

PRELIMINARY HYDROLOGY REPORT

For

**APPLE VALLEY 84
STODDARD WELLS ROAD AT WRANGLER ROAD
APN(s): 0472-211-01, -02, -03, -09, -10, -11, -17, -18, -19, -20, -21, 0469-
162-24, -27, & 0472-301-01
PPTXXXXX**

PROJECT LOCATION

North of Stoddard Wells Road, east of Wrangler Road
Town of Apple Valley, County of San Bernardino, CA

DEVELOPER

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C52921, Exp 12/31/2026

PREPARATION DATE

July 1, 2025

HZ PROJECT NUMBER

R317215.01

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Introduction

This preliminary hydrology report has been prepared for Covington Development Partners, LLC for the proposed industrial warehouse developments located north of Stoddard Wells Road and east of Wrangler Road in the Town of Apple Valley, County of San Bernardino, California. The project involves the development of a single industrial warehouse facility with associated auto and trailer parking. The proposed building is approximately 1,365,000 square feet, situated on approximately 92.7 acres of vacant land. The project also includes the widening of Wrangler Road and Stoddard Wells Road to their ultimate sections and the construction of Johnson Road along the project frontage. It is anticipated that project DP2022-016 will construct the west half of Wrangler Road including installation of water and sewer mains prior to this project being started.

Purpose

The purpose of this report is to 1) estimate the pre-development peak flow rate for the 25-year storm event for the project area; 2) estimate the post-development peak flow rate for the 100-year storm event for each building site; 3) determine the minimum mitigation volume for sizing on-site underground infiltration systems under proposed conditions, ensuring stormwater is released below the existing 25-year flow rate.

Existing Condition

The existing site is undeveloped land located north of Stoddard Wells Road and east of Wrangler Road. The project site slopes from north to south and the desert terrain has numerous significant undulations creating multiple paths for stormwater over the entire site. The highest elevation, located at the northwest corner is approximately 2990 feet mean sea level (MSL). The lowest site elevation, at the southwest corner is approximately 2921 feet MSL. All runoff is tributary to the Bell Mountain Wash on the south side of Stoddard Wells Road. Refer to Appendix A for Existing Condition Hydrology Map which uses the centroid method to calculate the existing Q_{25} .

Proposed Condition

The site will consist of one (1) drainage management area. Runoff will be collected by multiple catch basins located throughout the site and directed to an on-site underground infiltration system located in the southern section of the property. The underground infiltration system has been sized to accommodate the Design Capture Volume and provide peak storm detention. The proposed perimeter drainage channels have been excluded from the drainage boundary. Refer to Appendix A for proposed on-site hydrology map.

The small parking lot north of Johnson Road will be graded to mimic existing drainage patterns and covered with gravel.

Hydrologic Analysis

A hydrologic analysis was conducted following the methodology outlined in the San Bernardino County Flood Control District Hydrology Manual and the County's Basin Policy. The Rational Method analysis was performed for 100-year storm event under the proposed condition (See Appendix B). The Unit Hydrograph Method analysis was completed for the existing 25-year and the proposed 100-year return events using CivilD software (See Appendix C). The 100-year Basin Routing calculations are also included (See Appendix D).

The 100-year (Q100) 1-hour rainfall rate was obtained from the NOAA precipitation estimates, consistent with the isohyetal maps in the County of San Bernardino Hydrology Manual. The hydrologic soils type for the site is type "A" and was taken from NRCS (see Appendix E). For the existing condition, "undeveloped" land use cover was used with an antecedent moisture condition (AMC) of II for the 25-year storm event. For the proposed condition, "commercial" land use was applied with an AMC of II for the 100-year storm event.

Results

Based on the existing and proposed hydrology analyses, the underground infiltration system has been sized for water quality treatment and to mitigate outflow below the existing 25-year storm condition. The maximum allowable flow rate into the proposed public storm drain on Wrangler Road is 90% of the existing 25-year flow rate, which is 147 cfs.

In the proposed condition, through Basin Routing Analysis, the peak 100-year discharge flow (Q100) is 93 cfs. Therefore, the total peak discharge flow is less than 90% of the existing 25-year flow rate. See Appendix D for 100-year Basin Routing Calculations.

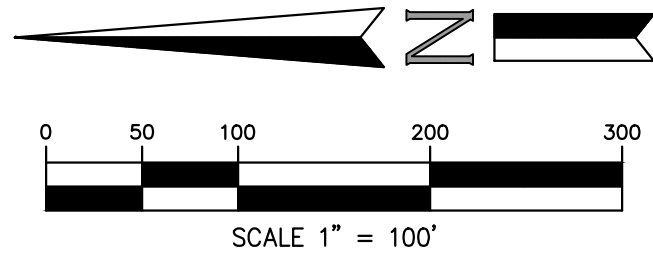
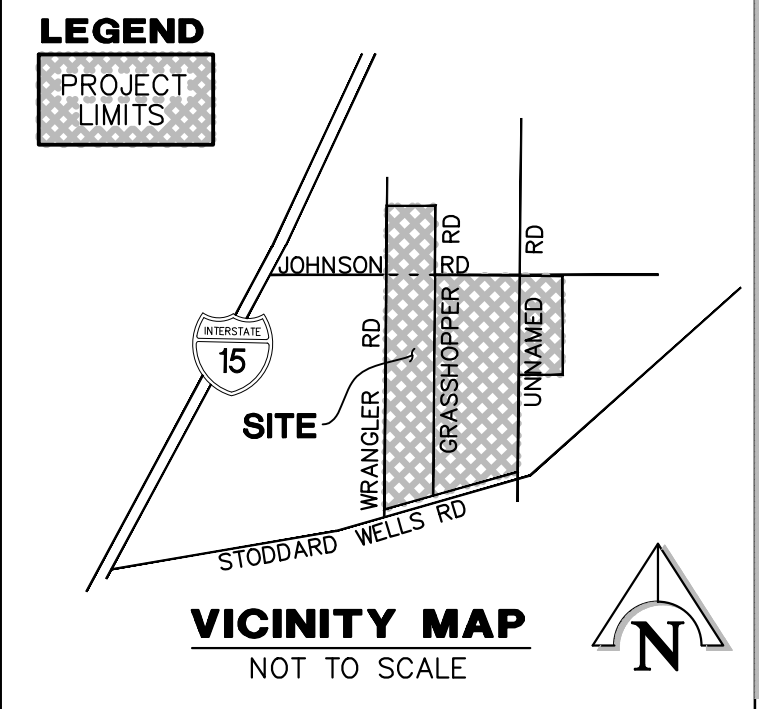
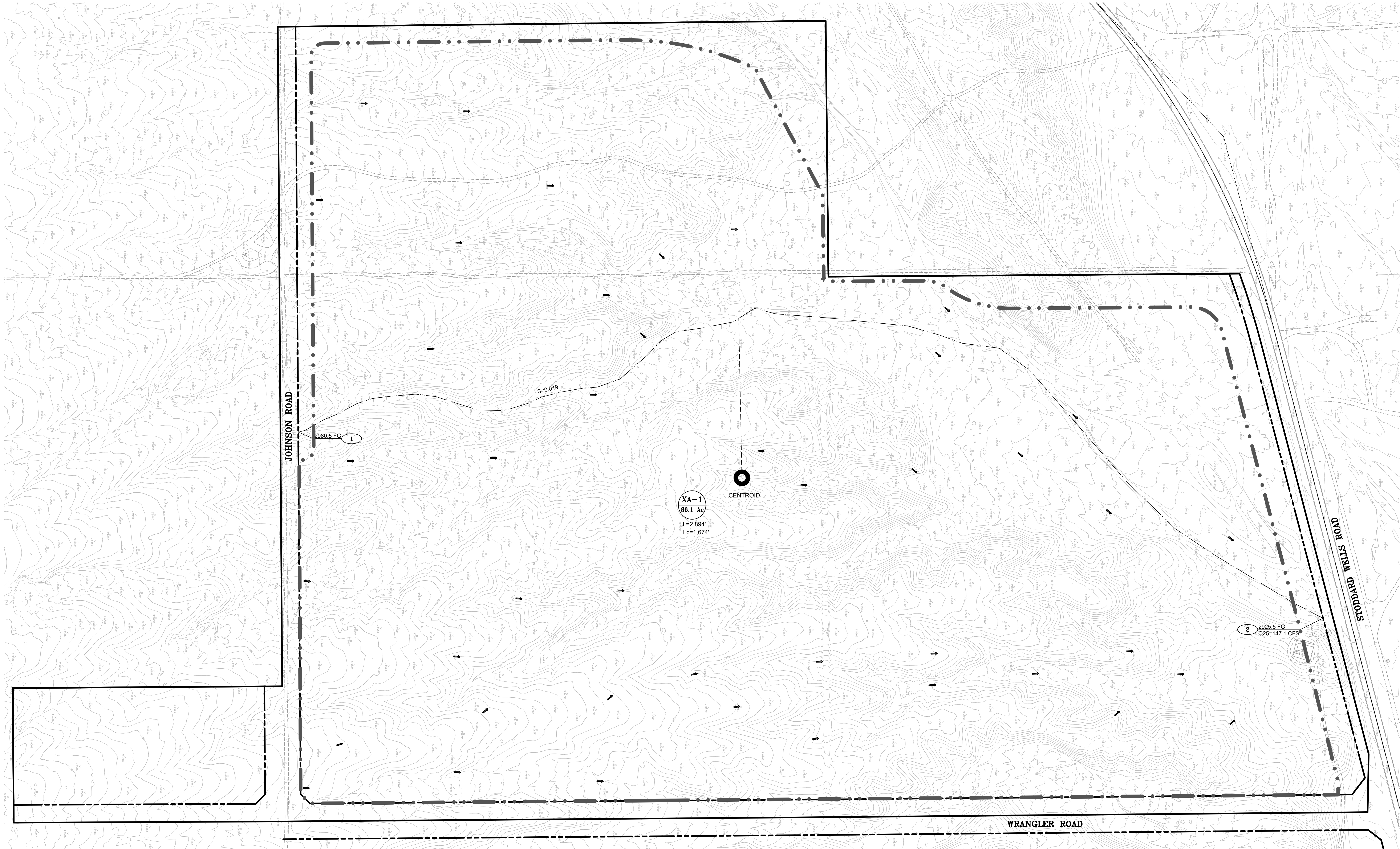
A separate off-site drainage study has been prepared to address the off-site run-on and includes sizing calculations for the proposed culverts along Johnson Road and the proposed drainage channels along the north, east, and south perimeter of the property. The culverts and drainage channels will divert existing flows around and through the project without comingling with the untreated runoff from the proposed development. See Appendix F for the off-site drainage map.

All proposed drainage and storm drain facilities will be appropriately sized for Q100 flow. Additional calculations will be provided in the final report including storm drain hydraulics and catch basin sizing.

Appendix A

Existing Condition Hydrology Map

Proposed Condition Hydrology Map



- LEGEND**
- NO. HYDROLOGY MODEL NODE NUMBER
 - A-1.1 7.40 AC TRIBUTARY AREA IN ACRES
 - L=300' LENGTH OF FLOW
 - DRAINAGE BOUNDARY
 - FLOWLINE
 - FLOW DIRECTION

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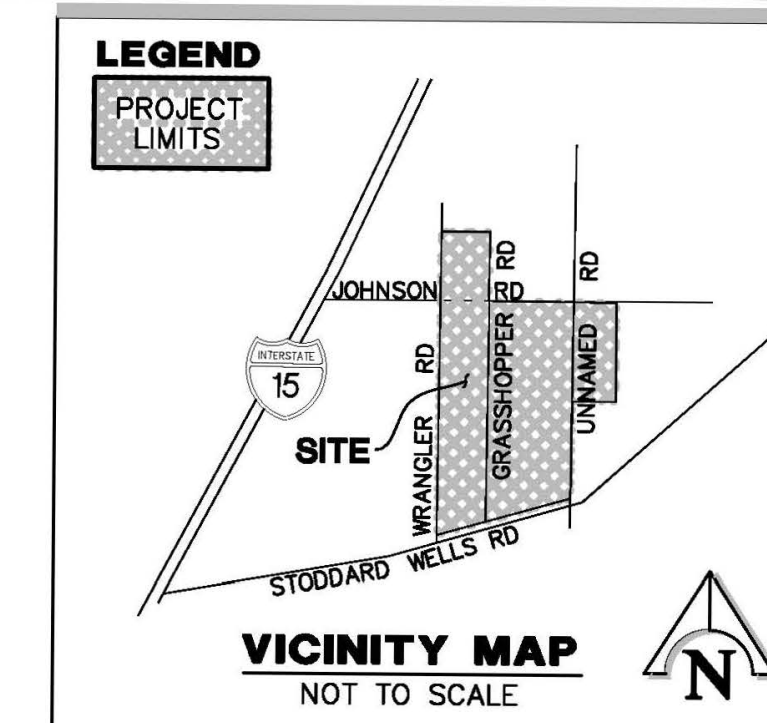
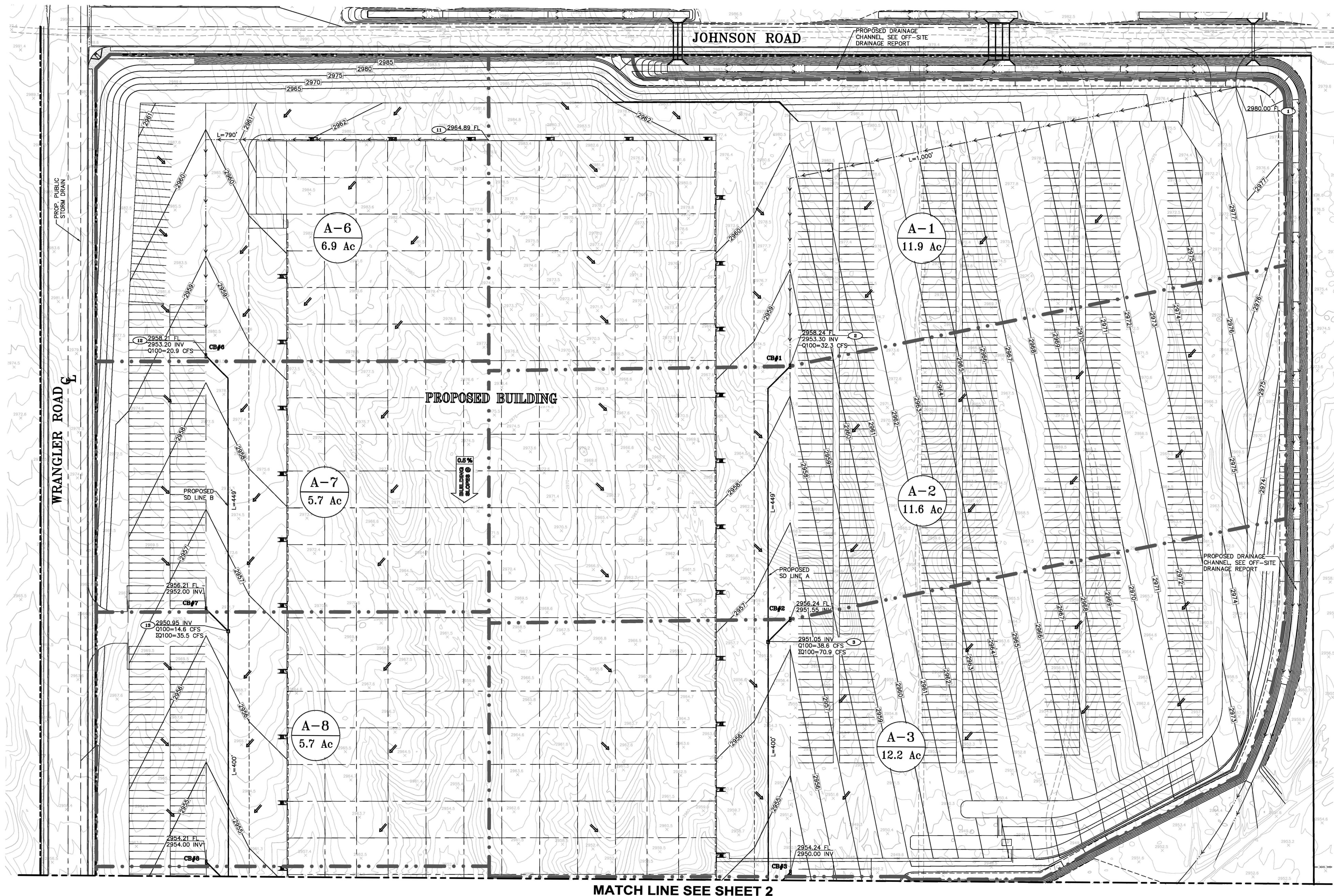
DAVID WHITE 52921 EXP. 12-31-26 DATE

TOWN OF APPLE VALLEY

**PRELIMINARY EXISTING
CONDITION HYDROLOGY MAP
APPLE VALLEY 84
FOR
COVINGTON DEVELOPMENT
PARTNERS, LLC**

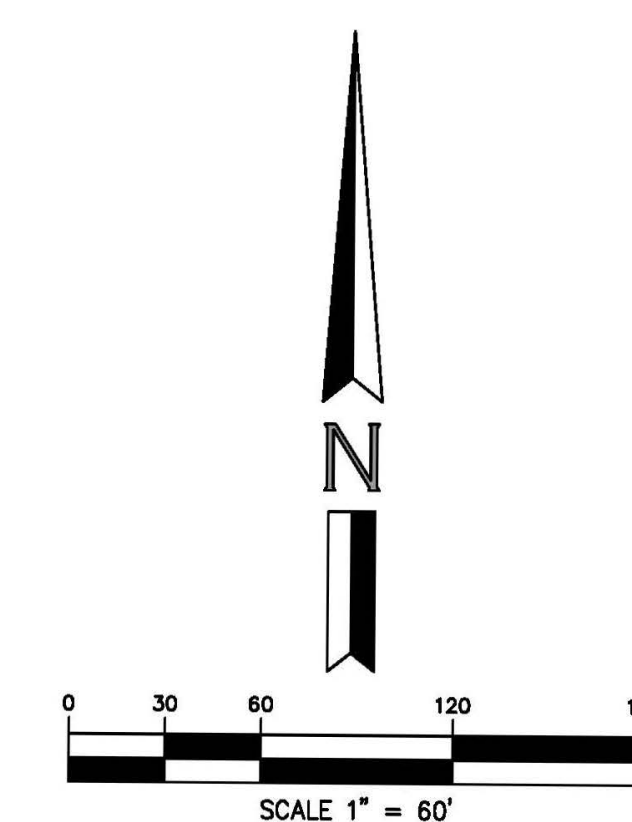
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OF **1** SHEETS

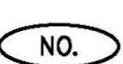
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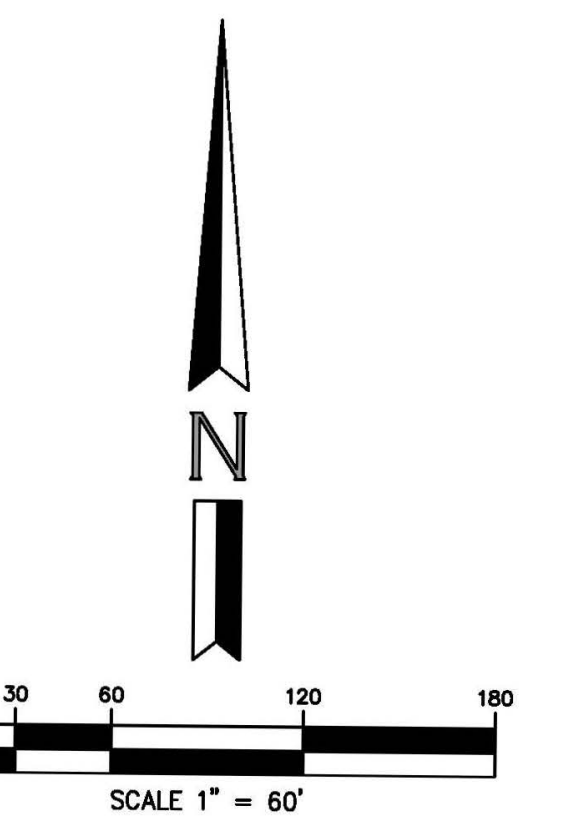
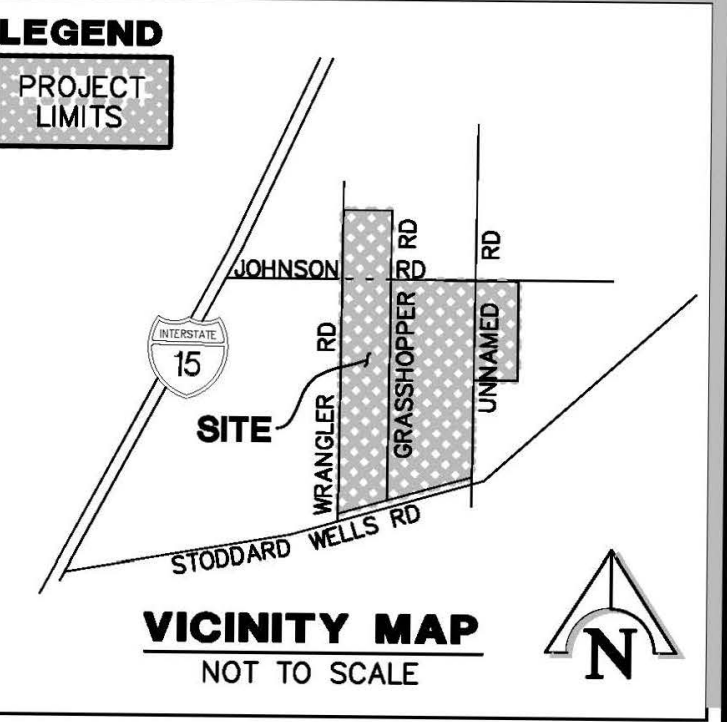


