						
13+30	1.5431	4.25	Q V						
13+45	1.6031	2.90	Q V						
14+ 0	1.6561	2.57	Q V						
14+15	1.7198	3.08	Q V						
14+30	1.7838	3.10	Q V						
14+45	1.8475	3.08	Q V						
15+ 0	1.9089	2.97	Q V						
15+15	1.9674	2.83	Q V						
15+30	2.0230	2.69	Q V						
15+45	2.0688	2.22	Q V						
16+ 0	2.1123	2.11	Q V						
16+15	2.1285	0.78	Q V						
16+30	2.1377	0.44	Q V						
16+45	2.1450	0.36	Q V						
17+ 0	2.1519	0.33	Q V						
17+15	2.1624	0.51	Q V						
17+30	2.1738	0.55	Q V						
17+45	2.1853	0.55	Q V						
18+ 0	2.1949	0.47	Q V						
18+15	2.2041	0.44	Q V						
18+30	2.2132	0.44	Q V						
18+45	2.2206	0.36	Q V						
19+ 0	2.2256	0.24	Q V						
19+15	2.2320	0.31	Q V						
19+30	2.2407	0.42	Q V						
19+45	2.2480	0.36	Q V						
20+ 0	2.2531	0.24	Q V						
20+15	2.2595	0.31	Q V						
20+30	2.2664	0.33	Q V						
20+45	2.2732	0.33	Q V						
21+ 0	2.2783	0.24	Q V						
21+15	2.2847	0.31	Q V						
21+30	2.2897	0.24	Q V						
21+45	2.2961	0.31	Q V						
22+ 0	2.3012	0.24	Q V						
22+15	2.3076	0.31	Q V						
22+30	2.3126	0.24	Q V						
22+45	2.3172	0.22	Q V						
23+ 0	2.3218	0.22	Q V						
23+15	2.3264	0.22	Q V						
23+30	2.3309	0.22	Q V						
23+45	2.3355	0.22	Q V						
24+ 0	2.3401	0.22	Q V						
24+15	2.3410	0.05	Q V						

APPENDIX B

EXISTING AND PROPOSED

UNIT HYDROGRAPH CALCULATIONS

DMA D

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD5EXIST15.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
EXISTING CONDITION, DMA D
5-YR 1-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.085 Hr.
Lag time = 5.07 Min.
25% of lag time = 1.27 Min.
40% of lag time = 2.03 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]
6.90	0.49	3.37

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	1.33	9.18

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 0.686(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.686(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.150
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.150	0.611	1.000	0.611
					Sum (F)	= 0.611

Area averaged mean soil loss (F) (In/Hr) = 0.611
Minimum soil loss rate ((In/Hr)) = 0.305

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.780

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	98.584	18.765
2	0.167	197.167	48.285
3	0.250	295.751	15.854
4	0.333	394.335	7.138
5	0.417	492.919	4.033
6	0.500	591.502	2.616
7	0.583	690.086	1.645
8	0.667	788.670	1.057
9	0.750	887.254	0.606
		Sum = 100.000	Sum= 6.954

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

Unit Time	Pattern	Storm Rain	Loss rate (In./Hr)	Effective
(Hr.)	Percent	(In/Hr)	Max Low	(In/Hr)
1	0.08	4.20	0.346 (0.611)	0.270 0.076
2	0.17	4.30	0.354 (0.611)	0.276 0.078
3	0.25	5.00	0.412 (0.611)	0.321 0.091
4	0.33	5.00	0.412 (0.611)	0.321 0.091
5	0.42	5.80	0.477 (0.611)	0.372 0.105
6	0.50	6.50	0.535 (0.611)	0.417 0.118
7	0.58	7.40	0.609 (0.611)	0.475 0.134
8	0.67	8.60	0.708 (0.611)	0.552 0.156
9	0.75	12.30	1.012 (0.611)	0.611 (0.790) 0.402
10	0.83	29.10	2.395 (0.611)	0.611 (1.868) 1.785
11	0.92	6.80	0.560 (0.611)	0.437 0.123
12	1.00	5.00	0.412 (0.611)	0.321 0.091

(Loss Rate Not Used)

Sum = 100.0 Sum = 3.2

Flood volume = Effective rainfall 0.27 (In)

times area 6.9 (Ac.)/[(In)/(Ft.)] = 0.2 (Ac.Ft)

Total soil loss = 0.42 (In)

Total soil loss = 0.239 (Ac.Ft)

Total rainfall = 0.69 (In)

Flood volume = 6778.4 Cubic Feet

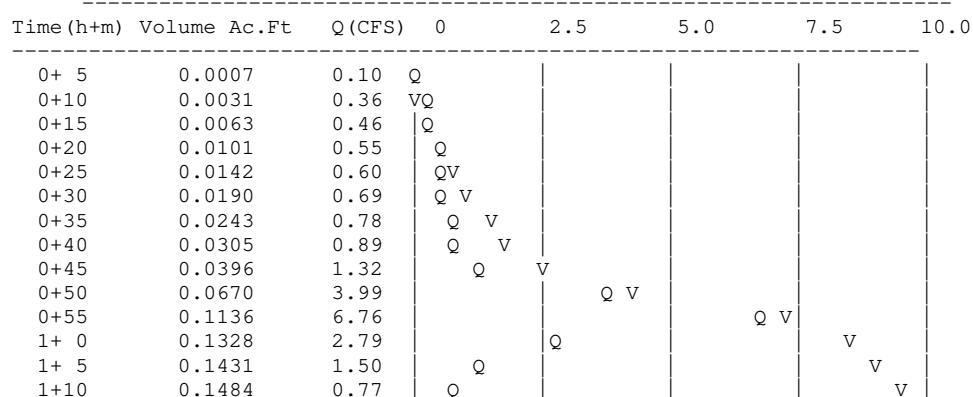
Total soil loss = 10402.3 Cubic Feet

Peak flow rate of this hydrograph = 6.758 (CFS)

+++++1 - H O U R S T O R M ++++++

Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))



1+15	0.1516	0.47	Q				v
1+20	0.1536	0.29	Q				v
1+25	0.1549	0.18	Q				v
1+30	0.1555	0.09	Q				v
1+35	0.1556	0.01	Q				v
1+40	0.1556	0.00	Q				v

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD5EXIST35.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
EXISTING CONDITION, DMA D
5-YR 3-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.085 Hr.
Lag time = 5.07 Min.
25% of lag time = 1.27 Min.
40% of lag time = 2.03 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]
6.90	0.87	5.98

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	2.09	14.42

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 1.153(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.153(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.150
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.150	0.611	1.000	0.611
					Sum (F)	= 0.611

Area averaged mean soil loss (F) (In/Hr) = 0.611
Minimum soil loss rate ((In/Hr)) = 0.305

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.780

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	98.584	18.765	1.305
2 0.167	197.167	48.285	3.358
3 0.250	295.751	15.854	1.102
4 0.333	394.335	7.138	0.496
5 0.417	492.919	4.033	0.280
6 0.500	591.502	2.616	0.182
7 0.583	690.086	1.645	0.114
8 0.667	788.670	1.057	0.073
9 0.750	887.254	0.606	0.042
	Sum = 100.000	Sum=	6.954

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 (In/Hr)	Loss rate (In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.08	1.30	0.180	(0.611)	0.140	0.040
2	0.17	1.30	0.180	(0.611)	0.140	0.040
3	0.25	1.10	0.152	(0.611)	0.119	0.033
4	0.33	1.50	0.207	(0.611)	0.162	0.046
5	0.42	1.50	0.207	(0.611)	0.162	0.046
6	0.50	1.80	0.249	(0.611)	0.194	0.055
7	0.58	1.50	0.207	(0.611)	0.162	0.046
8	0.67	1.80	0.249	(0.611)	0.194	0.055
9	0.75	1.80	0.249	(0.611)	0.194	0.055
10	0.83	1.50	0.207	(0.611)	0.162	0.046
11	0.92	1.60	0.221	(0.611)	0.173	0.049
12	1.00	1.80	0.249	(0.611)	0.194	0.055
13	1.08	2.20	0.304	(0.611)	0.237	0.067
14	1.17	2.20	0.304	(0.611)	0.237	0.067
15	1.25	2.20	0.304	(0.611)	0.237	0.067
16	1.33	2.00	0.277	(0.611)	0.216	0.061
17	1.42	2.60	0.360	(0.611)	0.281	0.079
18	1.50	2.70	0.373	(0.611)	0.291	0.082
19	1.58	2.40	0.332	(0.611)	0.259	0.073
20	1.67	2.70	0.373	(0.611)	0.291	0.082
21	1.75	3.30	0.456	(0.611)	0.356	0.100
22	1.83	3.10	0.429	(0.611)	0.334	0.094
23	1.92	2.90	0.401	(0.611)	0.313	0.088
24	2.00	3.00	0.415	(0.611)	0.324	0.091
25	2.08	3.10	0.429	(0.611)	0.334	0.094
26	2.17	4.20	0.581	(0.611)	0.453	0.128
27	2.25	5.00	0.692	(0.611)	0.539	0.152
28	2.33	3.50	0.484	(0.611)	0.378	0.107
29	2.42	6.80	0.941	0.611	(0.734)	0.330
30	2.50	7.30	1.010	0.611	(0.788)	0.399
31	2.58	8.20	1.134	0.611	(0.885)	0.524
32	2.67	5.90	0.816	0.611	(0.637)	0.205
33	2.75	2.00	0.277	(0.611)	0.216	0.061
34	2.83	1.80	0.249	(0.611)	0.194	0.055
35	2.92	1.80	0.249	(0.611)	0.194	0.055
36	3.00	0.60	0.083	(0.611)	0.065	0.018

Sum = 100.0 Sum = 3.6

$$\text{Flood volume} = \frac{\text{Effective rainfall}}{\text{times area}} = \frac{0.30 \text{ (In)}}{6.9 \text{ (Ac.)} / [(\text{In}) / (\text{Ft.})]} = 0.2 \text{ (Ac.Ft.)}$$

Total soil loss = 0.85 (In)

Total soil loss = 0.488 (Ac.Ft)

Total rainfall = 1.15 (In)

Flood volume = 7603.2 Cubic Feet

Total soil loss = 21267.3 Cubic Feet

Final Soil Test Results

Peak flow rate of this hydrograph = 2.714 (CFS)

Peak flow rate of this hydrograph = 2.714(CFS)

3 - H O U R S T O R M
Run off Hydrograph

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	0.0004	0.05	Q				
0+10	0.0016	0.18	Q				
0+15	0.0031	0.22	Q				
0+20	0.0048	0.24	QV				
0+25	0.0067	0.28	Q				
0+30	0.0088	0.31	QV				
0+35	0.0112	0.34	QV				
0+40	0.0135	0.33	Q V				
0+45	0.0160	0.36	Q V				
0+50	0.0184	0.36	Q V				
0+55	0.0208	0.34	Q V				
1+ 0	0.0232	0.35	Q V				
1+ 5	0.0258	0.38	Q V				
1+10	0.0288	0.43	Q V				
1+15	0.0319	0.45	Q V				
1+20	0.0349	0.45	Q V				
1+25	0.0381	0.45	Q V				
1+30	0.0416	0.52	Q V				
1+35	0.0453	0.53	Q V				
1+40	0.0489	0.53	Q V				
1+45	0.0529	0.58	Q V				
1+50	0.0573	0.64	Q V				
1+55	0.0617	0.64	Q V				
2+ 0	0.0660	0.62	Q V				
2+ 5	0.0704	0.63	Q V				
2+10	0.0751	0.69	Q V				
2+15	0.0809	0.84	Q V				
2+20	0.0871	0.90	Q V				
2+25	0.0946	1.08	Q V				
2+30	0.1076	1.90	Q V	V	V		
2+35	0.1250	2.53	Q V	V	V		
2+40	0.1437	2.71	Q V	V	V		
2+45	0.1554	1.69	Q V	V	V		
2+50	0.1620	0.96	Q V	V	V		
2+55	0.1668	0.70	Q V	V	V		
3+ 0	0.1704	0.53	Q V	V	V		
3+ 5	0.1725	0.31	Q V	V	V		
3+10	0.1736	0.15	Q V	V	V		
3+15	0.1741	0.08	Q V	V	V		
3+20	0.1743	0.03	Q V	V	V		
3+25	0.1745	0.02	Q V	V	V		
3+30	0.1745	0.01	Q V	V	V		
3+35	0.1745	0.00	Q V	V	V		
3+40	0.1745	0.00	Q V	V	V		

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD5EXIST65.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
EXISTING CONDITION, DMA D
5-YR 6-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.085 Hr.
Lag time = 5.07 Min.
25% of lag time = 1.27 Min.
40% of lag time = 2.03 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]
6.90	1.21	8.35

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	2.86	19.73

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 1.596(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.596(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.150
Total Area Entered =	6.90(Ac.)	

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.150	0.611	1.000	0.611
					Sum (F) =	0.611

Area averaged mean soil loss (F) (In/Hr) = 0.611
Minimum soil loss rate ((In/Hr)) = 0.305

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.780

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	98.584	18.765	1.305
2 0.167	197.167	48.285	3.358
3 0.250	295.751	15.854	1.102
4 0.333	394.335	7.138	0.496
5 0.417	492.919	4.033	0.280
6 0.500	591.502	2.616	0.182
7 0.583	690.086	1.645	0.114
8 0.667	788.670	1.057	0.073
9 0.750	887.254	0.606	0.042
	Sum = 100.000	Sum=	6.954

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	0.096	(0.611) 0.075	0.021
2 0.17	0.60	0.115	(0.611) 0.090	0.025
3 0.25	0.60	0.115	(0.611) 0.090	0.025
4 0.33	0.60	0.115	(0.611) 0.090	0.025
5 0.42	0.60	0.115	(0.611) 0.090	0.025
6 0.50	0.70	0.134	(0.611) 0.105	0.030
7 0.58	0.70	0.134	(0.611) 0.105	0.030
8 0.67	0.70	0.134	(0.611) 0.105	0.030
9 0.75	0.70	0.134	(0.611) 0.105	0.030
10 0.83	0.70	0.134	(0.611) 0.105	0.030
11 0.92	0.70	0.134	(0.611) 0.105	0.030
12 1.00	0.80	0.153	(0.611) 0.120	0.034
13 1.08	0.80	0.153	(0.611) 0.120	0.034
14 1.17	0.80	0.153	(0.611) 0.120	0.034
15 1.25	0.80	0.153	(0.611) 0.120	0.034
16 1.33	0.80	0.153	(0.611) 0.120	0.034
17 1.42	0.80	0.153	(0.611) 0.120	0.034
18 1.50	0.80	0.153	(0.611) 0.120	0.034
19 1.58	0.80	0.153	(0.611) 0.120	0.034
20 1.67	0.80	0.153	(0.611) 0.120	0.034
21 1.75	0.80	0.153	(0.611) 0.120	0.034
22 1.83	0.80	0.153	(0.611) 0.120	0.034
23 1.92	0.80	0.153	(0.611) 0.120	0.034
24 2.00	0.90	0.172	(0.611) 0.134	0.038
25 2.08	0.80	0.153	(0.611) 0.120	0.034
26 2.17	0.90	0.172	(0.611) 0.134	0.038
27 2.25	0.90	0.172	(0.611) 0.134	0.038
28 2.33	0.90	0.172	(0.611) 0.134	0.038
29 2.42	0.90	0.172	(0.611) 0.134	0.038
30 2.50	0.90	0.172	(0.611) 0.134	0.038
31 2.58	0.90	0.172	(0.611) 0.134	0.038
32 2.67	0.90	0.172	(0.611) 0.134	0.038
33 2.75	1.00	0.192	(0.611) 0.149	0.042
34 2.83	1.00	0.192	(0.611) 0.149	0.042
35 2.92	1.00	0.192	(0.611) 0.149	0.042
36 3.00	1.00	0.192	(0.611) 0.149	0.042
37 3.08	1.00	0.192	(0.611) 0.149	0.042
38 3.17	1.10	0.211	(0.611) 0.164	0.046
39 3.25	1.10	0.211	(0.611) 0.164	0.046
40 3.33	1.10	0.211	(0.611) 0.164	0.046
41 3.42	1.20	0.230	(0.611) 0.179	0.051
42 3.50	1.30	0.249	(0.611) 0.194	0.055
43 3.58	1.40	0.268	(0.611) 0.209	0.059
44 3.67	1.40	0.268	(0.611) 0.209	0.059
45 3.75	1.50	0.287	(0.611) 0.224	0.063
46 3.83	1.50	0.287	(0.611) 0.224	0.063
47 3.92	1.60	0.307	(0.611) 0.239	0.067
48 4.00	1.60	0.307	(0.611) 0.239	0.067
49 4.08	1.70	0.326	(0.611) 0.254	0.072

50	4.17	1.80	0.345	(-0.611)	0.269	0.076
51	4.25	1.90	0.364	(-0.611)	0.284	0.080
52	4.33	2.00	0.383	(-0.611)	0.299	0.084
53	4.42	2.10	0.402	(-0.611)	0.314	0.089
54	4.50	2.10	0.402	(-0.611)	0.314	0.089
55	4.58	2.20	0.421	(-0.611)	0.329	0.093
56	4.67	2.30	0.441	(-0.611)	0.344	0.097
57	4.75	2.40	0.460	(-0.611)	0.359	0.101
58	4.83	2.40	0.460	(-0.611)	0.359	0.101
59	4.92	2.50	0.479	(-0.611)	0.374	0.105
60	5.00	2.60	0.498	(-0.611)	0.389	0.110
61	5.08	3.10	0.594	(-0.611)	0.463	0.131
62	5.17	3.60	0.690	(-0.611)	0.538	0.152
63	5.25	3.90	0.747	(-0.611)	0.583	0.164
64	5.33	4.20	0.805	0.611	(-0.628)	0.194
65	5.42	4.70	0.900	0.611	(-0.702)	0.290
66	5.50	5.60	1.073	0.611	(-0.837)	0.462
67	5.58	1.90	0.364	(-0.611)	0.284	0.080
68	5.67	0.90	0.172	(-0.611)	0.134	0.038
69	5.75	0.60	0.115	(-0.611)	0.090	0.025
70	5.83	0.50	0.096	(-0.611)	0.075	0.021
71	5.92	0.30	0.057	(-0.611)	0.045	0.013
72	6.00	0.20	0.038	(-0.611)	0.030	0.008

(Loss Rate Not Used)

Sum = 100.0

Sum = 4.5

Flood volume = Effective rainfall 0.38 (In)

times area 6.9(Ac.)/(In)/(Ft.)] = 0.2 (Ac.Ft)

Total soil loss = 1.22 (In)

Total soil loss = 0.700 (Ac.Ft)

Total rainfall = 1.60 (In)

Flood volume = 9495.3 Cubic Feet

Total soil loss = 30490.5 Cubic Feet

Peak flow rate of this hydrograph = 2.174 (CFS)

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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	2.5	5.0	7.5	10.0
0+ 5	0.0002	0.03 Q					
0+10	0.0009	0.10 Q					
0+15	0.0019	0.14 Q					
0+20	0.0030	0.16 Q					
0+25	0.0041	0.16 Q					
0+30	0.0053	0.17 Q					
0+35	0.0066	0.19 QV					
0+40	0.0080	0.20 QV					
0+45	0.0094	0.20 QV					
0+50	0.0108	0.20 QV					
0+55	0.0122	0.20 Q V					
1+ 0	0.0136	0.21 Q V					
1+ 5	0.0152	0.22 Q V					
1+10	0.0168	0.23 Q V					
1+15	0.0184	0.23 Q V					
1+20	0.0200	0.23 Q V					
1+25	0.0216	0.23 Q V					
1+30	0.0232	0.23 Q V					
1+35	0.0248	0.23 Q V					
1+40	0.0264	0.23 Q V					
1+45	0.0280	0.23 Q V					
1+50	0.0296	0.23 Q V					
1+55	0.0313	0.23 Q V					
2+ 0	0.0329	0.24 Q V					
2+ 5	0.0346	0.25 Q V					
2+10	0.0363	0.24 Q V					
2+15	0.0381	0.26 Q V					
2+20	0.0399	0.26 Q V					
2+25	0.0417	0.26 Q V					
2+30	0.0435	0.26 Q V					
2+35	0.0453	0.26 Q V					
2+40	0.0471	0.26 Q V					
2+45	0.0490	0.27 Q V					
2+50	0.0509	0.28 Q V					
2+55	0.0529	0.29 Q V					

3+ 0	0.0549	0.29	Q	V				
3+ 5	0.0569	0.29	Q	V				
3+10	0.0590	0.30	Q	V				
3+15	0.0611	0.31	Q	V				
3+20	0.0633	0.32	Q	V				
3+25	0.0655	0.33	Q	V				
3+30	0.0679	0.35	Q	V				
3+35	0.0705	0.37	Q	V				
3+40	0.0732	0.39	Q	V				
3+45	0.0760	0.41	Q	V				
3+50	0.0789	0.42	Q	V				
3+55	0.0819	0.44	Q	V				
4+ 0	0.0850	0.45	Q	V				
4+ 5	0.0883	0.47	Q	V				
4+10	0.0916	0.49	Q	V				
4+15	0.0952	0.52	Q	V				
4+20	0.0989	0.54	Q	V				
4+25	0.1029	0.57	Q	V				
4+30	0.1070	0.60	Q	V				
4+35	0.1112	0.61	Q	V				
4+40	0.1155	0.63	Q	V				
4+45	0.1201	0.66	Q	V				
4+50	0.1248	0.68	Q	V				
4+55	0.1296	0.70	Q	V				
5+ 0	0.1346	0.72	Q	V				
5+ 5	0.1399	0.77	Q	V				
5+10	0.1460	0.88	Q	V				
5+15	0.1528	0.99	Q	V				
5+20	0.1605	1.11	Q	V				
5+25	0.1699	1.37	Q	V				
5+30	0.1834	1.96	Q	V				
5+35	0.1984	2.17	Q	V				
5+40	0.2059	1.09	Q	V				
5+45	0.2102	0.63	Q	V				
5+50	0.2131	0.42	Q	V				
5+55	0.2151	0.29	Q	V				
6+ 0	0.2165	0.20	Q	V				
6+ 5	0.2173	0.12	Q	V				
6+10	0.2177	0.06	Q	V				
6+15	0.2178	0.02	Q	V				
6+20	0.2179	0.01	Q	V				
6+25	0.2180	0.01	Q	V				
6+30	0.2180	0.00	Q	V				
6+35	0.2180	0.00	Q	V				
6+40	0.2180	0.00	Q	V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD5EXIST245.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
EXISTING CONDITION, DMA D
5-YR 24-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.085 Hr.
Lag time = 5.07 Min.
25% of lag time = 1.27 Min.
40% of lag time = 2.03 Min.
Unit time = 15.00 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]
6.90	2.05	14.15

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	5.16	35.60

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 2.778(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.778(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.150
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.150	0.611	1.000	0.611
					Sum (F)	= 0.611

Area averaged mean soil loss (F) (In/Hr) = 0.611
Minimum soil loss rate ((In/Hr)) = 0.305

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.780

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	295.751	56.239	3.911
2 0.500	591.502	37.364	2.598
3 0.750	887.254	6.397	0.445
		Sum = 100.000	Sum= 6.954

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	0.25	0.20	0.022	(1.078) 0.017	0.005
2	0.50	0.30	0.033	(1.066) 0.026	0.007
3	0.75	0.30	0.033	(1.053) 0.026	0.007
4	1.00	0.40	0.044	(1.041) 0.035	0.010
5	1.25	0.30	0.033	(1.029) 0.026	0.007
6	1.50	0.30	0.033	(1.017) 0.026	0.007
7	1.75	0.30	0.033	(1.004) 0.026	0.007
8	2.00	0.40	0.044	(0.992) 0.035	0.010
9	2.25	0.40	0.044	(0.980) 0.035	0.010
10	2.50	0.40	0.044	(0.968) 0.035	0.010
11	2.75	0.50	0.056	(0.957) 0.043	0.012
12	3.00	0.50	0.056	(0.945) 0.043	0.012
13	3.25	0.50	0.056	(0.933) 0.043	0.012
14	3.50	0.50	0.056	(0.922) 0.043	0.012
15	3.75	0.50	0.056	(0.910) 0.043	0.012
16	4.00	0.60	0.067	(0.899) 0.052	0.015
17	4.25	0.60	0.067	(0.887) 0.052	0.015
18	4.50	0.70	0.078	(0.876) 0.061	0.017
19	4.75	0.70	0.078	(0.865) 0.061	0.017
20	5.00	0.80	0.089	(0.853) 0.069	0.020
21	5.25	0.60	0.067	(0.842) 0.052	0.015
22	5.50	0.70	0.078	(0.831) 0.061	0.017
23	5.75	0.80	0.089	(0.821) 0.069	0.020
24	6.00	0.80	0.089	(0.810) 0.069	0.020
25	6.25	0.90	0.100	(0.799) 0.078	0.022
26	6.50	0.90	0.100	(0.788) 0.078	0.022
27	6.75	1.00	0.111	(0.778) 0.087	0.024
28	7.00	1.00	0.111	(0.767) 0.087	0.024
29	7.25	1.00	0.111	(0.757) 0.087	0.024
30	7.50	1.10	0.122	(0.746) 0.095	0.027
31	7.75	1.20	0.133	(0.736) 0.104	0.029
32	8.00	1.30	0.144	(0.726) 0.113	0.032
33	8.25	1.50	0.167	(0.716) 0.130	0.037
34	8.50	1.50	0.167	(0.706) 0.130	0.037
35	8.75	1.60	0.178	(0.696) 0.139	0.039
36	9.00	1.70	0.189	(0.686) 0.147	0.042
37	9.25	1.90	0.211	(0.677) 0.165	0.046
38	9.50	2.00	0.222	(0.667) 0.173	0.049
39	9.75	2.10	0.233	(0.657) 0.182	0.051
40	10.00	2.20	0.244	(0.648) 0.191	0.054
41	10.25	1.50	0.167	(0.639) 0.130	0.037
42	10.50	1.50	0.167	(0.629) 0.130	0.037
43	10.75	2.00	0.222	(0.620) 0.173	0.049
44	11.00	2.00	0.222	(0.611) 0.173	0.049
45	11.25	1.90	0.211	(0.602) 0.165	0.046
46	11.50	1.90	0.211	(0.593) 0.165	0.046
47	11.75	1.70	0.189	(0.584) 0.147	0.042
48	12.00	1.80	0.200	(0.576) 0.156	0.044
49	12.25	2.50	0.278	(0.567) 0.217	0.061
50	12.50	2.60	0.289	(0.559) 0.225	0.064
51	12.75	2.80	0.311	(0.550) 0.243	0.068
52	13.00	2.90	0.322	(0.542) 0.251	0.071
53	13.25	3.40	0.378	(0.534) 0.295	0.083
54	13.50	3.40	0.378	(0.526) 0.295	0.083
55	13.75	2.30	0.256	(0.518) 0.199	0.056

56	14.00	2.30	0.256	(-0.510)	0.199	0.056
57	14.25	2.70	0.300	(-0.502)	0.234	0.066
58	14.50	2.60	0.289	(-0.494)	0.225	0.064
59	14.75	2.60	0.289	(-0.487)	0.225	0.064
60	15.00	2.50	0.278	(-0.479)	0.217	0.061
61	15.25	2.40	0.267	(-0.472)	0.208	0.059
62	15.50	2.30	0.256	(-0.465)	0.199	0.056
63	15.75	1.90	0.211	(-0.458)	0.165	0.046
64	16.00	1.90	0.211	(-0.451)	0.165	0.046
65	16.25	0.40	0.044	(-0.444)	0.035	0.010
66	16.50	0.40	0.044	(-0.437)	0.035	0.010
67	16.75	0.30	0.033	(-0.430)	0.026	0.007
68	17.00	0.30	0.033	(-0.424)	0.026	0.007
69	17.25	0.50	0.056	(-0.418)	0.043	0.012
70	17.50	0.50	0.056	(-0.411)	0.043	0.012
71	17.75	0.50	0.056	(-0.405)	0.043	0.012
72	18.00	0.40	0.044	(-0.399)	0.035	0.010
73	18.25	0.40	0.044	(-0.393)	0.035	0.010
74	18.50	0.40	0.044	(-0.388)	0.035	0.010
75	18.75	0.30	0.033	(-0.382)	0.026	0.007
76	19.00	0.20	0.022	(-0.377)	0.017	0.005
77	19.25	0.30	0.033	(-0.371)	0.026	0.007
78	19.50	0.40	0.044	(-0.366)	0.035	0.010
79	19.75	0.30	0.033	(-0.361)	0.026	0.007
80	20.00	0.20	0.022	(-0.356)	0.017	0.005
81	20.25	0.30	0.033	(-0.351)	0.026	0.007
82	20.50	0.30	0.033	(-0.347)	0.026	0.007
83	20.75	0.30	0.033	(-0.343)	0.026	0.007
84	21.00	0.20	0.022	(-0.338)	0.017	0.005
85	21.25	0.30	0.033	(-0.334)	0.026	0.007
86	21.50	0.20	0.022	(-0.331)	0.017	0.005
87	21.75	0.30	0.033	(-0.327)	0.026	0.007
88	22.00	0.20	0.022	(-0.324)	0.017	0.005
89	22.25	0.30	0.033	(-0.320)	0.026	0.007
90	22.50	0.20	0.022	(-0.317)	0.017	0.005
91	22.75	0.20	0.022	(-0.315)	0.017	0.005
92	23.00	0.20	0.022	(-0.312)	0.017	0.005
93	23.25	0.20	0.022	(-0.310)	0.017	0.005
94	23.50	0.20	0.022	(-0.308)	0.017	0.005
95	23.75	0.20	0.022	(-0.307)	0.017	0.005
96	24.00	0.20	0.022	(-0.306)	0.017	0.005