- ## LEGEND
- | | |
|---|-----------------------------|
|  | HYDROLOGY MODEL NODE NUMBER |
|  | TRIBUTARY AREA IN ACRES |
|  | LENGTH OF FLOW |
|  | PROPOSED STORM DRAIN |
|  | DRAINAGE BOUNDARY |
|  | FLOWLINE |
|  | FLOW DIRECTION |

			
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DAVID WHITE	52921	EXP. 12-31-26	D

TOWN OF APPLE VALLEY	
PRELIMINARY DEVELOPED CONDITION HYDROLOGY MAP APPLE VALLEY 84 FOR COVINGTON DEVELOPMENT PARTNERS, LLC	SHEET <u>1</u> OF <u>2</u> SHEETS

MATCH LINE SEE SHEET 1



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- LEGEND**
- (NO.) HYDROLOGY MODEL NODE NUMBER
 - (A-11)
7.40 Ac TRIBUTARY AREA IN ACRES
 - L=300' LENGTH OF FLOW
 - PROPOSED STORM DRAIN
 - DRAINAGE BOUNDARY
 - FLOWLINE
 - ← FLOW DIRECTION

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TOWN OF APPLE VALLEY
**PRELIMINARY
CONDITION HYDROLOGY MAP
APPLE VALLEY 84
FOR
COVINGTON DEVELOPMENT
PARTNERS, LLC**

SHEET **2**
OF **2** SHEETS

Appendix B

100-yr Rational Method Hydrologic Analysis

-Proposed Condition

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 06/26/25

APPLE VALLEY
100 YEAR STORM EVENT - PROPOSED CONDITION
7215Q100NEW2

Program License Serial Number 6530

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.080 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2980.000(Ft.)
Bottom (of initial area) elevation = 2958.300(Ft.)
Difference in elevation = 21.700(Ft.)
Slope = 0.02170 s(%)= 2.17
 $TC = k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 10.365 min.
Rainfall intensity = 3.692(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.876
Subarea runoff = 32.345(CFS)
Total initial stream area = 10.000(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.098(In/Hr)

+++++
Process from Point/Station 2.000 to Point/Station 3.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2953.300(Ft.)
Downstream point/station elevation = 2951.050(Ft.)
Pipe length = 449.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 32.345(CFS)

Nearest computed pipe diameter = 33.00(In.)
Calculated individual pipe flow = 32.345(CFS)
Normal flow depth in pipe = 23.67(In.)
Flow top width inside pipe = 29.72(In.)
Critical Depth = 22.71(In.)
Pipe flow velocity = 7.09(Ft/s)
Travel time through pipe = 1.06 min.
Time of concentration (TC) = 11.42 min.

+++++
Process from Point/Station 3.000 to Point/Station 3.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Time of concentration = 11.42 min.
Rainfall intensity = 3.449(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.874
Subarea runoff = 38.544(CFS) for 13.500(Ac.)
Total runoff = 70.889(CFS)
Effective area this stream = 23.50(Ac.)
Total Study Area (Main Stream No. 1) = 23.50(Ac.)
Area averaged Fm value = 0.098(In/Hr)

+++++
Process from Point/Station 3.000 to Point/Station 4.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2951.050(Ft.)
Downstream point/station elevation = 2949.050(Ft.)
Pipe length = 400.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 70.889(CFS)
Nearest computed pipe diameter = 42.00(In.)
Calculated individual pipe flow = 70.889(CFS)
Normal flow depth in pipe = 34.31(In.)
Flow top width inside pipe = 32.48(In.)
Critical Depth = 31.66(In.)
Pipe flow velocity = 8.43(Ft/s)
Travel time through pipe = 0.79 min.
Time of concentration (TC) = 12.21 min.

+++++
Process from Point/Station 4.000 to Point/Station 4.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Time of concentration = 12.21 min.
Rainfall intensity = 3.292(In/Hr) for a 100.0 year storm

Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.873

Subarea runoff = 31.727(CFS) for 12.200(Ac.)

Total runoff = 102.615(CFS)

Effective area this stream = 35.70(Ac.)

Total Study Area (Main Stream No. 1) = 35.70(Ac.)

Area averaged Fm value = 0.098(In/Hr)

Process from Point/Station 4.000 to Point/Station 5.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2949.050(Ft.)
Downstream point/station elevation = 2945.680(Ft.)
Pipe length = 674.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 102.615(CFS)
Nearest computed pipe diameter = 51.00(In.)
Calculated individual pipe flow = 102.615(CFS)
Normal flow depth in pipe = 36.42(In.)
Flow top width inside pipe = 46.09(In.)
Critical Depth = 36.30(In.)
Pipe flow velocity = 9.46(Ft/s)
Travel time through pipe = 1.19 min.
Time of concentration (TC) = 13.40 min.

Process from Point/Station 5.000 to Point/Station 5.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Time of concentration = 13.40 min.
Rainfall intensity = 3.085(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.871
Subarea runoff = 22.919(CFS) for 11.000(Ac.)
Total runoff = 125.535(CFS)
Effective area this stream = 46.70(Ac.)
Total Study Area (Main Stream No. 1) = 46.70(Ac.)
Area averaged Fm value = 0.098(In/Hr)

Process from Point/Station 5.000 to Point/Station 6.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2945.680(Ft.)
Downstream point/station elevation = 2938.480(Ft.)
Pipe length = 266.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 125.535(CFS)
Nearest computed pipe diameter = 39.00(In.)
Calculated individual pipe flow = 125.535(CFS)
Normal flow depth in pipe = 29.58(In.)
Flow top width inside pipe = 33.39(In.)
Critical depth could not be calculated.
Pipe flow velocity = 18.59(Ft/s)

Travel time through pipe = 0.24 min.
Time of concentration (TC) = 13.64 min.

+++++
Process from Point/Station 6.000 to Point/Station 6.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Time of concentration = 13.64 min.
Rainfall intensity = 3.047(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.871
Subarea runoff = 12.475(CFS) for 5.300(Ac.)
Total runoff = 138.010(CFS)
Effective area this stream = 52.00(Ac.)
Total Study Area (Main Stream No. 1) = 52.00(Ac.)
Area averaged Fm value = 0.098(In/Hr)

+++++
Process from Point/Station 6.000 to Point/Station 7.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2938.480(Ft.)
Downstream point/station elevation = 2925.930(Ft.)
Pipe length = 500.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 138.010(CFS)
Nearest computed pipe diameter = 42.00(In.)
Calculated individual pipe flow = 138.010(CFS)
Normal flow depth in pipe = 30.19(In.)
Flow top width inside pipe = 37.77(In.)
Critical depth could not be calculated.
Pipe flow velocity = 18.65(Ft/s)
Travel time through pipe = 0.45 min.
Time of concentration (TC) = 14.08 min.

+++++
Process from Point/Station 7.000 to Point/Station 7.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 52.000(Ac.)
Runoff from this stream = 138.010(CFS)
Time of concentration = 14.08 min.
Rainfall intensity = 2.979(In/Hr)
Area averaged loss rate (Fm) = 0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2

+++++
Process from Point/Station 11.000 to Point/Station 12.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 32.00
 Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
 Initial subarea data:
 Initial area flow distance = 790.000(Ft.)
 Top (of initial area) elevation = 2964.890(Ft.)
 Bottom (of initial area) elevation = 2958.200(Ft.)
 Difference in elevation = 6.690(Ft.)
 Slope = 0.00847 s(%)= 0.85
 $TC = k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
 Initial area time of concentration = 11.386 min.
 Rainfall intensity = 3.457(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.875
 Subarea runoff = 20.860(CFS)
 Total initial stream area = 6.900(Ac.)
 Pervious area fraction = 0.100
 Initial area Fm value = 0.098(In/Hr)

++++++
 Process from Point/Station 12.000 to Point/Station 13.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2953.200(Ft.)
 Downstream point/station elevation = 2950.950(Ft.)
 Pipe length = 449.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 20.860(CFS)
 Nearest computed pipe diameter = 27.00(In.)
 Calculated individual pipe flow = 20.860(CFS)
 Normal flow depth in pipe = 21.05(In.)
 Flow top width inside pipe = 22.39(In.)
 Critical Depth = 19.17(In.)
 Pipe flow velocity = 6.28(Ft/s)
 Travel time through pipe = 1.19 min.
 Time of concentration (TC) = 12.58 min.

++++++
 Process from Point/Station 13.000 to Point/Station 13.000
 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 32.00
 Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
 Time of concentration = 12.58 min.
 Rainfall intensity = 3.224(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area, (total area with modified
 rational method) (Q=KCIA) is C = 0.873
 Subarea runoff = 14.592(CFS) for 5.700(Ac.)
 Total runoff = 35.451(CFS)
 Effective area this stream = 12.60(Ac.)
 Total Study Area (Main Stream No. 2) = 64.60(Ac.)
 Area averaged Fm value = 0.098(In/Hr)

+++++
Process from Point/Station 13.000 to Point/Station 14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2950.950(Ft.)
Downstream point/station elevation = 2948.950(Ft.)
Pipe length = 400.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 35.451(CFS)
Nearest computed pipe diameter = 33.00(In.)
Calculated individual pipe flow = 35.451(CFS)
Normal flow depth in pipe = 25.64(In.)
Flow top width inside pipe = 27.47(In.)
Critical Depth = 23.80(In.)
Pipe flow velocity = 7.16(Ft/s)
Travel time through pipe = 0.93 min.
Time of concentration (TC) = 13.51 min.

+++++
Process from Point/Station 14.000 to Point/Station 14.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Time of concentration = 13.51 min.
Rainfall intensity = 3.067(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.871
Subarea runoff = 13.450(CFS) for 5.700(Ac.)
Total runoff = 48.901(CFS)
Effective area this stream = 18.30(Ac.)
Total Study Area (Main Stream No. 2) = 70.30(Ac.)
Area averaged Fm value = 0.098(In/Hr)

+++++
Process from Point/Station 14.000 to Point/Station 15.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2948.950(Ft.)
Downstream point/station elevation = 2946.950(Ft.)
Pipe length = 400.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 48.901(CFS)
Nearest computed pipe diameter = 39.00(In.)
Calculated individual pipe flow = 48.901(CFS)
Normal flow depth in pipe = 27.33(In.)
Flow top width inside pipe = 35.72(In.)
Critical Depth = 26.78(In.)
Pipe flow velocity = 7.88(Ft/s)
Travel time through pipe = 0.85 min.
Time of concentration (TC) = 14.35 min.

+++++
Process from Point/Station 15.000 to Point/Station 15.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type

Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Time of concentration = 14.35 min.
Rainfall intensity = 2.939(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.870
Subarea runoff = 12.475(CFS) for 5.700 (Ac.)
Total runoff = 61.376(CFS)
Effective area this stream = 24.00 (Ac.)
Total Study Area (Main Stream No. 2) = 76.00 (Ac.)
Area averaged Fm value = 0.098 (In/Hr)

+++++
Process from Point/Station 15.000 to Point/Station 16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2946.950 (Ft.)
Downstream point/station elevation = 2945.610 (Ft.)
Pipe length = 268.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 61.376 (CFS)
Nearest computed pipe diameter = 42.00 (In.)
Calculated individual pipe flow = 61.376 (CFS)
Normal flow depth in pipe = 30.09 (In.)
Flow top width inside pipe = 37.86 (In.)
Critical Depth = 29.47 (In.)
Pipe flow velocity = 8.32 (Ft/s)
Travel time through pipe = 0.54 min.
Time of concentration (TC) = 14.89 min.

+++++
Process from Point/Station 16.000 to Point/Station 16.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098 (In/Hr)
Time of concentration = 14.89 min.
Rainfall intensity = 2.865 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.869
Subarea runoff = 11.089 (CFS) for 5.100 (Ac.)
Total runoff = 72.464 (CFS)
Effective area this stream = 29.10 (Ac.)
Total Study Area (Main Stream No. 2) = 81.10 (Ac.)
Area averaged Fm value = 0.098 (In/Hr)

+++++
Process from Point/Station 16.000 to Point/Station 17.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2945.610 (Ft.)
Downstream point/station elevation = 2929.150 (Ft.)

Pipe length = 241.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 72.464(CFS)
Nearest computed pipe diameter = 27.00(In.)
Calculated individual pipe flow = 72.464(CFS)
Normal flow depth in pipe = 19.92(In.)
Flow top width inside pipe = 23.75(In.)
Critical depth could not be calculated.
Pipe flow velocity = 23.02(Ft/s)
Travel time through pipe = 0.17 min.
Time of concentration (TC) = 15.07 min.

+++++
Process from Point/Station 17.000 to Point/Station 17.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Time of concentration = 15.07 min.
Rainfall intensity = 2.841(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.869
Subarea runoff = 2.848(CFS) for 1.400(Ac.)
Total runoff = 75.312(CFS)
Effective area this stream = 30.50(Ac.)
Total Study Area (Main Stream No. 2) = 82.50(Ac.)
Area averaged Fm value = 0.098(In/Hr)

+++++
Process from Point/Station 17.000 to Point/Station 7.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2929.150(Ft.)
Downstream point/station elevation = 2926.020(Ft.)
Pipe length = 37.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 75.312(CFS)
Nearest computed pipe diameter = 27.00(In.)
Calculated individual pipe flow = 75.312(CFS)
Normal flow depth in pipe = 18.89(In.)
Flow top width inside pipe = 24.75(In.)
Critical depth could not be calculated.
Pipe flow velocity = 25.37(Ft/s)
Travel time through pipe = 0.02 min.
Time of concentration (TC) = 15.09 min.

+++++
Process from Point/Station 7.000 to Point/Station 7.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)

Time of concentration = 15.09 min.
 Rainfall intensity = 2.838(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.869
 Subarea runoff = 8.544(CFS) for 3.500(Ac.)
 Total runoff = 83.856(CFS)
 Effective area this stream = 34.00(Ac.)
 Total Study Area (Main Stream No. 2) = 86.00(Ac.)
 Area averaged Fm value = 0.098(In/Hr)

++++++
 Process from Point/Station 7.000 to Point/Station 7.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
 Stream flow area = 34.000(Ac.)
 Runoff from this stream = 83.856(CFS)
 Time of concentration = 15.09 min.
 Rainfall intensity = 2.838(In/Hr)
 Area averaged loss rate (Fm) = 0.0978(In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
------------	-----------------	------------	----------	------------	----------------------------

1	138.01	52.000	14.08	0.098	2.979
2	83.86	34.000	15.09	0.098	2.838

Qmax(1) =
 1.000 * 1.000 * 138.010) +
 1.051 * 0.933 * 83.856) + = 220.285
 Qmax(2) =
 0.951 * 1.000 * 138.010) +
 1.000 * 1.000 * 83.856) + = 215.134

Total of 2 main streams to confluence:

Flow rates before confluence point:

139.010 84.856

Maximum flow rates at confluence using above data:

220.285 215.134

Area of streams before confluence:

52.000 34.000

Effective area values after confluence:

83.732 86.000

Results of confluence:

Total flow rate = 220.285(CFS)

Time of concentration = 14.084 min.

Effective stream area after confluence = 83.732(Ac.)

Study area average Pervious fraction(Ap) = 0.100

Study area average soil loss rate(Fm) = 0.098(In/Hr)

Study area total = 86.00(Ac.)

End of computations, Total Study Area = 86.00 (Ac.)

The following figures may

be used for a unit hydrograph study of the same area.

Note: These figures do not consider reduced effective area effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100

Area averaged SCS curve number = 32.0

Appendix C

25-yr Unit Hydrograph Calculations

-Existing Condition

100-yr Unit Hydrograph Calculations

-Proposed Condition

Unit Hydrograph Analysis

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Study date 07/01/25

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6145

APPLE VALLEY

25 YEAR UNIT HYDROGRAPH - EXISTING CONDITION

7215Q25EUH

JH

Storm Event Year = 25

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 25		
86.10	1	0.79

Rainfall data for year 25
86.10 6 1.55

Rainfall data for year 25
86.10 24 2.68

+++++

***** Area-averaged max loss rate, Fm *****

SCS curve No. (AMCII)	SCS curve NO. (AMC 2)	Area (Ac.)	Area Fraction	Fp (Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
91.0	91.0	86.10	1.000	0.174	1.000	0.174

Area-averaged adjusted loss rate Fm (In/Hr) = 0.174

***** Area-Averaged low loss rate fraction, Yb *****

Area	Area	SCS CN	SCS CN	S	Pervious
------	------	--------	--------	---	----------

(Ac.)	Fract	(AMC2)	(AMC2)		Yield Fr
86.10	1.000	91.0	91.0	0.99	0.662

Area-averaged catchment yield fraction, Y = 0.662
Area-averaged low loss fraction, Yb = 0.338
+++++
Watercourse length = 2894.00(Ft.)
Length from concentration point to centroid = 1674.00(Ft.)
Elevation difference along watercourse = 55.00(Ft.)
Mannings friction factor along watercourse = 0.030
Watershed area = 86.10(Ac.)
Catchment Lag time = 0.154 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 54.0227
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.174(In/Hr)
Average low loss rate fraction (Yb) = 0.338 (decimal)
DESERT S-Graph Selected
Computed peak 5-minute rainfall = 0.372(In)
Computed peak 30-minute rainfall = 0.638(In)
Specified peak 1-hour rainfall = 0.785(In)
Computed peak 3-hour rainfall = 1.191(In)
Specified peak 6-hour rainfall = 1.550(In)
Specified peak 24-hour rainfall = 2.680(In)

Rainfall depth area reduction factors:
Using a total area of 86.10(Ac.) (Ref: fig. E-4)

5-minute factor = 0.996	Adjusted rainfall = 0.371(In)
30-minute factor = 0.996	Adjusted rainfall = 0.635(In)
1-hour factor = 0.996	Adjusted rainfall = 0.782(In)
3-hour factor = 0.999	Adjusted rainfall = 1.191(In)
6-hour factor = 1.000	Adjusted rainfall = 1.550(In)
24-hour factor = 1.000	Adjusted rainfall = 2.680(In)

U n i t H y d r o g r a p h
+++++
Interval 'S' Graph Unit Hydrograph
Number Mean values ((CFS))

(K = 1041.27 (CFS))

1	4.545	47.327
2	35.121	318.373
3	63.921	299.887
4	76.294	128.840
5	83.492	74.956
6	88.359	50.670
7	91.605	33.805
8	94.032	25.266
9	95.816	18.575
10	97.124	13.623
11	97.965	8.763
12	98.556	6.148
13	99.203	6.741
14	99.683	4.999
15	100.000	3.299