(Loss Rate Not Used)

Sum = 100.0

Sum = 2.4

Flood volume = Effective rainfall 0.61 (In)

times area 6.9(Ac.)/[(In)/(Ft.)] = 0.4(Ac.Ft)

Total soil loss = 2.17 (In)

Total soil loss = 1.246 (Ac.Ft)

Total rainfall = 2.78 (In)

Flood volume = 15309.9 Cubic Feet

Total soil loss = 54280.7 Cubic Feet

Peak flow rate of this hydrograph = 0.573 (CFS)

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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 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0004	0.02 Q					
0+30	0.0013	0.04 Q					
0+45	0.0023	0.05 Q					
1+ 0	0.0035	0.06 Q					
1+15	0.0047	0.06 Q					
1+30	0.0058	0.05 Q					
1+45	0.0069	0.05 Q					
2+ 0	0.0081	0.06 Q					
2+15	0.0095	0.07 QV					
2+30	0.0109	0.07 QV					
2+45	0.0125	0.08 QV					
3+ 0	0.0142	0.08 QV					
3+15	0.0160	0.09 QV					
3+30	0.0177	0.09 Q V					
3+45	0.0195	0.09 Q V					
4+ 0	0.0215	0.09 Q V					
4+15	0.0235	0.10 Q V					

24+15

0.3514

0.01 Q

24+30

0.3515

0.00 Q

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v

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD5PROP15.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA D
5-YR 1-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.051 Hr.
Lag time = 3.04 Min.
25% of lag time = 0.76 Min.
40% of lag time = 1.22 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]
6.90	0.49	3.37

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	1.33	9.18

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 0.686(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.686(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.850
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.850	0.166	1.000	0.166
				Sum (F)	=	0.166

Area averaged mean soil loss (F) (In/Hr) = 0.166
Minimum soil loss rate ((In/Hr)) = 0.083

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.220

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	164.306	36.467
2	0.167	328.612	45.943
3	0.250	492.919	10.415
4	0.333	657.225	4.445
5	0.417	821.531	2.730
		Sum = 100.000	Sum= 6.954

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	4.20	0.346	(0.166) 0.076	0.270
2	0.17	4.30	0.354	(0.166) 0.078	0.276
3	0.25	5.00	0.412	(0.166) 0.091	0.321
4	0.33	5.00	0.412	(0.166) 0.091	0.321
5	0.42	5.80	0.477	(0.166) 0.105	0.372
6	0.50	6.50	0.535	(0.166) 0.118	0.417
7	0.58	7.40	0.609	(0.166) 0.134	0.475
8	0.67	8.60	0.708	(0.166) 0.156	0.552
9	0.75	12.30	1.012	0.166 (0.223)	0.847
10	0.83	29.10	2.395	0.166 (0.527)	2.229
11	0.92	6.80	0.560	(0.166) 0.123	0.437
12	1.00	5.00	0.412	(0.166) 0.091	0.321

(Loss Rate Not Used)

Sum = 100.0 Sum = 6.8

Flood volume = Effective rainfall 0.57 (In)

times area 6.9 (Ac.) / [(In)/(Ft.)] = 0.3 (Ac.Ft)

Total soil loss = 0.12 (In)

Total soil loss = 0.067 (Ac.Ft)

Total rainfall = 0.69 (In)

Flood volume = 14273.2 Cubic Feet

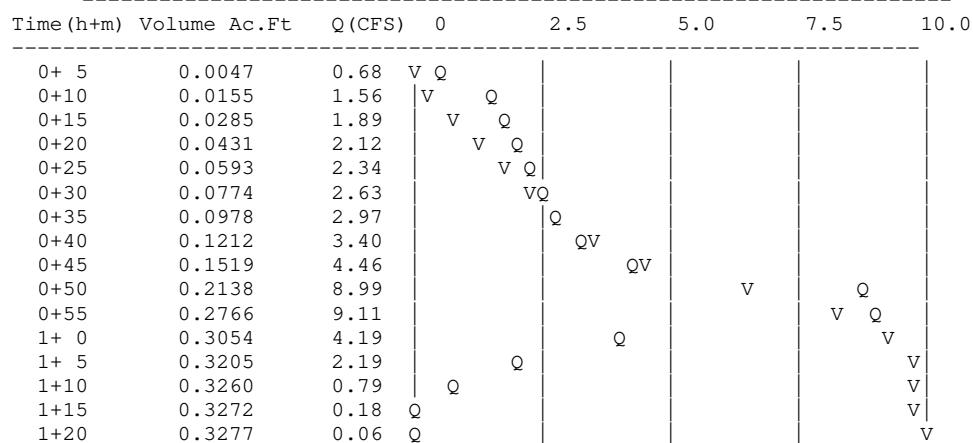
Total soil loss = 2907.5 Cubic Feet

Peak flow rate of this hydrograph = 9.108 (CFS)

+++++ 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))



Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD5PROP35.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA D
5-YR 3-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.051 Hr.
Lag time = 3.04 Min.
25% of lag time = 0.76 Min.
40% of lag time = 1.22 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]
6.90	0.87	5.98

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	2.09	14.42

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 1.153(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.153(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.850
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.850	0.166	1.000	0.166
				Sum (F)	=	0.166

Area averaged mean soil loss (F) (In/Hr) = 0.166
Minimum soil loss rate ((In/Hr)) = 0.083

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.220

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	164.306	36.467	2.536
2 0.167	328.612	45.943	3.195
3 0.250	492.919	10.415	0.724
4 0.333	657.225	4.445	0.309
5 0.417	821.531	2.730	0.190
	Sum = 100.000	Sum=	6.954

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	0.180	(0.166) 0.040	0.140
2	0.17	1.30	0.180	(0.166) 0.040	0.140
3	0.25	1.10	0.152	(0.166) 0.033	0.119
4	0.33	1.50	0.207	(0.166) 0.046	0.162
5	0.42	1.50	0.207	(0.166) 0.046	0.162
6	0.50	1.80	0.249	(0.166) 0.055	0.194
7	0.58	1.50	0.207	(0.166) 0.046	0.162
8	0.67	1.80	0.249	(0.166) 0.055	0.194
9	0.75	1.80	0.249	(0.166) 0.055	0.194
10	0.83	1.50	0.207	(0.166) 0.046	0.162
11	0.92	1.60	0.221	(0.166) 0.049	0.173
12	1.00	1.80	0.249	(0.166) 0.055	0.194
13	1.08	2.20	0.304	(0.166) 0.067	0.237
14	1.17	2.20	0.304	(0.166) 0.067	0.237
15	1.25	2.20	0.304	(0.166) 0.067	0.237
16	1.33	2.00	0.277	(0.166) 0.061	0.216
17	1.42	2.60	0.360	(0.166) 0.079	0.281
18	1.50	2.70	0.373	(0.166) 0.082	0.291
19	1.58	2.40	0.332	(0.166) 0.073	0.259
20	1.67	2.70	0.373	(0.166) 0.082	0.291
21	1.75	3.30	0.456	(0.166) 0.100	0.356
22	1.83	3.10	0.429	(0.166) 0.094	0.334
23	1.92	2.90	0.401	(0.166) 0.088	0.313
24	2.00	3.00	0.415	(0.166) 0.091	0.324
25	2.08	3.10	0.429	(0.166) 0.094	0.334
26	2.17	4.20	0.581	(0.166) 0.128	0.453
27	2.25	5.00	0.692	(0.166) 0.152	0.539
28	2.33	3.50	0.484	(0.166) 0.107	0.378
29	2.42	6.80	0.941	0.166 (0.207)	0.775
30	2.50	7.30	1.010	0.166 (0.222)	0.844
31	2.58	8.20	1.134	0.166 (0.250)	0.968
32	2.67	5.90	0.816	0.166 (0.180)	0.650
33	2.75	2.00	0.277	(0.166) 0.061	0.216
34	2.83	1.80	0.249	(0.166) 0.055	0.194
35	2.92	1.80	0.249	(0.166) 0.055	0.194
36	3.00	0.60	0.083	(0.166) 0.018	0.065

(Loss Rate Not Used)

Sum = 100.0 Sum = 11.0

Flood volume = Effective rainfall 0.92 (In)
times area 6.9 (Ac.) / [(In)/(Ft.)] = 0.5 (Ac.Ft)
Total soil loss = 0.24 (In)
Total soil loss = 0.136 (Ac.Ft)
Total rainfall = 1.15 (In)
Flood volume = 22925.0 Cubic Feet
Total soil loss = 5945.6 Cubic Feet

Peak flow rate of this hydrograph = 5.935 (CFS)

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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	2.5	5.0	7.5	10.0
0+ 5	0.0025		0.36	VQ				
0+10	0.0080		0.80	V Q				
0+15	0.0139		0.85	V Q				
0+20	0.0203		0.93	V Q				
0+25	0.0278		1.08	V Q				
0+30	0.0360		1.19	V Q				
0+35	0.0444		1.22	VQ				
0+40	0.0528		1.23	Q				
0+45	0.0619		1.32	VQ				
0+50	0.0706		1.26	Q				
0+55	0.0788		1.19	QV				
1+ 0	0.0875		1.26	QV				
1+ 5	0.0973		1.43	Q V				
1+10	0.1083		1.59	Q V				
1+15	0.1195		1.63	Q V				
1+20	0.1304		1.59	Q V				
1+25	0.1421		1.69	Q V				
1+30	0.1552		1.91	Q V				
1+35	0.1683		1.90	Q V				
1+40	0.1814		1.91	Q V				
1+45	0.1964		2.17	Q V				
1+50	0.2124		2.33	Q V				
1+55	0.2280		2.26	Q V				
2+ 0	0.2433		2.23	Q V				
2+ 5	0.2591		2.28	Q V				
2+10	0.2771		2.61	Q V				
2+15	0.2992		3.22	Q V				
2+20	0.3211		3.18	Q V				
2+25	0.3470		3.77	Q V				
2+30	0.3825		5.14	Q V				
2+35	0.4233		5.93	Q V				
2+40	0.4624		5.67	Q V				
2+45	0.4881		3.74	Q V				
2+50	0.5026		2.11	Q V				
2+55	0.5140		1.65	Q V				
3+ 0	0.5217		1.12	Q V				
3+ 5	0.5248		0.45	Q V				
3+10	0.5258		0.14	Q V				
3+15	0.5262		0.06	Q V				
3+20	0.5263		0.01	Q V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD5PROP65.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA D
5-YR 6-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.051 Hr.
Lag time = 3.04 Min.
25% of lag time = 0.76 Min.
40% of lag time = 1.22 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]
6.90	1.21	8.35

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	2.86	19.73

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 1.596(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.596(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.850
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.850	0.166	1.000	0.166
					Sum (F)	= 0.166

Area averaged mean soil loss (F) (In/Hr) = 0.166
Minimum soil loss rate ((In/Hr)) = 0.083

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.220

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	164.306	36.467	2.536
2 0.167	328.612	45.943	3.195
3 0.250	492.919	10.415	0.724
4 0.333	657.225	4.445	0.309
5 0.417	821.531	2.730	0.190
	Sum = 100.000	Sum=	6.954

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	0.096	(0.166) 0.021	0.075
2	0.17	0.60	0.115	(0.166) 0.025	0.090
3	0.25	0.60	0.115	(0.166) 0.025	0.090
4	0.33	0.60	0.115	(0.166) 0.025	0.090
5	0.42	0.60	0.115	(0.166) 0.025	0.090
6	0.50	0.70	0.134	(0.166) 0.030	0.105
7	0.58	0.70	0.134	(0.166) 0.030	0.105
8	0.67	0.70	0.134	(0.166) 0.030	0.105
9	0.75	0.70	0.134	(0.166) 0.030	0.105
10	0.83	0.70	0.134	(0.166) 0.030	0.105
11	0.92	0.70	0.134	(0.166) 0.030	0.105
12	1.00	0.80	0.153	(0.166) 0.034	0.120
13	1.08	0.80	0.153	(0.166) 0.034	0.120
14	1.17	0.80	0.153	(0.166) 0.034	0.120
15	1.25	0.80	0.153	(0.166) 0.034	0.120
16	1.33	0.80	0.153	(0.166) 0.034	0.120
17	1.42	0.80	0.153	(0.166) 0.034	0.120
18	1.50	0.80	0.153	(0.166) 0.034	0.120
19	1.58	0.80	0.153	(0.166) 0.034	0.120
20	1.67	0.80	0.153	(0.166) 0.034	0.120
21	1.75	0.80	0.153	(0.166) 0.034	0.120
22	1.83	0.80	0.153	(0.166) 0.034	0.120
23	1.92	0.80	0.153	(0.166) 0.034	0.120
24	2.00	0.90	0.172	(0.166) 0.038	0.134
25	2.08	0.80	0.153	(0.166) 0.034	0.120
26	2.17	0.90	0.172	(0.166) 0.038	0.134
27	2.25	0.90	0.172	(0.166) 0.038	0.134
28	2.33	0.90	0.172	(0.166) 0.038	0.134
29	2.42	0.90	0.172	(0.166) 0.038	0.134
30	2.50	0.90	0.172	(0.166) 0.038	0.134
31	2.58	0.90	0.172	(0.166) 0.038	0.134
32	2.67	0.90	0.172	(0.166) 0.038	0.134
33	2.75	1.00	0.192	(0.166) 0.042	0.149
34	2.83	1.00	0.192	(0.166) 0.042	0.149
35	2.92	1.00	0.192	(0.166) 0.042	0.149
36	3.00	1.00	0.192	(0.166) 0.042	0.149
37	3.08	1.00	0.192	(0.166) 0.042	0.149
38	3.17	1.10	0.211	(0.166) 0.046	0.164
39	3.25	1.10	0.211	(0.166) 0.046	0.164
40	3.33	1.10	0.211	(0.166) 0.046	0.164
41	3.42	1.20	0.230	(0.166) 0.051	0.179
42	3.50	1.30	0.249	(0.166) 0.055	0.194
43	3.58	1.40	0.268	(0.166) 0.059	0.209
44	3.67	1.40	0.268	(0.166) 0.059	0.209
45	3.75	1.50	0.287	(0.166) 0.063	0.224
46	3.83	1.50	0.287	(0.166) 0.063	0.224
47	3.92	1.60	0.307	(0.166) 0.067	0.239
48	4.00	1.60	0.307	(0.166) 0.067	0.239
49	4.08	1.70	0.326	(0.166) 0.072	0.254
50	4.17	1.80	0.345	(0.166) 0.076	0.269
51	4.25	1.90	0.364	(0.166) 0.080	0.284
52	4.33	2.00	0.383	(0.166) 0.084	0.299
53	4.42	2.10	0.402	(0.166) 0.089	0.314

54	4.50	2.10	0.402	(-0.166)	0.089	0.314
55	4.58	2.20	0.421	(-0.166)	0.093	0.329
56	4.67	2.30	0.441	(-0.166)	0.097	0.344
57	4.75	2.40	0.460	(-0.166)	0.101	0.359
58	4.83	2.40	0.460	(-0.166)	0.101	0.359
59	4.92	2.50	0.479	(-0.166)	0.105	0.374
60	5.00	2.60	0.498	(-0.166)	0.110	0.389
61	5.08	3.10	0.594	(-0.166)	0.131	0.463
62	5.17	3.60	0.690	(-0.166)	0.152	0.538
63	5.25	3.90	0.747	(-0.166)	0.164	0.583
64	5.33	4.20	0.805	0.166	(-0.177)	0.639
65	5.42	4.70	0.900	0.166	(-0.198)	0.734
66	5.50	5.60	1.073	0.166	(-0.236)	0.907
67	5.58	1.90	0.364	(-0.166)	0.080	0.284
68	5.67	0.90	0.172	(-0.166)	0.038	0.134
69	5.75	0.60	0.115	(-0.166)	0.025	0.090
70	5.83	0.50	0.096	(-0.166)	0.021	0.075
71	5.92	0.30	0.057	(-0.166)	0.013	0.045
72	6.00	0.20	0.038	(-0.166)	0.008	0.030

(Loss Rate Not Used)

Sum = 100.0

Sum = 15.1

Flood volume = Effective rainfall 1.25 (In)

times area 6.9(Ac.)/[(In)/(Ft.)] = 0.7(Ac.Ft)

Total soil loss = 0.34 (In)

Total soil loss = 0.197 (Ac.Ft)

Total rainfall = 1.60 (In)

Flood volume = 31425.6 Cubic Feet

Total soil loss = 8560.2 Cubic Feet

Peak flow rate of this hydrograph = 5.394 (CFS)

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6 - H O U R S T O R M
Run off Hydrograph

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	0.0045	0.47 VQ					
0+15	0.0084	0.57 V Q					
0+20	0.0126	0.60 V Q					
0+25	0.0169	0.62 V Q					
0+30	0.0214	0.66 VQ					
0+35	0.0263	0.71 VQ					
0+40	0.0313	0.72 VQ					
0+45	0.0362	0.72 Q					
0+50	0.0413	0.73 Q					
0+55	0.0463	0.73 Q					
1+ 0	0.0515	0.77 VQ					
1+ 5	0.0571	0.81 Q					
1+10	0.0628	0.82 Q					
1+15	0.0685	0.83 Q					
1+20	0.0743	0.83 QV					
1+25	0.0800	0.83 QV					
1+30	0.0857	0.83 QV					
1+35	0.0914	0.83 Q V					
1+40	0.0972	0.83 Q V					
1+45	0.1029	0.83 Q V					
1+50	0.1086	0.83 Q V					
1+55	0.1144	0.83 Q V					
2+ 0	0.1203	0.87 Q V					
2+ 5	0.1264	0.88 Q V					
2+10	0.1325	0.88 Q V					
2+15	0.1388	0.92 Q V					
2+20	0.1452	0.93 Q V					
2+25	0.1517	0.93 Q V					
2+30	0.1581	0.94 Q V					
2+35	0.1645	0.94 Q V					
2+40	0.1710	0.94 Q V					
2+45	0.1777	0.97 Q V					
2+50	0.1847	1.02 Q V					
2+55	0.1918	1.03 Q V					
3+ 0	0.1990	1.04 Q V					
3+ 5	0.2061	1.04 Q V					
3+10	0.2136	1.08 Q V					
3+15	0.2213	1.13 Q V					

3+20	0.2291	1.14	Q	V				
3+25	0.2372	1.18	Q	V				
3+30	0.2460	1.27	Q	V				
3+35	0.2554	1.36	Q	V				
3+40	0.2652	1.43	Q	V				
3+45	0.2754	1.48	Q	V				
3+50	0.2860	1.54	Q	V				
3+55	0.2970	1.59	Q	V				
4+ 0	0.3083	1.64	Q	V				
4+ 5	0.3199	1.69	Q	V				
4+10	0.3322	1.78	Q	V				
4+15	0.3452	1.88	Q	V				
4+20	0.3589	1.98	Q	V				
4+25	0.3732	2.09	Q	V				
4+30	0.3881	2.15	Q	V				
4+35	0.4033	2.21	Q	V				
4+40	0.4192	2.30	Q	V				
4+45	0.4357	2.40	Q	V				
4+50	0.4527	2.47	Q	V				
4+55	0.4701	2.52	Q	V				
5+ 0	0.4881	2.62	Q	V				
5+ 5	0.5078	2.87	Q	V				
5+10	0.5306	3.31	Q	V				
5+15	0.5563	3.72	Q	V				
5+20	0.5845	4.09	Q	V				
5+25	0.6160	4.58	Q	V				
5+30	0.6532	5.39	Q	V				
5+35	0.6839	4.46	Q	V				
5+40	0.6994	2.25	Q	V				
5+45	0.7082	1.28	Q	V				
5+50	0.7140	0.83	Q	V				
5+55	0.7175	0.51	Q	V				
6+ 0	0.7198	0.33	Q	V				
6+ 5	0.7209	0.17	Q	V				
6+10	0.7213	0.05	Q	V				
6+15	0.7214	0.02	Q	V				
6+20	0.7214	0.01	Q	V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD5PROP245.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA D
5-YR 24-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.051 Hr.
Lag time = 3.04 Min.
25% of lag time = 0.76 Min.
40% of lag time = 1.22 Min.
Unit time = 15.00 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]
6.90	2.05	14.15

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	5.16	35.60

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 2.778(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.778(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.850
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	36.0	0.706	0.850	0.166	1.000	0.166
				Sum (F)	=	0.166

Area averaged mean soil loss (F) (In/Hr) = 0.166
Minimum soil loss rate ((In/Hr)) = 0.083

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.220

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	492.919	70.567	4.907
2 0.500	985.837	29.433	2.047
		Sum = 100.000	Sum= 6.954

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	0.25	0.20	0.022	(0.293) 0.005	0.017
2	0.50	0.30	0.033	(0.290) 0.007	0.026
3	0.75	0.30	0.033	(0.286) 0.007	0.026
4	1.00	0.40	0.044	(0.283) 0.010	0.035
5	1.25	0.30	0.033	(0.279) 0.007	0.026
6	1.50	0.30	0.033	(0.276) 0.007	0.026
7	1.75	0.30	0.033	(0.273) 0.007	0.026
8	2.00	0.40	0.044	(0.270) 0.010	0.035
9	2.25	0.40	0.044	(0.266) 0.010	0.035
10	2.50	0.40	0.044	(0.263) 0.010	0.035
11	2.75	0.50	0.056	(0.260) 0.012	0.043
12	3.00	0.50	0.056	(0.257) 0.012	0.043
13	3.25	0.50	0.056	(0.254) 0.012	0.043
14	3.50	0.50	0.056	(0.250) 0.012	0.043
15	3.75	0.50	0.056	(0.247) 0.012	0.043
16	4.00	0.60	0.067	(0.244) 0.015	0.052
17	4.25	0.60	0.067	(0.241) 0.015	0.052
18	4.50	0.70	0.078	(0.238) 0.017	0.061
19	4.75	0.70	0.078	(0.235) 0.017	0.061
20	5.00	0.80	0.089	(0.232) 0.020	0.069
21	5.25	0.60	0.067	(0.229) 0.015	0.052
22	5.50	0.70	0.078	(0.226) 0.017	0.061
23	5.75	0.80	0.089	(0.223) 0.020	0.069
24	6.00	0.80	0.089	(0.220) 0.020	0.069
25	6.25	0.90	0.100	(0.217) 0.022	0.078
26	6.50	0.90	0.100	(0.214) 0.022	0.078
27	6.75	1.00	0.111	(0.211) 0.024	0.087
28	7.00	1.00	0.111	(0.208) 0.024	0.087
29	7.25	1.00	0.111	(0.206) 0.024	0.087
30	7.50	1.10	0.122	(0.203) 0.027	0.095
31	7.75	1.20	0.133	(0.200) 0.029	0.104
32	8.00	1.30	0.144	(0.197) 0.032	0.113
33	8.25	1.50	0.167	(0.195) 0.037	0.130
34	8.50	1.50	0.167	(0.192) 0.037	0.130
35	8.75	1.60	0.178	(0.189) 0.039	0.139
36	9.00	1.70	0.189	(0.186) 0.042	0.147
37	9.25	1.90	0.211	(0.184) 0.046	0.165
38	9.50	2.00	0.222	(0.181) 0.049	0.173
39	9.75	2.10	0.233	(0.179) 0.051	0.182
40	10.00	2.20	0.244	(0.176) 0.054	0.191
41	10.25	1.50	0.167	(0.174) 0.037	0.130
42	10.50	1.50	0.167	(0.171) 0.037	0.130
43	10.75	2.00	0.222	(0.169) 0.049	0.173
44	11.00	2.00	0.222	(0.166) 0.049	0.173
45	11.25	1.90	0.211	(0.164) 0.046	0.165
46	11.50	1.90	0.211	(0.161) 0.046	0.165
47	11.75	1.70	0.189	(0.159) 0.042	0.147
48	12.00	1.80	0.200	(0.156) 0.044	0.156
49	12.25	2.50	0.278	(0.154) 0.061	0.217
50	12.50	2.60	0.289	(0.152) 0.064	0.225
51	12.75	2.80	0.311	(0.150) 0.068	0.243
52	13.00	2.90	0.322	(0.147) 0.071	0.251
53	13.25	3.40	0.378	(0.145) 0.083	0.295
54	13.50	3.40	0.378	(0.143) 0.083	0.295
55	13.75	2.30	0.256	(0.141) 0.056	0.199
56	14.00	2.30	0.256	(0.139) 0.056	0.199

57	14.25	2.70	0.300	(-0.136)	0.066	0.234
58	14.50	2.60	0.289	(-0.134)	0.064	0.225
59	14.75	2.60	0.289	(-0.132)	0.064	0.225
60	15.00	2.50	0.278	(-0.130)	0.061	0.217
61	15.25	2.40	0.267	(-0.128)	0.059	0.208
62	15.50	2.30	0.256	(-0.126)	0.056	0.199
63	15.75	1.90	0.211	(-0.124)	0.046	0.165
64	16.00	1.90	0.211	(-0.122)	0.046	0.165
65	16.25	0.40	0.044	(-0.121)	0.010	0.035
66	16.50	0.40	0.044	(-0.119)	0.010	0.035
67	16.75	0.30	0.033	(-0.117)	0.007	0.026
68	17.00	0.30	0.033	(-0.115)	0.007	0.026
69	17.25	0.50	0.056	(-0.113)	0.012	0.043
70	17.50	0.50	0.056	(-0.112)	0.012	0.043
71	17.75	0.50	0.056	(-0.110)	0.012	0.043
72	18.00	0.40	0.044	(-0.108)	0.010	0.035
73	18.25	0.40	0.044	(-0.107)	0.010	0.035
74	18.50	0.40	0.044	(-0.105)	0.010	0.035
75	18.75	0.30	0.033	(-0.104)	0.007	0.026
76	19.00	0.20	0.022	(-0.102)	0.005	0.017
77	19.25	0.30	0.033	(-0.101)	0.007	0.026
78	19.50	0.40	0.044	(-0.099)	0.010	0.035
79	19.75	0.30	0.033	(-0.098)	0.007	0.026
80	20.00	0.20	0.022	(-0.097)	0.005	0.017
81	20.25	0.30	0.033	(-0.095)	0.007	0.026
82	20.50	0.30	0.033	(-0.094)	0.007	0.026
83	20.75	0.30	0.033	(-0.093)	0.007	0.026
84	21.00	0.20	0.022	(-0.092)	0.005	0.017
85	21.25	0.30	0.033	(-0.091)	0.007	0.026
86	21.50	0.20	0.022	(-0.090)	0.005	0.017
87	21.75	0.30	0.033	(-0.089)	0.007	0.026
88	22.00	0.20	0.022	(-0.088)	0.005	0.017
89	22.25	0.30	0.033	(-0.087)	0.007	0.026
90	22.50	0.20	0.022	(-0.086)	0.005	0.017
91	22.75	0.20	0.022	(-0.085)	0.005	0.017
92	23.00	0.20	0.022	(-0.085)	0.005	0.017
93	23.25	0.20	0.022	(-0.084)	0.005	0.017
94	23.50	0.20	0.022	(-0.084)	0.005	0.017
95	23.75	0.20	0.022	(-0.083)	0.005	0.017
96	24.00	0.20	0.022	(-0.083)	0.005	0.017

(Loss Rate Not Used)

Sum = 100.0

Sum = 8.7

Flood volume = Effective rainfall 2.17 (In)

times area 6.9(Ac.) / [(In) / (Ft.)] = 1.2 (Ac.Ft)

Total soil loss = 0.61 (In)

Total soil loss = 0.351 (Ac.Ft)

Total rainfall = 2.78 (In)

Flood volume = 54280.7 Cubic Feet

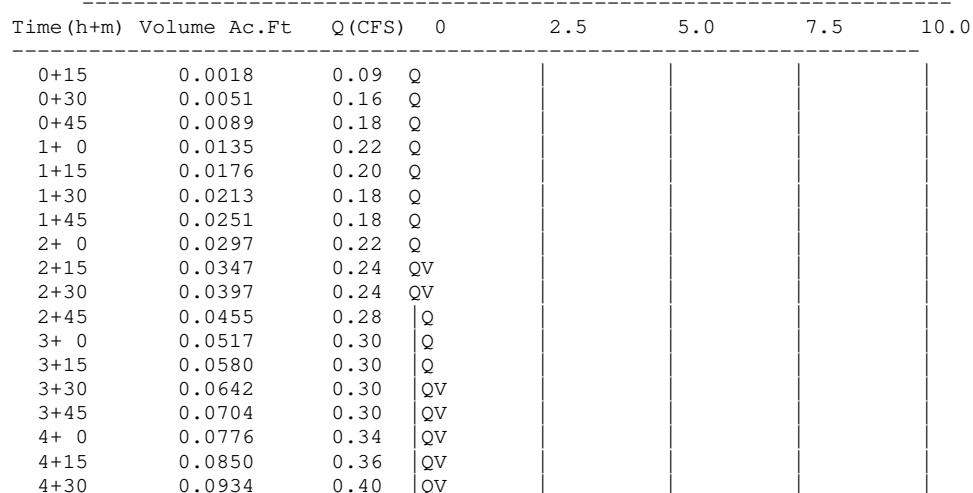
Total soil loss = 15309.9 Cubic Feet

Peak flow rate of this hydrograph = 2.051 (CFS)

+++++H O U R S T O R M+++++

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 15 Minute intervals ((CFS))



4+45	0.1021	0.42	Q V					
5+ 0	0.1117	0.46	Q V					
5+15	0.1199	0.40	Q V					
5+30	0.1283	0.40	Q V					
5+45	0.1379	0.46	Q V					
6+ 0	0.1478	0.48	Q V					
6+15	0.1587	0.53	Q V					
6+30	0.1699	0.54	Q V					
6+45	0.1820	0.59	Q V					
7+ 0	0.1945	0.60	Q V					
7+15	0.2069	0.60	Q V					
7+30	0.2203	0.65	Q V					
7+45	0.2349	0.71	Q V					
8+ 0	0.2507	0.77	Q V					
8+15	0.2686	0.87	Q V					
8+30	0.2873	0.90	Q V					
8+45	0.3069	0.95	Q V					
9+ 0	0.3277	1.01	Q V					
9+15	0.3507	1.11	Q V					
9+30	0.3752	1.19	Q V					
9+45	0.4010	1.25	Q V					
10+ 0	0.4281	1.31	Q V					
10+15	0.4493	1.03	Q V					
10+30	0.4680	0.90	Q V					
10+45	0.4911	1.12	Q V					
11+ 0	0.5160	1.21	Q V					
11+15	0.5401	1.16	Q V					
11+30	0.5638	1.15	Q V					
11+45	0.5857	1.06	Q V					
12+ 0	0.6077	1.07	Q V					
12+15	0.6363	1.38	Q V					
12+30	0.6683	1.55	Q V					
12+45	0.7025	1.65	Q V					
13+ 0	0.7383	1.73	Q V					
13+15	0.7788	1.96	Q V					
13+30	0.8212	2.05	Q V					
13+45	0.8539	1.58	Q V					
14+ 0	0.8825	1.39	Q V					
14+15	0.9147	1.56	Q V					
14+30	0.9475	1.59	Q V					
14+45	0.9799	1.57	Q V					
15+ 0	1.0114	1.53	Q V					
15+15	1.0417	1.47	Q V					
15+30	1.0707	1.40	Q V					
15+45	1.0958	1.22	Q V					
16+ 0	1.1195	1.15	Q V					
16+15	1.1300	0.51	Q V					
16+30	1.1350	0.24	Q V					
16+45	1.1391	0.20	Q V					
17+ 0	1.1428	0.18	Q V					
17+15	1.1483	0.27	Q V					
17+30	1.1546	0.30	Q V					
17+45	1.1608	0.30	Q V					
18+ 0	1.1661	0.26	Q V					
18+15	1.1711	0.24	Q V					
18+30	1.1761	0.24	Q V					
18+45	1.1802	0.20	Q V					
19+ 0	1.1831	0.14	Q V					
19+15	1.1864	0.16	Q V					
19+30	1.1911	0.22	Q V					
19+45	1.1952	0.20	Q V					
20+ 0	1.1980	0.14	Q V					
20+15	1.2014	0.16	Q V					
20+30	1.2051	0.18	Q V					
20+45	1.2089	0.18	Q V					
21+ 0	1.2117	0.14	Q V					
21+15	1.2151	0.16	Q V					
21+30	1.2180	0.14	Q V					
21+45	1.2213	0.16	Q V					
22+ 0	1.2242	0.14	Q V					
22+15	1.2276	0.16	Q V					
22+30	1.2304	0.14	Q V					
22+45	1.2329	0.12	Q V					
23+ 0	1.2354	0.12	Q V					
23+15	1.2379	0.12	Q V					
23+30	1.2404	0.12	Q V					
23+45	1.2429	0.12	Q V					
24+ 0	1.2454	0.12	Q V					
24+15	1.2461	0.04	Q V					

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD10EXIST110.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
EXISTING CONDITION, DMA D
10-YR 1-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.085 Hr.
Lag time = 5.07 Min.
25% of lag time = 1.27 Min.
40% of lag time = 2.03 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]
6.90	0.49	3.37

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	1.33	9.18

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 0.835(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.835(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.150
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.150	0.442	1.000	0.442
					Sum (F)	= 0.442

Area averaged mean soil loss (F) (In/Hr) = 0.442
Minimum soil loss rate ((In/Hr)) = 0.221

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.780

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	98.584	18.765	1.305
2 0.167	197.167	48.285	3.358
3 0.250	295.751	15.854	1.102
4 0.333	394.335	7.138	0.496
5 0.417	492.919	4.033	0.280
6 0.500	591.502	2.616	0.182
7 0.583	690.086	1.645	0.114
8 0.667	788.670	1.057	0.073
9 0.750	887.254	0.606	0.042
		Sum = 100.000	Sum= 6.954

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

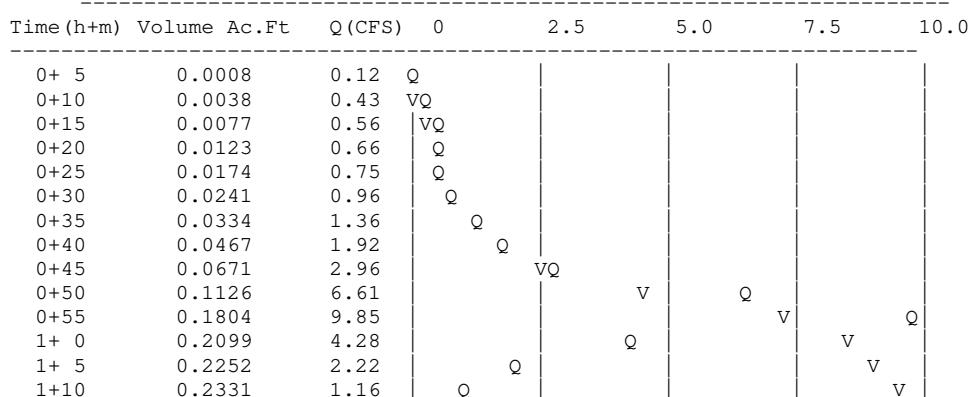
Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate (In./Hr) Max Low	Effective (In/Hr)
1 0.08	4.20	0.421	(0.442) 0.328	0.093
2 0.17	4.30	0.431	(0.442) 0.336	0.095
3 0.25	5.00	0.501	(0.442) 0.391	0.110
4 0.33	5.00	0.501	(0.442) 0.391	0.110
5 0.42	5.80	0.581	0.442 (0.453)	0.139
6 0.50	6.50	0.651	0.442 (0.508)	0.209
7 0.58	7.40	0.741	0.442 (0.578)	0.300
8 0.67	8.60	0.862	0.442 (0.672)	0.420
9 0.75	12.30	1.232	0.442 (0.961)	0.791
10 0.83	29.10	2.916	0.442 (2.274)	2.474
11 0.92	6.80	0.681	0.442 (0.531)	0.239
12 1.00	5.00	0.501	(0.442) 0.391	0.110
		(Loss Rate Not Used)		
		Sum = 100.0		Sum = 5.1

Flood volume = Effective rainfall 0.42 (In)
times area 6.9 (Ac.) / [(In) / (Ft.)] = 0.2 (Ac.Ft)
Total soil loss = 0.41 (In)
Total soil loss = 0.236 (Ac.Ft)
Total rainfall = 0.83 (In)
Flood volume = 10623.8 Cubic Feet
Total soil loss = 10289.0 Cubic Feet

Peak flow rate of this hydrograph = 9.854 (CFS)

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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))



1+15	0.2380	0.71	Q				V
1+20	0.2410	0.43	Q				V
1+25	0.2428	0.26	Q				V
1+30	0.2437	0.13	Q				V
1+35	0.2439	0.02	Q				V
1+40	0.2439	0.00	Q				V

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD10EXIST310.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
EXISTING CONDITION, DMA D
10-YR 3-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.085 Hr.
Lag time = 5.07 Min.
25% of lag time = 1.27 Min.
40% of lag time = 2.03 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]
6.90	0.87	5.98

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	2.09	14.42

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 1.370(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.370(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.150
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.150	0.442	1.000	0.442
					Sum (F)	= 0.442

Area averaged mean soil loss (F) (In/Hr) = 0.442
Minimum soil loss rate ((In/Hr)) = 0.221

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.780

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	98.584	18.765	1.305
2 0.167	197.167	48.285	3.358
3 0.250	295.751	15.854	1.102
4 0.333	394.335	7.138	0.496
5 0.417	492.919	4.033	0.280
6 0.500	591.502	2.616	0.182
7 0.583	690.086	1.645	0.114
8 0.667	788.670	1.057	0.073
9 0.750	887.254	0.606	0.042
	Sum = 100.000	Sum=	6.954

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 (In/Hr)	Rain		Loss rate (In./Hr)		Effective (In/Hr)
				Max	Low			
1	0.08	1.30	0.214	(0.442)	0.167			0.047
2	0.17	1.30	0.214	(0.442)	0.167			0.047
3	0.25	1.10	0.181	(0.442)	0.141			0.040
4	0.33	1.50	0.247	(0.442)	0.192			0.054
5	0.42	1.50	0.247	(0.442)	0.192			0.054
6	0.50	1.80	0.296	(0.442)	0.231			0.065
7	0.58	1.50	0.247	(0.442)	0.192			0.054
8	0.67	1.80	0.296	(0.442)	0.231			0.065
9	0.75	1.80	0.296	(0.442)	0.231			0.065
10	0.83	1.50	0.247	(0.442)	0.192			0.054
11	0.92	1.60	0.263	(0.442)	0.205			0.058
12	1.00	1.80	0.296	(0.442)	0.231			0.065
13	1.08	2.20	0.362	(0.442)	0.282			0.080
14	1.17	2.20	0.362	(0.442)	0.282			0.080
15	1.25	2.20	0.362	(0.442)	0.282			0.080
16	1.33	2.00	0.329	(0.442)	0.256			0.072
17	1.42	2.60	0.427	(0.442)	0.333			0.094
18	1.50	2.70	0.444	(0.442)	0.346			0.098
19	1.58	2.40	0.394	(0.442)	0.308			0.087
20	1.67	2.70	0.444	(0.442)	0.346			0.098
21	1.75	3.30	0.542	(0.442)	0.423			0.119
22	1.83	3.10	0.509	(0.442)	0.397			0.112
23	1.92	2.90	0.477	(0.442)	0.372			0.105
24	2.00	3.00	0.493	(0.442)	0.385			0.108
25	2.08	3.10	0.509	(0.442)	0.397			0.112
26	2.17	4.20	0.690	0.442	(0.538)			0.248
27	2.25	5.00	0.822	0.442	(0.641)			0.380
28	2.33	3.50	0.575	0.442	(0.449)			0.133
29	2.42	6.80	1.118	0.442	(0.872)			0.676
30	2.50	7.30	1.200	0.442	(0.936)			0.758
31	2.58	8.20	1.348	0.442	(1.051)			0.906
32	2.67	5.90	0.970	0.442	(0.756)			0.528
33	2.75	2.00	0.329	(0.442)	0.256			0.072
34	2.83	1.80	0.296	(0.442)	0.231			0.065
35	2.92	1.80	0.296	(0.442)	0.231			0.065
36	3.00	0.60	0.099	(0.442)	0.077			0.022

um = 100.0 Sum = 5.8

$$\text{Flood volume} = \text{Effective rainfall} \times \text{area}$$

Total soil loss = 0.89 (In)

Total soil loss = 0.511 (Ac.Ft)

Total rainfall = 1.37 (In)

Flood volume = 12034.0 Cubic Feet

Total soil loss = 22268.4 Cubic Feet

Peak flow rate of this hydrograph = 5.051(CFS)

Peak flow rate of this hydrograph = 5.051(CFS)

3 - H O U R S T O R M
Run off Hydrograph

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	0.0004	0.06 Q					
0+10	0.0019	0.22 Q					
0+15	0.0037	0.26 VQ					
0+20	0.0057	0.28 VQ					
0+25	0.0080	0.33 Q					
0+30	0.0105	0.37 Q					
0+35	0.0133	0.40 Q					
0+40	0.0160	0.40 QV					
0+45	0.0190	0.43 QV					
0+50	0.0219	0.43 Q V					
0+55	0.0247	0.40 Q V					
1+ 0	0.0275	0.41 Q V					
1+ 5	0.0307	0.46 Q V					
1+10	0.0342	0.51 Q V					
1+15	0.0378	0.53 Q V					
1+20	0.0415	0.53 Q V					
1+25	0.0452	0.54 Q V					
1+30	0.0495	0.61 Q V					
1+35	0.0538	0.63 Q V					
1+40	0.0581	0.63 Q V					
1+45	0.0629	0.69 Q V					
1+50	0.0681	0.76 Q V					
1+55	0.0733	0.76 Q V					
2+ 0	0.0784	0.74 Q V					
2+ 5	0.0836	0.75 Q V					
2+10	0.0901	0.95 Q					
2+15	0.1010	1.58 Q	V				
2+20	0.1138	1.86 Q	V				
2+25	0.1272	1.95 Q	V	V			
2+30	0.1528	3.71 Q	V	V			
2+35	0.1852	4.72 Q	V	V			
2+40	0.2200	5.05 Q	V	V			
2+45	0.2443	3.52 Q	V	V			
2+50	0.2563	1.75 Q	V	V			
2+55	0.2642	1.14 Q	V	V			
3+ 0	0.2698	0.81 Q	V	V			
3+ 5	0.2731	0.48 Q	V	V			
3+10	0.2748	0.25 Q	V	V			
3+15	0.2757	0.13 Q	V	V			
3+20	0.2760	0.05 Q	V	V			
3+25	0.2762	0.02 Q	V	V			
3+30	0.2762	0.01 Q	V	V			
3+35	0.2763	0.00 Q	V	V			
3+40	0.2763	0.00 Q	V	V			

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD10EXIST610.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
EXISTING CONDITION, DMA D
10-YR 6-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
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Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.085 Hr.
Lag time = 5.07 Min.
25% of lag time = 1.27 Min.
40% of lag time = 2.03 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]
6.90	1.21	8.35

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
6.90	2.86	19.73

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 1.889(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.889(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.150
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.150	0.442	1.000	0.442
					Sum (F)	= 0.442

Area averaged mean soil loss (F) (In/Hr) = 0.442
Minimum soil loss rate ((In/Hr)) = 0.221

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.780

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	98.584	18.765	1.305
2 0.167	197.167	48.285	3.358
3 0.250	295.751	15.854	1.102
4 0.333	394.335	7.138	0.496
5 0.417	492.919	4.033	0.280
6 0.500	591.502	2.616	0.182
7 0.583	690.086	1.645	0.114
8 0.667	788.670	1.057	0.073
9 0.750	887.254	0.606	0.042
	Sum = 100.000	Sum=	6.954

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	0.113	(0.442) 0.088	0.025
2 0.17	0.60	0.136	(0.442) 0.106	0.030
3 0.25	0.60	0.136	(0.442) 0.106	0.030
4 0.33	0.60	0.136	(0.442) 0.106	0.030
5 0.42	0.60	0.136	(0.442) 0.106	0.030
6 0.50	0.70	0.159	(0.442) 0.124	0.035
7 0.58	0.70	0.159	(0.442) 0.124	0.035
8 0.67	0.70	0.159	(0.442) 0.124	0.035
9 0.75	0.70	0.159	(0.442) 0.124	0.035
10 0.83	0.70	0.159	(0.442) 0.124	0.035
11 0.92	0.70	0.159	(0.442) 0.124	0.035
12 1.00	0.80	0.181	(0.442) 0.141	0.040
13 1.08	0.80	0.181	(0.442) 0.141	0.040
14 1.17	0.80	0.181	(0.442) 0.141	0.040
15 1.25	0.80	0.181	(0.442) 0.141	0.040
16 1.33	0.80	0.181	(0.442) 0.141	0.040
17 1.42	0.80	0.181	(0.442) 0.141	0.040
18 1.50	0.80	0.181	(0.442) 0.141	0.040
19 1.58	0.80	0.181	(0.442) 0.141	0.040
20 1.67	0.80	0.181	(0.442) 0.141	0.040
21 1.75	0.80	0.181	(0.442) 0.141	0.040
22 1.83	0.80	0.181	(0.442) 0.141	0.040
23 1.92	0.80	0.181	(0.442) 0.141	0.040
24 2.00	0.90	0.204	(0.442) 0.159	0.045
25 2.08	0.80	0.181	(0.442) 0.141	0.040
26 2.17	0.90	0.204	(0.442) 0.159	0.045
27 2.25	0.90	0.204	(0.442) 0.159	0.045
28 2.33	0.90	0.204	(0.442) 0.159	0.045
29 2.42	0.90	0.204	(0.442) 0.159	0.045
30 2.50	0.90	0.204	(0.442) 0.159	0.045
31 2.58	0.90	0.204	(0.442) 0.159	0.045
32 2.67	0.90	0.204	(0.442) 0.159	0.045
33 2.75	1.00	0.227	(0.442) 0.177	0.050
34 2.83	1.00	0.227	(0.442) 0.177	0.050
35 2.92	1.00	0.227	(0.442) 0.177	0.050
36 3.00	1.00	0.227	(0.442) 0.177	0.050
37 3.08	1.00	0.227	(0.442) 0.177	0.050
38 3.17	1.10	0.249	(0.442) 0.194	0.055
39 3.25	1.10	0.249	(0.442) 0.194	0.055
40 3.33	1.10	0.249	(0.442) 0.194	0.055
41 3.42	1.20	0.272	(0.442) 0.212	0.060
42 3.50	1.30	0.295	(0.442) 0.230	0.065
43 3.58	1.40	0.317	(0.442) 0.248	0.070
44 3.67	1.40	0.317	(0.442) 0.248	0.070
45 3.75	1.50	0.340	(0.442) 0.265	0.075
46 3.83	1.50	0.340	(0.442) 0.265	0.075
47 3.92	1.60	0.363	(0.442) 0.283	0.080
48 4.00	1.60	0.363	(0.442) 0.283	0.080
49 4.08	1.70	0.385	(0.442) 0.301	0.085

50	4.17	1.80	0.408	(0.442)	0.318	0.090
51	4.25	1.90	0.431	(0.442)	0.336	0.095
52	4.33	2.00	0.453	(0.442)	0.354	0.100
53	4.42	2.10	0.476	(0.442)	0.371	0.105
54	4.50	2.10	0.476	(0.442)	0.371	0.105
55	4.58	2.20	0.499	(0.442)	0.389	0.110
56	4.67	2.30	0.521	(0.442)	0.407	0.115
57	4.75	2.40	0.544	(0.442)	0.424	0.120
58	4.83	2.40	0.544	(0.442)	0.424	0.120
59	4.92	2.50	0.567	0.442	(0.442)	0.125
60	5.00	2.60	0.589	0.442	(0.460)	0.147
61	5.08	3.10	0.703	0.442	(0.548)	0.261
62	5.17	3.60	0.816	0.442	(0.636)	0.374
63	5.25	3.90	0.884	0.442	(0.689)	0.442
64	5.33	4.20	0.952	0.442	(0.743)	0.510
65	5.42	4.70	1.065	0.442	(0.831)	0.623
66	5.50	5.60	1.269	0.442	(0.990)	0.827
67	5.58	1.90	0.431	(0.442)	0.336	0.095
68	5.67	0.90	0.204	(0.442)	0.159	0.045
69	5.75	0.60	0.136	(0.442)	0.106	0.030
70	5.83	0.50	0.113	(0.442)	0.088	0.025
71	5.92	0.30	0.068	(0.442)	0.053	0.015
72	6.00	0.20	0.045	(0.442)	0.035	0.010

(Loss Rate Not Used)

Sum = 100.0 Sum = 6.8

Flood volume = Effective rainfall 0.57 (In)
times area 6.9(Ac.)/(In)/(Ft.)] = 0.3 (Ac.Ft)
Total soil loss = 1.32 (In)
Total soil loss = 0.761 (Ac.Ft)
Total rainfall = 1.89 (In)
Flood volume = 14173.9 Cubic Feet
Total soil loss = 33134.4 Cubic Feet

Peak flow rate of this hydrograph = 4.140 (CFS)

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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	2.5	5.0	7.5	10.0
0+ 5	0.0002	0.03 Q					
0+10	0.0011	0.12 Q					
0+15	0.0022	0.17 Q					
0+20	0.0035	0.18 Q					
0+25	0.0048	0.19 Q					
0+30	0.0063	0.21 Q					
0+35	0.0078	0.23 Q					
0+40	0.0094	0.24 QV					
0+45	0.0111	0.24 QV					
0+50	0.0128	0.24 QV					
0+55	0.0144	0.24 QV					
1+ 0	0.0161	0.25 QV					
1+ 5	0.0180	0.27 QV					
1+10	0.0198	0.27 QV					
1+15	0.0217	0.27 QV					
1+20	0.0236	0.28 QV					
1+25	0.0255	0.28 Q V					
1+30	0.0274	0.28 Q V					
1+35	0.0293	0.28 Q V					
1+40	0.0312	0.28 Q V					
1+45	0.0332	0.28 Q V					
1+50	0.0351	0.28 Q V					
1+55	0.0370	0.28 Q V					
2+ 0	0.0389	0.28 Q V					
2+ 5	0.0410	0.29 Q V					
2+10	0.0430	0.29 Q V					
2+15	0.0450	0.30 Q V					
2+20	0.0472	0.31 Q V					
2+25	0.0493	0.31 Q V					
2+30	0.0514	0.31 Q V					
2+35	0.0536	0.31 Q V					
2+40	0.0557	0.31 Q V					
2+45	0.0579	0.32 Q V					
2+50	0.0602	0.34 Q V					
2+55	0.0626	0.34 Q V					

3+ 0	0.0650	0.34	Q	V				
3+ 5	0.0673	0.34	Q	V				
3+10	0.0698	0.35	Q	V				
3+15	0.0723	0.37	Q	V				
3+20	0.0749	0.38	Q	V				
3+25	0.0775	0.38	Q	V				
3+30	0.0804	0.41	Q	V				
3+35	0.0834	0.44	Q	V				
3+40	0.0866	0.46	Q	V				
3+45	0.0899	0.48	Q	V				
3+50	0.0933	0.50	Q	V				
3+55	0.0969	0.52	Q	V				
4+ 0	0.1006	0.54	Q	V				
4+ 5	0.1044	0.55	Q	V				
4+10	0.1084	0.58	Q	V				
4+15	0.1126	0.61	Q	V				
4+20	0.1171	0.64	Q	V				
4+25	0.1217	0.68	Q	V				
4+30	0.1266	0.70	Q	V				
4+35	0.1315	0.72	Q	V				
4+40	0.1367	0.75	Q	V				
4+45	0.1421	0.78	Q	V				
4+50	0.1477	0.81	Q	V				
4+55	0.1534	0.83	Q	V				
5+ 0	0.1594	0.88	Q	V				
5+ 5	0.1671	1.11	Q	V				
5+10	0.1786	1.67	Q	V				
5+15	0.1943	2.28	Q	V				
5+20	0.2135	2.78	Q	V				
5+25	0.2364	3.33	Q	V				
5+30	0.2649	4.14	Q	V				
5+35	0.2930	4.08	Q	V				
5+40	0.3060	1.89	Q	V				
5+45	0.3134	1.06	Q	V				
5+50	0.3181	0.68	Q	V				
5+55	0.3212	0.46	Q	V				
6+ 0	0.3233	0.30	Q	V				
6+ 5	0.3245	0.18	Q	V				
6+10	0.3251	0.08	Q	V				
6+15	0.3252	0.02	Q	V				
6+20	0.3253	0.01	Q	V				
6+25	0.3254	0.01	Q	V				
6+30	0.3254	0.00	Q	V				
6+35	0.3254	0.00	Q	V				
6+40	0.3254	0.00	Q	V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD10EXIST2410.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
EXISTING CONDITION, DMA D
10-YR 24-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.085 Hr.
Lag time = 5.07 Min.
25% of lag time = 1.27 Min.
40% of lag time = 2.03 Min.
Unit time = 15.00 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]
6.90	2.05	14.15

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	5.16	35.60

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 3.329(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.329(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.150
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.150	0.442	1.000	0.442
					Sum (F)	= 0.442

Area averaged mean soil loss (F) (In/Hr) = 0.442
Minimum soil loss rate ((In/Hr)) = 0.221

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.780

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	295.751	56.239	3.911
2 0.500	591.502	37.364	2.598
3 0.750	887.254	6.397	0.445
		Sum = 100.000	Sum= 6.954

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	0.25	0.20	0.027	(0.780) 0.021	0.006
2	0.50	0.30	0.040	(0.771) 0.031	0.009
3	0.75	0.30	0.040	(0.762) 0.031	0.009
4	1.00	0.40	0.053	(0.753) 0.042	0.012
5	1.25	0.30	0.040	(0.744) 0.031	0.009
6	1.50	0.30	0.040	(0.736) 0.031	0.009
7	1.75	0.30	0.040	(0.727) 0.031	0.009
8	2.00	0.40	0.053	(0.718) 0.042	0.012
9	2.25	0.40	0.053	(0.709) 0.042	0.012
10	2.50	0.40	0.053	(0.701) 0.042	0.012
11	2.75	0.50	0.067	(0.692) 0.052	0.015
12	3.00	0.50	0.067	(0.684) 0.052	0.015
13	3.25	0.50	0.067	(0.675) 0.052	0.015
14	3.50	0.50	0.067	(0.667) 0.052	0.015
15	3.75	0.50	0.067	(0.658) 0.052	0.015
16	4.00	0.60	0.080	(0.650) 0.062	0.018
17	4.25	0.60	0.080	(0.642) 0.062	0.018
18	4.50	0.70	0.093	(0.634) 0.073	0.021
19	4.75	0.70	0.093	(0.626) 0.073	0.021
20	5.00	0.80	0.107	(0.617) 0.083	0.023
21	5.25	0.60	0.080	(0.609) 0.062	0.018
22	5.50	0.70	0.093	(0.602) 0.073	0.021
23	5.75	0.80	0.107	(0.594) 0.083	0.023
24	6.00	0.80	0.107	(0.586) 0.083	0.023
25	6.25	0.90	0.120	(0.578) 0.093	0.026
26	6.50	0.90	0.120	(0.570) 0.093	0.026
27	6.75	1.00	0.133	(0.563) 0.104	0.029
28	7.00	1.00	0.133	(0.555) 0.104	0.029
29	7.25	1.00	0.133	(0.548) 0.104	0.029
30	7.50	1.10	0.146	(0.540) 0.114	0.032
31	7.75	1.20	0.160	(0.533) 0.125	0.035
32	8.00	1.30	0.173	(0.525) 0.135	0.038
33	8.25	1.50	0.200	(0.518) 0.156	0.044
34	8.50	1.50	0.200	(0.511) 0.156	0.044
35	8.75	1.60	0.213	(0.504) 0.166	0.047
36	9.00	1.70	0.226	(0.497) 0.177	0.050
37	9.25	1.90	0.253	(0.490) 0.197	0.056
38	9.50	2.00	0.266	(0.483) 0.208	0.059
39	9.75	2.10	0.280	(0.476) 0.218	0.062
40	10.00	2.20	0.293	(0.469) 0.229	0.064
41	10.25	1.50	0.200	(0.462) 0.156	0.044
42	10.50	1.50	0.200	(0.455) 0.156	0.044
43	10.75	2.00	0.266	(0.449) 0.208	0.059
44	11.00	2.00	0.266	(0.442) 0.208	0.059
45	11.25	1.90	0.253	(0.436) 0.197	0.056
46	11.50	1.90	0.253	(0.429) 0.197	0.056
47	11.75	1.70	0.226	(0.423) 0.177	0.050
48	12.00	1.80	0.240	(0.417) 0.187	0.053
49	12.25	2.50	0.333	(0.410) 0.260	0.073
50	12.50	2.60	0.346	(0.404) 0.270	0.076
51	12.75	2.80	0.373	(0.398) 0.291	0.082
52	13.00	2.90	0.386	(0.392) 0.301	0.085
53	13.25	3.40	0.453	(0.386) 0.353	0.100
54	13.50	3.40	0.453	(0.380) 0.353	0.100
55	13.75	2.30	0.306	(0.375) 0.239	0.067