Peak Unit	Adjusted mass rainfall	Unit rainfall
Number	(In)	(In)
1	0.3710	0.3710

2	0.4567	0.0858
3	0.5158	0.0591
4	0.5623	0.0465
5	0.6012	0.0389
6	0.6350	0.0338
7	0.6651	0.0301
8	0.6923	0.0272
9	0.7172	0.0249
10	0.7402	0.0230
11	0.7617	0.0215
12	0.7818	0.0201
13	0.8062	0.0243
14	0.8294	0.0232
15	0.8516	0.0222
16	0.8729	0.0213
17	0.8934	0.0205
18	0.9131	0.0198
19	0.9322	0.0191
20	0.9507	0.0185
21	0.9687	0.0179
22	0.9861	0.0174
23	1.0030	0.0169
24	1.0195	0.0165
25	1.0355	0.0161
26	1.0512	0.0157
27	1.0665	0.0153
28	1.0815	0.0150
29	1.0961	0.0146
30	1.1104	0.0143
31	1.1245	0.0140
32	1.1382	0.0138
33	1.1517	0.0135
34	1.1649	0.0132
35	1.1779	0.0130
36	1.1907	0.0128
37	1.2032	0.0125
38	1.2154	0.0123
39	1.2275	0.0121
40	1.2394	0.0119
41	1.2511	0.0117
42	1.2626	0.0115
43	1.2739	0.0113
44	1.2851	0.0112
45	1.2961	0.0110
46	1.3070	0.0109
47	1.3177	0.0107
48	1.3283	0.0106
49	1.3387	0.0104
50	1.3491	0.0103
51	1.3592	0.0102
52	1.3693	0.0101
53	1.3793	0.0099
54	1.3891	0.0098
55	1.3988	0.0097
56	1.4084	0.0096
57	1.4179	0.0095
58	1.4273	0.0094
59	1.4366	0.0093
60	1.4458	0.0092
61	1.4550	0.0091
62	1.4640	0.0090
63	1.4729	0.0089
64	1.4817	0.0088

65	1.4905	0.0088
66	1.4992	0.0087
67	1.5078	0.0086
68	1.5163	0.0085
69	1.5247	0.0084
70	1.5331	0.0084
71	1.5414	0.0083
72	1.5496	0.0082
73	1.5581	0.0085
74	1.5664	0.0084
75	1.5748	0.0083
76	1.5830	0.0083
77	1.5912	0.0082
78	1.5994	0.0081
79	1.6074	0.0081
80	1.6155	0.0080
81	1.6234	0.0079
82	1.6313	0.0079
83	1.6391	0.0078
84	1.6469	0.0078
85	1.6546	0.0077
86	1.6623	0.0077
87	1.6699	0.0076
88	1.6774	0.0076
89	1.6849	0.0075
90	1.6924	0.0075
91	1.6998	0.0074
92	1.7072	0.0074
93	1.7145	0.0073
94	1.7217	0.0073
95	1.7289	0.0072
96	1.7361	0.0072
97	1.7432	0.0071
98	1.7503	0.0071
99	1.7573	0.0070
100	1.7643	0.0070
101	1.7713	0.0069
102	1.7782	0.0069
103	1.7851	0.0069
104	1.7919	0.0068
105	1.7987	0.0068
106	1.8054	0.0067
107	1.8121	0.0067
108	1.8188	0.0067
109	1.8254	0.0066
110	1.8320	0.0066
111	1.8386	0.0066
112	1.8451	0.0065
113	1.8516	0.0065
114	1.8581	0.0065
115	1.8645	0.0064
116	1.8709	0.0064
117	1.8773	0.0064
118	1.8836	0.0063
119	1.8899	0.0063
120	1.8961	0.0063
121	1.9024	0.0062
122	1.9085	0.0062
123	1.9147	0.0062
124	1.9208	0.0061
125	1.9270	0.0061
126	1.9330	0.0061
127	1.9391	0.0060

128	1.9451	0.0060
129	1.9511	0.0060
130	1.9570	0.0060
131	1.9630	0.0059
132	1.9689	0.0059
133	1.9748	0.0059
134	1.9806	0.0059
135	1.9864	0.0058
136	1.9922	0.0058
137	1.9980	0.0058
138	2.0038	0.0057
139	2.0095	0.0057
140	2.0152	0.0057
141	2.0209	0.0057
142	2.0265	0.0057
143	2.0321	0.0056
144	2.0378	0.0056
145	2.0433	0.0056
146	2.0489	0.0056
147	2.0544	0.0055
148	2.0599	0.0055
149	2.0654	0.0055
150	2.0709	0.0055
151	2.0763	0.0054
152	2.0818	0.0054
153	2.0872	0.0054
154	2.0925	0.0054
155	2.0979	0.0054
156	2.1032	0.0053
157	2.1085	0.0053
158	2.1138	0.0053
159	2.1191	0.0053
160	2.1244	0.0053
161	2.1296	0.0052
162	2.1348	0.0052
163	2.1400	0.0052
164	2.1452	0.0052
165	2.1504	0.0052
166	2.1555	0.0051
167	2.1606	0.0051
168	2.1657	0.0051
169	2.1708	0.0051
170	2.1759	0.0051
171	2.1809	0.0050
172	2.1859	0.0050
173	2.1910	0.0050
174	2.1960	0.0050
175	2.2009	0.0050
176	2.2059	0.0050
177	2.2108	0.0049
178	2.2158	0.0049
179	2.2207	0.0049
180	2.2256	0.0049
181	2.2304	0.0049
182	2.2353	0.0049
183	2.2401	0.0048
184	2.2450	0.0048
185	2.2498	0.0048
186	2.2546	0.0048
187	2.2594	0.0048
188	2.2641	0.0048
189	2.2689	0.0048
190	2.2736	0.0047

191	2.2783	0.0047
192	2.2830	0.0047
193	2.2877	0.0047
194	2.2924	0.0047
195	2.2971	0.0047
196	2.3017	0.0046
197	2.3064	0.0046
198	2.3110	0.0046
199	2.3156	0.0046
200	2.3202	0.0046
201	2.3247	0.0046
202	2.3293	0.0046
203	2.3339	0.0045
204	2.3384	0.0045
205	2.3429	0.0045
206	2.3474	0.0045
207	2.3519	0.0045
208	2.3564	0.0045
209	2.3609	0.0045
210	2.3653	0.0045
211	2.3698	0.0044
212	2.3742	0.0044
213	2.3786	0.0044
214	2.3830	0.0044
215	2.3874	0.0044
216	2.3918	0.0044
217	2.3962	0.0044
218	2.4005	0.0044
219	2.4049	0.0043
220	2.4092	0.0043
221	2.4135	0.0043
222	2.4178	0.0043
223	2.4221	0.0043
224	2.4264	0.0043
225	2.4307	0.0043
226	2.4350	0.0043
227	2.4392	0.0043
228	2.4434	0.0042
229	2.4477	0.0042
230	2.4519	0.0042
231	2.4561	0.0042
232	2.4603	0.0042
233	2.4645	0.0042
234	2.4686	0.0042
235	2.4728	0.0042
236	2.4770	0.0042
237	2.4811	0.0041
238	2.4852	0.0041
239	2.4894	0.0041
240	2.4935	0.0041
241	2.4976	0.0041
242	2.5017	0.0041
243	2.5057	0.0041
244	2.5098	0.0041
245	2.5139	0.0041
246	2.5179	0.0040
247	2.5220	0.0040
248	2.5260	0.0040
249	2.5300	0.0040
250	2.5340	0.0040
251	2.5380	0.0040
252	2.5420	0.0040
253	2.5460	0.0040

254	2.5500	0.0040
255	2.5539	0.0040
256	2.5579	0.0040
257	2.5618	0.0039
258	2.5657	0.0039
259	2.5697	0.0039
260	2.5736	0.0039
261	2.5775	0.0039
262	2.5814	0.0039
263	2.5853	0.0039
264	2.5892	0.0039
265	2.5930	0.0039
266	2.5969	0.0039
267	2.6007	0.0039
268	2.6046	0.0038
269	2.6084	0.0038
270	2.6122	0.0038
271	2.6161	0.0038
272	2.6199	0.0038
273	2.6237	0.0038
274	2.6275	0.0038
275	2.6313	0.0038
276	2.6350	0.0038
277	2.6388	0.0038
278	2.6426	0.0038
279	2.6463	0.0038
280	2.6501	0.0037
281	2.6538	0.0037
282	2.6575	0.0037
283	2.6612	0.0037
284	2.6649	0.0037
285	2.6686	0.0037
286	2.6723	0.0037
287	2.6760	0.0037
288	2.6797	0.0037

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0037	0.0012	0.0024
2	0.0037	0.0012	0.0024
3	0.0037	0.0013	0.0025
4	0.0037	0.0013	0.0025
5	0.0037	0.0013	0.0025
6	0.0037	0.0013	0.0025
7	0.0038	0.0013	0.0025
8	0.0038	0.0013	0.0025
9	0.0038	0.0013	0.0025
10	0.0038	0.0013	0.0025
11	0.0038	0.0013	0.0025
12	0.0038	0.0013	0.0025
13	0.0038	0.0013	0.0025
14	0.0038	0.0013	0.0025
15	0.0039	0.0013	0.0026
16	0.0039	0.0013	0.0026
17	0.0039	0.0013	0.0026
18	0.0039	0.0013	0.0026
19	0.0039	0.0013	0.0026
20	0.0039	0.0013	0.0026
21	0.0039	0.0013	0.0026
22	0.0039	0.0013	0.0026
23	0.0040	0.0013	0.0026

24	0.0040	0.0013	0.0026
25	0.0040	0.0013	0.0026
26	0.0040	0.0014	0.0026
27	0.0040	0.0014	0.0027
28	0.0040	0.0014	0.0027
29	0.0040	0.0014	0.0027
30	0.0041	0.0014	0.0027
31	0.0041	0.0014	0.0027
32	0.0041	0.0014	0.0027
33	0.0041	0.0014	0.0027
34	0.0041	0.0014	0.0027
35	0.0041	0.0014	0.0027
36	0.0042	0.0014	0.0027
37	0.0042	0.0014	0.0028
38	0.0042	0.0014	0.0028
39	0.0042	0.0014	0.0028
40	0.0042	0.0014	0.0028
41	0.0042	0.0014	0.0028
42	0.0043	0.0014	0.0028
43	0.0043	0.0014	0.0028
44	0.0043	0.0014	0.0028
45	0.0043	0.0015	0.0029
46	0.0043	0.0015	0.0029
47	0.0043	0.0015	0.0029
48	0.0044	0.0015	0.0029
49	0.0044	0.0015	0.0029
50	0.0044	0.0015	0.0029
51	0.0044	0.0015	0.0029
52	0.0044	0.0015	0.0029
53	0.0045	0.0015	0.0030
54	0.0045	0.0015	0.0030
55	0.0045	0.0015	0.0030
56	0.0045	0.0015	0.0030
57	0.0045	0.0015	0.0030
58	0.0045	0.0015	0.0030
59	0.0046	0.0015	0.0030
60	0.0046	0.0016	0.0030
61	0.0046	0.0016	0.0031
62	0.0046	0.0016	0.0031
63	0.0047	0.0016	0.0031
64	0.0047	0.0016	0.0031
65	0.0047	0.0016	0.0031
66	0.0047	0.0016	0.0031
67	0.0048	0.0016	0.0031
68	0.0048	0.0016	0.0032
69	0.0048	0.0016	0.0032
70	0.0048	0.0016	0.0032
71	0.0048	0.0016	0.0032
72	0.0049	0.0016	0.0032
73	0.0049	0.0017	0.0032
74	0.0049	0.0017	0.0033
75	0.0049	0.0017	0.0033
76	0.0050	0.0017	0.0033
77	0.0050	0.0017	0.0033
78	0.0050	0.0017	0.0033
79	0.0050	0.0017	0.0033
80	0.0051	0.0017	0.0034
81	0.0051	0.0017	0.0034
82	0.0051	0.0017	0.0034
83	0.0052	0.0017	0.0034
84	0.0052	0.0017	0.0034
85	0.0052	0.0018	0.0035
86	0.0052	0.0018	0.0035

87	0.0053	0.0018	0.0035
88	0.0053	0.0018	0.0035
89	0.0053	0.0018	0.0035
90	0.0054	0.0018	0.0035
91	0.0054	0.0018	0.0036
92	0.0054	0.0018	0.0036
93	0.0055	0.0018	0.0036
94	0.0055	0.0019	0.0036
95	0.0055	0.0019	0.0037
96	0.0056	0.0019	0.0037
97	0.0056	0.0019	0.0037
98	0.0056	0.0019	0.0037
99	0.0057	0.0019	0.0038
100	0.0057	0.0019	0.0038
101	0.0057	0.0019	0.0038
102	0.0058	0.0020	0.0038
103	0.0058	0.0020	0.0039
104	0.0059	0.0020	0.0039
105	0.0059	0.0020	0.0039
106	0.0059	0.0020	0.0039
107	0.0060	0.0020	0.0040
108	0.0060	0.0020	0.0040
109	0.0061	0.0021	0.0040
110	0.0061	0.0021	0.0040
111	0.0062	0.0021	0.0041
112	0.0062	0.0021	0.0041
113	0.0063	0.0021	0.0041
114	0.0063	0.0021	0.0042
115	0.0064	0.0021	0.0042
116	0.0064	0.0022	0.0042
117	0.0065	0.0022	0.0043
118	0.0065	0.0022	0.0043
119	0.0066	0.0022	0.0043
120	0.0066	0.0022	0.0044
121	0.0067	0.0023	0.0044
122	0.0067	0.0023	0.0044
123	0.0068	0.0023	0.0045
124	0.0068	0.0023	0.0045
125	0.0069	0.0023	0.0046
126	0.0069	0.0023	0.0046
127	0.0070	0.0024	0.0047
128	0.0071	0.0024	0.0047
129	0.0072	0.0024	0.0047
130	0.0072	0.0024	0.0048
131	0.0073	0.0025	0.0048
132	0.0074	0.0025	0.0049
133	0.0075	0.0025	0.0049
134	0.0075	0.0025	0.0050
135	0.0076	0.0026	0.0050
136	0.0077	0.0026	0.0051
137	0.0078	0.0026	0.0051
138	0.0078	0.0026	0.0052
139	0.0079	0.0027	0.0053
140	0.0080	0.0027	0.0053
141	0.0081	0.0027	0.0054
142	0.0082	0.0028	0.0054
143	0.0083	0.0028	0.0055
144	0.0084	0.0028	0.0056
145	0.0082	0.0028	0.0054
146	0.0083	0.0028	0.0055
147	0.0084	0.0028	0.0056
148	0.0085	0.0029	0.0056
149	0.0087	0.0029	0.0057

150	0.0088	0.0030	0.0058
151	0.0089	0.0030	0.0059
152	0.0090	0.0030	0.0060
153	0.0092	0.0031	0.0061
154	0.0093	0.0031	0.0062
155	0.0095	0.0032	0.0063
156	0.0096	0.0032	0.0064
157	0.0098	0.0033	0.0065
158	0.0099	0.0034	0.0066
159	0.0102	0.0034	0.0067
160	0.0103	0.0035	0.0068
161	0.0106	0.0036	0.0070
162	0.0107	0.0036	0.0071
163	0.0110	0.0037	0.0073
164	0.0112	0.0038	0.0074
165	0.0115	0.0039	0.0076
166	0.0117	0.0039	0.0077
167	0.0121	0.0041	0.0080
168	0.0123	0.0041	0.0081
169	0.0128	0.0043	0.0085
170	0.0130	0.0044	0.0086
171	0.0135	0.0046	0.0089
172	0.0138	0.0046	0.0091
173	0.0143	0.0048	0.0095
174	0.0146	0.0049	0.0097
175	0.0153	0.0052	0.0101
176	0.0157	0.0053	0.0104
177	0.0165	0.0056	0.0109
178	0.0169	0.0057	0.0112
179	0.0179	0.0061	0.0119
180	0.0185	0.0062	0.0122
181	0.0198	0.0067	0.0131
182	0.0205	0.0069	0.0136
183	0.0222	0.0075	0.0147
184	0.0232	0.0078	0.0154
185	0.0201	0.0068	0.0133
186	0.0215	0.0073	0.0142
187	0.0249	0.0084	0.0165
188	0.0272	0.0092	0.0180
189	0.0338	0.0114	0.0224
190	0.0389	0.0131	0.0258
191	0.0591	0.0145	0.0446
192	0.0858	0.0145	0.0713
193	0.3710	0.0145	0.3565
194	0.0465	0.0145	0.0320
195	0.0301	0.0102	0.0199
196	0.0230	0.0078	0.0153
197	0.0243	0.0082	0.0161
198	0.0213	0.0072	0.0141
199	0.0191	0.0065	0.0127
200	0.0174	0.0059	0.0115
201	0.0161	0.0054	0.0106
202	0.0150	0.0051	0.0099
203	0.0140	0.0047	0.0093
204	0.0132	0.0045	0.0088
205	0.0125	0.0042	0.0083
206	0.0119	0.0040	0.0079
207	0.0113	0.0038	0.0075
208	0.0109	0.0037	0.0072
209	0.0104	0.0035	0.0069
210	0.0101	0.0034	0.0067
211	0.0097	0.0033	0.0064
212	0.0094	0.0032	0.0062

213	0.0091	0.0031	0.0060
214	0.0088	0.0030	0.0059
215	0.0086	0.0029	0.0057
216	0.0084	0.0028	0.0055
217	0.0085	0.0029	0.0056
218	0.0083	0.0028	0.0055
219	0.0081	0.0027	0.0053
220	0.0079	0.0027	0.0052
221	0.0077	0.0026	0.0051
222	0.0076	0.0026	0.0050
223	0.0074	0.0025	0.0049
224	0.0073	0.0025	0.0048
225	0.0071	0.0024	0.0047
226	0.0070	0.0024	0.0046
227	0.0069	0.0023	0.0045
228	0.0067	0.0023	0.0045
229	0.0066	0.0022	0.0044
230	0.0065	0.0022	0.0043
231	0.0064	0.0022	0.0043
232	0.0063	0.0021	0.0042
233	0.0062	0.0021	0.0041
234	0.0061	0.0021	0.0041
235	0.0060	0.0020	0.0040
236	0.0060	0.0020	0.0039
237	0.0059	0.0020	0.0039
238	0.0058	0.0020	0.0038
239	0.0057	0.0019	0.0038
240	0.0057	0.0019	0.0037
241	0.0056	0.0019	0.0037
242	0.0055	0.0019	0.0036
243	0.0054	0.0018	0.0036
244	0.0054	0.0018	0.0036
245	0.0053	0.0018	0.0035
246	0.0053	0.0018	0.0035
247	0.0052	0.0018	0.0034
248	0.0051	0.0017	0.0034
249	0.0051	0.0017	0.0034
250	0.0050	0.0017	0.0033
251	0.0050	0.0017	0.0033
252	0.0049	0.0017	0.0033
253	0.0049	0.0016	0.0032
254	0.0048	0.0016	0.0032
255	0.0048	0.0016	0.0032
256	0.0047	0.0016	0.0031
257	0.0047	0.0016	0.0031
258	0.0046	0.0016	0.0031
259	0.0046	0.0016	0.0030
260	0.0046	0.0015	0.0030
261	0.0045	0.0015	0.0030
262	0.0045	0.0015	0.0030
263	0.0044	0.0015	0.0029
264	0.0044	0.0015	0.0029
265	0.0044	0.0015	0.0029
266	0.0043	0.0015	0.0029
267	0.0043	0.0015	0.0028
268	0.0043	0.0014	0.0028
269	0.0042	0.0014	0.0028
270	0.0042	0.0014	0.0028
271	0.0042	0.0014	0.0028
272	0.0041	0.0014	0.0027
273	0.0041	0.0014	0.0027
274	0.0041	0.0014	0.0027
275	0.0040	0.0014	0.0027

276	0.0040	0.0014	0.0027
277	0.0040	0.0013	0.0026
278	0.0040	0.0013	0.0026
279	0.0039	0.0013	0.0026
280	0.0039	0.0013	0.0026
281	0.0039	0.0013	0.0026
282	0.0038	0.0013	0.0025
283	0.0038	0.0013	0.0025
284	0.0038	0.0013	0.0025
285	0.0038	0.0013	0.0025
286	0.0037	0.0013	0.0025
287	0.0037	0.0013	0.0025
288	0.0037	0.0012	0.0024

 Total soil rain loss = 0.77(In)
 Total effective rainfall = 1.91(In)
 Peak flow rate in flood hydrograph = 147.10(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0008	0.12	Q					
0+10	0.0069	0.89	Q					
0+15	0.0181	1.62	Q					
0+20	0.0315	1.94	Q					
0+25	0.0462	2.13	Q					
0+30	0.0618	2.26	Q					
0+35	0.0780	2.35	Q					
0+40	0.0947	2.42	Q					
0+45	0.1117	2.47	Q					
0+50	0.1290	2.52	Q					
0+55	0.1466	2.55	Q					
1+ 0	0.1642	2.57	Q					
1+ 5	0.1821	2.59	Q					
1+10	0.2001	2.61	Q					
1+15	0.2182	2.63	Q					
1+20	0.2364	2.64	Q					
1+25	0.2547	2.65	Q					
1+30	0.2730	2.66	Q					
1+35	0.2913	2.67	Q					
1+40	0.3098	2.68	Q					
1+45	0.3283	2.69	Q					
1+50	0.3468	2.70	QV					
1+55	0.3655	2.70	QV					
2+ 0	0.3842	2.71	QV					
2+ 5	0.4029	2.72	QV					
2+10	0.4217	2.73	QV					
2+15	0.4406	2.74	QV					
2+20	0.4596	2.75	QV					
2+25	0.4786	2.76	QV					
2+30	0.4977	2.77	QV					
2+35	0.5169	2.78	QV					
2+40	0.5361	2.79	QV					
2+45	0.5554	2.80	QV					
2+50	0.5748	2.81	QV					
2+55	0.5943	2.82	QV					

3+ 0	0.6138	2.84	QV				
3+ 5	0.6334	2.85	QV				
3+10	0.6531	2.86	QV				
3+15	0.6728	2.87	QV				
3+20	0.6927	2.88	Q V				
3+25	0.7126	2.89	Q V				
3+30	0.7326	2.90	Q V				
3+35	0.7526	2.91	Q V				
3+40	0.7728	2.93	Q V				
3+45	0.7930	2.94	Q V				
3+50	0.8133	2.95	Q V				
3+55	0.8337	2.96	Q V				
4+ 0	0.8542	2.97	Q V				
4+ 5	0.8748	2.99	Q V				
4+10	0.8954	3.00	Q V				
4+15	0.9161	3.01	Q V				
4+20	0.9369	3.02	Q V				
4+25	0.9579	3.04	Q V				
4+30	0.9789	3.05	Q V				
4+35	0.9999	3.06	Q V				
4+40	1.0211	3.08	Q V				
4+45	1.0424	3.09	Q V				
4+50	1.0638	3.10	Q V				
4+55	1.0852	3.12	Q V				
5+ 0	1.1068	3.13	Q V				
5+ 5	1.1284	3.14	Q V				
5+10	1.1502	3.16	Q V				
5+15	1.1720	3.17	Q V				
5+20	1.1940	3.19	Q V				
5+25	1.2160	3.20	Q V				
5+30	1.2382	3.22	Q V				
5+35	1.2604	3.23	Q V				
5+40	1.2828	3.25	Q V				
5+45	1.3053	3.26	Q V				
5+50	1.3278	3.28	Q V				
5+55	1.3505	3.29	Q V				
6+ 0	1.3733	3.31	Q V				
6+ 5	1.3962	3.33	Q V				
6+10	1.4193	3.34	Q V				
6+15	1.4424	3.36	Q V				
6+20	1.4656	3.38	Q V				
6+25	1.4890	3.39	Q V				
6+30	1.5125	3.41	Q V				
6+35	1.5361	3.43	Q V				
6+40	1.5599	3.45	Q V				
6+45	1.5837	3.47	Q V				
6+50	1.6077	3.48	Q V				
6+55	1.6319	3.50	Q V				
7+ 0	1.6561	3.52	Q V				
7+ 5	1.6805	3.54	Q V				
7+10	1.7050	3.56	Q V				
7+15	1.7297	3.58	Q V				
7+20	1.7545	3.60	Q V				
7+25	1.7794	3.62	Q V				
7+30	1.8045	3.64	Q V				
7+35	1.8297	3.66	Q V				
7+40	1.8551	3.68	Q V				
7+45	1.8806	3.71	Q V				
7+50	1.9063	3.73	Q V				
7+55	1.9321	3.75	Q V				
8+ 0	1.9581	3.77	Q V				
8+ 5	1.9842	3.80	Q V				
8+10	2.0105	3.82	Q V				

8+15	2.0370	3.84	Q	V				
8+20	2.0636	3.87	Q	V				
8+25	2.0904	3.89	Q	V				
8+30	2.1174	3.92	Q	V				
8+35	2.1445	3.94	Q	V				
8+40	2.1719	3.97	Q	V				
8+45	2.1994	3.99	Q	V				
8+50	2.2271	4.02	Q	V				
8+55	2.2550	4.05	Q	V				
9+ 0	2.2831	4.08	Q	V				
9+ 5	2.3113	4.11	Q	V				
9+10	2.3398	4.14	Q	V				
9+15	2.3685	4.16	Q	V				
9+20	2.3974	4.19	Q	V				
9+25	2.4265	4.23	Q	V				
9+30	2.4558	4.26	Q	V				
9+35	2.4853	4.29	Q	V				
9+40	2.5151	4.32	Q	V				
9+45	2.5451	4.35	Q	V				
9+50	2.5753	4.39	Q	V				
9+55	2.6058	4.42	Q	V				
10+ 0	2.6365	4.46	Q	V				
10+ 5	2.6674	4.49	Q	V				
10+10	2.6986	4.53	Q	V				
10+15	2.7301	4.57	Q	V				
10+20	2.7618	4.61	Q	V				
10+25	2.7938	4.65	Q	V				
10+30	2.8261	4.69	Q	V				
10+35	2.8587	4.73	Q	V				
10+40	2.8915	4.77	Q	V				
10+45	2.9247	4.81	Q	V				
10+50	2.9582	4.86	Q	V				
10+55	2.9919	4.90	Q	V				
11+ 0	3.0260	4.95	Q	V				
11+ 5	3.0605	5.00	Q	V				
11+10	3.0952	5.05	Q	V				
11+15	3.1303	5.10	Q	V				
11+20	3.1658	5.15	Q	V				
11+25	3.2016	5.20	Q	V				
11+30	3.2378	5.26	Q	V				
11+35	3.2744	5.31	Q	V				
11+40	3.3114	5.37	Q	V				
11+45	3.3488	5.43	Q	V				
11+50	3.3867	5.49	Q	V				
11+55	3.4249	5.55	Q	V				
12+ 0	3.4636	5.62	Q	V				
12+ 5	3.5027	5.68	Q	V				
12+10	3.5418	5.68	Q	V				
12+15	3.5810	5.68	Q	V				
12+20	3.6205	5.73	Q	V				
12+25	3.6603	5.79	Q	V				
12+30	3.7007	5.86	Q	V				
12+35	3.7415	5.93	Q	V				
12+40	3.7829	6.01	Q	V				
12+45	3.8249	6.09	Q	V				
12+50	3.8675	6.18	Q	V				
12+55	3.9107	6.27	Q	V				
13+ 0	3.9546	6.37	Q	V				
13+ 5	3.9992	6.47	Q	V				
13+10	4.0445	6.58	Q	V				
13+15	4.0906	6.69	Q	V				
13+20	4.1374	6.81	Q	V				
13+25	4.1851	6.93	Q	V				

13+30	4.2338	7.06	Q		V				
13+35	4.2833	7.19	Q		V				
13+40	4.3338	7.33	Q		V				
13+45	4.3853	7.48	Q		V				
13+50	4.4379	7.64	Q		V				
13+55	4.4917	7.80	Q		V				
14+ 0	4.5466	7.98	Q		V				
14+ 5	4.6029	8.17	Q		V				
14+10	4.6607	8.39	Q		V				
14+15	4.7201	8.62	Q		V				
14+20	4.7811	8.86	Q		V				
14+25	4.8438	9.10	Q		V				
14+30	4.9083	9.37	Q		V				
14+35	4.9748	9.65	Q		V				
14+40	5.0435	9.97	Q		V				
14+45	5.1144	10.30	Q		V				
14+50	5.1879	10.67	Q		V				
14+55	5.2641	11.07	Q		V				
15+ 0	5.3435	11.53	Q		V				
15+ 5	5.4262	12.01	Q		V				
15+10	5.5129	12.58	Q		V				
15+15	5.6038	13.20	Q		V				
15+20	5.6999	13.95	Q		V				
15+25	5.8005	14.60	Q		V				
15+30	5.9002	14.47	Q		V				
15+35	6.0001	14.51	Q		V				
15+40	6.1067	15.48	Q		V				
15+45	6.2233	16.93	Q		V				
15+50	6.3561	19.28	Q		V				
15+55	6.5143	22.97	Q		V				
16+ 0	6.7350	32.05	Q		V				
16+ 5	7.1526	60.62		Q	V				
16+10	8.1656	147.10			V	Q			
16+15	9.0885	134.01				Q			
16+20	9.5887	72.62		Q		V			
16+25	9.9283	49.31		Q		V			
16+30	10.1913	38.19		Q		V			
16+35	10.4019	30.57		Q		V			
16+40	10.5786	25.67		Q		V			
16+45	10.7280	21.69		Q		V			
16+50	10.8556	18.53		Q		V			
16+55	10.9640	15.73		Q		V			
17+ 0	11.0599	13.92	Q			V			
17+ 5	11.1507	13.20	Q			V			
17+10	11.2319	11.79	Q			V			
17+15	11.3039	10.45	Q			V			
17+20	11.3645	8.80	Q			V			
17+25	11.4217	8.32	Q			V			
17+30	11.4763	7.92	Q			V			
17+35	11.5284	7.57	Q			V			
17+40	11.5784	7.26	Q			V			
17+45	11.6265	6.98	Q			V			
17+50	11.6729	6.73	Q			V			
17+55	11.7176	6.50	Q			V			
18+ 0	11.7610	6.29	Q			V			
18+ 5	11.8031	6.11	Q			V			
18+10	11.8445	6.01	Q			V			
18+15	11.8852	5.91	Q			V			
18+20	11.9250	5.78	Q			V			
18+25	11.9639	5.66	Q			V			
18+30	12.0021	5.53	Q			V			
18+35	12.0393	5.42	Q			V			
18+40	12.0759	5.30	Q			V			

18+45	12.1116	5.20	Q				V	
18+50	12.1467	5.09	Q				V	
18+55	12.1811	4.99	Q				V	
19+ 0	12.2149	4.90	Q				V	
19+ 5	12.2480	4.81	Q				V	
19+10	12.2806	4.73	Q				V	
19+15	12.3126	4.65	Q				V	
19+20	12.3440	4.57	Q				V	
19+25	12.3750	4.49	Q				V	
19+30	12.4054	4.42	Q				V	
19+35	12.4354	4.35	Q				V	
19+40	12.4649	4.29	Q				V	
19+45	12.4940	4.22	Q				V	
19+50	12.5227	4.16	Q				V	
19+55	12.5509	4.10	Q				V	
20+ 0	12.5788	4.05	Q				V	
20+ 5	12.6063	3.99	Q				V	
20+10	12.6334	3.94	Q				V	
20+15	12.6602	3.89	Q				V	
20+20	12.6867	3.84	Q				V	
20+25	12.7128	3.79	Q				V	
20+30	12.7386	3.75	Q				V	
20+35	12.7641	3.70	Q				V	
20+40	12.7893	3.66	Q				V	
20+45	12.8142	3.62	Q				V	
20+50	12.8389	3.58	Q				V	
20+55	12.8632	3.54	Q				V	
21+ 0	12.8873	3.50	Q				V	
21+ 5	12.9112	3.46	Q				V	
21+10	12.9348	3.43	Q				V	
21+15	12.9581	3.39	Q				V	
21+20	12.9813	3.36	Q				V	
21+25	13.0042	3.32	Q				V	
21+30	13.0268	3.29	Q				V	
21+35	13.0493	3.26	Q				V	
21+40	13.0715	3.23	Q				V	
21+45	13.0936	3.20	Q				V	
21+50	13.1154	3.17	Q				V	
21+55	13.1370	3.14	Q				V	
22+ 0	13.1585	3.11	Q				V	
22+ 5	13.1797	3.09	Q				V	
22+10	13.2008	3.06	Q				V	
22+15	13.2217	3.03	Q				V	
22+20	13.2424	3.01	Q				V	
22+25	13.2630	2.98	Q				V	
22+30	13.2833	2.96	Q				V	
22+35	13.3035	2.94	Q				V	
22+40	13.3236	2.91	Q				V	
22+45	13.3435	2.89	Q				V	
22+50	13.3632	2.87	Q				V	
22+55	13.3828	2.84	Q				V	
23+ 0	13.4023	2.82	Q				V	
23+ 5	13.4216	2.80	Q				V	
23+10	13.4407	2.78	Q				V	
23+15	13.4597	2.76	Q				V	
23+20	13.4786	2.74	Q				V	
23+25	13.4974	2.72	Q				V	
23+30	13.5160	2.70	Q				V	
23+35	13.5345	2.68	Q				V	
23+40	13.5528	2.67	Q				V	
23+45	13.5711	2.65	Q				V	
23+50	13.5892	2.63	Q				V	
23+55	13.6072	2.61	Q				V	

24+ 0	13.6250	2.60	Q				V
24+ 5	13.6420	2.46	Q				V
24+10	13.6535	1.67	Q				V
24+15	13.6599	0.93	Q				V
24+20	13.6642	0.61	Q				V
24+25	13.6671	0.43	Q				V
24+30	13.6692	0.30	Q				V
24+35	13.6707	0.22	Q				V
24+40	13.6717	0.15	Q				V
24+45	13.6725	0.11	Q				V
24+50	13.6730	0.07	Q				V
24+55	13.6734	0.05	Q				V
25+ 0	13.6736	0.04	Q				V
25+ 5	13.6737	0.02	Q				V
25+10	13.6738	0.01	Q				V

Unit Hydrograph Analysis

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Study date 06/27/25

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6145

APPLE VALLEY

100 YEAR UNIT HYDROGRAPH - PROPOSED CONDITION

7215Q100PUHNEW

JH

Storm Event Year = 100

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 100		
86.10	1	1.08

Rainfall data for year 100
86.10 6 2.05

Rainfall data for year 100
86.10 24 3.48

+++++

***** Area-averaged max loss rate, Fm *****

SCS curve No. (AMCII)	SCS curve NO. (AMC 2)	Area (Ac.)	Area Fraction	Fp (Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	32.0	86.10	1.000	0.978	0.100	0.098

Area-averaged adjusted loss rate Fm (In/Hr) = 0.098

***** Area-Averaged low loss rate fraction, Yb *****

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
8.61	0.100	32.0	32.0	17.40	0.000
77.49	0.900	98.0	98.0	0.20	0.933

Area-averaged catchment yield fraction, Y = 0.840

Area-averaged low loss fraction, Yb = 0.160

User entry of time of concentration = 0.235 (hours)

+++++

Watershed area = 86.10 (Ac.)
 Catchment Lag time = 0.188 hours
 Unit interval = 5.000 minutes
 Unit interval percentage of lag time = 44.3262
 Hydrograph baseflow = 0.00 (CFS)
 Average maximum watershed loss rate (Fm) = 0.098 (In/Hr)
 Average low loss rate fraction (Yb) = 0.160 (decimal)
 DESERT S-Graph Selected
 Computed peak 5-minute rainfall = 0.512 (In)
 Computed peak 30-minute rainfall = 0.877 (In)
 Specified peak 1-hour rainfall = 1.080 (In)
 Computed peak 3-hour rainfall = 1.600 (In)
 Specified peak 6-hour rainfall = 2.050 (In)
 Specified peak 24-hour rainfall = 3.480 (In)

Rainfall depth area reduction factors:
 Using a total area of 86.10 (Ac.) (Ref: fig. E-4)

5-minute factor = 0.996	Adjusted rainfall = 0.510 (In)
30-minute factor = 0.996	Adjusted rainfall = 0.874 (In)
1-hour factor = 0.996	Adjusted rainfall = 1.076 (In)
3-hour factor = 0.999	Adjusted rainfall = 1.599 (In)
6-hour factor = 1.000	Adjusted rainfall = 2.049 (In)
24-hour factor = 1.000	Adjusted rainfall = 3.480 (In)

U n i t H y d r o g r a p h

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 1041.27 (CFS))		
1	3.248	33.817
2	23.770	213.690
3	54.755	322.639
4	69.544	153.998
5	78.011	88.165
6	83.592	58.113
7	87.711	42.888
8	90.605	30.138
9	92.859	23.469
10	94.617	18.305
11	95.997	14.367
12	97.062	11.086
13	97.811	7.806
14	98.294	5.022
15	98.813	5.406
16	99.339	5.481
17	99.696	3.717
18	100.000	3.164

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5104	0.5104
2	0.6284	0.1180
3	0.7097	0.0813
4	0.7736	0.0640
5	0.8272	0.0536
6	0.8737	0.0465
7	0.9150	0.0414
8	0.9524	0.0374
9	0.9867	0.0343
10	1.0184	0.0317
11	1.0479	0.0295
12	1.0756	0.0277
13	1.1072	0.0315
14	1.1372	0.0300
15	1.1658	0.0287
16	1.1933	0.0275

17	1.2197	0.0264
18	1.2451	0.0254
19	1.2697	0.0245
20	1.2934	0.0237
21	1.3164	0.0230
22	1.3387	0.0223
23	1.3603	0.0216
24	1.3814	0.0211
25	1.4019	0.0205
26	1.4218	0.0200
27	1.4413	0.0195
28	1.4604	0.0190
29	1.4790	0.0186
30	1.4972	0.0182
31	1.5150	0.0178
32	1.5325	0.0175
33	1.5496	0.0171
34	1.5664	0.0168
35	1.5829	0.0165
36	1.5990	0.0162
37	1.6148	0.0158
38	1.6303	0.0155
39	1.6455	0.0152
40	1.6605	0.0150
41	1.6753	0.0147
42	1.6898	0.0145
43	1.7041	0.0143
44	1.7182	0.0141
45	1.7320	0.0139
46	1.7457	0.0137
47	1.7592	0.0135
48	1.7725	0.0133
49	1.7857	0.0131
50	1.7986	0.0130
51	1.8114	0.0128
52	1.8241	0.0126
53	1.8365	0.0125
54	1.8489	0.0123
55	1.8611	0.0122
56	1.8731	0.0120
57	1.8850	0.0119
58	1.8968	0.0118
59	1.9084	0.0116
60	1.9199	0.0115
61	1.9313	0.0114
62	1.9426	0.0113
63	1.9538	0.0112
64	1.9648	0.0110
65	1.9758	0.0109
66	1.9866	0.0108
67	1.9973	0.0107
68	2.0079	0.0106
69	2.0185	0.0105
70	2.0289	0.0104
71	2.0392	0.0103
72	2.0494	0.0102
73	2.0603	0.0108
74	2.0710	0.0107
75	2.0816	0.0106
76	2.0922	0.0106
77	2.1027	0.0105
78	2.1131	0.0104
79	2.1234	0.0103
80	2.1336	0.0102
81	2.1437	0.0101
82	2.1538	0.0101
83	2.1638	0.0100
84	2.1737	0.0099
85	2.1835	0.0098
86	2.1933	0.0098
87	2.2030	0.0097

88	2.2127	0.0096
89	2.2222	0.0096
90	2.2317	0.0095
91	2.2412	0.0094
92	2.2505	0.0094
93	2.2598	0.0093
94	2.2691	0.0092
95	2.2783	0.0092
96	2.2874	0.0091
97	2.2965	0.0091
98	2.3055	0.0090
99	2.3144	0.0090
100	2.3233	0.0089
101	2.3322	0.0088
102	2.3410	0.0088
103	2.3497	0.0087
104	2.3584	0.0087
105	2.3670	0.0086
106	2.3756	0.0086
107	2.3842	0.0085
108	2.3926	0.0085
109	2.4011	0.0084
110	2.4095	0.0084
111	2.4178	0.0083
112	2.4261	0.0083
113	2.4343	0.0082
114	2.4425	0.0082
115	2.4507	0.0082
116	2.4588	0.0081
117	2.4669	0.0081
118	2.4749	0.0080
119	2.4829	0.0080
120	2.4909	0.0079
121	2.4988	0.0079
122	2.5066	0.0079
123	2.5145	0.0078
124	2.5222	0.0078
125	2.5300	0.0077
126	2.5377	0.0077
127	2.5454	0.0077
128	2.5530	0.0076
129	2.5606	0.0076
130	2.5682	0.0076
131	2.5757	0.0075
132	2.5832	0.0075
133	2.5906	0.0075
134	2.5981	0.0074
135	2.6054	0.0074
136	2.6128	0.0074
137	2.6201	0.0073
138	2.6274	0.0073
139	2.6347	0.0073
140	2.6419	0.0072
141	2.6491	0.0072
142	2.6562	0.0072
143	2.6634	0.0071
144	2.6705	0.0071
145	2.6775	0.0071
146	2.6846	0.0070
147	2.6916	0.0070
148	2.6985	0.0070
149	2.7055	0.0069
150	2.7124	0.0069
151	2.7193	0.0069
152	2.7262	0.0069
153	2.7330	0.0068
154	2.7398	0.0068
155	2.7466	0.0068
156	2.7533	0.0068
157	2.7601	0.0067
158	2.7668	0.0067