56	14.00	2.30	0.306	(-0.369)	0.239	0.067
57	14.25	2.70	0.360	(-0.363)	0.280	0.079
58	14.50	2.60	0.346	(-0.358)	0.270	0.076
59	14.75	2.60	0.346	(-0.352)	0.270	0.076
60	15.00	2.50	0.333	(-0.347)	0.260	0.073
61	15.25	2.40	0.320	(-0.342)	0.249	0.070
62	15.50	2.30	0.306	(-0.336)	0.239	0.067
63	15.75	1.90	0.253	(-0.331)	0.197	0.056
64	16.00	1.90	0.253	(-0.326)	0.197	0.056
65	16.25	0.40	0.053	(-0.321)	0.042	0.012
66	16.50	0.40	0.053	(-0.316)	0.042	0.012
67	16.75	0.30	0.040	(-0.311)	0.031	0.009
68	17.00	0.30	0.040	(-0.307)	0.031	0.009
69	17.25	0.50	0.067	(-0.302)	0.052	0.015
70	17.50	0.50	0.067	(-0.298)	0.052	0.015
71	17.75	0.50	0.067	(-0.293)	0.052	0.015
72	18.00	0.40	0.053	(-0.289)	0.042	0.012
73	18.25	0.40	0.053	(-0.285)	0.042	0.012
74	18.50	0.40	0.053	(-0.280)	0.042	0.012
75	18.75	0.30	0.040	(-0.276)	0.031	0.009
76	19.00	0.20	0.027	(-0.272)	0.021	0.006
77	19.25	0.30	0.040	(-0.269)	0.031	0.009
78	19.50	0.40	0.053	(-0.265)	0.042	0.012
79	19.75	0.30	0.040	(-0.261)	0.031	0.009
80	20.00	0.20	0.027	(-0.258)	0.021	0.006
81	20.25	0.30	0.040	(-0.254)	0.031	0.009
82	20.50	0.30	0.040	(-0.251)	0.031	0.009
83	20.75	0.30	0.040	(-0.248)	0.031	0.009
84	21.00	0.20	0.027	(-0.245)	0.021	0.006
85	21.25	0.30	0.040	(-0.242)	0.031	0.009
86	21.50	0.20	0.027	(-0.239)	0.021	0.006
87	21.75	0.30	0.040	(-0.237)	0.031	0.009
88	22.00	0.20	0.027	(-0.234)	0.021	0.006
89	22.25	0.30	0.040	(-0.232)	0.031	0.009
90	22.50	0.20	0.027	(-0.230)	0.021	0.006
91	22.75	0.20	0.027	(-0.228)	0.021	0.006
92	23.00	0.20	0.027	(-0.226)	0.021	0.006
93	23.25	0.20	0.027	(-0.224)	0.021	0.006
94	23.50	0.20	0.027	(-0.223)	0.021	0.006
95	23.75	0.20	0.027	(-0.222)	0.021	0.006
96	24.00	0.20	0.027	(-0.221)	0.021	0.006

(Loss Rate Not Used)

Sum = 100.0

Sum = 2.9

Flood volume = Effective rainfall 0.73 (In)

times area 6.9 (Ac.) / [(In) / (Ft.)] = 0.4 (Ac.Ft)

Total soil loss = 2.60 (In)

Total soil loss = 1.493 (Ac.Ft)

Total rainfall = 3.33 (In)

Flood volume = 18346.3 Cubic Feet

Total soil loss = 65046.0 Cubic Feet

Peak flow rate of this hydrograph = 0.687 (CFS)

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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 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0005	0.02 Q					
0+30	0.0015	0.05 Q					
0+45	0.0027	0.06 Q					
1+ 0	0.0042	0.07 Q					
1+15	0.0057	0.07 Q					
1+30	0.0069	0.06 Q					
1+45	0.0082	0.06 Q					
2+ 0	0.0097	0.07 Q					
2+15	0.0114	0.08 QV					
2+30	0.0131	0.08 QV					
2+45	0.0150	0.09 QV					
3+ 0	0.0171	0.10 QV					
3+15	0.0192	0.10 QV					
3+30	0.0213	0.10 Q V					
3+45	0.0234	0.10 Q V					
4+ 0	0.0257	0.11 Q V					
4+15	0.0282	0.12 Q V					

4+30	0.0310	0.13	Q	V				
4+45	0.0339	0.14	Q	V				
5+ 0	0.0371	0.15	Q	V				
5+15	0.0400	0.14	Q	V				
5+30	0.0428	0.14	Q	V				
5+45	0.0459	0.15	Q	V				
6+ 0	0.0493	0.16	Q	V				
6+15	0.0529	0.17	Q	V				
6+30	0.0566	0.18	Q	V				
6+45	0.0607	0.19	Q	V				
7+ 0	0.0649	0.20	Q	V				
7+15	0.0691	0.20	Q	V				
7+30	0.0735	0.22	Q	V				
7+45	0.0784	0.23	Q	V				
8+ 0	0.0836	0.25	Q	V				
8+15	0.0895	0.29	Q	V				
8+30	0.0958	0.30	Q	V				
8+45	0.1024	0.32	Q	V				
9+ 0	0.1093	0.34	Q	V				
9+15	0.1169	0.37	Q	V				
9+30	0.1251	0.40	Q	V				
9+45	0.1337	0.42	Q	V				
10+ 0	0.1428	0.44	Q	V				
10+15	0.1504	0.37	Q	V				
10+30	0.1569	0.31	Q	V				
10+45	0.1644	0.36	Q	V				
11+ 0	0.1727	0.40	Q	V				
11+15	0.1809	0.40	Q	V				
11+30	0.1889	0.39	Q	V				
11+45	0.1964	0.36	Q	V				
12+ 0	0.2039	0.36	Q	V				
12+15	0.2131	0.45	Q	V				
12+30	0.2237	0.51	Q	V				
12+45	0.2351	0.55	Q	V				
13+ 0	0.2470	0.58	Q	V				
13+15	0.2604	0.65	Q	V				
13+30	0.2746	0.69	Q	V				
13+45	0.2863	0.57	Q	V				
14+ 0	0.2963	0.48	Q	V				
14+15	0.3069	0.51	Q	V				
14+30	0.3179	0.53	Q	V				
14+45	0.3289	0.53	Q	V				
15+ 0	0.3396	0.52	Q	V				
15+15	0.3500	0.50	Q	V				
15+30	0.3599	0.48	Q	V				
15+45	0.3686	0.42	Q	V				
16+ 0	0.3767	0.39	Q	V				
16+15	0.3812	0.22	Q	V				
16+30	0.3833	0.10	Q	V				
16+45	0.3847	0.07	Q	V				
17+ 0	0.3860	0.06	Q	V				
17+15	0.3877	0.08	Q	V				
17+30	0.3898	0.10	Q	V				
17+45	0.3919	0.10	Q	V				
18+ 0	0.3938	0.09	Q	V				
18+15	0.3955	0.08	Q	V				
18+30	0.3972	0.08	Q	V				
18+45	0.3986	0.07	Q	V				
19+ 0	0.3997	0.05	Q	V				
19+15	0.4008	0.05	Q	V				
19+30	0.4022	0.07	Q	V				
19+45	0.4037	0.07	Q	V				
20+ 0	0.4047	0.05	Q	V				
20+15	0.4058	0.05	Q	V				
20+30	0.4071	0.06	Q	V				
20+45	0.4083	0.06	Q	V				
21+ 0	0.4094	0.05	Q	V				
21+15	0.4105	0.05	Q	V				
21+30	0.4115	0.05	Q	V				
21+45	0.4126	0.05	Q	V				
22+ 0	0.4136	0.05	Q	V				
22+15	0.4147	0.05	Q	V				
22+30	0.4157	0.05	Q	V				
22+45	0.4165	0.04	Q	V				
23+ 0	0.4174	0.04	Q	V				
23+15	0.4182	0.04	Q	V				
23+30	0.4191	0.04	Q	V				
23+45	0.4199	0.04	Q	V				
24+ 0	0.4208	0.04	Q	V				

24+15

0.4211

0.02 Q

24+30

0.4212

0.00 Q

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Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD10PROP110.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA D
10-YR 1-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.051 Hr.
Lag time = 3.04 Min.
25% of lag time = 0.76 Min.
40% of lag time = 1.22 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]
6.90	0.49	3.37

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	1.33	9.18

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 0.835(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.835(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.850
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.850	0.120	1.000	0.120
					Sum (F)	= 0.120

Area averaged mean soil loss (F) (In/Hr) = 0.120
Minimum soil loss rate ((In/Hr)) = 0.060

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.220

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	164.306	36.467
2	0.167	328.612	45.943
3	0.250	492.919	10.415
4	0.333	657.225	4.445
5	0.417	821.531	2.730
		Sum = 100.000	Sum= 6.954

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	4.20	0.421	(0.120) 0.093	0.328
2	0.17	4.30	0.431	(0.120) 0.095	0.336
3	0.25	5.00	0.501	(0.120) 0.110	0.391
4	0.33	5.00	0.501	(0.120) 0.110	0.391
5	0.42	5.80	0.581	0.120 (0.128)	0.461
6	0.50	6.50	0.651	0.120 (0.143)	0.531
7	0.58	7.40	0.741	0.120 (0.163)	0.621
8	0.67	8.60	0.862	0.120 (0.190)	0.742
9	0.75	12.30	1.232	0.120 (0.271)	1.112
10	0.83	29.10	2.916	0.120 (0.641)	2.796
11	0.92	6.80	0.681	0.120 (0.150)	0.561
12	1.00	5.00	0.501	(0.120) 0.110	0.391

(Loss Rate Not Used)

Sum = 100.0 Sum = 8.7

Flood volume = Effective rainfall 0.72 (In)

times area 6.9 (Ac.) / [(In)/(Ft.)] = 0.4 (Ac.Ft)

Total soil loss = 0.11 (In)

Total soil loss = 0.065 (Ac.Ft)

Total rainfall = 0.83 (In)

Flood volume = 18077.8 Cubic Feet

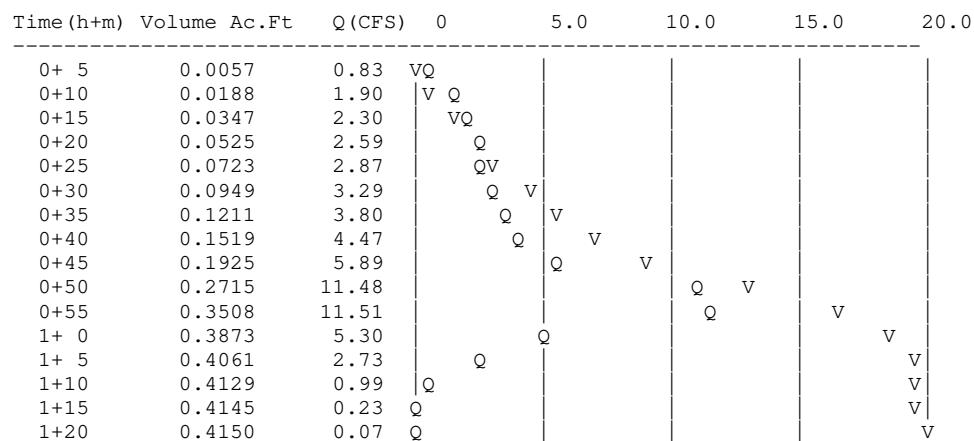
Total soil loss = 2835.0 Cubic Feet

Peak flow rate of this hydrograph = 11.514 (CFS)

+++++ 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))



Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD10PROP310.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA D
10-YR 3-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.051 Hr.
Lag time = 3.04 Min.
25% of lag time = 0.76 Min.
40% of lag time = 1.22 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]
6.90	0.87	5.98

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	2.09	14.42

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 1.370(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.370(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.850
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.850	0.120	1.000	0.120
					Sum (F)	= 0.120

Area averaged mean soil loss (F) (In/Hr) = 0.120
Minimum soil loss rate ((In/Hr)) = 0.060

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.220

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	164.306	36.467	2.536
2 0.167	328.612	45.943	3.195
3 0.250	492.919	10.415	0.724
4 0.333	657.225	4.445	0.309
5 0.417	821.531	2.730	0.190
	Sum = 100.000	Sum=	6.954

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	0.214	(0.120) 0.047	0.167
2	0.17	1.30	0.214	(0.120) 0.047	0.167
3	0.25	1.10	0.181	(0.120) 0.040	0.141
4	0.33	1.50	0.247	(0.120) 0.054	0.192
5	0.42	1.50	0.247	(0.120) 0.054	0.192
6	0.50	1.80	0.296	(0.120) 0.065	0.231
7	0.58	1.50	0.247	(0.120) 0.054	0.192
8	0.67	1.80	0.296	(0.120) 0.065	0.231
9	0.75	1.80	0.296	(0.120) 0.065	0.231
10	0.83	1.50	0.247	(0.120) 0.054	0.192
11	0.92	1.60	0.263	(0.120) 0.058	0.205
12	1.00	1.80	0.296	(0.120) 0.065	0.231
13	1.08	2.20	0.362	(0.120) 0.080	0.282
14	1.17	2.20	0.362	(0.120) 0.080	0.282
15	1.25	2.20	0.362	(0.120) 0.080	0.282
16	1.33	2.00	0.329	(0.120) 0.072	0.256
17	1.42	2.60	0.427	(0.120) 0.094	0.333
18	1.50	2.70	0.444	(0.120) 0.098	0.346
19	1.58	2.40	0.394	(0.120) 0.087	0.308
20	1.67	2.70	0.444	(0.120) 0.098	0.346
21	1.75	3.30	0.542	(0.120) 0.119	0.423
22	1.83	3.10	0.509	(0.120) 0.112	0.397
23	1.92	2.90	0.477	(0.120) 0.105	0.372
24	2.00	3.00	0.493	(0.120) 0.108	0.385
25	2.08	3.10	0.509	(0.120) 0.112	0.397
26	2.17	4.20	0.690	0.120 (0.152)	0.570
27	2.25	5.00	0.822	0.120 (0.181)	0.702
28	2.33	3.50	0.575	0.120 (0.127)	0.455
29	2.42	6.80	1.118	0.120 (0.246)	0.997
30	2.50	7.30	1.200	0.120 (0.264)	1.080
31	2.58	8.20	1.348	0.120 (0.296)	1.228
32	2.67	5.90	0.970	0.120 (0.213)	0.850
33	2.75	2.00	0.329	(0.120) 0.072	0.256
34	2.83	1.80	0.296	(0.120) 0.065	0.231
35	2.92	1.80	0.296	(0.120) 0.065	0.231
36	3.00	0.60	0.099	(0.120) 0.022	0.077

(Loss Rate Not Used)

Sum = 100.0 Sum = 13.5

Flood volume = Effective rainfall 1.12 (In)
times area 6.9 (Ac.) / [(In)/(Ft.)] = 0.6 (Ac.Ft)
Total soil loss = 0.25 (In)
Total soil loss = 0.143 (Ac.Ft)
Total rainfall = 1.37 (In)
Flood volume = 28088.6 Cubic Feet
Total soil loss = 6213.8 Cubic Feet

Peak flow rate of this hydrograph = 7.563 (CFS)

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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	2.5	5.0	7.5	10.0
0+ 5	0.0029	0.42	VQ					
0+10	0.0095	0.96	V Q					
0+15	0.0165	1.01	V Q					
0+20	0.0241	1.11	V Q					
0+25	0.0330	1.29	V Q					
0+30	0.0427	1.41	V Q					
0+35	0.0527	1.45	V Q					
0+40	0.0628	1.46	V Q					
0+45	0.0736	1.57	V Q					
0+50	0.0839	1.50	Q					
0+55	0.0936	1.41	Q					
1+ 0	0.1039	1.50	QV					
1+ 5	0.1157	1.70	QV					
1+10	0.1286	1.88	Q					
1+15	0.1419	1.93	QV					
1+20	0.1549	1.89	Q V					
1+25	0.1688	2.01	Q V					
1+30	0.1844	2.27	Q V					
1+35	0.2000	2.26	Q V					
1+40	0.2156	2.26	Q V					
1+45	0.2333	2.57	Q V					
1+50	0.2524	2.77	Q V					
1+55	0.2709	2.69	Q V					
2+ 0	0.2891	2.65	Q V					
2+ 5	0.3078	2.71	Q V					
2+10	0.3297	3.19	Q					
2+15	0.3578	4.08	Q					
2+20	0.3854	4.01	Q					
2+25	0.4181	4.75	Q					
2+30	0.4635	6.58	Q					
2+35	0.5155	7.56	Q					
2+40	0.5655	7.26	Q					
2+45	0.5984	4.78	Q					
2+50	0.6164	2.61	Q					
2+55	0.6302	2.00	Q					
3+ 0	0.6394	1.34	Q					
3+ 5	0.6431	0.53	Q					
3+10	0.6443	0.17	Q					
3+15	0.6447	0.07	Q					
3+20	0.6448	0.01	Q					

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD10PROP610.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA D
10-YR 6-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.051 Hr.
Lag time = 3.04 Min.
25% of lag time = 0.76 Min.
40% of lag time = 1.22 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]
6.90	1.21	8.35

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	2.86	19.73

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 1.889(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.889(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.850
Total Area Entered =	6.90(Ac.)	

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.850	0.120	1.000	0.120
					Sum (F) =	0.120

Area averaged mean soil loss (F) (In/Hr) = 0.120
Minimum soil loss rate ((In/Hr)) = 0.060

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.220

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	164.306	36.467	2.536
2 0.167	328.612	45.943	3.195
3 0.250	492.919	10.415	0.724
4 0.333	657.225	4.445	0.309
5 0.417	821.531	2.730	0.190
	Sum = 100.000	Sum=	6.954

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	0.113	(0.120) 0.025	0.088
2	0.17	0.60	0.136	(0.120) 0.030	0.106
3	0.25	0.60	0.136	(0.120) 0.030	0.106
4	0.33	0.60	0.136	(0.120) 0.030	0.106
5	0.42	0.60	0.136	(0.120) 0.030	0.106
6	0.50	0.70	0.159	(0.120) 0.035	0.124
7	0.58	0.70	0.159	(0.120) 0.035	0.124
8	0.67	0.70	0.159	(0.120) 0.035	0.124
9	0.75	0.70	0.159	(0.120) 0.035	0.124
10	0.83	0.70	0.159	(0.120) 0.035	0.124
11	0.92	0.70	0.159	(0.120) 0.035	0.124
12	1.00	0.80	0.181	(0.120) 0.040	0.141
13	1.08	0.80	0.181	(0.120) 0.040	0.141
14	1.17	0.80	0.181	(0.120) 0.040	0.141
15	1.25	0.80	0.181	(0.120) 0.040	0.141
16	1.33	0.80	0.181	(0.120) 0.040	0.141
17	1.42	0.80	0.181	(0.120) 0.040	0.141
18	1.50	0.80	0.181	(0.120) 0.040	0.141
19	1.58	0.80	0.181	(0.120) 0.040	0.141
20	1.67	0.80	0.181	(0.120) 0.040	0.141
21	1.75	0.80	0.181	(0.120) 0.040	0.141
22	1.83	0.80	0.181	(0.120) 0.040	0.141
23	1.92	0.80	0.181	(0.120) 0.040	0.141
24	2.00	0.90	0.204	(0.120) 0.045	0.159
25	2.08	0.80	0.181	(0.120) 0.040	0.141
26	2.17	0.90	0.204	(0.120) 0.045	0.159
27	2.25	0.90	0.204	(0.120) 0.045	0.159
28	2.33	0.90	0.204	(0.120) 0.045	0.159
29	2.42	0.90	0.204	(0.120) 0.045	0.159
30	2.50	0.90	0.204	(0.120) 0.045	0.159
31	2.58	0.90	0.204	(0.120) 0.045	0.159
32	2.67	0.90	0.204	(0.120) 0.045	0.159
33	2.75	1.00	0.227	(0.120) 0.050	0.177
34	2.83	1.00	0.227	(0.120) 0.050	0.177
35	2.92	1.00	0.227	(0.120) 0.050	0.177
36	3.00	1.00	0.227	(0.120) 0.050	0.177
37	3.08	1.00	0.227	(0.120) 0.050	0.177
38	3.17	1.10	0.249	(0.120) 0.055	0.194
39	3.25	1.10	0.249	(0.120) 0.055	0.194
40	3.33	1.10	0.249	(0.120) 0.055	0.194
41	3.42	1.20	0.272	(0.120) 0.060	0.212
42	3.50	1.30	0.295	(0.120) 0.065	0.230
43	3.58	1.40	0.317	(0.120) 0.070	0.248
44	3.67	1.40	0.317	(0.120) 0.070	0.248
45	3.75	1.50	0.340	(0.120) 0.075	0.265
46	3.83	1.50	0.340	(0.120) 0.075	0.265
47	3.92	1.60	0.363	(0.120) 0.080	0.283
48	4.00	1.60	0.363	(0.120) 0.080	0.283
49	4.08	1.70	0.385	(0.120) 0.085	0.301
50	4.17	1.80	0.408	(0.120) 0.090	0.318
51	4.25	1.90	0.431	(0.120) 0.095	0.336
52	4.33	2.00	0.453	(0.120) 0.100	0.354
53	4.42	2.10	0.476	(0.120) 0.105	0.371

54	4.50	2.10	0.476	(0.120)	0.105	0.371
55	4.58	2.20	0.499	(0.120)	0.110	0.389
56	4.67	2.30	0.521	(0.120)	0.115	0.407
57	4.75	2.40	0.544	(0.120)	0.120	0.424
58	4.83	2.40	0.544	(0.120)	0.120	0.424
59	4.92	2.50	0.567	0.120	(0.125)	0.447
60	5.00	2.60	0.589	0.120	(0.130)	0.469
61	5.08	3.10	0.703	0.120	(0.155)	0.583
62	5.17	3.60	0.816	0.120	(0.180)	0.696
63	5.25	3.90	0.884	0.120	(0.194)	0.764
64	5.33	4.20	0.952	0.120	(0.209)	0.832
65	5.42	4.70	1.065	0.120	(0.234)	0.945
66	5.50	5.60	1.269	0.120	(0.279)	1.149
67	5.58	1.90	0.431	(0.120)	0.095	0.336
68	5.67	0.90	0.204	(0.120)	0.045	0.159
69	5.75	0.60	0.136	(0.120)	0.030	0.106
70	5.83	0.50	0.113	(0.120)	0.025	0.088
71	5.92	0.30	0.068	(0.120)	0.015	0.053
72	6.00	0.20	0.045	(0.120)	0.010	0.035

(Loss Rate Not Used)

Sum = 100.0

Sum = 18.2

Flood volume = Effective rainfall 1.52 (In)

times area 6.9(Ac.)/[(In)/(Ft.)] = 0.9(Ac.Ft)

Total soil loss = 0.37 (In)

Total soil loss = 0.213 (Ac.Ft)

Total rainfall = 1.89 (In)

Flood volume = 38039.2 Cubic Feet

Total soil loss = 9269.0 Cubic Feet

Peak flow rate of this hydrograph = 6.908 (CFS)

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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	2.5	5.0	7.5	10.0
0+ 5	0.0015	0.22	Q				
0+10	0.0053	0.55	V Q				
0+15	0.0100	0.67	V Q				
0+20	0.0149	0.71	V Q				
0+25	0.0199	0.73	V Q				
0+30	0.0253	0.78	V Q				
0+35	0.0311	0.84	V Q				
0+40	0.0370	0.85	V Q				
0+45	0.0429	0.86	V Q				
0+50	0.0488	0.86	VQ				
0+55	0.0547	0.86	VQ				
1+ 0	0.0610	0.91	VQ				
1+ 5	0.0676	0.96	Q				
1+10	0.0743	0.98	Q				
1+15	0.0811	0.98	Q				
1+20	0.0879	0.98	QV				
1+25	0.0946	0.98	QV				
1+30	0.1014	0.98	QV				
1+35	0.1082	0.98	QV				
1+40	0.1150	0.98	Q V				
1+45	0.1217	0.98	Q V				
1+50	0.1285	0.98	Q V				
1+55	0.1353	0.98	Q V				
2+ 0	0.1424	1.03	Q V				
2+ 5	0.1496	1.04	Q V				
2+10	0.1567	1.04	Q V				
2+15	0.1642	1.09	Q V				
2+20	0.1718	1.10	Q V				
2+25	0.1794	1.10	Q V				
2+30	0.1870	1.11	Q V				
2+35	0.1947	1.11	Q V				
2+40	0.2023	1.11	Q V				
2+45	0.2102	1.15	Q V				
2+50	0.2186	1.21	Q V				
2+55	0.2270	1.22	Q V				
3+ 0	0.2354	1.23	Q V				
3+ 5	0.2439	1.23	Q V				
3+10	0.2527	1.27	Q V				
3+15	0.2618	1.33	Q V				

3+20	0.2711	1.34		V				
3+25	0.2807	1.39	Q	V				
3+30	0.2910	1.50	Q	V				
3+35	0.3021	1.61	Q	V				
3+40	0.3138	1.69	Q	V				
3+45	0.3258	1.75	Q	V				
3+50	0.3384	1.82	Q	V				
3+55	0.3513	1.88	Q	V				
4+ 0	0.3647	1.94	Q	V				
4+ 5	0.3785	2.00	Q	V				
4+10	0.3931	2.11	Q	V				
4+15	0.4084	2.23	Q	V				
4+20	0.4246	2.35	Q	V				
4+25	0.4416	2.47	Q	V				
4+30	0.4591	2.55	Q	V				
4+35	0.4772	2.62	Q	V				
4+40	0.4959	2.73	Q	V				
4+45	0.5155	2.84	Q	V				
4+50	0.5356	2.92	Q	V				
4+55	0.5563	3.00	Q	V				
5+ 0	0.5778	3.13	Q	V				
5+ 5	0.6020	3.51	Q	V				
5+10	0.6309	4.19	Q	V				
5+15	0.6640	4.81	Q	V				
5+20	0.7007	5.33	Q	V				
5+25	0.7416	5.94	Q	V				
5+30	0.7892	6.91	Q	V				
5+35	0.8278	5.61	Q	V				
5+40	0.8468	2.76	Q	V				
5+45	0.8576	1.56	Q	V				
5+50	0.8645	1.00	Q	V				
5+55	0.8686	0.61	Q	V				
6+ 0	0.8713	0.39	Q	V				
6+ 5	0.8727	0.20	Q	V				
6+10	0.8731	0.06	Q	V				
6+15	0.8732	0.02	Q	V				
6+20	0.8733	0.01	Q	V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD10PROP2410.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS
PROPOSED CONDITION, DMA D
10-YR 24-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.051 Hr.
Lag time = 3.04 Min.
25% of lag time = 0.76 Min.
40% of lag time = 1.22 Min.
Unit time = 15.00 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]
6.90	2.05	14.15