159	2.7734	0.0067
160	2.7801	0.0066
161	2.7867	0.0066
162	2.7933	0.0066
163	2.7999	0.0066
164	2.8064	0.0065
165	2.8129	0.0065
166	2.8194	0.0065
167	2.8259	0.0065
168	2.8324	0.0064
169	2.8388	0.0064
170	2.8452	0.0064
171	2.8516	0.0064
172	2.8579	0.0064
173	2.8643	0.0063
174	2.8706	0.0063
175	2.8769	0.0063
176	2.8831	0.0063
177	2.8894	0.0062
178	2.8956	0.0062
179	2.9018	0.0062
180	2.9080	0.0062
181	2.9141	0.0062
182	2.9203	0.0061
183	2.9264	0.0061
184	2.9325	0.0061
185	2.9386	0.0061
186	2.9446	0.0061
187	2.9506	0.0060
188	2.9567	0.0060
189	2.9627	0.0060
190	2.9686	0.0060
191	2.9746	0.0060
192	2.9805	0.0059
193	2.9864	0.0059
194	2.9923	0.0059
195	2.9982	0.0059
196	3.0041	0.0059
197	3.0099	0.0058
198	3.0158	0.0058
199	3.0216	0.0058
200	3.0273	0.0058
201	3.0331	0.0058
202	3.0389	0.0058
203	3.0446	0.0057
204	3.0503	0.0057
205	3.0560	0.0057
206	3.0617	0.0057
207	3.0674	0.0057
208	3.0730	0.0056
209	3.0787	0.0056
210	3.0843	0.0056
211	3.0899	0.0056
212	3.0955	0.0056
213	3.1010	0.0056
214	3.1066	0.0056
215	3.1121	0.0055
216	3.1176	0.0055
217	3.1231	0.0055
218	3.1286	0.0055
219	3.1341	0.0055
220	3.1396	0.0055
221	3.1450	0.0054
222	3.1504	0.0054
223	3.1558	0.0054
224	3.1612	0.0054
225	3.1666	0.0054
226	3.1720	0.0054
227	3.1773	0.0054
228	3.1827	0.0053
229	3.1880	0.0053

230	3.1933	0.0053
231	3.1986	0.0053
232	3.2039	0.0053
233	3.2091	0.0053
234	3.2144	0.0053
235	3.2196	0.0052
236	3.2249	0.0052
237	3.2301	0.0052
238	3.2353	0.0052
239	3.2404	0.0052
240	3.2456	0.0052
241	3.2508	0.0052
242	3.2559	0.0051
243	3.2610	0.0051
244	3.2662	0.0051
245	3.2713	0.0051
246	3.2764	0.0051
247	3.2814	0.0051
248	3.2865	0.0051
249	3.2916	0.0051
250	3.2966	0.0050
251	3.3016	0.0050
252	3.3067	0.0050
253	3.3117	0.0050
254	3.3166	0.0050
255	3.3216	0.0050
256	3.3266	0.0050
257	3.3316	0.0050
258	3.3365	0.0049
259	3.3414	0.0049
260	3.3463	0.0049
261	3.3513	0.0049
262	3.3562	0.0049
263	3.3610	0.0049
264	3.3659	0.0049
265	3.3708	0.0049
266	3.3756	0.0049
267	3.3805	0.0048
268	3.3853	0.0048
269	3.3901	0.0048
270	3.3949	0.0048
271	3.3997	0.0048
272	3.4045	0.0048
273	3.4093	0.0048
274	3.4140	0.0048
275	3.4188	0.0048
276	3.4235	0.0047
277	3.4283	0.0047
278	3.4330	0.0047
279	3.4377	0.0047
280	3.4424	0.0047
281	3.4471	0.0047
282	3.4518	0.0047
283	3.4564	0.0047
284	3.4611	0.0047
285	3.4657	0.0046
286	3.4704	0.0046
287	3.4750	0.0046
288	3.4796	0.0046

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0046	0.0007	0.0039
2	0.0046	0.0007	0.0039
3	0.0046	0.0007	0.0039
4	0.0047	0.0007	0.0039
5	0.0047	0.0008	0.0039
6	0.0047	0.0008	0.0039
7	0.0047	0.0008	0.0040

8	0.0047	0.0008	0.0040
9	0.0047	0.0008	0.0040
10	0.0048	0.0008	0.0040
11	0.0048	0.0008	0.0040
12	0.0048	0.0008	0.0040
13	0.0048	0.0008	0.0040
14	0.0048	0.0008	0.0040
15	0.0048	0.0008	0.0041
16	0.0049	0.0008	0.0041
17	0.0049	0.0008	0.0041
18	0.0049	0.0008	0.0041
19	0.0049	0.0008	0.0041
20	0.0049	0.0008	0.0041
21	0.0049	0.0008	0.0042
22	0.0050	0.0008	0.0042
23	0.0050	0.0008	0.0042
24	0.0050	0.0008	0.0042
25	0.0050	0.0008	0.0042
26	0.0050	0.0008	0.0042
27	0.0051	0.0008	0.0042
28	0.0051	0.0008	0.0043
29	0.0051	0.0008	0.0043
30	0.0051	0.0008	0.0043
31	0.0051	0.0008	0.0043
32	0.0051	0.0008	0.0043
33	0.0052	0.0008	0.0043
34	0.0052	0.0008	0.0044
35	0.0052	0.0008	0.0044
36	0.0052	0.0008	0.0044
37	0.0053	0.0008	0.0044
38	0.0053	0.0008	0.0044
39	0.0053	0.0008	0.0044
40	0.0053	0.0009	0.0045
41	0.0053	0.0009	0.0045
42	0.0054	0.0009	0.0045
43	0.0054	0.0009	0.0045
44	0.0054	0.0009	0.0045
45	0.0054	0.0009	0.0046
46	0.0054	0.0009	0.0046
47	0.0055	0.0009	0.0046
48	0.0055	0.0009	0.0046
49	0.0055	0.0009	0.0046
50	0.0055	0.0009	0.0046
51	0.0056	0.0009	0.0047
52	0.0056	0.0009	0.0047
53	0.0056	0.0009	0.0047
54	0.0056	0.0009	0.0047
55	0.0057	0.0009	0.0048
56	0.0057	0.0009	0.0048
57	0.0057	0.0009	0.0048
58	0.0057	0.0009	0.0048
59	0.0058	0.0009	0.0048
60	0.0058	0.0009	0.0049
61	0.0058	0.0009	0.0049
62	0.0058	0.0009	0.0049
63	0.0059	0.0009	0.0049
64	0.0059	0.0009	0.0050
65	0.0059	0.0010	0.0050
66	0.0060	0.0010	0.0050
67	0.0060	0.0010	0.0050
68	0.0060	0.0010	0.0051
69	0.0061	0.0010	0.0051
70	0.0061	0.0010	0.0051
71	0.0061	0.0010	0.0051
72	0.0061	0.0010	0.0052
73	0.0062	0.0010	0.0052
74	0.0062	0.0010	0.0052
75	0.0062	0.0010	0.0052
76	0.0063	0.0010	0.0053
77	0.0063	0.0010	0.0053
78	0.0063	0.0010	0.0053

79	0.0064	0.0010	0.0054
80	0.0064	0.0010	0.0054
81	0.0064	0.0010	0.0054
82	0.0065	0.0010	0.0054
83	0.0065	0.0010	0.0055
84	0.0065	0.0010	0.0055
85	0.0066	0.0011	0.0055
86	0.0066	0.0011	0.0056
87	0.0067	0.0011	0.0056
88	0.0067	0.0011	0.0056
89	0.0068	0.0011	0.0057
90	0.0068	0.0011	0.0057
91	0.0068	0.0011	0.0057
92	0.0069	0.0011	0.0058
93	0.0069	0.0011	0.0058
94	0.0069	0.0011	0.0058
95	0.0070	0.0011	0.0059
96	0.0070	0.0011	0.0059
97	0.0071	0.0011	0.0060
98	0.0071	0.0011	0.0060
99	0.0072	0.0012	0.0060
100	0.0072	0.0012	0.0061
101	0.0073	0.0012	0.0061
102	0.0073	0.0012	0.0061
103	0.0074	0.0012	0.0062
104	0.0074	0.0012	0.0062
105	0.0075	0.0012	0.0063
106	0.0075	0.0012	0.0063
107	0.0076	0.0012	0.0064
108	0.0076	0.0012	0.0064
109	0.0077	0.0012	0.0065
110	0.0077	0.0012	0.0065
111	0.0078	0.0013	0.0066
112	0.0079	0.0013	0.0066
113	0.0079	0.0013	0.0067
114	0.0080	0.0013	0.0067
115	0.0081	0.0013	0.0068
116	0.0081	0.0013	0.0068
117	0.0082	0.0013	0.0069
118	0.0082	0.0013	0.0069
119	0.0083	0.0013	0.0070
120	0.0084	0.0013	0.0070
121	0.0085	0.0014	0.0071
122	0.0085	0.0014	0.0072
123	0.0086	0.0014	0.0072
124	0.0087	0.0014	0.0073
125	0.0088	0.0014	0.0074
126	0.0088	0.0014	0.0074
127	0.0090	0.0014	0.0075
128	0.0090	0.0014	0.0076
129	0.0091	0.0015	0.0077
130	0.0092	0.0015	0.0077
131	0.0093	0.0015	0.0078
132	0.0094	0.0015	0.0079
133	0.0095	0.0015	0.0080
134	0.0096	0.0015	0.0080
135	0.0097	0.0016	0.0081
136	0.0098	0.0016	0.0082
137	0.0099	0.0016	0.0083
138	0.0100	0.0016	0.0084
139	0.0101	0.0016	0.0085
140	0.0102	0.0016	0.0086
141	0.0104	0.0017	0.0087
142	0.0105	0.0017	0.0088
143	0.0106	0.0017	0.0089
144	0.0107	0.0017	0.0090
145	0.0102	0.0016	0.0086
146	0.0103	0.0017	0.0087
147	0.0105	0.0017	0.0088
148	0.0106	0.0017	0.0089
149	0.0108	0.0017	0.0091

150	0.0109	0.0018	0.0092
151	0.0112	0.0018	0.0094
152	0.0113	0.0018	0.0095
153	0.0115	0.0018	0.0097
154	0.0116	0.0019	0.0098
155	0.0119	0.0019	0.0100
156	0.0120	0.0019	0.0101
157	0.0123	0.0020	0.0104
158	0.0125	0.0020	0.0105
159	0.0128	0.0021	0.0107
160	0.0130	0.0021	0.0109
161	0.0133	0.0021	0.0112
162	0.0135	0.0022	0.0113
163	0.0139	0.0022	0.0117
164	0.0141	0.0023	0.0118
165	0.0145	0.0023	0.0122
166	0.0147	0.0024	0.0124
167	0.0152	0.0024	0.0128
168	0.0155	0.0025	0.0130
169	0.0162	0.0026	0.0136
170	0.0165	0.0026	0.0138
171	0.0171	0.0027	0.0144
172	0.0175	0.0028	0.0147
173	0.0182	0.0029	0.0153
174	0.0186	0.0030	0.0156
175	0.0195	0.0031	0.0164
176	0.0200	0.0032	0.0168
177	0.0211	0.0034	0.0177
178	0.0216	0.0035	0.0182
179	0.0230	0.0037	0.0193
180	0.0237	0.0038	0.0199
181	0.0254	0.0041	0.0213
182	0.0264	0.0042	0.0222
183	0.0287	0.0046	0.0241
184	0.0300	0.0048	0.0252
185	0.0277	0.0044	0.0233
186	0.0295	0.0047	0.0248
187	0.0343	0.0055	0.0288
188	0.0374	0.0060	0.0314
189	0.0465	0.0075	0.0390
190	0.0536	0.0081	0.0454
191	0.0813	0.0081	0.0731
192	0.1180	0.0081	0.1098
193	0.5104	0.0081	0.5023
194	0.0640	0.0081	0.0558
195	0.0414	0.0066	0.0347
196	0.0317	0.0051	0.0266
197	0.0315	0.0051	0.0265
198	0.0275	0.0044	0.0231
199	0.0245	0.0039	0.0206
200	0.0223	0.0036	0.0187
201	0.0205	0.0033	0.0172
202	0.0190	0.0031	0.0160
203	0.0178	0.0029	0.0150
204	0.0168	0.0027	0.0141
205	0.0158	0.0025	0.0132
206	0.0150	0.0024	0.0126
207	0.0143	0.0023	0.0120
208	0.0137	0.0022	0.0115
209	0.0131	0.0021	0.0110
210	0.0126	0.0020	0.0106
211	0.0122	0.0020	0.0102
212	0.0118	0.0019	0.0099
213	0.0114	0.0018	0.0096
214	0.0110	0.0018	0.0093
215	0.0107	0.0017	0.0090
216	0.0104	0.0017	0.0088
217	0.0108	0.0017	0.0091
218	0.0106	0.0017	0.0089
219	0.0103	0.0017	0.0087
220	0.0101	0.0016	0.0085

221	0.0098	0.0016	0.0083
222	0.0096	0.0015	0.0081
223	0.0094	0.0015	0.0079
224	0.0092	0.0015	0.0078
225	0.0091	0.0015	0.0076
226	0.0089	0.0014	0.0075
227	0.0087	0.0014	0.0073
228	0.0086	0.0014	0.0072
229	0.0084	0.0014	0.0071
230	0.0083	0.0013	0.0070
231	0.0082	0.0013	0.0069
232	0.0080	0.0013	0.0067
233	0.0079	0.0013	0.0066
234	0.0078	0.0012	0.0065
235	0.0077	0.0012	0.0064
236	0.0076	0.0012	0.0063
237	0.0075	0.0012	0.0063
238	0.0074	0.0012	0.0062
239	0.0073	0.0012	0.0061
240	0.0072	0.0011	0.0060
241	0.0071	0.0011	0.0059
242	0.0070	0.0011	0.0059
243	0.0069	0.0011	0.0058
244	0.0068	0.0011	0.0057
245	0.0067	0.0011	0.0056
246	0.0066	0.0011	0.0056
247	0.0066	0.0011	0.0055
248	0.0065	0.0010	0.0055
249	0.0064	0.0010	0.0054
250	0.0064	0.0010	0.0053
251	0.0063	0.0010	0.0053
252	0.0062	0.0010	0.0052
253	0.0062	0.0010	0.0052
254	0.0061	0.0010	0.0051
255	0.0060	0.0010	0.0051
256	0.0060	0.0010	0.0050
257	0.0059	0.0009	0.0050
258	0.0059	0.0009	0.0049
259	0.0058	0.0009	0.0049
260	0.0058	0.0009	0.0048
261	0.0057	0.0009	0.0048
262	0.0056	0.0009	0.0047
263	0.0056	0.0009	0.0047
264	0.0056	0.0009	0.0047
265	0.0055	0.0009	0.0046
266	0.0055	0.0009	0.0046
267	0.0054	0.0009	0.0045
268	0.0054	0.0009	0.0045
269	0.0053	0.0009	0.0045
270	0.0053	0.0008	0.0044
271	0.0052	0.0008	0.0044
272	0.0052	0.0008	0.0044
273	0.0052	0.0008	0.0043
274	0.0051	0.0008	0.0043
275	0.0051	0.0008	0.0043
276	0.0050	0.0008	0.0042
277	0.0050	0.0008	0.0042
278	0.0050	0.0008	0.0042
279	0.0049	0.0008	0.0041
280	0.0049	0.0008	0.0041
281	0.0049	0.0008	0.0041
282	0.0048	0.0008	0.0041
283	0.0048	0.0008	0.0040
284	0.0048	0.0008	0.0040
285	0.0047	0.0008	0.0040
286	0.0047	0.0008	0.0039
287	0.0047	0.0007	0.0039
288	0.0046	0.0007	0.0039

 Total soil rain loss = 0.47(In)

Total effective rainfall = 3.01(In)
 Peak flow rate in flood hydrograph = 206.17(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	75.0	150.0	225.0	300.0
0+ 5	0.0009		0.13	Q				
0+10	0.0075		0.96	Q				
0+15	0.0228		2.21	Q				
0+20	0.0422		2.82	Q				
0+25	0.0640		3.17	Q				
0+30	0.0874		3.40	Q				
0+35	0.1121		3.58	Q				
0+40	0.1376		3.71	Q				
0+45	0.1639		3.81	Q				
0+50	0.1907		3.90	Q				
0+55	0.2180		3.97	Q				
1+ 0	0.2457		4.02	Q				
1+ 5	0.2737		4.07	Q				
1+10	0.3020		4.10	Q				
1+15	0.3304		4.13	Q				
1+20	0.3591		4.17	Q				
1+25	0.3881		4.20	Q				
1+30	0.4172		4.22	Q				
1+35	0.4464		4.24	Q				
1+40	0.4757		4.25	Q				
1+45	0.5051		4.27	Q				
1+50	0.5346		4.28	Q				
1+55	0.5642		4.30	QV				
2+ 0	0.5939		4.32	QV				
2+ 5	0.6237		4.33	QV				
2+10	0.6537		4.35	QV				
2+15	0.6837		4.36	QV				
2+20	0.7139		4.38	QV				
2+25	0.7441		4.39	QV				
2+30	0.7745		4.41	QV				
2+35	0.8050		4.43	QV				
2+40	0.8356		4.44	QV				
2+45	0.8663		4.46	QV				
2+50	0.8972		4.48	QV				
2+55	0.9281		4.50	QV				
3+ 0	0.9592		4.51	QV				
3+ 5	0.9904		4.53	QV				
3+10	1.0217		4.55	QV				
3+15	1.0531		4.57	QV				
3+20	1.0847		4.58	Q V				
3+25	1.1164		4.60	Q V				
3+30	1.1482		4.62	Q V				
3+35	1.1802		4.64	Q V				
3+40	1.2122		4.66	Q V				
3+45	1.2445		4.68	Q V				
3+50	1.2768		4.70	Q V				
3+55	1.3093		4.72	Q V				
4+ 0	1.3419		4.73	Q V				
4+ 5	1.3746		4.75	Q V				
4+10	1.4075		4.77	Q V				
4+15	1.4405		4.80	Q V				
4+20	1.4737		4.82	Q V				
4+25	1.5070		4.84	Q V				
4+30	1.5405		4.86	Q V				
4+35	1.5741		4.88	Q V				
4+40	1.6078		4.90	Q V				
4+45	1.6417		4.92	Q V				
4+50	1.6758		4.94	Q V				
4+55	1.7100		4.97	Q V				

5+ 0	1.7443	4.99	Q	V					
5+ 5	1.7788	5.01	Q	V					
5+10	1.8135	5.03	Q	V					
5+15	1.8484	5.06	Q	V					
5+20	1.8834	5.08	Q	V					
5+25	1.9185	5.11	Q	V					
5+30	1.9539	5.13	Q	V					
5+35	1.9894	5.15	Q	V					
5+40	2.0250	5.18	Q	V					
5+45	2.0609	5.20	Q	V					
5+50	2.0969	5.23	Q	V					
5+55	2.1331	5.26	Q	V					
6+ 0	2.1695	5.28	Q	V					
6+ 5	2.2060	5.31	Q	V					
6+10	2.2428	5.34	Q	V					
6+15	2.2797	5.36	Q	V					
6+20	2.3168	5.39	Q	V					
6+25	2.3541	5.42	Q	V					
6+30	2.3916	5.45	Q	V					
6+35	2.4293	5.48	Q	V					
6+40	2.4672	5.50	Q	V					
6+45	2.5054	5.53	Q	V					
6+50	2.5437	5.56	Q	V					
6+55	2.5822	5.59	Q	V					
7+ 0	2.6209	5.62	Q	V					
7+ 5	2.6599	5.66	Q	V					
7+10	2.6991	5.69	Q	V					
7+15	2.7385	5.72	Q	V					
7+20	2.7781	5.75	Q	V					
7+25	2.8179	5.79	Q	V					
7+30	2.8580	5.82	Q	V					
7+35	2.8983	5.85	Q	V					
7+40	2.9389	5.89	Q	V					
7+45	2.9797	5.92	Q	V					
7+50	3.0207	5.96	Q	V					
7+55	3.0620	6.00	Q	V					
8+ 0	3.1035	6.03	Q	V					
8+ 5	3.1453	6.07	Q	V					
8+10	3.1874	6.11	Q	V					
8+15	3.2298	6.15	Q	V					
8+20	3.2724	6.19	Q	V					
8+25	3.3152	6.23	Q	V					
8+30	3.3584	6.27	Q	V					
8+35	3.4019	6.31	Q	V					
8+40	3.4456	6.35	Q	V					
8+45	3.4896	6.39	Q	V					
8+50	3.5340	6.44	Q	V					
8+55	3.5786	6.48	Q	V					
9+ 0	3.6236	6.53	Q	V					
9+ 5	3.6689	6.58	Q	V					
9+10	3.7145	6.62	Q	V					
9+15	3.7604	6.67	Q	V					
9+20	3.8067	6.72	Q	V					
9+25	3.8533	6.77	Q	V					
9+30	3.9003	6.82	Q	V					
9+35	3.9476	6.87	Q	V					
9+40	3.9953	6.92	Q	V					
9+45	4.0434	6.98	Q	V					
9+50	4.0918	7.03	Q	V					
9+55	4.1406	7.09	Q	V					
10+ 0	4.1899	7.15	Q	V					
10+ 5	4.2395	7.21	Q	V					
10+10	4.2895	7.27	Q	V					
10+15	4.3400	7.33	Q	V					
10+20	4.3909	7.39	Q	V					
10+25	4.4422	7.46	Q	V					
10+30	4.4940	7.52	IQ	V					
10+35	4.5463	7.59	IQ	V					
10+40	4.5990	7.66	IQ	V					
10+45	4.6522	7.73	IQ	V					
10+50	4.7059	7.80	IQ	V					

10+55	4.7602	7.87	Q	V					
11+ 0	4.8149	7.95	Q	V					
11+ 5	4.8702	8.03	Q	V					
11+10	4.9260	8.11	Q	V					
11+15	4.9824	8.19	Q	V					
11+20	5.0394	8.27	Q	V					
11+25	5.0970	8.36	Q	V					
11+30	5.1551	8.45	Q	V					
11+35	5.2140	8.54	Q	V					
11+40	5.2734	8.63	Q	V					
11+45	5.3335	8.73	Q	V					
11+50	5.3943	8.83	Q	V					
11+55	5.4559	8.93	Q	V					
12+ 0	5.5181	9.04	Q	V					
12+ 5	5.5810	9.13	Q	V					
12+10	5.6438	9.12	Q	V					
12+15	5.7061	9.05	Q	V					
12+20	5.7687	9.08	Q	V					
12+25	5.8317	9.16	Q	V					
12+30	5.8954	9.25	Q	V					
12+35	5.9598	9.35	Q	V					
12+40	6.0251	9.47	Q	V					
12+45	6.0912	9.60	Q	V					
12+50	6.1582	9.73	Q	V					
12+55	6.2263	9.88	Q	V					
13+ 0	6.2953	10.03	Q	V					
13+ 5	6.3655	10.19	Q	V					
13+10	6.4369	10.36	Q	V					
13+15	6.5094	10.54	Q	V					
13+20	6.5833	10.72	Q	V					
13+25	6.6584	10.92	Q	V					
13+30	6.7350	11.12	Q	V					
13+35	6.8131	11.34	Q	V					
13+40	6.8927	11.56	Q	V					
13+45	6.9740	11.80	Q	V					
13+50	7.0570	12.05	Q	V					
13+55	7.1419	12.32	Q	V					
14+ 0	7.2287	12.60	Q	V					
14+ 5	7.3177	12.91	Q	V					
14+10	7.4089	13.25	Q	V					
14+15	7.5028	13.63	Q	V					
14+20	7.5993	14.01	Q	V					
14+25	7.6985	14.41	Q	V					
14+30	7.8007	14.84	Q	V					
14+35	7.9061	15.30	Q	V					
14+40	8.0148	15.79	Q	V					
14+45	8.1274	16.34	Q	V					
14+50	8.2439	16.92	Q	V					
14+55	8.3649	17.57	Q	V					
15+ 0	8.4908	18.28	Q	V					
15+ 5	8.6223	19.09	Q	V					
15+10	8.7598	19.97	Q	V					
15+15	8.9044	20.99	Q	V					
15+20	9.0568	22.14	Q	V					
15+25	9.2175	23.33	Q	V					
15+30	9.3821	23.90	Q	V					
15+35	9.5493	24.28	Q	V					
15+40	9.7268	25.77	Q	V					
15+45	9.9210	28.19	Q	V					
15+50	10.1394	31.71	Q	V					
15+55	10.3968	37.38	Q	V					
16+ 0	10.7299	48.36	Q	V					
16+ 5	11.2842	80.48	Q	V					
16+10	12.4319	166.65		QV					
16+15	13.8518	206.17		V Q					
16+20	14.7009	123.30		Q					
16+25	15.2824	84.43		Q					
16+30	15.7278	64.67		Q					
16+35	16.0973	53.65		Q					
16+40	16.4021	44.27		Q					
16+45	16.6646	38.10		Q					

16+50	16.8927	33.12	Q			V	
16+55	17.0930	29.09	Q			V	
17+ 0	17.2696	25.64	Q			V	
17+ 5	17.4247	22.52	Q			V	
17+10	17.5623	19.98	Q			V	
17+15	17.6928	18.95	Q			V	
17+20	17.8160	17.88	Q			V	
17+25	17.9268	16.09	Q			V	
17+30	18.0290	14.84	Q			V	
17+35	18.1164	12.69	Q			V	
17+40	18.1993	12.04	Q			V	
17+45	18.2787	11.51	Q			V	
17+50	18.3548	11.06	Q			V	
17+55	18.4280	10.63	Q			V	
18+ 0	18.4987	10.26	Q			V	
18+ 5	18.5671	9.93	Q			V	
18+10	18.6342	9.74	Q			V	
18+15	18.7006	9.64	Q			V	
18+20	18.7657	9.46	Q			V	
18+25	18.8295	9.26	Q			V	
18+30	18.8919	9.06	Q			V	
18+35	18.9529	8.86	Q			V	
18+40	19.0127	8.68	Q			V	
18+45	19.0712	8.50	Q			V	
18+50	19.1286	8.33	Q			V	
18+55	19.1848	8.16	Q			V	
19+ 0	19.2399	8.01	Q			V	
19+ 5	19.2940	7.86	Q			V	
19+10	19.3471	7.71	Q			V	
19+15	19.3993	7.57	Q			V	
19+20	19.4506	7.44	Q			V	
19+25	19.5010	7.32	Q			V	
19+30	19.5506	7.20	Q			V	
19+35	19.5993	7.08	Q			V	
19+40	19.6474	6.97	Q			V	
19+45	19.6946	6.86	Q			V	
19+50	19.7412	6.76	Q			V	
19+55	19.7871	6.66	Q			V	
20+ 0	19.8323	6.57	Q			V	
20+ 5	19.8769	6.47	Q			V	
20+10	19.9209	6.39	Q			V	
20+15	19.9642	6.30	Q			V	
20+20	20.0071	6.22	Q			V	
20+25	20.0494	6.14	Q			V	
20+30	20.0911	6.06	Q			V	
20+35	20.1323	5.99	Q			V	
20+40	20.1731	5.92	Q			V	
20+45	20.2133	5.85	Q			V	
20+50	20.2531	5.78	Q			V	
20+55	20.2925	5.71	Q			V	
21+ 0	20.3314	5.65	Q			V	
21+ 5	20.3698	5.59	Q			V	
21+10	20.4079	5.53	Q			V	
21+15	20.4455	5.47	Q			V	
21+20	20.4828	5.41	Q			V	
21+25	20.5197	5.35	Q			V	
21+30	20.5562	5.30	Q			V	
21+35	20.5923	5.25	Q			V	
21+40	20.6281	5.20	Q			V	
21+45	20.6636	5.15	Q			V	
21+50	20.6987	5.10	Q			V	
21+55	20.7335	5.05	Q			V	
22+ 0	20.7680	5.00	Q			V	
22+ 5	20.8021	4.96	Q			V	
22+10	20.8360	4.92	Q			V	
22+15	20.8695	4.87	Q			V	
22+20	20.9028	4.83	Q			V	
22+25	20.9358	4.79	Q			V	
22+30	20.9685	4.75	Q			V	
22+35	21.0009	4.71	Q			V	
22+40	21.0331	4.67	Q			V	

22+45	21.0650	4.63	Q				V
22+50	21.0966	4.60	Q				V
22+55	21.1280	4.56	Q				V
23+ 0	21.1592	4.52	Q				V
23+ 5	21.1901	4.49	Q				V
23+10	21.2208	4.46	Q				V
23+15	21.2512	4.42	Q				V
23+20	21.2815	4.39	Q				V
23+25	21.3115	4.36	Q				V
23+30	21.3413	4.33	Q				V
23+35	21.3708	4.29	Q				V
23+40	21.4002	4.26	Q				V
23+45	21.4294	4.23	Q				V
23+50	21.4583	4.21	Q				V
23+55	21.4871	4.18	Q				V
24+ 0	21.5157	4.15	Q				V
24+ 5	21.5431	3.99	Q				V
24+10	21.5647	3.14	Q				V
24+15	21.5776	1.87	Q				V
24+20	21.5863	1.26	Q				V
24+25	21.5925	0.91	Q				V
24+30	21.5972	0.68	Q				V
24+35	21.6007	0.51	Q				V
24+40	21.6034	0.39	Q				V
24+45	21.6054	0.29	Q				V
24+50	21.6069	0.22	Q				V
24+55	21.6081	0.16	Q				V
25+ 0	21.6089	0.12	Q				V
25+ 5	21.6095	0.09	Q				V
25+10	21.6100	0.07	Q				V
25+15	21.6103	0.05	Q				V
25+20	21.6105	0.03	Q				V
25+25	21.6106	0.01	Q				V

Appendix D

100-yr Basin Routing

**Apple Valley
Basin Routing Study Summary**

Stage Storage Table

#	Depth	Elevation	Area (sf)	Incremental volume (cf)	Total Volume (cf)	Total Volume (acre-ft)	Outflow Q	Notes
1	0.00	2,921.50	61,712	0	0	-	0.00	Bottom of the rock
2	0.50	2,922.00	61,712	12,342	12,342	0.283	1.42	Invert
3	1.50	2,923.00	61,712	36,768	49,110	1.127	1.42	
4	2.50	2,924.00	61,712	45,343	94,453	2.168	1.42	
5	3.50	2,925.00	61,712	49,307	143,760	3.300	1.42	
6	4.50	2,926.00	61,712	51,058	194,818	4.472	1.42	*Outlet/ Basin WQMP Volume
7	5.50	2,927.00	61,712	51,070	245,888	5.645	22.62	Hydrowin software for outflow
8	6.50	2,928.00	61,712	49,296	295,184	6.776	48.20	Orifice method for outflow
9	7.50	2,929.00	61,712	45,344	340,528	7.817	83.39	Orifice method for outflow
10	8.50	2,930.00	61,712	36,767	377,295	8.662	107.65	Soffit
11	9.00	2,930.50	61,712	12,343	389,638	8.945	117.92	Top of the rock

WQMP Design Capture Volume is **194,430 CF**

***Infiltration Rate = 3"/hour

System releases water after basin volume reaches 194,818 CF

Outlet = Double 36" HDPE

Orifice Q OutFlow = $2 \times CA \times (2gh)^{(1/2)}$

= $2 \times 0.6A \times (2 \times 32.2 \times h)^{(1/2)}$

A = $3.141 \times 1.5^2 = 7.07 \text{ ft}^2$

h = Water Height Above the centerline of pipe

Example: WSE @ 2929.00

= $2 \times 0.6 \times (7.07) \times [2 \times 32.2 \times (2929 - 2927.50)]^{(1/2)}$

= 83.39 cfs

*** Average Infiltration rate per geotechnical report = 3"/hr, Factor of Safety =3.

Unit convert = $(3"/\text{hr}) / 3 \times (1'/12") \times (1\text{hr}/60\text{min}) \times (1 \text{ min}/60 \text{ sec}) = 0.000023 \text{ ft/sec}$

Underground footprint area is $464' \times 133' = 61,712 \text{ sf}$

Therefore, Q out for basin = $61,712 \times 0.000023 = 1.42 \text{ cfs}$

Allowable outflow = 90% of existing Q25 = $147 \times .9 = 132 \text{ cfs}$

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 06/27/25

APPLE VALLEY
100 YEAR STORM EVENT 1 HOUR BASIN ROUTING
7215Q100BRNEW
JH

Program License Serial Number 6145

***** HYDROGRAPH INFORMATION *****

From study/file name: 7215Q100PUHNEW.rte
*****HYDROGRAPH DATA*****
Number of intervals = 305
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 206.166 (CFS)
Total volume = 21.611 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
Process from Point/Station 1.000 to Point/Station 1.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 305
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00 (Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.283	1.420	0.278	0.288
1.500	1.127	1.420	1.122	1.132
2.500	2.168	1.420	2.163	2.173
3.500	3.300	1.420	3.295	3.305
4.500	4.472	1.420	4.467	4.477
5.500	5.645	22.620	5.567	5.723

6.500	6.776	48.200	6.610	6.942
7.500	7.817	83.390	7.530	8.104
8.500	8.662	107.650	8.291	9.033
9.000	8.945	117.920	8.539	9.351

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	51.5	103.08	154.62	206.17	Depth (Ft.)
0.083	0.13	0.00	0.000	O					0.00
0.167	0.96	0.02	0.004	O					0.01
0.250	2.21	0.07	0.015	O					0.03
0.333	2.82	0.16	0.031	O					0.06
0.417	3.17	0.25	0.050	O					0.09
0.500	3.40	0.36	0.071	O					0.13
0.583	3.58	0.46	0.092	O					0.16
0.667	3.71	0.57	0.114	O					0.20
0.750	3.81	0.68	0.135	O					0.24
0.833	3.90	0.79	0.157	O					0.28
0.917	3.97	0.89	0.178	O					0.31
1.000	4.02	1.00	0.199	O					0.35
1.083	4.07	1.10	0.220	O					0.39
1.167	4.10	1.20	0.240	O					0.42
1.250	4.13	1.30	0.260	O					0.46
1.333	4.17	1.40	0.279	O					0.49
1.417	4.20	1.42	0.298	O					0.52
1.500	4.22	1.42	0.317	O					0.54
1.583	4.24	1.42	0.337	O					0.56
1.667	4.25	1.42	0.356	O					0.59
1.750	4.27	1.42	0.376	O					0.61
1.833	4.28	1.42	0.395	O					0.63
1.917	4.30	1.42	0.415	O					0.66
2.000	4.32	1.42	0.435	O					0.68
2.083	4.33	1.42	0.455	O					0.70
2.167	4.35	1.42	0.475	O					0.73
2.250	4.36	1.42	0.495	O					0.75
2.333	4.38	1.42	0.516	O					0.78
2.417	4.39	1.42	0.536	O					0.80
2.500	4.41	1.42	0.557	O					0.82
2.583	4.43	1.42	0.577	O					0.85
2.667	4.44	1.42	0.598	O					0.87
2.750	4.46	1.42	0.619	O					0.90
2.833	4.48	1.42	0.640	O					0.92
2.917	4.50	1.42	0.661	O					0.95
3.000	4.51	1.42	0.682	O					0.97
3.083	4.53	1.42	0.704	O					1.00
3.167	4.55	1.42	0.725	O					1.02
3.250	4.57	1.42	0.747	O					1.05
3.333	4.58	1.42	0.768	O					1.08
3.417	4.60	1.42	0.790	O					1.10
3.500	4.62	1.42	0.812	O					1.13
3.583	4.64	1.42	0.834	O					1.15
3.667	4.66	1.42	0.857	O					1.18
3.750	4.68	1.42	0.879	O					1.21
3.833	4.70	1.42	0.901	O					1.23
3.917	4.72	1.42	0.924	O					1.26
4.000	4.73	1.42	0.947	O					1.29
4.083	4.75	1.42	0.970	O					1.31
4.167	4.77	1.42	0.993	O					1.34
4.250	4.80	1.42	1.016	O					1.37

4.333	4.82	1.42	1.039	O					1.40
4.417	4.84	1.42	1.063	O					1.42
4.500	4.86	1.42	1.086	O					1.45
4.583	4.88	1.42	1.110	O					1.48
4.667	4.90	1.42	1.134	O					1.51
4.750	4.92	1.42	1.158	O					1.53
4.833	4.94	1.42	1.182	O					1.55
4.917	4.97	1.42	1.207	O					1.58
5.000	4.99	1.42	1.231	O					1.60
5.083	5.01	1.42	1.256	O					1.62
5.167	5.03	1.42	1.281	O					1.65
5.250	5.06	1.42	1.305	O					1.67
5.333	5.08	1.42	1.331	O					1.70
5.417	5.11	1.42	1.356	O					1.72
5.500	5.13	1.42	1.381	O					1.74
5.583	5.15	1.42	1.407	O					1.77
5.667	5.18	1.42	1.433	O					1.79
5.750	5.20	1.42	1.459	O					1.82
5.833	5.23	1.42	1.485	O					1.84
5.917	5.26	1.42	1.511	O					1.87
6.000	5.28	1.42	1.538	O					1.89
6.083	5.31	1.42	1.564	O					1.92
6.167	5.34	1.42	1.591	O					1.95
6.250	5.36	1.42	1.618	O					1.97
6.333	5.39	1.42	1.646	O					2.00
6.417	5.42	1.42	1.673	O					2.02
6.500	5.45	1.42	1.701	O					2.05
6.583	5.48	1.42	1.729	O					2.08
6.667	5.50	1.42	1.757	O					2.10
6.750	5.53	1.42	1.785	O					2.13
6.833	5.56	1.42	1.813	O					2.16
6.917	5.59	1.42	1.842	O					2.19
7.000	5.62	1.42	1.871	O					2.21
7.083	5.66	1.42	1.900	O					2.24
7.167	5.69	1.42	1.929	O					2.27
7.250	5.72	1.42	1.959	O					2.30
7.333	5.75	1.42	1.988	O					2.33
7.417	5.79	1.42	2.018	O					2.36
7.500	5.82	1.42	2.048	O					2.39
7.583	5.85	1.42	2.079	O					2.41
7.667	5.89	1.42	2.110	O					2.44
7.750	5.92	1.42	2.140	O					2.47
7.833	5.96	1.42	2.172	O					2.50
7.917	6.00	1.42	2.203	O					2.53
8.000	6.03	1.42	2.235	O					2.56
8.083	6.07	1.42	2.266	O					2.59
8.167	6.11	1.42	2.299	O					2.62
8.250	6.15	1.42	2.331	O					2.64
8.333	6.19	1.42	2.364	O					2.67
8.417	6.23	1.42	2.397	O					2.70
8.500	6.27	1.42	2.430	O					2.73
8.583	6.31	1.42	2.464	O					2.76
8.667	6.35	1.42	2.497	O					2.79
8.750	6.39	1.42	2.531	O					2.82
8.833	6.44	1.42	2.566	O					2.85
8.917	6.48	1.42	2.601	OI					2.88
9.000	6.53	1.42	2.636	OI					2.91
9.083	6.58	1.42	2.671	OI					2.94
9.167	6.62	1.42	2.707	OI					2.98
9.250	6.67	1.42	2.743	OI					3.01
9.333	6.72	1.42	2.779	OI					3.04
9.417	6.77	1.42	2.816	OI					3.07
9.500	6.82	1.42	2.853	OI					3.10

9.583	6.87	1.42	2.890	OI					3.14
9.667	6.92	1.42	2.928	OI					3.17
9.750	6.98	1.42	2.966	OI					3.20
9.833	7.03	1.42	3.004	OI					3.24
9.917	7.09	1.42	3.043	OI					3.27
10.000	7.15	1.42	3.082	OI					3.31
10.083	7.21	1.42	3.122	OI					3.34
10.167	7.27	1.42	3.162	OI					3.38
10.250	7.33	1.42	3.203	OI					3.41
10.333	7.39	1.42	3.243	OI					3.45
10.417	7.46	1.42	3.285	OI					3.49
10.500	7.52	1.42	3.327	OI					3.52
10.583	7.59	1.42	3.369	OI					3.56
10.667	7.66	1.42	3.412	OI					3.60
10.750	7.73	1.42	3.455	OI					3.63
10.833	7.80	1.42	3.498	OI					3.67
10.917	7.87	1.42	3.543	OI					3.71
11.000	7.95	1.42	3.587	OI					3.75
11.083	8.03	1.42	3.633	OI					3.78
11.167	8.11	1.42	3.678	OI					3.82
11.250	8.19	1.42	3.725	OI					3.86
11.333	8.27	1.42	3.772	OI					3.90
11.417	8.36	1.42	3.819	OI					3.94
11.500	8.45	1.42	3.867	OI					3.98
11.583	8.54	1.42	3.916	OI					4.03
11.667	8.63	1.42	3.965	OI					4.07
11.750	8.73	1.42	4.015	OI					4.11
11.833	8.83	1.42	4.066	OI					4.15
11.917	8.93	1.42	4.117	OI					4.20
12.000	9.04	1.42	4.169	OI					4.24
12.083	9.13	1.42	4.222	OI					4.29
12.167	9.12	1.42	4.275	OI					4.33
12.250	9.05	1.42	4.328	OI					4.38
12.333	9.08	1.42	4.381	OI					4.42
12.417	9.16	1.42	4.434	OI					4.47
12.500	9.25	1.68	4.486	OI					4.51
12.583	9.35	2.57	4.536	OI					4.55
12.667	9.47	3.37	4.580	OI					4.59
12.750	9.60	4.10	4.620	OI					4.63
12.833	9.73	4.75	4.656	OI					4.66
12.917	9.88	5.34	4.689	OI					4.68
13.000	10.03	5.88	4.719	OI					4.71
13.083	10.19	6.38	4.746	OI					4.73
13.167	10.36	6.83	4.772	IO					4.76
13.250	10.54	7.26	4.795	IO					4.78
13.333	10.72	7.65	4.817	IO					4.79
13.417	10.92	8.02	4.837	IO					4.81
13.500	11.12	8.37	4.857	IO					4.83
13.583	11.34	8.71	4.875	IO					4.84
13.667	11.56	9.03	4.893	IO					4.86
13.750	11.80	9.34	4.910	IO					4.87
13.833	12.05	9.64	4.927	IO					4.89
13.917	12.32	9.94	4.944	IO					4.90
14.000	12.60	10.24	4.960	IO					4.92
14.083	12.91	10.53	4.976	IOI					4.93
14.167	13.25	10.83	4.993	IOI					4.94
14.250	13.63	11.14	5.010	IOI					4.96
14.333	14.01	11.45	5.027	IOI					4.97
14.417	14.41	11.78	5.045	IOI					4.99
14.500	14.84	12.11	5.063	IOI					5.00
14.583	15.30	12.46	5.083	IOI					5.02
14.667	15.79	12.82	5.103	IOI					5.04
14.750	16.34	13.20	5.124	O					5.06