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	5.16	35.60

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 3.329(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.329(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.850
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.850	0.120	1.000	0.120
					Sum (F)	= 0.120

Area averaged mean soil loss (F) (In/Hr) = 0.120
Minimum soil loss rate ((In/Hr)) = 0.060

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.220

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 0.250	492.919	70.567	4.907
2 0.500	985.837	29.433	2.047
		Sum = 100.000	Sum= 6.954

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	0.25	0.20	0.027	(0.212) 0.006	0.021
2	0.50	0.30	0.040	(0.210) 0.009	0.031
3	0.75	0.30	0.040	(0.207) 0.009	0.031
4	1.00	0.40	0.053	(0.205) 0.012	0.042
5	1.25	0.30	0.040	(0.202) 0.009	0.031
6	1.50	0.30	0.040	(0.200) 0.009	0.031
7	1.75	0.30	0.040	(0.197) 0.009	0.031
8	2.00	0.40	0.053	(0.195) 0.012	0.042
9	2.25	0.40	0.053	(0.193) 0.012	0.042
10	2.50	0.40	0.053	(0.190) 0.012	0.042
11	2.75	0.50	0.067	(0.188) 0.015	0.052
12	3.00	0.50	0.067	(0.186) 0.015	0.052
13	3.25	0.50	0.067	(0.183) 0.015	0.052
14	3.50	0.50	0.067	(0.181) 0.015	0.052
15	3.75	0.50	0.067	(0.179) 0.015	0.052
16	4.00	0.60	0.080	(0.177) 0.018	0.062
17	4.25	0.60	0.080	(0.174) 0.018	0.062
18	4.50	0.70	0.093	(0.172) 0.021	0.073
19	4.75	0.70	0.093	(0.170) 0.021	0.073
20	5.00	0.80	0.107	(0.168) 0.023	0.083
21	5.25	0.60	0.080	(0.166) 0.018	0.062
22	5.50	0.70	0.093	(0.163) 0.021	0.073
23	5.75	0.80	0.107	(0.161) 0.023	0.083
24	6.00	0.80	0.107	(0.159) 0.023	0.083
25	6.25	0.90	0.120	(0.157) 0.026	0.093
26	6.50	0.90	0.120	(0.155) 0.026	0.093
27	6.75	1.00	0.133	(0.153) 0.029	0.104
28	7.00	1.00	0.133	(0.151) 0.029	0.104
29	7.25	1.00	0.133	(0.149) 0.029	0.104
30	7.50	1.10	0.146	(0.147) 0.032	0.114
31	7.75	1.20	0.160	(0.145) 0.035	0.125
32	8.00	1.30	0.173	(0.143) 0.038	0.135
33	8.25	1.50	0.200	(0.141) 0.044	0.156
34	8.50	1.50	0.200	(0.139) 0.044	0.156
35	8.75	1.60	0.213	(0.137) 0.047	0.166
36	9.00	1.70	0.226	(0.135) 0.050	0.177
37	9.25	1.90	0.253	(0.133) 0.056	0.197
38	9.50	2.00	0.266	(0.131) 0.059	0.208
39	9.75	2.10	0.280	(0.129) 0.062	0.218
40	10.00	2.20	0.293	(0.127) 0.064	0.229
41	10.25	1.50	0.200	(0.126) 0.044	0.156
42	10.50	1.50	0.200	(0.124) 0.044	0.156
43	10.75	2.00	0.266	(0.122) 0.059	0.208
44	11.00	2.00	0.266	(0.120) 0.059	0.208
45	11.25	1.90	0.253	(0.118) 0.056	0.197
46	11.50	1.90	0.253	(0.117) 0.056	0.197
47	11.75	1.70	0.226	(0.115) 0.050	0.177
48	12.00	1.80	0.240	(0.113) 0.053	0.187
49	12.25	2.50	0.333	(0.111) 0.073	0.260
50	12.50	2.60	0.346	(0.110) 0.076	0.270
51	12.75	2.80	0.373	(0.108) 0.082	0.291
52	13.00	2.90	0.386	(0.107) 0.085	0.301
53	13.25	3.40	0.453	(0.105) 0.100	0.353
54	13.50	3.40	0.453	(0.103) 0.100	0.353
55	13.75	2.30	0.306	(0.102) 0.067	0.239
56	14.00	2.30	0.306	(0.100) 0.067	0.239

57	14.25	2.70	0.360	(0.099)	0.079	0.280
58	14.50	2.60	0.346	(0.097)	0.076	0.270
59	14.75	2.60	0.346	(0.096)	0.076	0.270
60	15.00	2.50	0.333	(0.094)	0.073	0.260
61	15.25	2.40	0.320	(0.093)	0.070	0.249
62	15.50	2.30	0.306	(0.091)	0.067	0.239
63	15.75	1.90	0.253	(0.090)	0.056	0.197
64	16.00	1.90	0.253	(0.089)	0.056	0.197
65	16.25	0.40	0.053	(0.087)	0.012	0.042
66	16.50	0.40	0.053	(0.086)	0.012	0.042
67	16.75	0.30	0.040	(0.085)	0.009	0.031
68	17.00	0.30	0.040	(0.083)	0.009	0.031
69	17.25	0.50	0.067	(0.082)	0.015	0.052
70	17.50	0.50	0.067	(0.081)	0.015	0.052
71	17.75	0.50	0.067	(0.080)	0.015	0.052
72	18.00	0.40	0.053	(0.078)	0.012	0.042
73	18.25	0.40	0.053	(0.077)	0.012	0.042
74	18.50	0.40	0.053	(0.076)	0.012	0.042
75	18.75	0.30	0.040	(0.075)	0.009	0.031
76	19.00	0.20	0.027	(0.074)	0.006	0.021
77	19.25	0.30	0.040	(0.073)	0.009	0.031
78	19.50	0.40	0.053	(0.072)	0.012	0.042
79	19.75	0.30	0.040	(0.071)	0.009	0.031
80	20.00	0.20	0.027	(0.070)	0.006	0.021
81	20.25	0.30	0.040	(0.069)	0.009	0.031
82	20.50	0.30	0.040	(0.068)	0.009	0.031
83	20.75	0.30	0.040	(0.067)	0.009	0.031
84	21.00	0.20	0.027	(0.067)	0.006	0.021
85	21.25	0.30	0.040	(0.066)	0.009	0.031
86	21.50	0.20	0.027	(0.065)	0.006	0.021
87	21.75	0.30	0.040	(0.064)	0.009	0.031
88	22.00	0.20	0.027	(0.064)	0.006	0.021
89	22.25	0.30	0.040	(0.063)	0.009	0.031
90	22.50	0.20	0.027	(0.062)	0.006	0.021
91	22.75	0.20	0.027	(0.062)	0.006	0.021
92	23.00	0.20	0.027	(0.061)	0.006	0.021
93	23.25	0.20	0.027	(0.061)	0.006	0.021
94	23.50	0.20	0.027	(0.061)	0.006	0.021
95	23.75	0.20	0.027	(0.060)	0.006	0.021
96	24.00	0.20	0.027	(0.060)	0.006	0.021

(Loss Rate Not Used)

Sum = 100.0

Sum = 10.4

Flood volume = Effective rainfall 2.60 (In)

times area 6.9(Ac.)/[(In)/(Ft.)] = 1.5 (Ac.Ft)

Total soil loss = 0.73 (In)

Total soil loss = 0.421 (Ac.Ft)

Total rainfall = 3.33 (In)

Flood volume = 65046.0 Cubic Feet

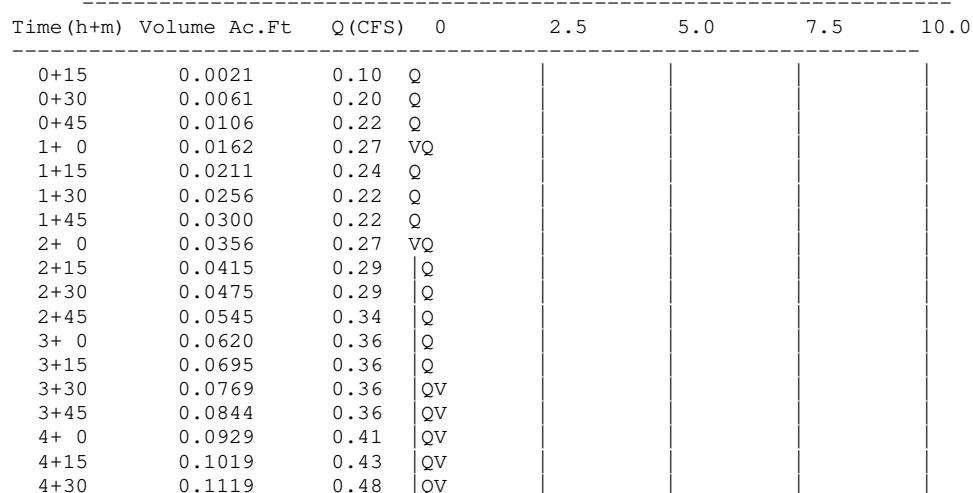
Total soil loss = 18346.3 Cubic Feet

Peak flow rate of this hydrograph = 2.457 (CFS)

+++++H O U R S T O R M ++++++

24 - H O U R S T O R M
Run off Hydrograph

Hydrograph in 15 Minute intervals ((CFS))



4+45	0.1224	0.51	QV					
5+ 0	0.1339	0.56	QV					
5+15	0.1437	0.48	Q V					
5+30	0.1537	0.48	Q V					
5+45	0.1652	0.56	Q V					
6+ 0	0.1772	0.58	Q V					
6+15	0.1902	0.63	Q V					
6+30	0.2036	0.65	Q V					
6+45	0.2181	0.70	Q V					
7+ 0	0.2330	0.72	Q V					
7+15	0.2480	0.72	Q V					
7+30	0.2640	0.77	Q V					
7+45	0.2814	0.85	Q V					
8+ 0	0.3004	0.92	Q V					
8+15	0.3219	1.04	Q V					
8+30	0.3443	1.08	Q V					
8+45	0.3678	1.14	Q V					
9+ 0	0.3927	1.21	Q V					
9+15	0.4202	1.33	Q V					
9+30	0.4496	1.42	Q V					
9+45	0.4806	1.50	Q V					
10+ 0	0.5130	1.57	Q V					
10+15	0.5384	1.23	Q V					
10+30	0.5608	1.08	Q V					
10+45	0.5885	1.34	Q V					
11+ 0	0.6184	1.45	Q V					
11+15	0.6472	1.39	Q V					
11+30	0.6756	1.37	Q V					
11+45	0.7018	1.27	Q V					
12+ 0	0.7283	1.28	Q V					
12+15	0.7625	1.66	Q V					
12+30	0.8009	1.86	Q V					
12+45	0.8418	1.98	Q V					
13+ 0	0.8847	2.07	Q V					
13+15	0.9333	2.35	Q V					
13+30	0.9840	2.46	Q V					
13+45	1.0232	1.90	Q V					
14+ 0	1.0576	1.66	Q V					
14+15	1.0961	1.87	Q V					
14+30	1.1354	1.90	Q V					
14+45	1.1742	1.88	Q V					
15+ 0	1.2120	1.83	Q V					
15+15	1.2483	1.76	Q V					
15+30	1.2830	1.68	Q V					
15+45	1.3132	1.46	Q V					
16+ 0	1.3415	1.37	Q V					
16+15	1.3541	0.61	Q V					
16+30	1.3601	0.29	Q V					
16+45	1.3650	0.24	Q V					
17+ 0	1.3695	0.22	Q V					
17+15	1.3761	0.32	Q V					
17+30	1.3835	0.36	Q V					
17+45	1.3910	0.36	Q V					
18+ 0	1.3974	0.31	Q V					
18+15	1.4034	0.29	Q V					
18+30	1.4094	0.29	Q V					
18+45	1.4143	0.24	Q V					
19+ 0	1.4177	0.17	Q V					
19+15	1.4217	0.20	Q V					
19+30	1.4273	0.27	Q V					
19+45	1.4322	0.24	Q V					
20+ 0	1.4356	0.17	Q V					
20+15	1.4397	0.20	Q V					
20+30	1.4441	0.22	Q V					
20+45	1.4486	0.22	Q V					
21+ 0	1.4521	0.17	Q V					
21+15	1.4561	0.20	Q V					
21+30	1.4595	0.17	Q V					
21+45	1.4636	0.20	Q V					
22+ 0	1.4670	0.17	Q V					
22+15	1.4710	0.20	Q V					
22+30	1.4745	0.17	Q V					
22+45	1.4774	0.14	Q V					
23+ 0	1.4804	0.14	Q V					
23+15	1.4834	0.14	Q V					
23+30	1.4864	0.14	Q V					
23+45	1.4894	0.14	Q V					
24+ 0	1.4924	0.14	Q V					
24+15	1.4933	0.04	Q V					

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD100EXIST1100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION, DMA D

100-YR 1-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.085 Hr.
Lag time = 5.07 Min.
25% of lag time = 1.27 Min.
40% of lag time = 2.03 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]
6.90	0.49	3.37

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	1.33	9.18

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 1.330(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.330(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.150
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.150	0.442	1.000	0.442
					Sum (F)	= 0.442

Area averaged mean soil loss (F) (In/Hr) = 0.442
Minimum soil loss rate ((In/Hr)) = 0.221

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.780

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	98.584	18.765
2	0.167	197.167	48.285
3	0.250	295.751	15.854
4	0.333	394.335	7.138
5	0.417	492.919	4.033
6	0.500	591.502	2.616
7	0.583	690.086	1.645
8	0.667	788.670	1.057
9	0.750	887.254	0.606
		Sum = 100.000	Sum= 6.954

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

Unit	Time	Pattern	Storm Rain	Loss rate (In./Hr)	Effective
	(Hr.)	Percent	(In/Hr)	Max Low	(In/Hr)
1	0.08	4.20	0.670	0.442 (0.523)	0.228
2	0.17	4.30	0.686	0.442 (0.535)	0.244
3	0.25	5.00	0.798	0.442 (0.622)	0.356
4	0.33	5.00	0.798	0.442 (0.622)	0.356
5	0.42	5.80	0.926	0.442 (0.722)	0.484
6	0.50	6.50	1.037	0.442 (0.809)	0.595
7	0.58	7.40	1.181	0.442 (0.921)	0.739
8	0.67	8.60	1.372	0.442 (1.071)	0.931
9	0.75	12.30	1.963	0.442 (1.531)	1.521
10	0.83	29.10	4.644	0.442 (3.622)	4.202
11	0.92	6.80	1.085	0.442 (0.846)	0.643
12	1.00	5.00	0.798	0.442 (0.622)	0.356

(Loss Rate Not Used)

Sum = 100.0 Sum = 10.7

Flood volume = Effective rainfall 0.89 (In)

times area 6.9 (Ac.) / [(In) / (Ft.)] = 0.5 (Ac.Ft)

Total soil loss = 0.44 (In)

Total soil loss = 0.254 (Ac.Ft)

Total rainfall = 1.33 (In)

Flood volume = 22243.6 Cubic Feet

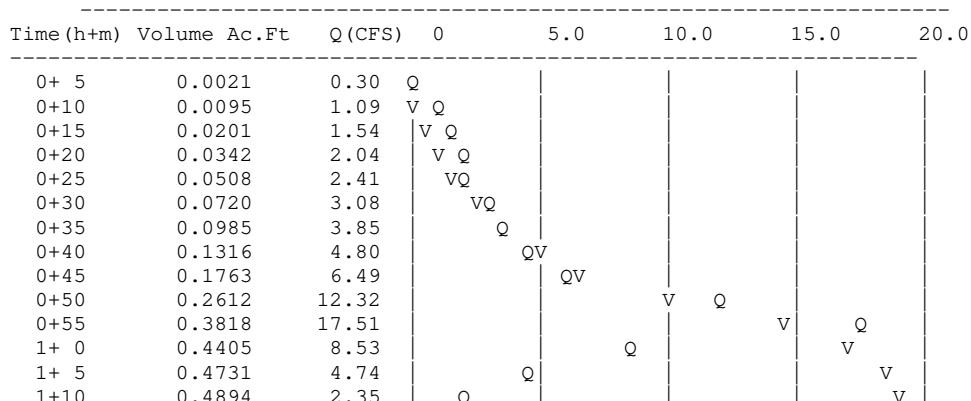
Total soil loss = 11066.8 Cubic Feet

Peak flow rate of this hydrograph = 17.509 (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))



1+15	0.4990	1.40		Q					v
1+20	0.5048	0.85		Q					v
1+25	0.5083	0.51		Q					v
1+30	0.5102	0.27		Q					v
1+35	0.5105	0.05		Q					v
1+40	0.5106	0.02		Q					v

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD100EXIST3100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION, DMA D

100-YR 3-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.085 Hr.
Lag time = 5.07 Min.
25% of lag time = 1.27 Min.
40% of lag time = 2.03 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]
6.90	0.87	5.98

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	2.09	14.42

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 2.090(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.090(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.150
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.150	0.442	1.000	0.442
					Sum (F)	= 0.442

Area averaged mean soil loss (F) (In/Hr) = 0.442
Minimum soil loss rate ((In/Hr)) = 0.221

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.780

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	98.584	18.765	1.305
2 0.167	197.167	48.285	3.358
3 0.250	295.751	15.854	1.102
4 0.333	394.335	7.138	0.496
5 0.417	492.919	4.033	0.280
6 0.500	591.502	2.616	0.182
7 0.583	690.086	1.645	0.114
8 0.667	788.670	1.057	0.073
9 0.750	887.254	0.606	0.042
	Sum = 100.000	Sum=	6.954

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)		Effective (In/Hr)
				Max		
1	0.08	1.30	0.326	(0.442)		0.254
2	0.17	1.30	0.326	(0.442)		0.254
3	0.25	1.10	0.276	(0.442)		0.215
4	0.33	1.50	0.376	(0.442)		0.293
5	0.42	1.50	0.376	(0.442)		0.293
6	0.50	1.80	0.451	(0.442)		0.352
7	0.58	1.50	0.376	(0.442)		0.293
8	0.67	1.80	0.451	(0.442)		0.352
9	0.75	1.80	0.451	(0.442)		0.352
10	0.83	1.50	0.376	(0.442)		0.293
11	0.92	1.60	0.401	(0.442)		0.313
12	1.00	1.80	0.451	(0.442)		0.352
13	1.08	2.20	0.552	(0.442)		0.430
14	1.17	2.20	0.552	(0.442)		0.430
15	1.25	2.20	0.552	(0.442)		0.430
16	1.33	2.00	0.502	(0.442)		0.391
17	1.42	2.60	0.652	0.442	(0.509)	0.210
18	1.50	2.70	0.677	0.442	(0.528)	0.235
19	1.58	2.40	0.602	0.442	(0.469)	0.160
20	1.67	2.70	0.677	0.442	(0.528)	0.235
21	1.75	3.30	0.828	0.442	(0.646)	0.386
22	1.83	3.10	0.777	0.442	(0.606)	0.336
23	1.92	2.90	0.727	0.442	(0.567)	0.285
24	2.00	3.00	0.752	0.442	(0.587)	0.311
25	2.08	3.10	0.777	0.442	(0.606)	0.336
26	2.17	4.20	1.053	0.442	(0.822)	0.611
27	2.25	5.00	1.254	0.442	(0.978)	0.812
28	2.33	3.50	0.878	0.442	(0.685)	0.436
29	2.42	6.80	1.705	0.442	(1.330)	1.264
30	2.50	7.30	1.831	0.442	(1.428)	1.389
31	2.58	8.20	2.056	0.442	(1.604)	1.615
32	2.67	5.90	1.480	0.442	(1.154)	1.038
33	2.75	2.00	0.502	(0.442)		0.391
34	2.83	1.80	0.451	(0.442)		0.352
35	2.92	1.80	0.451	(0.442)		0.352
36	3.00	0.60	0.150	(0.442)		0.033

Sum = 100.0 Sum = 11.5

$$\text{Flood volume} = \text{Effective rainfall} \times \text{area}$$

Total soil loss = 1.13 (In)

Total soil loss = 0.651 (Ac.Ft)

Total rainfall = 2.09 (In)

Flood volume = 23994.4 Cubic Feet

Total soil loss = 28352.3 Cubic Feet

Peak flow rate of this hydrograph = 9.317 (CFS)

3 - H O U R S T O R M
Run off Hydrograph

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	0.0006	0.09	Q				
0+10	0.0029	0.33	VQ				
0+15	0.0057	0.40	VQ				
0+20	0.0086	0.43	VQ				
0+25	0.0121	0.51	V Q				
0+30	0.0160	0.56	VQ				
0+35	0.0202	0.61	VQ				
0+40	0.0244	0.61	VQ				
0+45	0.0289	0.66	Q				
0+50	0.0334	0.65	Q				
0+55	0.0376	0.61	Q				
1+ 0	0.0420	0.63	QV				
1+ 5	0.0468	0.70	QV				
1+10	0.0522	0.78	Q				
1+15	0.0578	0.81	QV				
1+20	0.0633	0.81	QV				
1+25	0.0696	0.91	Q V				
1+30	0.0784	1.27	Q				
1+35	0.0878	1.37	QV				
1+40	0.0967	1.29	Q V				
1+45	0.1084	1.69	QV				
1+50	0.1235	2.20	Q				
1+55	0.1385	2.17	Q V				
2+ 0	0.1527	2.07	Q V				
2+ 5	0.1676	2.16	Q V				
2+10	0.1856	2.62	Q V				
2+15	0.2121	3.85	Q				
2+20	0.2421	4.35					
2+25	0.2734	4.54					
2+30	0.3233	7.25					
2+35	0.3839	8.80					
2+40	0.4480	9.32					
2+45	0.4941	6.69					
2+50	0.5161	3.20					
2+55	0.5300	2.02					
3+ 0	0.5397	1.40	Q				
3+ 5	0.5454	0.83	Q				
3+10	0.5483	0.43	Q				
3+15	0.5498	0.22	Q				
3+20	0.5505	0.09	Q				
3+25	0.5507	0.03	Q				
3+30	0.5508	0.02	Q				
3+35	0.5508	0.01	Q				
3+40	0.5508	0.00	Q				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD100EXIST6100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION, DMA D

100-YR 6-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.085 Hr.
Lag time = 5.07 Min.
25% of lag time = 1.27 Min.
40% of lag time = 2.03 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]
6.90	1.21	8.35

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	2.86	19.73

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 2.860(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.860(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.150
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.150	0.442	1.000	0.442
					Sum (F)	= 0.442

Area averaged mean soil loss (F) (In/Hr) = 0.442
Minimum soil loss rate ((In/Hr)) = 0.221

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.780

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	98.584	18.765	1.305
2 0.167	197.167	48.285	3.358
3 0.250	295.751	15.854	1.102
4 0.333	394.335	7.138	0.496
5 0.417	492.919	4.033	0.280
6 0.500	591.502	2.616	0.182
7 0.583	690.086	1.645	0.114
8 0.667	788.670	1.057	0.073
9 0.750	887.254	0.606	0.042
	Sum = 100.000	Sum=	6.954

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	0.172	(0.442) 0.134	0.038
2 0.17	0.60	0.206	(0.442) 0.161	0.045
3 0.25	0.60	0.206	(0.442) 0.161	0.045
4 0.33	0.60	0.206	(0.442) 0.161	0.045
5 0.42	0.60	0.206	(0.442) 0.161	0.045
6 0.50	0.70	0.240	(0.442) 0.187	0.053
7 0.58	0.70	0.240	(0.442) 0.187	0.053
8 0.67	0.70	0.240	(0.442) 0.187	0.053
9 0.75	0.70	0.240	(0.442) 0.187	0.053
10 0.83	0.70	0.240	(0.442) 0.187	0.053
11 0.92	0.70	0.240	(0.442) 0.187	0.053
12 1.00	0.80	0.275	(0.442) 0.214	0.060
13 1.08	0.80	0.275	(0.442) 0.214	0.060
14 1.17	0.80	0.275	(0.442) 0.214	0.060
15 1.25	0.80	0.275	(0.442) 0.214	0.060
16 1.33	0.80	0.275	(0.442) 0.214	0.060
17 1.42	0.80	0.275	(0.442) 0.214	0.060
18 1.50	0.80	0.275	(0.442) 0.214	0.060
19 1.58	0.80	0.275	(0.442) 0.214	0.060
20 1.67	0.80	0.275	(0.442) 0.214	0.060
21 1.75	0.80	0.275	(0.442) 0.214	0.060
22 1.83	0.80	0.275	(0.442) 0.214	0.060
23 1.92	0.80	0.275	(0.442) 0.214	0.060
24 2.00	0.90	0.309	(0.442) 0.241	0.068
25 2.08	0.80	0.275	(0.442) 0.214	0.060
26 2.17	0.90	0.309	(0.442) 0.241	0.068
27 2.25	0.90	0.309	(0.442) 0.241	0.068
28 2.33	0.90	0.309	(0.442) 0.241	0.068
29 2.42	0.90	0.309	(0.442) 0.241	0.068
30 2.50	0.90	0.309	(0.442) 0.241	0.068
31 2.58	0.90	0.309	(0.442) 0.241	0.068
32 2.67	0.90	0.309	(0.442) 0.241	0.068
33 2.75	1.00	0.343	(0.442) 0.268	0.076
34 2.83	1.00	0.343	(0.442) 0.268	0.076
35 2.92	1.00	0.343	(0.442) 0.268	0.076
36 3.00	1.00	0.343	(0.442) 0.268	0.076
37 3.08	1.00	0.343	(0.442) 0.268	0.076
38 3.17	1.10	0.378	(0.442) 0.294	0.083
39 3.25	1.10	0.378	(0.442) 0.294	0.083
40 3.33	1.10	0.378	(0.442) 0.294	0.083
41 3.42	1.20	0.412	(0.442) 0.321	0.091
42 3.50	1.30	0.446	(0.442) 0.348	0.098
43 3.58	1.40	0.480	(0.442) 0.375	0.106
44 3.67	1.40	0.480	(0.442) 0.375	0.106
45 3.75	1.50	0.515	(0.442) 0.402	0.113
46 3.83	1.50	0.515	(0.442) 0.402	0.113
47 3.92	1.60	0.549	(0.442) 0.428	0.121
48 4.00	1.60	0.549	(0.442) 0.428	0.121
49 4.08	1.70	0.583	(0.442) (0.455) 0.442	0.142

50	4.17	1.80	0.618	0.442	(0.482)	0.176
51	4.25	1.90	0.652	0.442	(0.509)	0.210
52	4.33	2.00	0.686	0.442	(0.535)	0.245
53	4.42	2.10	0.721	0.442	(0.562)	0.279
54	4.50	2.10	0.721	0.442	(0.562)	0.279
55	4.58	2.20	0.755	0.442	(0.589)	0.313
56	4.67	2.30	0.789	0.442	(0.616)	0.347
57	4.75	2.40	0.824	0.442	(0.642)	0.382
58	4.83	2.40	0.824	0.442	(0.642)	0.382
59	4.92	2.50	0.858	0.442	(0.669)	0.416
60	5.00	2.60	0.892	0.442	(0.696)	0.450
61	5.08	3.10	1.064	0.442	(0.830)	0.622
62	5.17	3.60	1.235	0.442	(0.964)	0.794
63	5.25	3.90	1.338	0.442	(1.044)	0.897
64	5.33	4.20	1.441	0.442	(1.124)	1.000
65	5.42	4.70	1.613	0.442	(1.258)	1.171
66	5.50	5.60	1.922	0.442	(1.499)	1.480
67	5.58	1.90	0.652	0.442	(0.509)	0.210
68	5.67	0.90	0.309	(0.442)	0.241	0.068
69	5.75	0.60	0.206	(0.442)	0.161	0.045
70	5.83	0.50	0.172	(0.442)	0.134	0.038
71	5.92	0.30	0.103	(0.442)	0.080	0.023
72	6.00	0.20	0.069	(0.442)	0.054	0.015

(Loss Rate Not Used)

Sum = 100.0

Sum = 13.3

Flood volume = Effective rainfall 1.11 (In)

times area 6.9(Ac.)/((In)/(Ft.)) = 0.6(Ac.Ft)

Total soil loss = 1.75 (In)

Total soil loss = 1.005 (Ac.Ft)

Total rainfall = 2.86 (In)

Flood volume = 27849.7 Cubic Feet

Total soil loss = 43783.0 Cubic Feet

Peak flow rate of this hydrograph = 7.849 (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	2.5	5.0	7.5	10.0
0+ 5	0.0003	0.05 Q					
0+10	0.0016	0.19 Q					
0+15	0.0034	0.25 VQ					
0+20	0.0053	0.28 VQ					
0+25	0.0073	0.29 VQ					
0+30	0.0095	0.31 VQ					
0+35	0.0118	0.34 VQ					
0+40	0.0143	0.36 VQ					
0+45	0.0168	0.36 Q					
0+50	0.0193	0.36 Q					
0+55	0.0218	0.37 Q					
1+ 0	0.0244	0.38 Q					
1+ 5	0.0272	0.40 Q					
1+10	0.0300	0.41 Q					
1+15	0.0329	0.42 QV					
1+20	0.0358	0.42 QV					
1+25	0.0386	0.42 QV					
1+30	0.0415	0.42 QV					
1+35	0.0444	0.42 QV					
1+40	0.0473	0.42 QV					
1+45	0.0502	0.42 Q V					
1+50	0.0531	0.42 Q V					
1+55	0.0560	0.42 Q V					
2+ 0	0.0590	0.43 Q V					
2+ 5	0.0620	0.45 Q V					
2+10	0.0650	0.44 Q V					
2+15	0.0682	0.46 Q V					
2+20	0.0714	0.47 Q V					
2+25	0.0746	0.47 Q V					
2+30	0.0779	0.47 Q V					
2+35	0.0811	0.47 Q V					
2+40	0.0844	0.47 Q V					
2+45	0.0877	0.48 Q V					
2+50	0.0912	0.51 Q V					
2+55	0.0948	0.52 Q V					

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD100EXIST24100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

EXISTING CONDITION, DMA D

100-YR 24-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.085 Hr.
Lag time = 5.07 Min.
25% of lag time = 1.27 Min.
40% of lag time = 2.03 Min.
Unit time = 15.00 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]
6.90	2.05	14.15

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	5.16	35.60

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 5.160(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 5.160(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.150
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.150	0.442	1.000	0.442
					Sum (F)	= 0.442

Area averaged mean soil loss (F) (In/Hr) = 0.442
Minimum soil loss rate ((In/Hr)) = 0.221

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.780

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	295.751	56.239	3.911
2 0.500	591.502	37.364	2.598
3 0.750	887.254	6.397	0.445
		Sum = 100.000	Sum= 6.954

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	0.25	0.20	0.041	(0.780) 0.032	0.009
2	0.50	0.30	0.062	(0.771) 0.048	0.014
3	0.75	0.30	0.062	(0.762) 0.048	0.014
4	1.00	0.40	0.083	(0.753) 0.064	0.018
5	1.25	0.30	0.062	(0.744) 0.048	0.014
6	1.50	0.30	0.062	(0.736) 0.048	0.014
7	1.75	0.30	0.062	(0.727) 0.048	0.014
8	2.00	0.40	0.083	(0.718) 0.064	0.018
9	2.25	0.40	0.083	(0.709) 0.064	0.018
10	2.50	0.40	0.083	(0.701) 0.064	0.018
11	2.75	0.50	0.103	(0.692) 0.080	0.023
12	3.00	0.50	0.103	(0.684) 0.080	0.023
13	3.25	0.50	0.103	(0.675) 0.080	0.023
14	3.50	0.50	0.103	(0.667) 0.080	0.023
15	3.75	0.50	0.103	(0.658) 0.080	0.023
16	4.00	0.60	0.124	(0.650) 0.097	0.027
17	4.25	0.60	0.124	(0.642) 0.097	0.027
18	4.50	0.70	0.144	(0.634) 0.113	0.032
19	4.75	0.70	0.144	(0.626) 0.113	0.032
20	5.00	0.80	0.165	(0.617) 0.129	0.036
21	5.25	0.60	0.124	(0.609) 0.097	0.027
22	5.50	0.70	0.144	(0.602) 0.113	0.032
23	5.75	0.80	0.165	(0.594) 0.129	0.036
24	6.00	0.80	0.165	(0.586) 0.129	0.036
25	6.25	0.90	0.186	(0.578) 0.145	0.041
26	6.50	0.90	0.186	(0.570) 0.145	0.041
27	6.75	1.00	0.206	(0.563) 0.161	0.045
28	7.00	1.00	0.206	(0.555) 0.161	0.045
29	7.25	1.00	0.206	(0.548) 0.161	0.045
30	7.50	1.10	0.227	(0.540) 0.177	0.050
31	7.75	1.20	0.248	(0.533) 0.193	0.054
32	8.00	1.30	0.268	(0.525) 0.209	0.059
33	8.25	1.50	0.310	(0.518) 0.241	0.068
34	8.50	1.50	0.310	(0.511) 0.241	0.068
35	8.75	1.60	0.330	(0.504) 0.258	0.073
36	9.00	1.70	0.351	(0.497) 0.274	0.077
37	9.25	1.90	0.392	(0.490) 0.306	0.086
38	9.50	2.00	0.413	(0.483) 0.322	0.091
39	9.75	2.10	0.433	(0.476) 0.338	0.095
40	10.00	2.20	0.454	(0.469) 0.354	0.100
41	10.25	1.50	0.310	(0.462) 0.241	0.068
42	10.50	1.50	0.310	(0.455) 0.241	0.068
43	10.75	2.00	0.413	(0.449) 0.322	0.091
44	11.00	2.00	0.413	(0.442) 0.322	0.091
45	11.25	1.90	0.392	(0.436) 0.306	0.086
46	11.50	1.90	0.392	(0.429) 0.306	0.086
47	11.75	1.70	0.351	(0.423) 0.274	0.077
48	12.00	1.80	0.372	(0.417) 0.290	0.082
49	12.25	2.50	0.516	(0.410) 0.402	0.114
50	12.50	2.60	0.537	0.404 (0.419)	0.132
51	12.75	2.80	0.578	0.398 (0.451)	0.180
52	13.00	2.90	0.599	0.392 (0.467)	0.206
53	13.25	3.40	0.702	0.386 (0.547)	0.316
54	13.50	3.40	0.702	0.380 (0.547)	0.321
55	13.75	2.30	0.475	(0.375) 0.370	0.104

56	14.00	2.30	0.475	0.369	(0.370)	0.106
57	14.25	2.70	0.557	0.363	(0.435)	0.194
58	14.50	2.60	0.537	0.358	(0.419)	0.179
59	14.75	2.60	0.537	0.352	(0.419)	0.184
60	15.00	2.50	0.516	0.347	(0.402)	0.169
61	15.25	2.40	0.495	0.342	(0.386)	0.154
62	15.50	2.30	0.475	0.336	(0.370)	0.138
63	15.75	1.90	0.392	(0.331)	0.306	0.086
64	16.00	1.90	0.392	(0.326)	0.306	0.086
65	16.25	0.40	0.083	(0.321)	0.064	0.018
66	16.50	0.40	0.083	(0.316)	0.064	0.018
67	16.75	0.30	0.062	(0.311)	0.048	0.014
68	17.00	0.30	0.062	(0.307)	0.048	0.014
69	17.25	0.50	0.103	(0.302)	0.080	0.023
70	17.50	0.50	0.103	(0.298)	0.080	0.023
71	17.75	0.50	0.103	(0.293)	0.080	0.023
72	18.00	0.40	0.083	(0.289)	0.064	0.018
73	18.25	0.40	0.083	(0.285)	0.064	0.018
74	18.50	0.40	0.083	(0.280)	0.064	0.018
75	18.75	0.30	0.062	(0.276)	0.048	0.014
76	19.00	0.20	0.041	(0.272)	0.032	0.009
77	19.25	0.30	0.062	(0.269)	0.048	0.014
78	19.50	0.40	0.083	(0.265)	0.064	0.018
79	19.75	0.30	0.062	(0.261)	0.048	0.014
80	20.00	0.20	0.041	(0.258)	0.032	0.009
81	20.25	0.30	0.062	(0.254)	0.048	0.014
82	20.50	0.30	0.062	(0.251)	0.048	0.014
83	20.75	0.30	0.062	(0.248)	0.048	0.014
84	21.00	0.20	0.041	(0.245)	0.032	0.009
85	21.25	0.30	0.062	(0.242)	0.048	0.014
86	21.50	0.20	0.041	(0.239)	0.032	0.009
87	21.75	0.30	0.062	(0.237)	0.048	0.014
88	22.00	0.20	0.041	(0.234)	0.032	0.009
89	22.25	0.30	0.062	(0.232)	0.048	0.014
90	22.50	0.20	0.041	(0.230)	0.032	0.009
91	22.75	0.20	0.041	(0.228)	0.032	0.009
92	23.00	0.20	0.041	(0.226)	0.032	0.009
93	23.25	0.20	0.041	(0.224)	0.032	0.009
94	23.50	0.20	0.041	(0.223)	0.032	0.009
95	23.75	0.20	0.041	(0.222)	0.032	0.009
96	24.00	0.20	0.041	(0.221)	0.032	0.009

(Loss Rate Not Used)

Sum = 100.0 Sum = 5.3

Flood volume = Effective rainfall 1.34 (In)
times area 6.9(Ac.)/[(In)/(Ft.)] = 0.8(Ac.Ft)
Total soil loss = 3.82 (In)
Total soil loss = 2.199(Ac.Ft)
Total rainfall = 5.16 (In)
Flood volume = 33467.7 Cubic Feet
Total soil loss = 95773.1 Cubic Feet

Peak flow rate of this hydrograph = 2.170(CFS)

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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 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0007	0.04 Q					
0+30	0.0023	0.08 Q					
0+45	0.0042	0.09 Q					
1+ 0	0.0066	0.11 Q					
1+15	0.0088	0.11 Q					
1+30	0.0108	0.10 Q					
1+45	0.0127	0.09 Q					
2+ 0	0.0151	0.11 Q					
2+15	0.0176	0.12 Q					
2+30	0.0202	0.13 QV					
2+45	0.0232	0.14 QV					
3+ 0	0.0264	0.16 QV					
3+15	0.0297	0.16 QV					
3+30	0.0330	0.16 QV					
3+45	0.0362	0.16 QV					
4+ 0	0.0399	0.18 Q V					
4+15	0.0437	0.19 Q V					

24+15
24+30

0.7682
0.7683

0.03 Q
0.00 Q

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Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD100PROP1100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

PROPOSED CONDITION, DMA D

100-YR 1-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.051 Hr.
Lag time = 3.04 Min.
25% of lag time = 0.76 Min.
40% of lag time = 1.22 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]
6.90	0.49	3.37

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	1.33	9.18

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.489(In)
Area Averaged 100-Year Rainfall = 1.330(In)

Point rain (area averaged) = 1.330(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.330(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.850
Total Area Entered =	6.90(Ac.)	

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.850	0.120	1.000	0.120
					Sum (F) =	0.120

Area averaged mean soil loss (F) (In/Hr) = 0.120
Minimum soil loss rate ((In/Hr)) = 0.060

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.220

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	164.306	36.467
2	0.167	328.612	45.943
3	0.250	492.919	10.415
4	0.333	657.225	4.445
5	0.417	821.531	2.730
		Sum = 100.000	Sum= 6.954

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	4.20	0.670	0.120 (0.147)	0.550
2	0.17	4.30	0.686	0.120 (0.151)	0.566
3	0.25	5.00	0.798	0.120 (0.176)	0.678
4	0.33	5.00	0.798	0.120 (0.176)	0.678
5	0.42	5.80	0.926	0.120 (0.204)	0.806
6	0.50	6.50	1.037	0.120 (0.228)	0.917
7	0.58	7.40	1.181	0.120 (0.260)	1.061
8	0.67	8.60	1.372	0.120 (0.302)	1.252
9	0.75	12.30	1.963	0.120 (0.432)	1.843
10	0.83	29.10	4.644	0.120 (1.022)	4.524
11	0.92	6.80	1.085	0.120 (0.239)	0.965
12	1.00	5.00	0.798	0.120 (0.176)	0.678

(Loss Rate Not Used)

Sum = 100.0 Sum = 14.5

Flood volume = Effective rainfall 1.21 (In)

times area 6.9 (Ac.) / [(In)/(Ft.)] = 0.7 (Ac.Ft)

Total soil loss = 0.12 (In)

Total soil loss = 0.069 (Ac.Ft)

Total rainfall = 1.33 (In)

Flood volume = 30303.8 Cubic Feet

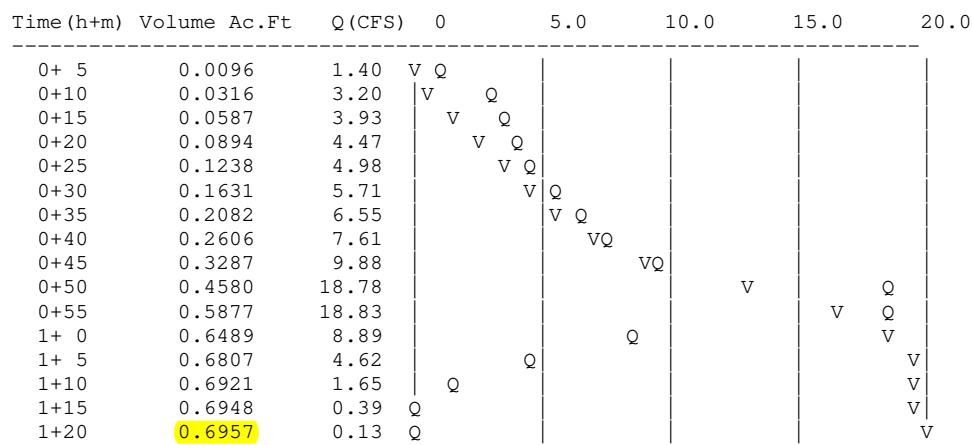
Total soil loss = 3006.6 Cubic Feet

Peak flow rate of this hydrograph = 18.834 (CFS)

+++++ 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))



Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD100PROP3100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

PROPOSED CONDITION, DMA D

100-YR 3-HR DESIGN STORM

BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.051 Hr.
Lag time = 3.04 Min.
25% of lag time = 0.76 Min.
40% of lag time = 1.22 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]
6.90	0.87	5.98

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	2.09	14.42

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.866(In)
Area Averaged 100-Year Rainfall = 2.090(In)

Point rain (area averaged) = 2.090(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.090(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.850
Total Area Entered	=	6.90(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.850	0.120	1.000	0.120
					Sum (F)	= 0.120

Area averaged mean soil loss (F) (In/Hr) = 0.120
Minimum soil loss rate ((In/Hr)) = 0.060

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.220

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	164.306	36.467	2.536
2 0.167	328.612	45.943	3.195
3 0.250	492.919	10.415	0.724
4 0.333	657.225	4.445	0.309
5 0.417	821.531	2.730	0.190
	Sum = 100.000	Sum=	6.954

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	0.326	(0.120) 0.072	0.254
2	0.17	1.30	0.326	(0.120) 0.072	0.254
3	0.25	1.10	0.276	(0.120) 0.061	0.215
4	0.33	1.50	0.376	(0.120) 0.083	0.293
5	0.42	1.50	0.376	(0.120) 0.083	0.293
6	0.50	1.80	0.451	(0.120) 0.099	0.352
7	0.58	1.50	0.376	(0.120) 0.083	0.293
8	0.67	1.80	0.451	(0.120) 0.099	0.352
9	0.75	1.80	0.451	(0.120) 0.099	0.352
10	0.83	1.50	0.376	(0.120) 0.083	0.293
11	0.92	1.60	0.401	(0.120) 0.088	0.313
12	1.00	1.80	0.451	(0.120) 0.099	0.352
13	1.08	2.20	0.552	0.120 (0.121)	0.432
14	1.17	2.20	0.552	0.120 (0.121)	0.432
15	1.25	2.20	0.552	0.120 (0.121)	0.432
16	1.33	2.00	0.502	(0.120) 0.110	0.391
17	1.42	2.60	0.652	0.120 (0.143)	0.532
18	1.50	2.70	0.677	0.120 (0.149)	0.557
19	1.58	2.40	0.602	0.120 (0.132)	0.482
20	1.67	2.70	0.677	0.120 (0.149)	0.557
21	1.75	3.30	0.828	0.120 (0.182)	0.708
22	1.83	3.10	0.777	0.120 (0.171)	0.657
23	1.92	2.90	0.727	0.120 (0.160)	0.607
24	2.00	3.00	0.752	0.120 (0.166)	0.632
25	2.08	3.10	0.777	0.120 (0.171)	0.657
26	2.17	4.20	1.053	0.120 (0.232)	0.933
27	2.25	5.00	1.254	0.120 (0.276)	1.134
28	2.33	3.50	0.878	0.120 (0.193)	0.758
29	2.42	6.80	1.705	0.120 (0.375)	1.585
30	2.50	7.30	1.831	0.120 (0.403)	1.711
31	2.58	8.20	2.056	0.120 (0.452)	1.936
32	2.67	5.90	1.480	0.120 (0.326)	1.360
33	2.75	2.00	0.502	(0.120) 0.110	0.391
34	2.83	1.80	0.451	(0.120) 0.099	0.352
35	2.92	1.80	0.451	(0.120) 0.099	0.352
36	3.00	0.60	0.150	(0.120) 0.033	0.117

(Loss Rate Not Used)

Sum = 100.0 Sum = 21.3

Flood volume = Effective rainfall 1.78 (In)
times area 6.9(Ac.)/[(In)/(Ft.)] = 1.0(Ac.Ft)
Total soil loss = 0.31 (In)
Total soil loss = 0.180 (Ac.Ft)
Total rainfall = 2.09 (In)
Flood volume = 44511.4 Cubic Feet
Total soil loss = 7835.3 Cubic Feet

Peak flow rate of this hydrograph = 11.980 (CFS)

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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	0.0044		0.65	VQ				
0+10	0.0145		1.46	V Q				
0+15	0.0251		1.54	V Q				
0+20	0.0368		1.70	V Q				
0+25	0.0503		1.97	V Q				
0+30	0.0652		2.16	V Q				
0+35	0.0804		2.21	VQ				
0+40	0.0958		2.23	VQ				
0+45	0.1123		2.40	Q				
0+50	0.1280		2.28	QV				
0+55	0.1429		2.15	QV				
1+ 0	0.1586		2.28	Q V				
1+ 5	0.1765		2.61	QV				
1+10	0.1964		2.88	Q V				
1+15	0.2167		2.96	Q V				
1+20	0.2366		2.89	Q V				
1+25	0.2582		3.13	Q V				
1+30	0.2830		3.61	Q V				
1+35	0.3078		3.59	Q V				
1+40	0.3325		3.60	Q V				
1+45	0.3615		4.20	Q V				
1+50	0.3931		4.59	Q V				
1+55	0.4235		4.42	Q V				
2+ 0	0.4534		4.35	Q V				
2+ 5	0.4842		4.47	Q V				
2+10	0.5203		5.24	Q V				
2+15	0.5661		6.65	Q V				
2+20	0.6112		6.55	Q V				
2+25	0.6640		7.68	Q V				
2+30	0.7363		10.49	Q V				
2+35	0.8188		11.98	Q V				
2+40	0.8981		11.51	Q V				
2+45	0.9502		7.57	Q V				
2+50	0.9781		4.05	Q V				
2+55	0.9994		3.09	Q V				
3+ 0	1.0136		2.06	Q V				
3+ 5	1.0192		0.81	Q V				
3+10	1.0210		0.26	Q V				
3+15	1.0217		0.10	Q V				
3+20	1.0218		0.02	Q V				

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD100PROP6100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

PROPOSED CONDITION, DMA D
100-YR 6-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.051 Hr.
Lag time = 3.04 Min.
25% of lag time = 0.76 Min.
40% of lag time = 1.22 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]
6.90	1.21	8.35

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	2.86	19.73

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.210(In)
Area Averaged 100-Year Rainfall = 2.860(In)

Point rain (area averaged) = 2.860(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.860(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.850
Total Area Entered =	6.90(Ac.)	

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.850	0.120	1.000	0.120
					Sum (F) =	0.120

Area averaged mean soil loss (F) (In/Hr) = 0.120
Minimum soil loss rate ((In/Hr)) = 0.060

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.220

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	164.306	36.467	2.536
2 0.167	328.612	45.943	3.195
3 0.250	492.919	10.415	0.724
4 0.333	657.225	4.445	0.309
5 0.417	821.531	2.730	0.190
	Sum = 100.000	Sum=	6.954

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	0.172	(0.120) 0.038	0.134
2	0.17	0.60	0.206	(0.120) 0.045	0.161
3	0.25	0.60	0.206	(0.120) 0.045	0.161
4	0.33	0.60	0.206	(0.120) 0.045	0.161
5	0.42	0.60	0.206	(0.120) 0.045	0.161
6	0.50	0.70	0.240	(0.120) 0.053	0.187
7	0.58	0.70	0.240	(0.120) 0.053	0.187
8	0.67	0.70	0.240	(0.120) 0.053	0.187
9	0.75	0.70	0.240	(0.120) 0.053	0.187
10	0.83	0.70	0.240	(0.120) 0.053	0.187
11	0.92	0.70	0.240	(0.120) 0.053	0.187
12	1.00	0.80	0.275	(0.120) 0.060	0.214
13	1.08	0.80	0.275	(0.120) 0.060	0.214
14	1.17	0.80	0.275	(0.120) 0.060	0.214
15	1.25	0.80	0.275	(0.120) 0.060	0.214
16	1.33	0.80	0.275	(0.120) 0.060	0.214
17	1.42	0.80	0.275	(0.120) 0.060	0.214
18	1.50	0.80	0.275	(0.120) 0.060	0.214
19	1.58	0.80	0.275	(0.120) 0.060	0.214
20	1.67	0.80	0.275	(0.120) 0.060	0.214
21	1.75	0.80	0.275	(0.120) 0.060	0.214
22	1.83	0.80	0.275	(0.120) 0.060	0.214
23	1.92	0.80	0.275	(0.120) 0.060	0.214
24	2.00	0.90	0.309	(0.120) 0.068	0.241
25	2.08	0.80	0.275	(0.120) 0.060	0.214
26	2.17	0.90	0.309	(0.120) 0.068	0.241
27	2.25	0.90	0.309	(0.120) 0.068	0.241
28	2.33	0.90	0.309	(0.120) 0.068	0.241
29	2.42	0.90	0.309	(0.120) 0.068	0.241
30	2.50	0.90	0.309	(0.120) 0.068	0.241
31	2.58	0.90	0.309	(0.120) 0.068	0.241
32	2.67	0.90	0.309	(0.120) 0.068	0.241
33	2.75	1.00	0.343	(0.120) 0.076	0.268
34	2.83	1.00	0.343	(0.120) 0.076	0.268
35	2.92	1.00	0.343	(0.120) 0.076	0.268
36	3.00	1.00	0.343	(0.120) 0.076	0.268
37	3.08	1.00	0.343	(0.120) 0.076	0.268
38	3.17	1.10	0.378	(0.120) 0.083	0.294
39	3.25	1.10	0.378	(0.120) 0.083	0.294
40	3.33	1.10	0.378	(0.120) 0.083	0.294
41	3.42	1.20	0.412	(0.120) 0.091	0.321
42	3.50	1.30	0.446	(0.120) 0.098	0.348
43	3.58	1.40	0.480	(0.120) 0.106	0.375
44	3.67	1.40	0.480	(0.120) 0.106	0.375
45	3.75	1.50	0.515	(0.120) 0.113	0.402
46	3.83	1.50	0.515	(0.120) 0.113	0.402
47	3.92	1.60	0.549	0.120 (0.121)	0.429
48	4.00	1.60	0.549	0.120 (0.121)	0.429
49	4.08	1.70	0.583	0.120 (0.128)	0.463
50	4.17	1.80	0.618	0.120 (0.136)	0.498
51	4.25	1.90	0.652	0.120 (0.143)	0.532
52	4.33	2.00	0.686	0.120 (0.151)	0.566
53	4.42	2.10	0.721	0.120 (0.159)	0.601

54	4.50	2.10	0.721	0.120	(0.159)	0.601
55	4.58	2.20	0.755	0.120	(0.166)	0.635
56	4.67	2.30	0.789	0.120	(0.174)	0.669
57	4.75	2.40	0.824	0.120	(0.181)	0.704
58	4.83	2.40	0.824	0.120	(0.181)	0.704
59	4.92	2.50	0.858	0.120	(0.189)	0.738
60	5.00	2.60	0.892	0.120	(0.196)	0.772
61	5.08	3.10	1.064	0.120	(0.234)	0.944
62	5.17	3.60	1.235	0.120	(0.272)	1.115
63	5.25	3.90	1.338	0.120	(0.294)	1.218
64	5.33	4.20	1.441	0.120	(0.317)	1.321
65	5.42	4.70	1.613	0.120	(0.355)	1.493
66	5.50	5.60	1.922	0.120	(0.423)	1.802
67	5.58	1.90	0.652	0.120	(0.143)	0.532
68	5.67	0.90	0.309	(0.120)	0.068	0.241
69	5.75	0.60	0.206	(0.120)	0.045	0.161
70	5.83	0.50	0.172	(0.120)	0.038	0.134
71	5.92	0.30	0.103	(0.120)	0.023	0.080
72	6.00	0.20	0.069	(0.120)	0.015	0.054

(Loss Rate Not Used)

Sum = 100.0

Sum = 28.5

Flood volume = Effective rainfall 2.37 (In)

times area 6.9(Ac.)/[(In)/(Ft.)] = 1.4 (Ac.Ft)

Total soil loss = 0.49 (In)

Total soil loss = 0.279 (Ac.Ft)

Total rainfall = 2.86 (In)

Flood volume = 59468.7 Cubic Feet

Total soil loss = 12164.1 Cubic Feet

Peak flow rate of this hydrograph = 10.890 (CFS)

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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	0.0023	0.34 Q					
0+10	0.0081	0.84 VQ					
0+15	0.0151	1.02 V Q					
0+20	0.0225	1.08 V Q					
0+25	0.0302	1.11 V Q					
0+30	0.0384	1.19 VQ					
0+35	0.0471	1.27 VQ					
0+40	0.0560	1.29 VQ					
0+45	0.0649	1.30 VQ					
0+50	0.0739	1.30 Q					
0+55	0.0829	1.30 Q					
1+ 0	0.0923	1.37 Q					
1+ 5	0.1024	1.46 Q					
1+10	0.1125	1.48 QV					
1+15	0.1228	1.48 QV					
1+20	0.1330	1.49 QV					
1+25	0.1433	1.49 Q V					
1+30	0.1536	1.49 Q V					
1+35	0.1638	1.49 Q V					
1+40	0.1741	1.49 Q V					
1+45	0.1843	1.49 Q V					
1+50	0.1946	1.49 Q V					
1+55	0.2049	1.49 Q V					
2+ 0	0.2156	1.56 Q V					
2+ 5	0.2264	1.58 Q V					
2+10	0.2373	1.58 Q V					
2+15	0.2487	1.65 Q V					
2+20	0.2602	1.67 Q V					
2+25	0.2717	1.67 Q V					
2+30	0.2832	1.68 Q V					
2+35	0.2948	1.68 Q V					
2+40	0.3063	1.68 Q V					
2+45	0.3183	1.74 Q V					
2+50	0.3309	1.83 Q V					
2+55	0.3437	1.85 Q V					
3+ 0	0.3565	1.86 Q V					
3+ 5	0.3693	1.86 Q V					
3+10	0.3826	1.93 Q V					
3+15	0.3965	2.02 Q V					

3+20	0.4105	2.04	Q	V			
3+25	0.4250	2.11	Q	V			
3+30	0.4407	2.27	Q	V			
3+35	0.4575	2.44	Q	V			
3+40	0.4751	2.56	Q	V			
3+45	0.4934	2.66	Q	V			
3+50	0.5124	2.76	Q	V			
3+55	0.5320	2.85	Q	V			
4+ 0	0.5523	2.95	Q	V			
4+ 5	0.5733	3.06	Q	V			
4+10	0.5958	3.26	Q	V			
4+15	0.6199	3.49	Q	V			
4+20	0.6455	3.72	Q	V			
4+25	0.6728	3.96	Q	V			
4+30	0.7011	4.11	Q	V			
4+35	0.7303	4.24	Q	V			
4+40	0.7610	4.46	Q	V			
4+45	0.7933	4.68	Q	V			
4+50	0.8266	4.83	Q	V			
4+55	0.8607	4.96	Q	V			
5+ 0	0.8963	5.17	Q	V			
5+ 5	0.9359	5.75	Q	V			
5+10	0.9825	6.77	Q	V			
5+15	1.0357	7.72	Q	V			
5+20	1.0942	8.49	Q	V			
5+25	1.1591	9.42	Q	V			
5+30	1.2341	10.89	Q	V			
5+35	1.2949	8.83	Q	V			
5+40	1.3247	4.33	Q	V			
5+45	1.3413	2.40	Q	V			
5+50	1.3518	1.53	Q	V			
5+55	1.3582	0.92	Q	V			
6+ 0	1.3622	0.58	Q	V			
6+ 5	1.3643	0.30	Q	V			
6+10	1.3649	0.09	Q	V			
6+15	1.3651	0.03	Q	V			
6+20	1.3652	0.01	Q	V			

Unit Hydrograph Analyses

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Study date 07/23/19 File: DMAD100PROP24100.out

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

Program License Serial Number 6388

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

English Units used in output format

KPMV PROJECT UNIT HYDROGRAPH ANALYSIS

PROPOSED CONDITION, DMA D
100-YR 24-HR DESIGN STORM
BY PRASAD KASTURI, JULY 2019

Drainage Area = 6.90(Ac.) = 0.011 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.90(Ac.) = 0.011 Sq. Mi.
Length along longest watercourse = 1710.00(Ft.)
Length along longest watercourse measured to centroid = 1043.00(Ft.)
Length along longest watercourse = 0.324 Mi.
Length along longest watercourse measured to centroid = 0.198 Mi.
Difference in elevation = 40.00(Ft.)
Slope along watercourse = 123.5088 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.051 Hr.
Lag time = 3.04 Min.
25% of lag time = 0.76 Min.
40% of lag time = 1.22 Min.
Unit time = 15.00 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]
6.90	2.05	14.15

100 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
6.90	5.16	35.60

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.050(In)
Area Averaged 100-Year Rainfall = 5.160(In)

Point rain (area averaged) = 5.160(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 5.160(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.900	56.00	0.850
Total Area Entered =	6.90(Ac.)	