14.833	16.92	13.60	5.146	O					5.07
14.917	17.57	14.03	5.170	O					5.09
15.000	18.28	14.48	5.195	O					5.12
15.083	19.09	14.98	5.222	O					5.14
15.167	19.97	15.51	5.252	OI					5.16
15.250	20.99	16.09	5.284	OI					5.19
15.333	22.14	16.73	5.319	OI					5.22
15.417	23.33	17.44	5.358	OI					5.26
15.500	23.90	18.16	5.398	OI					5.29
15.583	24.28	18.86	5.437	OI					5.32
15.667	25.77	19.58	5.477	O					5.36
15.750	28.19	20.45	5.525	OI					5.40
15.833	31.71	21.56	5.586	OI					5.45
15.917	37.38	23.19	5.670	O I					5.52
16.000	48.36	26.03	5.796	O I					5.63
16.083	80.48	31.58	6.041	O	I				5.85
16.167	166.65	44.87	6.629	O			I		6.37
16.250	206.17	72.91	7.507	O		O		I	7.20
16.333	123.30	90.87	8.078	O		O	I		7.81
16.417	84.43	93.21	8.159	IO					7.90
16.500	64.67	89.85	8.042	I O					7.77
16.583	53.65	84.33	7.850	I O					7.54
16.667	44.27	77.10	7.631	I O					7.32
16.750	38.10	69.61	7.409	I O					7.11
16.833	33.12	62.52	7.200	I O					6.91
16.917	29.09	55.97	7.006	I O					6.72
17.000	25.64	50.01	6.829	I O					6.55
17.083	22.52	45.70	6.666	I O					6.40
17.167	19.98	42.17	6.509	I O					6.26
17.250	18.95	38.89	6.364	I O					6.14
17.333	17.88	35.93	6.234	I O					6.02
17.417	16.09	33.19	6.113	I O					5.91
17.500	14.84	30.63	5.999	I O					5.81
17.583	12.69	28.19	5.891	I O					5.72
17.667	12.04	25.91	5.790	I O					5.63
17.750	11.51	23.87	5.700	I O					5.55
17.833	11.06	22.16	5.619	I O					5.48
17.917	10.63	20.83	5.546	I O					5.42
18.000	10.26	19.61	5.479	I O					5.36
18.083	9.93	18.50	5.417	IO					5.31
18.167	9.74	17.48	5.361	IO					5.26
18.250	9.64	16.57	5.310	IO					5.21
18.333	9.46	15.75	5.265	IO					5.18
18.417	9.26	15.00	5.223	IO					5.14
18.500	9.06	14.31	5.185	IO					5.11
18.583	8.86	13.69	5.151	IO					5.08
18.667	8.68	13.11	5.119	IO					5.05
18.750	8.50	12.58	5.090	O					5.03
18.833	8.33	12.09	5.063	O					5.00
18.917	8.16	11.64	5.038	O					4.98
19.000	8.01	11.22	5.015	O					4.96
19.083	7.86	10.84	4.993	O					4.94
19.167	7.71	10.48	4.973	O					4.93
19.250	7.57	10.15	4.955	O					4.91
19.333	7.44	9.84	4.938	O					4.90
19.417	7.32	9.55	4.922	O					4.88
19.500	7.20	9.28	4.907	O					4.87
19.583	7.08	9.03	4.893	O					4.86
19.667	6.97	8.80	4.880	O					4.85
19.750	6.86	8.58	4.868	O					4.84
19.833	6.76	8.37	4.857	O					4.83
19.917	6.66	8.18	4.846	O					4.82
20.000	6.57	7.99	4.836	O					4.81

20.083	6.47	7.82	4.826	IO					4.80
20.167	6.39	7.66	4.817	IO					4.79
20.250	6.30	7.50	4.809	IO					4.79
20.333	6.22	7.36	4.801	IO					4.78
20.417	6.14	7.22	4.793	IO					4.77
20.500	6.06	7.09	4.786	IO					4.77
20.583	5.99	6.96	4.779	IO					4.76
20.667	5.92	6.84	4.772	IO					4.76
20.750	5.85	6.73	4.766	IO					4.75
20.833	5.78	6.62	4.760	IO					4.75
20.917	5.71	6.52	4.754	IO					4.74
21.000	5.65	6.42	4.749	O					4.74
21.083	5.59	6.33	4.744	O					4.73
21.167	5.53	6.24	4.739	O					4.73
21.250	5.47	6.15	4.734	O					4.72
21.333	5.41	6.07	4.729	O					4.72
21.417	5.35	5.99	4.725	O					4.72
21.500	5.30	5.91	4.720	O					4.71
21.583	5.25	5.84	4.716	O					4.71
21.667	5.20	5.76	4.712	O					4.70
21.750	5.15	5.69	4.709	O					4.70
21.833	5.10	5.63	4.705	O					4.70
21.917	5.05	5.56	4.701	O					4.70
22.000	5.00	5.50	4.698	O					4.69
22.083	4.96	5.44	4.694	O					4.69
22.167	4.92	5.38	4.691	O					4.69
22.250	4.87	5.32	4.688	O					4.68
22.333	4.83	5.27	4.685	O					4.68
22.417	4.79	5.21	4.682	O					4.68
22.500	4.75	5.16	4.679	O					4.68
22.583	4.71	5.11	4.676	O					4.67
22.667	4.67	5.06	4.674	O					4.67
22.750	4.63	5.01	4.671	O					4.67
22.833	4.60	4.97	4.668	O					4.67
22.917	4.56	4.92	4.666	O					4.67
23.000	4.52	4.88	4.663	O					4.66
23.083	4.49	4.83	4.661	O					4.66
23.167	4.46	4.79	4.659	O					4.66
23.250	4.42	4.75	4.656	O					4.66
23.333	4.39	4.71	4.654	O					4.66
23.417	4.36	4.67	4.652	O					4.65
23.500	4.33	4.63	4.650	O					4.65
23.583	4.29	4.59	4.648	O					4.65
23.667	4.26	4.56	4.646	O					4.65
23.750	4.23	4.52	4.644	O					4.65
23.833	4.21	4.49	4.642	O					4.64
23.917	4.18	4.45	4.640	O					4.64
24.000	4.15	4.42	4.638	O					4.64
24.083	3.99	4.38	4.636	O					4.64
24.167	3.14	4.28	4.630	O					4.63
24.250	1.87	4.07	4.619	O					4.63
24.333	1.26	3.78	4.602	O					4.61
24.417	0.91	3.46	4.585	O					4.60
24.500	0.68	3.15	4.568	O					4.58
24.583	0.51	2.85	4.551	O					4.57
24.667	0.39	2.57	4.536	O					4.55
24.750	0.29	2.31	4.521	O					4.54
24.833	0.22	2.07	4.508	O					4.53
24.917	0.16	1.85	4.496	O					4.52
25.000	0.12	1.65	4.485	O					4.51
25.083	0.09	1.47	4.475	O					4.50
25.167	0.07	1.42	4.465	O					4.49
25.250	0.05	1.42	4.456	O					4.49

25.333	0.03	1.42	4.446	O					4.48
25.417	0.01	1.42	4.437	O					4.47
25.500	0.00	1.42	4.427	O					4.46
25.583	0.00	1.42	4.417	O					4.45
25.667	0.00	1.42	4.407	O					4.44
25.750	0.00	1.42	4.398	O					4.44
25.833	0.00	1.42	4.388	O					4.43
25.917	0.00	1.42	4.378	O					4.42
26.000	0.00	1.42	4.368	O					4.41
26.083	0.00	1.42	4.359	O					4.40
26.167	0.00	1.42	4.349	O					4.39
26.250	0.00	1.42	4.339	O					4.39
26.333	0.00	1.42	4.329	O					4.38
26.417	0.00	1.42	4.319	O					4.37
26.500	0.00	1.42	4.310	O					4.36
26.583	0.00	1.42	4.300	O					4.35
26.667	0.00	1.42	4.290	O					4.34
26.750	0.00	1.42	4.280	O					4.34
26.833	0.00	1.42	4.270	O					4.33
26.917	0.00	1.42	4.261	O					4.32
27.000	0.00	1.42	4.251	O					4.31
27.083	0.00	1.42	4.241	O					4.30
27.167	0.00	1.42	4.231	O					4.29
27.250	0.00	1.42	4.222	O					4.29
27.333	0.00	1.42	4.212	O					4.28
27.417	0.00	1.42	4.202	O					4.27
27.500	0.00	1.42	4.192	O					4.26
27.583	0.00	1.42	4.182	O					4.25
27.667	0.00	1.42	4.173	O					4.24
27.750	0.00	1.42	4.163	O					4.24
27.833	0.00	1.42	4.153	O					4.23
27.917	0.00	1.42	4.143	O					4.22
28.000	0.00	1.42	4.134	O					4.21
28.083	0.00	1.42	4.124	O					4.20
28.167	0.00	1.42	4.114	O					4.19
28.250	0.00	1.42	4.104	O					4.19
28.333	0.00	1.42	4.094	O					4.18
28.417	0.00	1.42	4.085	O					4.17
28.500	0.00	1.42	4.075	O					4.16
28.583	0.00	1.42	4.065	O					4.15
28.667	0.00	1.42	4.055	O					4.14
28.750	0.00	1.42	4.046	O					4.14
28.833	0.00	1.42	4.036	O					4.13
28.917	0.00	1.42	4.026	O					4.12
29.000	0.00	1.42	4.016	O					4.11
29.083	0.00	1.42	4.006	O					4.10
29.167	0.00	1.42	3.997	O					4.09
29.250	0.00	1.42	3.987	O					4.09
29.333	0.00	1.42	3.977	O					4.08
29.417	0.00	1.42	3.967	O					4.07
29.500	0.00	1.42	3.958	O					4.06
29.583	0.00	1.42	3.948	O					4.05
29.667	0.00	1.42	3.938	O					4.04
29.750	0.00	1.42	3.928	O					4.04
29.833	0.00	1.42	3.918	O					4.03
29.917	0.00	1.42	3.909	O					4.02
30.000	0.00	1.42	3.899	O					4.01
30.083	0.00	1.42	3.889	O					4.00
30.167	0.00	1.42	3.879	O					3.99
30.250	0.00	1.42	3.870	O					3.99
30.333	0.00	1.42	3.860	O					3.98
30.417	0.00	1.42	3.850	O					3.97
30.500	0.00	1.42	3.840	O					3.96

30.583	0.00	1.42	3.830	O					3.95
30.667	0.00	1.42	3.821	O					3.94
30.750	0.00	1.42	3.811	O					3.94
30.833	0.00	1.42	3.801	O					3.93
30.917	0.00	1.42	3.791	O					3.92
31.000	0.00	1.42	3.782	O					3.91
31.083	0.00	1.42	3.772	O					3.90
31.167	0.00	1.42	3.762	O					3.89
31.250	0.00	1.42	3.752	O					3.89
31.333	0.00	1.42	3.742	O					3.88
31.417	0.00	1.42	3.733	O					3.87
31.500	0.00	1.42	3.723	O					3.86
31.583	0.00	1.42	3.713	O					3.85
31.667	0.00	1.42	3.703	O					3.84
31.750	0.00	1.42	3.693	O					3.84
31.833	0.00	1.42	3.684	O					3.83
31.917	0.00	1.42	3.674	O					3.82
32.000	0.00	1.42	3.664	O					3.81
32.083	0.00	1.42	3.654	O					3.80
32.167	0.00	1.42	3.645	O					3.79
32.250	0.00	1.42	3.635	O					3.79
32.333	0.00	1.42	3.625	O					3.78
32.417	0.00	1.42	3.615	O					3.77
32.500	0.00	1.42	3.605	O					3.76
32.583	0.00	1.42	3.596	O					3.75
32.667	0.00	1.42	3.586	O					3.74
32.750	0.00	1.42	3.576	O					3.74
32.833	0.00	1.42	3.566	O					3.73
32.917	0.00	1.42	3.557	O					3.72
33.000	0.00	1.42	3.547	O					3.71
33.083	0.00	1.42	3.537	O					3.70
33.167	0.00	1.42	3.527	O					3.69
33.250	0.00	1.42	3.517	O					3.69
33.333	0.00	1.42	3.508	O					3.68
33.417	0.00	1.42	3.498	O					3.67
33.500	0.00	1.42	3.488	O					3.66
33.583	0.00	1.42	3.478	O					3.65
33.667	0.00	1.42	3.469	O					3.64
33.750	0.00	1.42	3.459	O					3.64
33.833	0.00	1.42	3.449	O					3.63
33.917	0.00	1.42	3.439	O					3.62
34.000	0.00	1.42	3.429	O					3.61
34.083	0.00	1.42	3.420	O					3.60
34.167	0.00	1.42	3.410	O					3.59
34.250	0.00	1.42	3.400	O					3.59
34.333	0.00	1.42	3.390	O					3.58
34.417	0.00	1.42	3.381	O					3.57
34.500	0.00	1.42	3.371	O					3.56
34.583	0.00	1.42	3.361	O					3.55
34.667	0.00	1.42	3.351	O					3.54
34.750	0.00	1.42	3.341	O					3.54
34.833	0.00	1.42	3.332	O					3.53
34.917	0.00	1.42	3.322	O					3.52
35.000	0.00	1.42	3.312	O					3.51
35.083	0.00	1.42	3.302	O					3.50
35.167	0.00	1.42	3.293	O					3.49
35.250	0.00	1.42	3.283	O					3.48
35.333	0.00	1.42	3.273	O					3.48
35.417	0.00	1.42	3.263	O					3.47
35.500	0.00	1.42	3.253	O					3.46
35.583	0.00	1.42	3.244	O					3.45
35.667	0.00	1.42	3.234	O					3.44
35.750	0.00	1.42	3.224	O					3.43

35.833	0.00	1.42	3.214	O					3.42
35.917	0.00	1.42	3.205	O					3.42
36.000	0.00	1.42	3.195	O					3.41
36.083	0.00	1.42	3.185	O					3.40
36.167	0.00	1.42	3.175	O					3.39
36.250	0.00	1.42	3.165	O					3.38
36.333	0.00	1.42	3.156	O					3.37
36.417	0.00	1.42	3.146	O					3.36
36.500	0.00	1.42	3.136	O					3.36
36.583	0.00	1.42	3.126	O					3.35
36.667	0.00	1.42	3.116	O					3.34
36.750	0.00	1.42	3.107	O					3.33
36.833	0.00	1.42	3.097	O					3.32
36.917	0.00	1.42	3.087	O					3.31
37.000	0.00	1.42	3.077	O					3.30
37.083	0.00	1.42	3.068	O					3.29
37.167	0.00	1.42	3.058	O					3.29
37.250	0.00	1.42	3.048	O					3.28
37.333	0.00	1.42	3.038	O					3.27
37.417	0.00	1.42	3.028	O					3.26
37.500	0.00	1.42	3.019	O					3.25
37.583	0.00	1.42	3.009	O					3.24
37.667	0.00	1.42	2.999	O					3.23
37.750	0.00	1.42	2.989	O					3.23
37.833	0.00	1.42	2.980	O					3.22
37.917	0.00	1.42	2.970	O					3.21
38.000	0.00	1.42	2.960	O					3.20
38.083	0.00	1.42	2.950	O					3.19
38.167	0.00	1.42	2.940	O					3.18
38.250	0.00	1.42	2.931	O					3.17
38.333	0.00	1.42	2.921	O					3.17
38.417	0.00	1.42	2.911	O					3.16
38.500	0.00	1.42	2.901	O					3.15
38.583	0.00	1.42	2.892	O					3.14
38.667	0.00	1.42	2.882	O					3.13
38.750	0.00	1.42	2.872	O					3.12
38.833	0.00	1.42	2.862	O					3.11
38.917	0.00	1.42	2.852	O					3.10
39.000	0.00	1.42	2.843	O					3.10
39.083	0.00	1.42	2.833	O					3.09
39.167	0.00	1.42	2.823	O					3.08
39.250	0.00	1.42	2.813	O					3.07
39.333	0.00	1.42	2.804	O					3.06
39.417	0.00	1.42	2.794	O					3.05
39.500	0.00	1.42	2.784	O					3.04
39.583	0.00	1.42	2.774	O					3.04
39.667	0.00	1.42	2.764	O					3.03
39.750	0.00	1.42	2.755	O					3.02
39.833	0.00	1.42	2.745	O					3.01
39.917	0.00	1.42	2.735	O					3.00
40.000	0.00	1.42	2.725	O					2.99
40.083	0.00	1.42	2.716	O					2.98
40.167	0.00	1.42	2.706	O					2.98
40.250	0.00	1.42	2.696	O					2.97
40.333	0.00	1.42	2.686	O					2.96
40.417	0.00	1.42	2.676	O					2.95
40.500	0.00	1.42	2.667	O					2.94
40.583	0.00	1.42	2.657	O					2.93
40.667	0.00	1.42	2.647	O					2.92
40.750	0.00	1.42	2.637	O					2.91
40.833	0.00	1.42	2.628	O					2.91
40.917	0.00	1.42	2.618	O					2.90
41.000	0.00	1.42	2.608	O					2.89

41.083	0.00	1.42	2.598	O					2.88
41.167	0.00	1.42	2.588	O					2.87
41.250	0.00	1.42	2.579	O					2.86
41.333	0.00	1.42	2.569	O					2.85
41.417	0.00	1.42	2.559	O					2.85
41.500	0.00	1.42	2.549	O					2.84
41.583	0.00	1.42	2.539	O					2.83
41.667	0.00	1.42	2.530	O					2.82
41.750	0.00	1.42	2.520	O					2.81
41.833	0.00	1.42	2.510	O					2.80
41.917	0.00	1.42	2.500	O					2.79
42.000	0.00	1.42	2.491	O					2.78
42.083	0.00	1.42	2.481	O					2.78
42.167	0.00	1.42	2.471	O					2.77
42.250	0.00	1.42	2.461	O					2.76
42.333	0.00	1.42	2.451	O					2.75
42.417	0.00	1.42	2.442	O					2.74
42.500	0.00	1.42	2.432	O					2.73
42.583	0.00	1.42	2.422	O					2.72
42.667	0.00	1.42	2.412	O					2.72
42.750	0.00	1.42	2.403	O					2.71
42.833	0.00	1.42	2.393	O					2.70
42.917	0.00	1.42	2.383	O					2.69
43.000	0.00	1.42	2.373	O					2.68
43.083	0.00	1.42	2.363	O					2.67
43.167	0.00	1.42	2.354	O					2.66
43.250	0.00	1.42	2.344	O					2.66
43.333	0.00	1.42	2.334	O					2.65
43.417	0.00	1.42	2.324	O					2.64
43.500	0.00	1.42	2.315	O					2.63
43.583	0.00	1.42	2.305	O					2.62
43.667	0.00	1.42	2.295	O					2.61
43.750	0.00	1.42	2.285	O					2.60
43.833	0.00	1.42	2.275	O					2.59
43.917	0.00	1.42	2.266	O					2.59
44.000	0.00	1.42	2.256	O					2.58
44.083	0.00	1.42	2.246	O					2.57
44.167	0.00	1.42	2.236	O					2.56
44.250	0.00	1.42	2.227	O					2.55
44.333	0.00	1.42	2.217	O					2.54
44.417	0.00	1.42	2.207	O					2.53
44.500	0.00	1.42	2.197	O					2.53
44.583	0.00	1.42	2.187	O					2.52
44.667	0.00	1.42	2.178	O					2.51
44.750	0.00	1.42	2.168	O					2.50
44.833	0.00	1.42	2.158	O					2.49
44.917	0.00	1.42	2.148	O					2.48
45.000	0.00	1.42	2.139	O					2.47
45.083	0.00	1.42	2.129	O					2.46
45.167	0.00	1.42	2.119	O					2.45
45.250	0.00	1.42	2.109	O					2.44
45.333	0.00	1.42	2.099	O					2.43
45.417	0.00	1.42	2.090	O					2.42
45.500	0.00	1.42	2.080	O					2.42
45.583	0.00	1.42	2.070	O					2.41
45.667	0.00	1.42	2.060	O					2.40
45.750	0.00	1.42	2.051	O					2.39
45.833	0.00	1.42	2.041	O					2.38
45.917	0.00	1.42	2.031	O					2.37
46.000	0.00	1.42	2.021	O					2.36
46.083	0.00	1.42	2.011	O					2.35
46.167	0.00	1.42	2.002	O					2.34
46.250	0.00	1.42	1.992	O					2.33