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
56.0	56.0	0.511	0.850	0.120	1.000	0.120
					Sum (F) =	0.120

Area averaged mean soil loss (F) (In/Hr) = 0.120
Minimum soil loss rate ((In/Hr)) = 0.060

(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.220

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 0.250	492.919	70.567	4.907
2 0.500	985.837	29.433	2.047
		Sum = 100.000	Sum= 6.954

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	0.25	0.20	0.041	(0.212) 0.009	0.032
2	0.50	0.30	0.062	(0.210) 0.014	0.048
3	0.75	0.30	0.062	(0.207) 0.014	0.048
4	1.00	0.40	0.083	(0.205) 0.018	0.064
5	1.25	0.30	0.062	(0.202) 0.014	0.048
6	1.50	0.30	0.062	(0.200) 0.014	0.048
7	1.75	0.30	0.062	(0.197) 0.014	0.048
8	2.00	0.40	0.083	(0.195) 0.018	0.064
9	2.25	0.40	0.083	(0.193) 0.018	0.064
10	2.50	0.40	0.083	(0.190) 0.018	0.064
11	2.75	0.50	0.103	(0.188) 0.023	0.080
12	3.00	0.50	0.103	(0.186) 0.023	0.080
13	3.25	0.50	0.103	(0.183) 0.023	0.080
14	3.50	0.50	0.103	(0.181) 0.023	0.080
15	3.75	0.50	0.103	(0.179) 0.023	0.080
16	4.00	0.60	0.124	(0.177) 0.027	0.097
17	4.25	0.60	0.124	(0.174) 0.027	0.097
18	4.50	0.70	0.144	(0.172) 0.032	0.113
19	4.75	0.70	0.144	(0.170) 0.032	0.113
20	5.00	0.80	0.165	(0.168) 0.036	0.129
21	5.25	0.60	0.124	(0.166) 0.027	0.097
22	5.50	0.70	0.144	(0.163) 0.032	0.113
23	5.75	0.80	0.165	(0.161) 0.036	0.129
24	6.00	0.80	0.165	(0.159) 0.036	0.129
25	6.25	0.90	0.186	(0.157) 0.041	0.145
26	6.50	0.90	0.186	(0.155) 0.041	0.145
27	6.75	1.00	0.206	(0.153) 0.045	0.161
28	7.00	1.00	0.206	(0.151) 0.045	0.161
29	7.25	1.00	0.206	(0.149) 0.045	0.161
30	7.50	1.10	0.227	(0.147) 0.050	0.177
31	7.75	1.20	0.248	(0.145) 0.054	0.193
32	8.00	1.30	0.268	(0.143) 0.059	0.209
33	8.25	1.50	0.310	(0.141) 0.068	0.241
34	8.50	1.50	0.310	(0.139) 0.068	0.241
35	8.75	1.60	0.330	(0.137) 0.073	0.258
36	9.00	1.70	0.351	(0.135) 0.077	0.274
37	9.25	1.90	0.392	(0.133) 0.086	0.306
38	9.50	2.00	0.413	(0.131) 0.091	0.322
39	9.75	2.10	0.433	(0.129) 0.095	0.338
40	10.00	2.20	0.454	(0.127) 0.100	0.354
41	10.25	1.50	0.310	(0.126) 0.068	0.241
42	10.50	1.50	0.310	(0.124) 0.068	0.241
43	10.75	2.00	0.413	(0.122) 0.091	0.322
44	11.00	2.00	0.413	(0.120) 0.091	0.322
45	11.25	1.90	0.392	(0.118) 0.086	0.306
46	11.50	1.90	0.392	(0.117) 0.086	0.306
47	11.75	1.70	0.351	(0.115) 0.077	0.274
48	12.00	1.80	0.372	(0.113) 0.082	0.290
49	12.25	2.50	0.516	0.111 (0.114)	0.405
50	12.50	2.60	0.537	0.110 (0.118)	0.427
51	12.75	2.80	0.578	0.108 (0.127)	0.470
52	13.00	2.90	0.599	0.107 (0.132)	0.492
53	13.25	3.40	0.702	0.105 (0.154)	0.597
54	13.50	3.40	0.702	0.103 (0.154)	0.598
55	13.75	2.30	0.475	0.102 (0.104)	0.373
56	14.00	2.30	0.475	0.100 (0.104)	0.374

57	14.25	2.70	0.557	0.099	(0.123)	0.459
58	14.50	2.60	0.537	0.097	(0.118)	0.439
59	14.75	2.60	0.537	0.096	(0.118)	0.441
60	15.00	2.50	0.516	0.094	(0.114)	0.422
61	15.25	2.40	0.495	0.093	(0.109)	0.403
62	15.50	2.30	0.475	0.091	(0.104)	0.383
63	15.75	1.90	0.392	(0.090)	0.086	0.306
64	16.00	1.90	0.392	(0.089)	0.086	0.306
65	16.25	0.40	0.083	(0.087)	0.018	0.064
66	16.50	0.40	0.083	(0.086)	0.018	0.064
67	16.75	0.30	0.062	(0.085)	0.014	0.048
68	17.00	0.30	0.062	(0.083)	0.014	0.048
69	17.25	0.50	0.103	(0.082)	0.023	0.080
70	17.50	0.50	0.103	(0.081)	0.023	0.080
71	17.75	0.50	0.103	(0.080)	0.023	0.080
72	18.00	0.40	0.083	(0.078)	0.018	0.064
73	18.25	0.40	0.083	(0.077)	0.018	0.064
74	18.50	0.40	0.083	(0.076)	0.018	0.064
75	18.75	0.30	0.062	(0.075)	0.014	0.048
76	19.00	0.20	0.041	(0.074)	0.009	0.032
77	19.25	0.30	0.062	(0.073)	0.014	0.048
78	19.50	0.40	0.083	(0.072)	0.018	0.064
79	19.75	0.30	0.062	(0.071)	0.014	0.048
80	20.00	0.20	0.041	(0.070)	0.009	0.032
81	20.25	0.30	0.062	(0.069)	0.014	0.048
82	20.50	0.30	0.062	(0.068)	0.014	0.048
83	20.75	0.30	0.062	(0.067)	0.014	0.048
84	21.00	0.20	0.041	(0.067)	0.009	0.032
85	21.25	0.30	0.062	(0.066)	0.014	0.048
86	21.50	0.20	0.041	(0.065)	0.009	0.032
87	21.75	0.30	0.062	(0.064)	0.014	0.048
88	22.00	0.20	0.041	(0.064)	0.009	0.032
89	22.25	0.30	0.062	(0.063)	0.014	0.048
90	22.50	0.20	0.041	(0.062)	0.009	0.032
91	22.75	0.20	0.041	(0.062)	0.009	0.032
92	23.00	0.20	0.041	(0.061)	0.009	0.032
93	23.25	0.20	0.041	(0.061)	0.009	0.032
94	23.50	0.20	0.041	(0.061)	0.009	0.032
95	23.75	0.20	0.041	(0.060)	0.009	0.032
96	24.00	0.20	0.041	(0.060)	0.009	0.032

(Loss Rate Not Used)

Sum = 100.0

Sum = 16.4

Flood volume = Effective rainfall 4.09 (In)

times area 6.9 (Ac.) / [(In) / (Ft.)] = 2.4 (Ac.Ft)

Total soil loss = 1.07 (In)

Total soil loss = 0.613 (Ac.Ft)

Total rainfall = 5.16 (In)

Flood volume = 102544.9 Cubic Feet

Total soil loss = 26695.9 Cubic Feet

Peak flow rate of this hydrograph = 4.160 (CFS)

+++++H O U R S T O R M+++++

24 - H O U R S T O R M
Run off Hydrograph

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0033	0.16	Q				
0+30	0.0095	0.30	VQ				
0+45	0.0165	0.34	VQ				
1+ 0	0.0250	0.42	VQ				
1+15	0.0327	0.37	VQ				
1+30	0.0396	0.34	VQ				
1+45	0.0466	0.34	VQ				
2+ 0	0.0551	0.42	VQ				
2+15	0.0644	0.45	Q				
2+30	0.0736	0.45	Q				
2+45	0.0845	0.53	VQ				
3+ 0	0.0961	0.56	VQ				
3+15	0.1077	0.56	VQ				
3+30	0.1192	0.56	Q				
3+45	0.1308	0.56	Q				
4+ 0	0.1440	0.64	Q				
4+15	0.1579	0.67	Q				
4+30	0.1734	0.75	VQ				

4+45	0.1896	0.78	Q					
5+ 0	0.2075	0.86	Q					
5+15	0.2227	0.74	QV					
5+30	0.2382	0.75	QV					
5+45	0.2561	0.86	QV					
6+ 0	0.2746	0.90	QV					
6+15	0.2947	0.98	Q V					
6+30	0.3155	1.01	QV					
6+45	0.3380	1.09	QV					
7+ 0	0.3612	1.12	Q V					
7+15	0.3843	1.12	Q V					
7+30	0.4091	1.20	Q V					
7+45	0.4362	1.31	Q V					
8+ 0	0.4656	1.42	Q V					
8+15	0.4989	1.61	Q V					
8+30	0.5336	1.68	Q V					
8+45	0.5700	1.76	Q V					
9+ 0	0.6086	1.87	Q V					
9+15	0.6512	2.06	Q V					
9+30	0.6968	2.21	Q V					
9+45	0.7448	2.32	Q V					
10+ 0	0.7950	2.43	Q V					
10+15	0.8345	1.91	Q V					
10+30	0.8692	1.68	Q V					
10+45	0.9121	2.08	Q V					
11+ 0	0.9584	2.24	Q V					
11+15	1.0030	2.16	Q V					
11+30	1.0470	2.13	Q V					
11+45	1.0877	1.97	Q V					
12+ 0	1.1287	1.98	Q V					
12+15	1.1819	2.58	Q V					
12+30	1.2424	2.92	Q V					
12+45	1.3081	3.18	Q V					
13+ 0	1.3779	3.38	Q Q					
13+15	1.4592	3.94	Q Q					
13+30	1.5452	4.16	Q Q					
13+45	1.6083	3.06	Q Q					
14+ 0	1.6621	2.60	Q Q					
14+15	1.7244	3.02	Q Q					
14+30	1.7884	3.10	Q Q					
14+45	1.8517	3.06	Q Q					
15+ 0	1.9132	2.97	Q Q					
15+15	1.9719	2.84	Q Q					
15+30	2.0278	2.71	Q Q					
15+45	2.0750	2.29	Q Q					
16+ 0	2.1190	2.13	Q Q					
16+15	2.1385	0.94	Q Q					
16+30	2.1477	0.45	Q Q					
16+45	2.1554	0.37	Q Q					
17+ 0	2.1623	0.34	Q Q					
17+15	2.1725	0.49	Q Q					
17+30	2.1841	0.56	Q Q					
17+45	2.1956	0.56	Q Q					
18+ 0	2.2056	0.48	Q Q					
18+15	2.2148	0.45	Q Q					
18+30	2.2241	0.45	Q Q					
18+45	2.2317	0.37	Q Q					
19+ 0	2.2370	0.26	Q Q					
19+15	2.2433	0.30	Q Q					
19+30	2.2519	0.42	Q Q					
19+45	2.2595	0.37	Q Q					
20+ 0	2.2648	0.26	Q Q					
20+15	2.2711	0.30	Q Q					
20+30	2.2780	0.34	Q Q					
20+45	2.2850	0.34	Q Q					
21+ 0	2.2903	0.26	Q Q					
21+15	2.2965	0.30	Q Q					
21+30	2.3018	0.26	Q Q					
21+45	2.3081	0.30	Q Q					
22+ 0	2.3134	0.26	Q Q					
22+15	2.3197	0.30	Q Q					
22+30	2.3250	0.26	Q Q					
22+45	2.3296	0.22	Q Q					
23+ 0	2.3342	0.22	Q Q					
23+15	2.3389	0.22	Q Q					
23+30	2.3435	0.22	Q Q					
23+45	2.3481	0.22	Q Q					
24+ 0	2.3527	0.22	Q Q					
24+15	2.3541	0.07	Q Q					

APPENDIX C

RCFC&WCD Reference Material

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

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

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

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

Notes:

1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.
2. Quality of cover definitions:

Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.

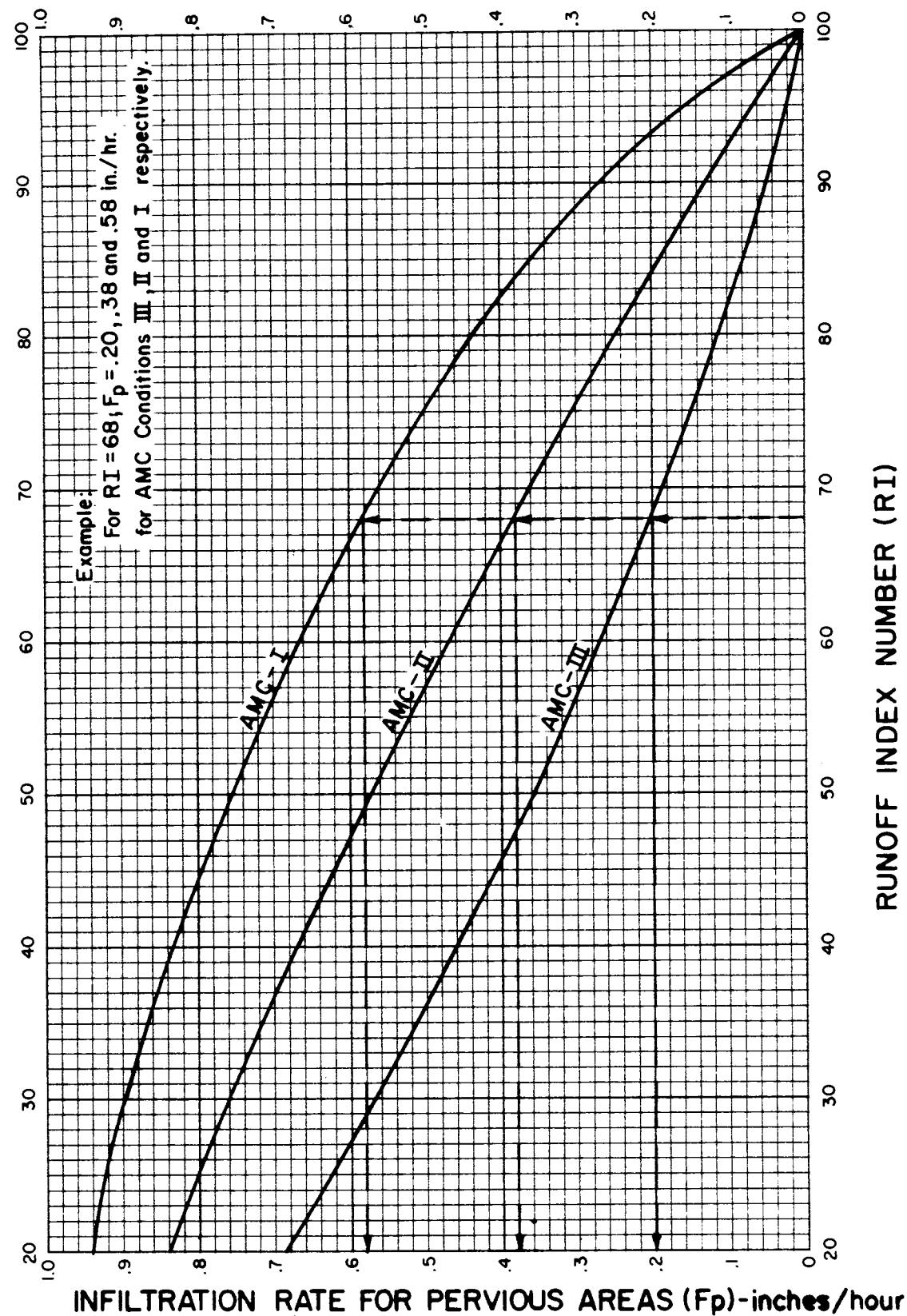
Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.

Good-Heavy or dense cover with more than 75 percent of the ground surface protected.
3. See Plate C-2 for a detailed description of cover types.
4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.
5. Reference Bibliography item 17.

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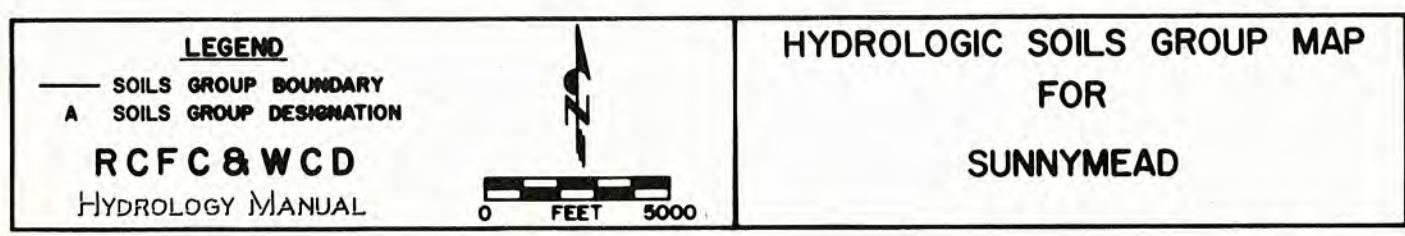
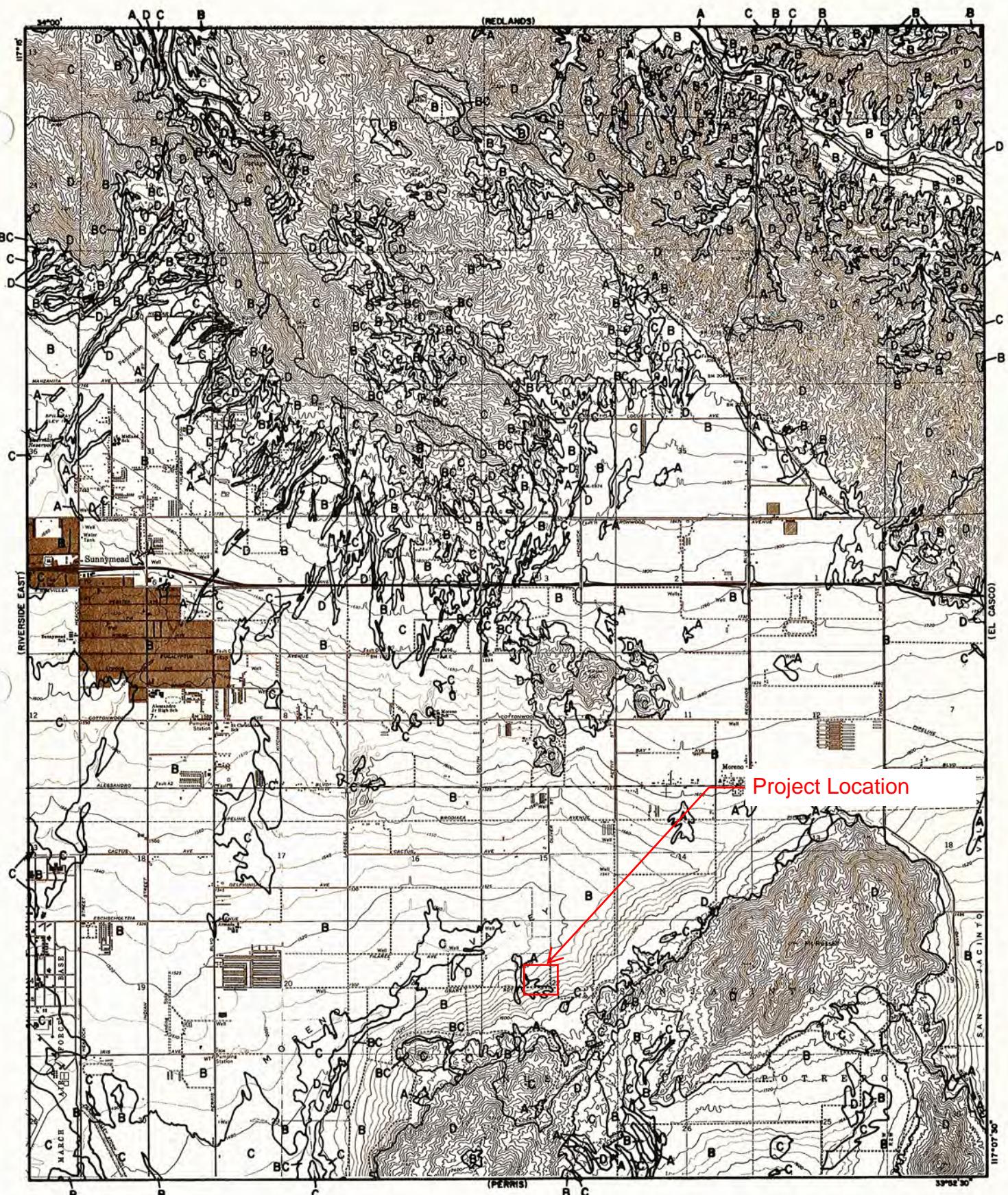
**RUNOFF INDEX NUMBERS
FOR
PERVERIOUS AREAS**

NOTES:
 I. R.I. Number-Infiltration relationships are derived from rainfall-runoff relationships in Bibliography item No. 36.



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INFILTRATION RATE FOR
 PERVIOUS AREAS VERSUS
 RUNOFF INDEX NUMBERS



RAINFALL INTENSITY-INCHES PER HOUR

SUNNYMEAD - MORENO			WOODCREST		
DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY	
	10 YEAR	100 YEAR		10 YEAR	100 YEAR
5	2.84	4.16	5	3.37	5.30
6	2.59	3.79	6	3.05	4.79
7	2.40	3.51	7	2.80	4.40
8	2.25	3.29	8	2.60	4.09
9	2.12	3.10	9	2.44	3.83
10	2.01	2.94	10	2.30	3.62
11	1.92	2.80	11	2.19	3.43
12	1.83	2.68	12	2.08	3.27
13	1.76	2.58	13	1.99	3.13
14	1.70	2.48	14	1.91	3.01
15	1.64	2.40	15	1.84	2.89
16	1.59	2.32	16	1.78	2.79
17	1.54	2.25	17	1.72	2.70
18	1.50	2.19	18	1.67	2.62
19	1.46	2.13	19	1.62	2.54
20	1.42	2.08	20	1.57	2.47
22	1.35	1.98	22	1.49	2.34
24	1.30	1.90	24	1.42	2.23
26	1.25	1.82	26	1.36	2.14
28	1.20	1.76	28	1.31	2.05
30	1.16	1.70	30	1.26	1.98
32	1.12	1.64	32	1.22	1.91
34	1.09	1.59	34	1.18	1.85
36	1.06	1.55	36	1.14	1.79
38	1.03	1.51	38	1.11	1.74
40	1.00	1.47	40	1.07	1.69
45	.95	1.39	45	1.01	1.58
50	.90	1.31	50	.95	1.49
55	.86	1.25	55	.90	1.42
60	.82	1.20	60	.86	1.35
65	.79	1.15	65	.82	1.29
70	.76	1.11	70	.79	1.24
75	.73	1.07	75	.76	1.19
80	.71	1.04	80	.73	1.15
85	.69	1.01	85	.71	1.11

SLOPE = .500

SLOPE = .550

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HYDROLOGY MANUAL

**STANDARD
INTENSITY-DURATION
CURVES DATA**

APPENDIX D

HYDRAULIC CALCULATIONS

PVC/HPDE PIPE DIAMETER (INCH)

12"

18"

24"

30"

40"

WQMP STRUCTURES/PIPS
SIZED PER WQMP REPORT



WEST NODE 101 TO 102

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.27000 ft/ft
Diameter	1.00 ft
Discharge	3.89 ft ³ /s

Results

Normal Depth	0.31	ft
Flow Area	0.21	ft ²
Wetted Perimeter	1.18	ft
Hydraulic Radius	0.18	ft
Top Width	0.93	ft
Critical Depth	0.84	ft
Percent Full	31.1	%
Critical Slope	0.01148	ft/ft
Velocity	18.66	ft/s
Velocity Head	5.41	ft
Specific Energy	5.72	ft
Froude Number	6.93	
Maximum Discharge	19.91	ft ³ /s
Discharge Full	18.51	ft ³ /s
Slope Full	0.01192	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	31.11	%
Downstream Velocity	Infinity	ft/s

WEST NODE 101 TO 102

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.31	ft
Critical Depth	0.84	ft
Channel Slope	0.27000	ft/ft
Critical Slope	0.01148	ft/ft

WEST NODE 104 TO 102

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.04000 ft/ft
Diameter	1.00 ft
Discharge	2.71 ft ³ /s

Results

Normal Depth	0.43	ft
Flow Area	0.32	ft ²
Wetted Perimeter	1.43	ft
Hydraulic Radius	0.22	ft
Top Width	0.99	ft
Critical Depth	0.71	ft
Percent Full	42.7	%
Critical Slope	0.00808	ft/ft
Velocity	8.46	ft/s
Velocity Head	1.11	ft
Specific Energy	1.54	ft
Froude Number	2.62	
Maximum Discharge	7.66	ft ³ /s
Discharge Full	7.13	ft ³ /s
Slope Full	0.00579	ft/ft
Flow Type	SuperCritical	

GVF Input Data

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	42.75	%
Downstream Velocity	Infinity	ft/s

WEST NODE 104 TO 102

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.43	ft
Critical Depth	0.71	ft
Channel Slope	0.04000	ft/ft
Critical Slope	0.00808	ft/ft

WEST NODE 102 TO 105

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.00570 ft/ft
Diameter	2.00 ft
Discharge	9.70 ft ³ /s

Results

Normal Depth	1.08 ft
Flow Area	1.73 ft ²
Wetted Perimeter	3.30 ft
Hydraulic Radius	0.52 ft
Top Width	1.99 ft
Critical Depth	1.11 ft
Percent Full	54.0 %
Critical Slope	0.00515 ft/ft
Velocity	5.61 ft/s
Velocity Head	0.49 ft
Specific Energy	1.57 ft
Froude Number	1.06
Maximum Discharge	18.37 ft ³ /s
Discharge Full	17.08 ft ³ /s
Slope Full	0.00184 ft/ft
Flow Type	SuperCritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	53.96 %
Downstream Velocity	Infinity ft/s

WEST NODE 102 TO 105

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.08	ft
Critical Depth	1.11	ft
Channel Slope	0.00570	ft/ft
Critical Slope	0.00515	ft/ft

WEST NODE 105 TO 106

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.03100 ft/ft
Diameter	1.50 ft
Discharge	11.49 ft ³ /s

Results

Normal Depth	0.86 ft
Flow Area	1.04 ft ²
Wetted Perimeter	2.57 ft
Hydraulic Radius	0.41 ft
Top Width	1.48 ft
Critical Depth	1.29 ft
Percent Full	57.1 %
Critical Slope	0.01105 ft/ft
Velocity	11.03 ft/s
Velocity Head	1.89 ft
Specific Energy	2.75 ft
Froude Number	2.32
Maximum Discharge	19.89 ft ³ /s
Discharge Full	18.49 ft ³ /s
Slope Full	0.01197 ft/ft
Flow Type	SuperCritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	57.06 %
Downstream Velocity	Infinity ft/s

WEST NODE 105 TO 106

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.86	ft
Critical Depth	1.29	ft
Channel Slope	0.03100	ft/ft
Critical Slope	0.01105	ft/ft

WEST NODE 201 TO 106

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.06300 ft/ft
Diameter	1.00 ft
Discharge	5.82 ft ³ /s

Results

Normal Depth	0.59	ft
Flow Area	0.48	ft ²
Wetted Perimeter	1.75	ft
Hydraulic Radius	0.27	ft
Top Width	0.98	ft
Critical Depth	0.95	ft
Percent Full	58.8	%
Critical Slope	0.02312	ft/ft
Velocity	12.12	ft/s
Velocity Head	2.28	ft
Specific Energy	2.87	ft
Froude Number	3.06	
Maximum Discharge	9.62	ft ³ /s
Discharge Full	8.94	ft ³ /s
Slope Full	0.02669	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	58.78	%
Downstream Velocity	Infinity	ft/s

WEST NODE 201 TO 106

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.59	ft
Critical Depth	0.95	ft
Channel Slope	0.06300	ft/ft
Critical Slope	0.02312	ft/ft

WEST NODE 301 TO 106

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.03200 ft/ft
Diameter	1.00 ft
Discharge	0.76 ft ³ /s

Results

Normal Depth	0.23 ft
Flow Area	0.14 ft ²
Wetted Perimeter	1.01 ft
Hydraulic Radius	0.14 ft
Top Width	0.85 ft
Critical Depth	0.36 ft
Percent Full	23.3 %
Critical Slope	0.00569 ft/ft
Velocity	5.47 ft/s
Velocity Head	0.46 ft
Specific Energy	0.70 ft
Froude Number	2.38
Maximum Discharge	6.86 ft ³ /s
Discharge Full	6.37 ft ³ /s
Slope Full	0.00046 ft/ft
Flow Type	SuperCritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	23.31 %
Downstream Velocity	Infinity ft/s

WEST NODE 301 TO 106

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.23	ft
Critical Depth	0.36	ft
Channel Slope	0.03200	ft/ft
Critical Slope	0.00569	ft/ft

WEST NODE 106 TO 107

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.01100 ft/ft
Diameter	2.00 ft
Discharge	20.33 ft ³ /s

Results

Normal Depth	1.43 ft
Flow Area	2.40 ft ²
Wetted Perimeter	4.02 ft
Hydraulic Radius	0.60 ft
Top Width	1.81 ft
Critical Depth	1.62 ft
Percent Full	71.3 %
Critical Slope	0.00827 ft/ft
Velocity	8.49 ft/s
Velocity Head	1.12 ft
Specific Energy	2.54 ft
Froude Number	1.30
Maximum Discharge	25.52 ft ³ /s
Discharge Full	23.73 ft ³ /s
Slope Full	0.00808 ft/ft
Flow Type	SuperCritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	71.27 %
Downstream Velocity	Infinity ft/s

WEST NODE 106 TO 107

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.43	ft
Critical Depth	1.62	ft
Channel Slope	0.01100	ft/ft
Critical Slope	0.00827	ft/ft

WEST NODE 107 TO 108

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.04400 ft/ft
Diameter	2.00 ft
Discharge	22.26 ft ³ /s

Results

Normal Depth	0.96 ft
Flow Area	1.50 ft ²
Wetted Perimeter	3.07 ft
Hydraulic Radius	0.49 ft
Top Width	2.00 ft
Critical Depth	1.68 ft
Percent Full	48.2 %
Critical Slope	0.00926 ft/ft
Velocity	14.86 ft/s
Velocity Head	3.43 ft
Specific Energy	4.39 ft
Froude Number	3.03
Maximum Discharge	51.04 ft ³ /s
Discharge Full	47.45 ft ³ /s
Slope Full	0.00968 ft/ft
Flow Type	SuperCritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	48.18 %
Downstream Velocity	Infinity ft/s

WEST NODE 107 TO 108

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.96	ft
Critical Depth	1.68	ft
Channel Slope	0.04400	ft/ft
Critical Slope	0.00926	ft/ft

WEST NODE 401 TO 402

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.01500 ft/ft
Diameter	1.00 ft
Discharge	1.03 ft ³ /s

Results

Normal Depth	0.33 ft
Flow Area	0.23 ft ²
Wetted Perimeter	1.23 ft
Hydraulic Radius	0.18 ft
Top Width	0.94 ft
Critical Depth	0.43 ft
Percent Full	33.1 %
Critical Slope	0.00583 ft/ft
Velocity	4.55 ft/s
Velocity Head	0.32 ft
Specific Energy	0.65 ft
Froude Number	1.63
Maximum Discharge	4.69 ft ³ /s
Discharge Full	4.36 ft ³ /s
Slope Full	0.00084 ft/ft
Flow Type	SuperCritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	33.05 %
Downstream Velocity	Infinity ft/s

WEST NODE 401 TO 402

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.33	ft
Critical Depth	0.43	ft
Channel Slope	0.01500	ft/ft
Critical Slope	0.00583	ft/ft

WEST NODE 402 TO 403

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.00600 ft/ft
Diameter	1.50 ft
Discharge	4.96 ft ³ /s

Results

Normal Depth	0.85	ft
Flow Area	1.03	ft ²
Wetted Perimeter	2.55	ft
Hydraulic Radius	0.40	ft
Top Width	1.49	ft
Critical Depth	0.86	ft
Percent Full	56.4	%
Critical Slope	0.00576	ft/ft
Velocity	4.83	ft/s
Velocity Head	0.36	ft
Specific Energy	1.21	ft
Froude Number	1.02	
Maximum Discharge	8.75	ft ³ /s
Discharge Full	8.14	ft ³ /s
Slope Full	0.00223	ft/ft
Flow Type	SuperCritical	

GVF Input Data

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	56.39	%
Downstream Velocity	Infinity	ft/s

WEST NODE 402 TO 403

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.85	ft
Critical Depth	0.86	ft
Channel Slope	0.00600	ft/ft
Critical Slope	0.00576	ft/ft

WEST NODE 403 TO 108

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.10000 ft/ft
Diameter	1.50 ft
Discharge	5.76 ft ³ /s

Results

Normal Depth	0.42 ft
Flow Area	0.41 ft ²
Wetted Perimeter	1.68 ft
Hydraulic Radius	0.24 ft
Top Width	1.35 ft
Critical Depth	0.93 ft
Percent Full	28.2 %
Critical Slope	0.00611 ft/ft
Velocity	14.09 ft/s
Velocity Head	3.09 ft
Specific Energy	3.51 ft
Froude Number	4.52
Maximum Discharge	35.73 ft ³ /s
Discharge Full	33.22 ft ³ /s
Slope Full	0.00301 ft/ft
Flow Type	SuperCritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	28.18 %
Downstream Velocity	Infinity ft/s

WEST NODE 403 TO 108

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.42	ft
Critical Depth	0.93	ft
Channel Slope	0.10000	ft/ft
Critical Slope	0.00611	ft/ft

WEST NODE 108 TO 500

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.02900 ft/ft
Diameter	2.00 ft
Discharge	28.01 ft³/s

Results

Normal Depth	1.26 ft
Flow Area	2.09 ft²
Wetted Perimeter	3.68 ft
Hydraulic Radius	0.57 ft
Top Width	1.93 ft
Critical Depth	1.83 ft
Percent Full	63.2 %
Critical Slope	0.01335 ft/ft
Velocity	13.37 ft/s
Velocity Head	2.78 ft
Specific Energy	4.04 ft
Froude Number	2.26
Maximum Discharge	41.44 ft³/s
Discharge Full	38.52 ft³/s
Slope Full	0.01533 ft/ft
Flow Type	SuperCritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	63.24 %
Downstream Velocity	Infinity ft/s

WEST NODE 108 TO 500

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.26	ft
Critical Depth	1.83	ft
Channel Slope	0.02900	ft/ft
Critical Slope	0.01335	ft/ft

EAST NODE 101 TO 102

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.06250 ft/ft
Diameter	1.50 ft
Discharge	10.59 ft ³ /s

Results

Normal Depth	0.66	ft
Flow Area	0.75	ft ²
Wetted Perimeter	2.18	ft
Hydraulic Radius	0.35	ft
Top Width	1.49	ft
Critical Depth	1.25	ft
Percent Full	44.2	%
Critical Slope	0.00988	ft/ft
Velocity	14.06	ft/s
Velocity Head	3.07	ft
Specific Energy	3.73	ft
Froude Number	3.49	
Maximum Discharge	28.25	ft ³ /s
Discharge Full	26.26	ft ³ /s
Slope Full	0.01016	ft/ft
Flow Type	SuperCritical	

GVF Input Data

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	44.19	%
Downstream Velocity	Infinity	ft/s

EAST NODE 101 TO 102

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.66	ft
Critical Depth	1.25	ft
Channel Slope	0.06250	ft/ft
Critical Slope	0.00988	ft/ft

EAST NODE 103 TO 105

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.00690 ft/ft
Diameter	1.00 ft
Discharge	1.35 ft ³ /s

Results

Normal Depth	0.47	ft
Flow Area	0.37	ft ²
Wetted Perimeter	1.52	ft
Hydraulic Radius	0.24	ft
Top Width	1.00	ft
Critical Depth	0.49	ft
Percent Full	47.4	%
Critical Slope	0.00610	ft/ft
Velocity	3.68	ft/s
Velocity Head	0.21	ft
Specific Energy	0.68	ft
Froude Number	1.07	
Maximum Discharge	3.18	ft ³ /s
Discharge Full	2.96	ft ³ /s
Slope Full	0.00144	ft/ft
Flow Type	SuperCritical	

GVF Input Data

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	47.39	%
Downstream Velocity	Infinity	ft/s

EAST NODE 103 TO 105

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.47	ft
Critical Depth	0.49	ft
Channel Slope	0.00690	ft/ft
Critical Slope	0.00610	ft/ft

EAST NODE 105 TO 102

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.00714 ft/ft
Diameter	1.50 ft
Discharge	4.69 ft ³ /s

Results

Normal Depth	0.78 ft
Flow Area	0.92 ft ²
Wetted Perimeter	2.41 ft
Hydraulic Radius	0.38 ft
Top Width	1.50 ft
Critical Depth	0.83 ft
Percent Full	51.7 %
Critical Slope	0.00566 ft/ft
Velocity	5.09 ft/s
Velocity Head	0.40 ft
Specific Energy	1.18 ft
Froude Number	1.15
Maximum Discharge	9.55 ft ³ /s
Discharge Full	8.88 ft ³ /s
Slope Full	0.00199 ft/ft
Flow Type	SuperCritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	51.67 %
Downstream Velocity	Infinity ft/s

EAST NODE 105 TO 102

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.78	ft
Critical Depth	0.83	ft
Channel Slope	0.00714	ft/ft
Critical Slope	0.00566	ft/ft

EAST NODE 102 TO 106

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.15000 ft/ft
Diameter	1.50 ft
Discharge	16.00 ft ³ /s

Results

Normal Depth	0.65	ft
Flow Area	0.74	ft ²
Wetted Perimeter	2.16	ft
Hydraulic Radius	0.34	ft
Top Width	1.49	ft
Critical Depth	1.42	ft
Percent Full	43.6	%
Critical Slope	0.02010	ft/ft
Velocity	21.64	ft/s
Velocity Head	7.27	ft
Specific Energy	7.93	ft
Froude Number	5.41	
Maximum Discharge	43.76	ft ³ /s
Discharge Full	40.68	ft ³ /s
Slope Full	0.02320	ft/ft
Flow Type	SuperCritical	

GVF Input Data

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	43.58	%
Downstream Velocity	Infinity	ft/s

EAST NODE 102 TO 106

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.65	ft
Critical Depth	1.42	ft
Channel Slope	0.15000	ft/ft
Critical Slope	0.02010	ft/ft

EAST NODE 106 TO 107

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.01800 ft/ft
Diameter	2.00 ft
Discharge	16.00 ft³/s

Results

Normal Depth	1.03 ft
Flow Area	1.63 ft²
Wetted Perimeter	3.21 ft
Hydraulic Radius	0.51 ft
Top Width	2.00 ft
Critical Depth	1.44 ft
Percent Full	51.6 %
Critical Slope	0.00661 ft/ft
Velocity	9.79 ft/s
Velocity Head	1.49 ft
Specific Energy	2.52 ft
Froude Number	1.91
Maximum Discharge	32.65 ft³/s
Discharge Full	30.35 ft³/s
Slope Full	0.00500 ft/ft
Flow Type	SuperCritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	51.59 %
Downstream Velocity	Infinity ft/s

EAST NODE 106 TO 107

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.03	ft
Critical Depth	1.44	ft
Channel Slope	0.01800	ft/ft
Critical Slope	0.00661	ft/ft

EAST NODE 108 TO 109

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.01200 ft/ft
Diameter	1.50 ft
Discharge	5.89 ft ³ /s

Results

Normal Depth	0.76 ft
Flow Area	0.90 ft ²
Wetted Perimeter	2.38 ft
Hydraulic Radius	0.38 ft
Top Width	1.50 ft
Critical Depth	0.94 ft
Percent Full	50.7 %
Critical Slope	0.00617 ft/ft
Velocity	6.55 ft/s
Velocity Head	0.67 ft
Specific Energy	1.43 ft
Froude Number	1.49
Maximum Discharge	12.38 ft ³ /s
Discharge Full	11.51 ft ³ /s
Slope Full	0.00314 ft/ft
Flow Type	SuperCritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	50.69 %
Downstream Velocity	Infinity ft/s

EAST NODE 108 TO 109

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.76	ft
Critical Depth	0.94	ft
Channel Slope	0.01200	ft/ft
Critical Slope	0.00617	ft/ft

EAST NODE 109 TO 111

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.02400 ft/ft
Diameter	1.50 ft
Discharge	6.48 ft ³ /s

Results

Normal Depth	0.66 ft
Flow Area	0.75 ft ²
Wetted Perimeter	2.17 ft
Hydraulic Radius	0.34 ft
Top Width	1.49 ft
Critical Depth	0.98 ft
Percent Full	43.9 %
Critical Slope	0.00647 ft/ft
Velocity	8.68 ft/s
Velocity Head	1.17 ft
Specific Energy	1.83 ft
Froude Number	2.16
Maximum Discharge	17.50 ft ³ /s
Discharge Full	16.27 ft ³ /s
Slope Full	0.00381 ft/ft
Flow Type	SuperCritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	43.88 %
Downstream Velocity	Infinity ft/s

EAST NODE 109 TO 111

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.66	ft
Critical Depth	0.98	ft
Channel Slope	0.02400	ft/ft
Critical Slope	0.00647	ft/ft

EAST NODE 110 TO 111

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.01110 ft/ft
Diameter	2.00 ft
Discharge	14.43 ft ³ /s

Results

Normal Depth	1.12 ft
Flow Area	1.82 ft ²
Wetted Perimeter	3.39 ft
Hydraulic Radius	0.54 ft
Top Width	1.98 ft
Critical Depth	1.37 ft
Percent Full	56.1 %
Critical Slope	0.00616 ft/ft
Velocity	7.95 ft/s
Velocity Head	0.98 ft
Specific Energy	2.10 ft
Froude Number	1.46
Maximum Discharge	25.64 ft ³ /s
Discharge Full	23.83 ft ³ /s
Slope Full	0.00407 ft/ft
Flow Type	SuperCritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	56.14 %
Downstream Velocity	Infinity ft/s

EAST NODE 110 TO 111

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.12	ft
Critical Depth	1.37	ft
Channel Slope	0.01110	ft/ft
Critical Slope	0.00616	ft/ft

EAST NODE 111 TO 112

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.01500 ft/ft
Diameter	2.00 ft
Discharge	20.58 ft ³ /s

Results

Normal Depth	1.28	ft
Flow Area	2.13	ft ²
Wetted Perimeter	3.72	ft
Hydraulic Radius	0.57	ft
Top Width	1.92	ft
Critical Depth	1.63	ft
Percent Full	64.2	%
Critical Slope	0.00839	ft/ft
Velocity	9.66	ft/s
Velocity Head	1.45	ft
Specific Energy	2.73	ft
Froude Number	1.62	
Maximum Discharge	29.80	ft ³ /s
Discharge Full	27.71	ft ³ /s
Slope Full	0.00828	ft/ft
Flow Type	SuperCritical	

GVF Input Data

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	64.18	%
Downstream Velocity	Infinity	ft/s

EAST NODE 111 TO 112

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.28	ft
Critical Depth	1.63	ft
Channel Slope	0.01500	ft/ft
Critical Slope	0.00839	ft/ft

EAST NODE 112 TO 117

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.05000 ft/ft
Diameter	2.00 ft
Discharge	20.58 ft ³ /s

Results

Normal Depth	0.89	ft
Flow Area	1.35	ft ²
Wetted Perimeter	2.92	ft
Hydraulic Radius	0.46	ft
Top Width	1.99	ft
Critical Depth	1.63	ft
Percent Full	44.4	%
Critical Slope	0.00839	ft/ft
Velocity	15.27	ft/s
Velocity Head	3.62	ft
Specific Energy	4.51	ft
Froude Number	3.27	
Maximum Discharge	54.41	ft ³ /s
Discharge Full	50.58	ft ³ /s
Slope Full	0.00828	ft/ft
Flow Type	SuperCritical	

GVF Input Data

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	44.41	%
Downstream Velocity	Infinity	ft/s

EAST NODE 112 TO 117

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.89	ft
Critical Depth	1.63	ft
Channel Slope	0.05000	ft/ft
Critical Slope	0.00839	ft/ft

EAST NODE 107 TO 113

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.00940 ft/ft
Diameter	2.50 ft
Discharge	35.50 ft ³ /s

Results

Normal Depth	1.84	ft
Flow Area	3.88	ft ²
Wetted Perimeter	5.16	ft
Hydraulic Radius	0.75	ft
Top Width	2.20	ft
Critical Depth	2.02	ft
Percent Full	73.7	%
Critical Slope	0.00768	ft/ft
Velocity	9.16	ft/s
Velocity Head	1.30	ft
Specific Energy	3.15	ft
Froude Number	1.22	
Maximum Discharge	42.78	ft ³ /s
Discharge Full	39.77	ft ³ /s
Slope Full	0.00749	ft/ft
Flow Type	SuperCritical	

GVF Input Data

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	73.67	%
Downstream Velocity	Infinity	ft/s

EAST NODE 107 TO 113

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.84	ft
Critical Depth	2.02	ft
Channel Slope	0.00940	ft/ft
Critical Slope	0.00768	ft/ft

EAST NODE 201 TO 202

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.01500 ft/ft
Diameter	1.00 ft
Discharge	0.53 ft ³ /s

Results

Normal Depth	0.24	ft
Flow Area	0.14	ft ²
Wetted Perimeter	1.01	ft
Hydraulic Radius	0.14	ft
Top Width	0.85	ft
Critical Depth	0.30	ft
Percent Full	23.5	%
Critical Slope	0.00561	ft/ft
Velocity	3.76	ft/s
Velocity Head	0.22	ft
Specific Energy	0.46	ft
Froude Number	1.63	
Maximum Discharge	4.69	ft ³ /s
Discharge Full	4.36	ft ³ /s
Slope Full	0.00022	ft/ft
Flow Type	SuperCritical	

GVF Input Data

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	23.53	%
Downstream Velocity	Infinity	ft/s

EAST NODE 201 TO 202

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.24	ft
Critical Depth	0.30	ft
Channel Slope	0.01500	ft/ft
Critical Slope	0.00561	ft/ft

EAST NODE 202 TO 203

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.03100 ft/ft
Diameter	1.00 ft
Discharge	3.66 ft ³ /s

Results

Normal Depth	0.55	ft
Flow Area	0.44	ft ²
Wetted Perimeter	1.67	ft
Hydraulic Radius	0.26	ft
Top Width	1.00	ft
Critical Depth	0.82	ft
Percent Full	54.9	%
Critical Slope	0.01064	ft/ft
Velocity	8.29	ft/s
Velocity Head	1.07	ft
Specific Energy	1.62	ft
Froude Number	2.20	
Maximum Discharge	6.75	ft ³ /s
Discharge Full	6.27	ft ³ /s
Slope Full	0.01055	ft/ft
Flow Type	SuperCritical	

GVF Input Data

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	54.87	%
Downstream Velocity	Infinity	ft/s

EAST NODE 202 TO 203

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.55	ft
Critical Depth	0.82	ft
Channel Slope	0.03100	ft/ft
Critical Slope	0.01064	ft/ft

EAST NODE 203 TO 204

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.01700 ft/ft
Diameter	1.50 ft
Discharge	10.11 ft ³ /s

Results

Normal Depth	0.96	ft
Flow Area	1.19	ft ²
Wetted Perimeter	2.78	ft
Hydraulic Radius	0.43	ft
Top Width	1.44	ft
Critical Depth	1.23	ft
Percent Full	63.9	%
Critical Slope	0.00932	ft/ft
Velocity	8.48	ft/s
Velocity Head	1.12	ft
Specific Energy	2.08	ft
Froude Number	1.64	
Maximum Discharge	14.73	ft ³ /s
Discharge Full	13.70	ft ³ /s
Slope Full	0.00926	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth 0.00 ft
Length 0.00 ft
Number Of Steps 0

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	63.90	%
Downstream Velocity	Infinity	ft/s

EAST NODE 203 TO 204

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.96	ft
Critical Depth	1.23	ft
Channel Slope	0.01700	ft/ft
Critical Slope	0.00932	ft/ft

EAST NODE 301 TO 204

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.00590 ft/ft
Diameter	1.50 ft
Discharge	4.08 ft ³ /s

Results

Normal Depth	0.75 ft
Flow Area	0.89 ft ²
Wetted Perimeter	2.37 ft
Hydraulic Radius	0.38 ft
Top Width	1.50 ft
Critical Depth	0.77 ft
Percent Full	50.3 %
Critical Slope	0.00543 ft/ft
Velocity	4.58 ft/s
Velocity Head	0.33 ft
Specific Energy	1.08 ft
Froude Number	1.05
Maximum Discharge	8.68 ft ³ /s
Discharge Full	8.07 ft ³ /s
Slope Full	0.00151 ft/ft
Flow Type	SuperCritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	50.32 %
Downstream Velocity	Infinity ft/s

EAST NODE 301 TO 204

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.75	ft
Critical Depth	0.77	ft
Channel Slope	0.00590	ft/ft
Critical Slope	0.00543	ft/ft

EAST NODE 204 TO 205

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.01100 ft/ft
Diameter	2.00 ft
Discharge	15.62 ft ³ /s

Results

Normal Depth	1.18	ft
Flow Area	1.94	ft ²
Wetted Perimeter	3.51	ft
Hydraulic Radius	0.55	ft
Top Width	1.97	ft
Critical Depth	1.43	ft
Percent Full	59.2	%
Critical Slope	0.00650	ft/ft
Velocity	8.06	ft/s
Velocity Head	1.01	ft
Specific Energy	2.19	ft
Froude Number	1.43	
Maximum Discharge	25.52	ft ³ /s
Discharge Full	23.73	ft ³ /s
Slope Full	0.00477	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth 0.00 ft
Length 0.00 ft
Number Of Steps 0

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	59.22	%
Downstream Velocity	Infinity	ft/s

EAST NODE 204 TO 205

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.18	ft
Critical Depth	1.43	ft
Channel Slope	0.01100	ft/ft
Critical Slope	0.00650	ft/ft

EAST NODE 205 TO 208

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.00770 ft/ft
Diameter	2.00 ft
Discharge	19.55 ft ³ /s

Results

Normal Depth	1.61	ft
Flow Area	2.71	ft ²
Wetted Perimeter	4.46	ft
Hydraulic Radius	0.61	ft
Top Width	1.58	ft
Critical Depth	1.59	ft
Percent Full	80.6	%
Critical Slope	0.00792	ft/ft
Velocity	7.20	ft/s
Velocity Head	0.81	ft
Specific Energy	2.42	ft
Froude Number	0.97	
Maximum Discharge	21.35	ft ³ /s
Discharge Full	19.85	ft ³ /s
Slope Full	0.00747	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	80.63	%
Downstream Velocity	Infinity	ft/s

EAST NODE 205 TO 208

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.61	ft
Critical Depth	1.59	ft
Channel Slope	0.00770	ft/ft
Critical Slope	0.00792	ft/ft

EAST NODE 207 TO 208

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.00560 ft/ft
Diameter	1.00 ft
Discharge	0.79 ft ³ /s

Results

Normal Depth	0.37	ft
Flow Area	0.27	ft ²
Wetted Perimeter	1.31	ft
Hydraulic Radius	0.20	ft
Top Width	0.97	ft
Critical Depth	0.37	ft
Percent Full	37.3	%
Critical Slope	0.00569	ft/ft
Velocity	2.96	ft/s
Velocity Head	0.14	ft
Specific Energy	0.51	ft
Froude Number	0.99	
Maximum Discharge	2.87	ft ³ /s
Discharge Full	2.67	ft ³ /s
Slope Full	0.00049	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	37.30	%
Downstream Velocity	Infinity	ft/s

EAST NODE 207 TO 208

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.37	ft
Critical Depth	0.37	ft
Channel Slope	0.00560	ft/ft
Critical Slope	0.00569	ft/ft

EAST NODE 208 TO 209

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.01000 ft/ft
Diameter	2.50 ft
Discharge	20.26 ft ³ /s

Results

Normal Depth	1.24	ft
Flow Area	2.43	ft ²
Wetted Perimeter	3.91	ft
Hydraulic Radius	0.62	ft
Top Width	2.50	ft
Critical Depth	1.53	ft
Percent Full	49.6	%
Critical Slope	0.00511	ft/ft
Velocity	8.33	ft/s
Velocity Head	1.08	ft
Specific Energy	2.32	ft
Froude Number	1.49	
Maximum Discharge	44.12	ft ³ /s
Discharge Full	41.01	ft ³ /s
Slope Full	0.00244	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth 0.00 ft
Length 0.00 ft
Number Of Steps 0

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	49.65	%
Downstream Velocity	Infinity	ft/s

EAST NODE 208 TO 209

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.24	ft
Critical Depth	1.53	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00511	ft/ft

EAST NODE 209 TO 113

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.01000 ft/ft
Diameter	2.50 ft
Discharge	20.26 ft ³ /s

Results

Normal Depth	1.24	ft
Flow Area	2.43	ft ²
Wetted Perimeter	3.91	ft
Hydraulic Radius	0.62	ft
Top Width	2.50	ft
Critical Depth	1.53	ft
Percent Full	49.6	%
Critical Slope	0.00511	ft/ft
Velocity	8.33	ft/s
Velocity Head	1.08	ft
Specific Energy	2.32	ft
Froude Number	1.49	
Maximum Discharge	44.12	ft ³ /s
Discharge Full	41.01	ft ³ /s
Slope Full	0.00244	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	49.65	%
Downstream Velocity	Infinity	ft/s

EAST NODE 209 TO 113

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.24	ft
Critical Depth	1.53	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00511	ft/ft

EAST NODE 113 TO 400

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.00560 ft/ft
Diameter	3.50 ft
Discharge	54.83 ft ³ /s

Results

Normal Depth	2.22 ft
Flow Area	6.42 ft ²
Wetted Perimeter	6.44 ft
Hydraulic Radius	1.00 ft
Top Width	3.37 ft
Critical Depth	2.32 ft
Percent Full	63.3 %
Critical Slope	0.00492 ft/ft
Velocity	8.54 ft/s
Velocity Head	1.13 ft
Specific Energy	3.35 ft
Froude Number	1.09
Maximum Discharge	80.98 ft ³ /s
Discharge Full	75.29 ft ³ /s
Slope Full	0.00297 ft/ft
Flow Type	SuperCritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	63.32 %
Downstream Velocity	Infinity ft/s

EAST NODE 113 TO 400

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.22	ft
Critical Depth	2.32	ft
Channel Slope	0.00560	ft/ft
Critical Slope	0.00492	ft/ft