46.333	0.00	1.42	1.982	O					2.32
46.417	0.00	1.42	1.972	O					2.31
46.500	0.00	1.42	1.962	O					2.30
46.583	0.00	1.42	1.953	O					2.29
46.667	0.00	1.42	1.943	O					2.28
46.750	0.00	1.42	1.933	O					2.27
46.833	0.00	1.42	1.923	O					2.27
46.917	0.00	1.42	1.914	O					2.26
47.000	0.00	1.42	1.904	O					2.25
47.083	0.00	1.42	1.894	O					2.24
47.167	0.00	1.42	1.884	O					2.23
47.250	0.00	1.42	1.874	O					2.22
47.333	0.00	1.42	1.865	O					2.21
47.417	0.00	1.42	1.855	O					2.20
47.500	0.00	1.42	1.845	O					2.19
47.583	0.00	1.42	1.835	O					2.18
47.667	0.00	1.42	1.826	O					2.17
47.750	0.00	1.42	1.816	O					2.16
47.833	0.00	1.42	1.806	O					2.15
47.917	0.00	1.42	1.796	O					2.14
48.000	0.00	1.42	1.786	O					2.13
48.083	0.00	1.42	1.777	O					2.12
48.167	0.00	1.42	1.767	O					2.11
48.250	0.00	1.42	1.757	O					2.11
48.333	0.00	1.42	1.747	O					2.10
48.417	0.00	1.42	1.738	O					2.09
48.500	0.00	1.42	1.728	O					2.08
48.583	0.00	1.42	1.718	O					2.07
48.667	0.00	1.42	1.708	O					2.06
48.750	0.00	1.42	1.698	O					2.05
48.833	0.00	1.42	1.689	O					2.04
48.917	0.00	1.42	1.679	O					2.03
49.000	0.00	1.42	1.669	O					2.02
49.083	0.00	1.42	1.659	O					2.01
49.167	0.00	1.42	1.650	O					2.00
49.250	0.00	1.42	1.640	O					1.99
49.333	0.00	1.42	1.630	O					1.98
49.417	0.00	1.42	1.620	O					1.97
49.500	0.00	1.42	1.610	O					1.96
49.583	0.00	1.42	1.601	O					1.95
49.667	0.00	1.42	1.591	O					1.95
49.750	0.00	1.42	1.581	O					1.94
49.833	0.00	1.42	1.571	O					1.93
49.917	0.00	1.42	1.562	O					1.92
50.000	0.00	1.42	1.552	O					1.91
50.083	0.00	1.42	1.542	O					1.90
50.167	0.00	1.42	1.532	O					1.89
50.250	0.00	1.42	1.522	O					1.88
50.333	0.00	1.42	1.513	O					1.87
50.417	0.00	1.42	1.503	O					1.86
50.500	0.00	1.42	1.493	O					1.85
50.583	0.00	1.42	1.483	O					1.84
50.667	0.00	1.42	1.474	O					1.83
50.750	0.00	1.42	1.464	O					1.82
50.833	0.00	1.42	1.454	O					1.81
50.917	0.00	1.42	1.444	O					1.80
51.000	0.00	1.42	1.434	O					1.80
51.083	0.00	1.42	1.425	O					1.79
51.167	0.00	1.42	1.415	O					1.78
51.250	0.00	1.42	1.405	O					1.77
51.333	0.00	1.42	1.395	O					1.76
51.417	0.00	1.42	1.385	O					1.75
51.500	0.00	1.42	1.376	O					1.74

51.583	0.00	1.42	1.366	O					1.73
51.667	0.00	1.42	1.356	O					1.72
51.750	0.00	1.42	1.346	O					1.71
51.833	0.00	1.42	1.337	O					1.70
51.917	0.00	1.42	1.327	O					1.69
52.000	0.00	1.42	1.317	O					1.68
52.083	0.00	1.42	1.307	O					1.67
52.167	0.00	1.42	1.297	O					1.66
52.250	0.00	1.42	1.288	O					1.65
52.333	0.00	1.42	1.278	O					1.64
52.417	0.00	1.42	1.268	O					1.64
52.500	0.00	1.42	1.258	O					1.63
52.583	0.00	1.42	1.249	O					1.62
52.667	0.00	1.42	1.239	O					1.61
52.750	0.00	1.42	1.229	O					1.60
52.833	0.00	1.42	1.219	O					1.59
52.917	0.00	1.42	1.209	O					1.58
53.000	0.00	1.42	1.200	O					1.57
53.083	0.00	1.42	1.190	O					1.56
53.167	0.00	1.42	1.180	O					1.55
53.250	0.00	1.42	1.170	O					1.54
53.333	0.00	1.42	1.161	O					1.53
53.417	0.00	1.42	1.151	O					1.52
53.500	0.00	1.42	1.141	O					1.51
53.583	0.00	1.42	1.131	O					1.50
53.667	0.00	1.42	1.121	O					1.49
53.750	0.00	1.42	1.112	O					1.48
53.833	0.00	1.42	1.102	O					1.47
53.917	0.00	1.42	1.092	O					1.46
54.000	0.00	1.42	1.082	O					1.45
54.083	0.00	1.42	1.073	O					1.44
54.167	0.00	1.42	1.063	O					1.42
54.250	0.00	1.42	1.053	O					1.41
54.333	0.00	1.42	1.043	O					1.40
54.417	0.00	1.42	1.033	O					1.39
54.500	0.00	1.42	1.024	O					1.38
54.583	0.00	1.42	1.014	O					1.37
54.667	0.00	1.42	1.004	O					1.35
54.750	0.00	1.42	0.994	O					1.34
54.833	0.00	1.42	0.985	O					1.33
54.917	0.00	1.42	0.975	O					1.32
55.000	0.00	1.42	0.965	O					1.31
55.083	0.00	1.42	0.955	O					1.30
55.167	0.00	1.42	0.945	O					1.28
55.250	0.00	1.42	0.936	O					1.27
55.333	0.00	1.42	0.926	O					1.26
55.417	0.00	1.42	0.916	O					1.25
55.500	0.00	1.42	0.906	O					1.24
55.583	0.00	1.42	0.897	O					1.23
55.667	0.00	1.42	0.887	O					1.22
55.750	0.00	1.42	0.877	O					1.20
55.833	0.00	1.42	0.867	O					1.19
55.917	0.00	1.42	0.857	O					1.18
56.000	0.00	1.42	0.848	O					1.17
56.083	0.00	1.42	0.838	O					1.16
56.167	0.00	1.42	0.828	O					1.15
56.250	0.00	1.42	0.818	O					1.13
56.333	0.00	1.42	0.809	O					1.12
56.417	0.00	1.42	0.799	O					1.11
56.500	0.00	1.42	0.789	O					1.10
56.583	0.00	1.42	0.779	O					1.09
56.667	0.00	1.42	0.769	O					1.08
56.750	0.00	1.42	0.760	O					1.06

56.833	0.00	1.42	0.750	O					1.05
56.917	0.00	1.42	0.740	O					1.04
57.000	0.00	1.42	0.730	O					1.03
57.083	0.00	1.42	0.720	O					1.02
57.167	0.00	1.42	0.711	O					1.01
57.250	0.00	1.42	0.701	O					1.00
57.333	0.00	1.42	0.691	O					0.98
57.417	0.00	1.42	0.681	O					0.97
57.500	0.00	1.42	0.672	O					0.96
57.583	0.00	1.42	0.662	O					0.95
57.667	0.00	1.42	0.652	O					0.94
57.750	0.00	1.42	0.642	O					0.93
57.833	0.00	1.42	0.632	O					0.91
57.917	0.00	1.42	0.623	O					0.90
58.000	0.00	1.42	0.613	O					0.89
58.083	0.00	1.42	0.603	O					0.88
58.167	0.00	1.42	0.593	O					0.87
58.250	0.00	1.42	0.584	O					0.86
58.333	0.00	1.42	0.574	O					0.84
58.417	0.00	1.42	0.564	O					0.83
58.500	0.00	1.42	0.554	O					0.82
58.583	0.00	1.42	0.544	O					0.81
58.667	0.00	1.42	0.535	O					0.80
58.750	0.00	1.42	0.525	O					0.79
58.833	0.00	1.42	0.515	O					0.78
58.917	0.00	1.42	0.505	O					0.76
59.000	0.00	1.42	0.496	O					0.75
59.083	0.00	1.42	0.486	O					0.74
59.167	0.00	1.42	0.476	O					0.73
59.250	0.00	1.42	0.466	O					0.72
59.333	0.00	1.42	0.456	O					0.71
59.417	0.00	1.42	0.447	O					0.69
59.500	0.00	1.42	0.437	O					0.68
59.583	0.00	1.42	0.427	O					0.67
59.667	0.00	1.42	0.417	O					0.66
59.750	0.00	1.42	0.408	O					0.65
59.833	0.00	1.42	0.398	O					0.64
59.917	0.00	1.42	0.388	O					0.62
60.000	0.00	1.42	0.378	O					0.61
60.083	0.00	1.42	0.368	O					0.60
60.167	0.00	1.42	0.359	O					0.59
60.250	0.00	1.42	0.349	O					0.58
60.333	0.00	1.42	0.339	O					0.57
60.417	0.00	1.42	0.329	O					0.55
60.500	0.00	1.42	0.320	O					0.54
60.583	0.00	1.42	0.310	O					0.53
60.667	0.00	1.42	0.300	O					0.52
60.750	0.00	1.42	0.290	O					0.51
60.833	0.00	1.41	0.280	O					0.50
60.917	0.00	1.36	0.271	O					0.48
61.000	0.00	1.31	0.262	O					0.46
61.083	0.00	1.27	0.253	O					0.45
61.167	0.00	1.23	0.244	O					0.43
61.250	0.00	1.18	0.236	O					0.42
61.333	0.00	1.14	0.228	O					0.40
61.417	0.00	1.10	0.220	O					0.39
61.500	0.00	1.07	0.213	O					0.38
61.583	0.00	1.03	0.205	O					0.36
61.667	0.00	1.00	0.198	O					0.35
61.750	0.00	0.96	0.192	O					0.34
61.833	0.00	0.93	0.185	O					0.33
61.917	0.00	0.90	0.179	O					0.32
62.000	0.00	0.87	0.173	O					0.31

62.083	0.00	0.84	0.167	O					0.30
62.167	0.00	0.81	0.161	O					0.29
62.250	0.00	0.78	0.156	O					0.28
62.333	0.00	0.76	0.151	O					0.27
62.417	0.00	0.73	0.145	O					0.26
62.500	0.00	0.70	0.140	O					0.25
62.583	0.00	0.68	0.136	O					0.24
62.667	0.00	0.66	0.131	O					0.23
62.750	0.00	0.64	0.127	O					0.22
62.833	0.00	0.61	0.122	O					0.22
62.917	0.00	0.59	0.118	O					0.21
63.000	0.00	0.57	0.114	O					0.20
63.083	0.00	0.55	0.110	O					0.19
63.167	0.00	0.53	0.107	O					0.19
63.250	0.00	0.52	0.103	O					0.18
63.333	0.00	0.50	0.099	O					0.18
63.417	0.00	0.48	0.096	O					0.17
63.500	0.00	0.47	0.093	O					0.16
63.583	0.00	0.45	0.090	O					0.16
63.667	0.00	0.43	0.087	O					0.15
63.750	0.00	0.42	0.084	O					0.15
63.833	0.00	0.41	0.081	O					0.14
63.917	0.00	0.39	0.078	O					0.14
64.000	0.00	0.38	0.075	O					0.13
64.083	0.00	0.37	0.073	O					0.13
64.167	0.00	0.35	0.070	O					0.12
64.250	0.00	0.34	0.068	O					0.12
64.333	0.00	0.33	0.066	O					0.12
64.417	0.00	0.32	0.063	O					0.11
64.500	0.00	0.31	0.061	O					0.11
64.583	0.00	0.30	0.059	O					0.10
64.667	0.00	0.29	0.057	O					0.10
64.750	0.00	0.28	0.055	O					0.10
64.833	0.00	0.27	0.053	O					0.09
64.917	0.00	0.26	0.052	O					0.09
65.000	0.00	0.25	0.050	O					0.09
65.083	0.00	0.24	0.048	O					0.09
65.167	0.00	0.23	0.046	O					0.08
65.250	0.00	0.23	0.045	O					0.08
65.333	0.00	0.22	0.043	O					0.08
65.417	0.00	0.21	0.042	O					0.07
65.500	0.00	0.20	0.040	O					0.07
65.583	0.00	0.20	0.039	O					0.07
65.667	0.00	0.19	0.038	O					0.07
65.750	0.00	0.18	0.037	O					0.06
65.833	0.00	0.18	0.035	O					0.06
65.917	0.00	0.17	0.034	O					0.06
66.000	0.00	0.17	0.033	O					0.06
66.083	0.00	0.16	0.032	O					0.06
66.167	0.00	0.15	0.031	O					0.05
66.250	0.00	0.15	0.030	O					0.05
66.333	0.00	0.14	0.029	O					0.05
66.417	0.00	0.14	0.028	O					0.05
66.500	0.00	0.13	0.027	O					0.05
66.583	0.00	0.13	0.026	O					0.05
66.667	0.00	0.13	0.025	O					0.04
66.750	0.00	0.12	0.024	O					0.04
66.833	0.00	0.12	0.023	O					0.04
66.917	0.00	0.11	0.022	O					0.04
67.000	0.00	0.11	0.022	O					0.04
67.083	0.00	0.11	0.021	O					0.04
67.167	0.00	0.10	0.020	O					0.04
67.250	0.00	0.10	0.020	O					0.03

67.333	0.00	0.09	0.019	O					0.03
67.417	0.00	0.09	0.018	O					0.03
67.500	0.00	0.09	0.018	O					0.03
67.583	0.00	0.09	0.017	O					0.03
67.667	0.00	0.08	0.016	O					0.03
67.750	0.00	0.08	0.016	O					0.03
67.833	0.00	0.08	0.015	O					0.03
67.917	0.00	0.07	0.015	O					0.03
68.000	0.00	0.07	0.014	O					0.03
68.083	0.00	0.07	0.014	O					0.02
68.167	0.00	0.07	0.013	O					0.02
68.250	0.00	0.06	0.013	O					0.02
68.333	0.00	0.06	0.013	O					0.02
68.417	0.00	0.06	0.012	O					0.02
68.500	0.00	0.06	0.012	O					0.02
68.583	0.00	0.06	0.011	O					0.02
68.667	0.00	0.05	0.011	O					0.02
68.750	0.00	0.05	0.011	O					0.02
68.833	0.00	0.05	0.010	O					0.02
68.917	0.00	0.05	0.010	O					0.02
69.000	0.00	0.05	0.009	O					0.02
69.083	0.00	0.05	0.009	O					0.02
69.167	0.00	0.04	0.009	O					0.02
69.250	0.00	0.04	0.009	O					0.02
69.333	0.00	0.04	0.008	O					0.01
69.417	0.00	0.04	0.008	O					0.01
69.500	0.00	0.04	0.008	O					0.01
69.583	0.00	0.04	0.007	O					0.01
69.667	0.00	0.04	0.007	O					0.01
69.750	0.00	0.03	0.007	O					0.01
69.833	0.00	0.03	0.007	O					0.01
69.917	0.00	0.03	0.006	O					0.01
70.000	0.00	0.03	0.006	O					0.01
70.083	0.00	0.03	0.006	O					0.01
70.167	0.00	0.03	0.006	O					0.01
70.250	0.00	0.03	0.006	O					0.01
70.333	0.00	0.03	0.005	O					0.01
70.417	0.00	0.03	0.005	O					0.01
70.500	0.00	0.03	0.005	O					0.01
70.583	0.00	0.02	0.005	O					0.01
70.667	0.00	0.02	0.005	O					0.01
70.750	0.00	0.02	0.005	O					0.01
70.833	0.00	0.02	0.004	O					0.01
70.917	0.00	0.02	0.004	O					0.01
71.000	0.00	0.02	0.004	O					0.01
71.083	0.00	0.02	0.004	O					0.01
71.167	0.00	0.02	0.004	O					0.01
71.250	0.00	0.02	0.004	O					0.01
71.333	0.00	0.02	0.004	O					0.01
71.417	0.00	0.02	0.003	O					0.01
71.500	0.00	0.02	0.003	O					0.01
71.583	0.00	0.02	0.003	O					0.01
71.667	0.00	0.02	0.003	O					0.01
71.750	0.00	0.02	0.003	O					0.01
71.833	0.00	0.01	0.003	O					0.01
71.917	0.00	0.01	0.003	O					0.00
72.000	0.00	0.01	0.003	O					0.00
72.083	0.00	0.01	0.003	O					0.00
72.167	0.00	0.01	0.003	O					0.00
72.250	0.00	0.01	0.002	O					0.00
72.333	0.00	0.01	0.002	O					0.00
72.417	0.00	0.01	0.002	O					0.00
72.500	0.00	0.01	0.002	O					0.00

72.583	0.00	0.01	0.002	O					0.00
72.667	0.00	0.01	0.002	O					0.00
72.750	0.00	0.01	0.002	O					0.00
72.833	0.00	0.01	0.002	O					0.00
72.917	0.00	0.01	0.002	O					0.00
73.000	0.00	0.01	0.002	O					0.00
73.083	0.00	0.01	0.002	O					0.00
73.167	0.00	0.01	0.002	O					0.00
73.250	0.00	0.01	0.002	O					0.00
73.333	0.00	0.01	0.002	O					0.00
73.417	0.00	0.01	0.002	O					0.00
73.500	0.00	0.01	0.001	O					0.00
73.583	0.00	0.01	0.001	O					0.00
73.667	0.00	0.01	0.001	O					0.00
73.750	0.00	0.01	0.001	O					0.00
73.833	0.00	0.01	0.001	O					0.00
73.917	0.00	0.01	0.001	O					0.00
74.000	0.00	0.01	0.001	O					0.00
74.083	0.00	0.01	0.001	O					0.00
74.167	0.00	0.01	0.001	O					0.00
74.250	0.00	0.01	0.001	O					0.00
74.333	0.00	0.01	0.001	O					0.00
74.417	0.00	0.01	0.001	O					0.00
74.500	0.00	0.00	0.001	O					0.00
74.583	0.00	0.00	0.001	O					0.00
74.667	0.00	0.00	0.001	O					0.00
74.750	0.00	0.00	0.001	O					0.00
74.833	0.00	0.00	0.001	O					0.00
74.917	0.00	0.00	0.001	O					0.00
75.000	0.00	0.00	0.001	O					0.00
75.083	0.00	0.00	0.001	O					0.00
75.167	0.00	0.00	0.001	O					0.00
75.250	0.00	0.00	0.001	O					0.00
75.333	0.00	0.00	0.001	O					0.00
75.417	0.00	0.00	0.001	O					0.00
75.500	0.00	0.00	0.001	O					0.00
75.583	0.00	0.00	0.001	O					0.00
75.667	0.00	0.00	0.001	O					0.00
75.750	0.00	0.00	0.001	O					0.00
75.833	0.00	0.00	0.001	O					0.00

*****HYDROGRAPH DATA*****

Number of intervals = 910

Time interval = 5.0 (Min.)

Maximum/Peak flow rate = 93.211 (CFS)

Total volume = 21.610 (Ac.Ft)

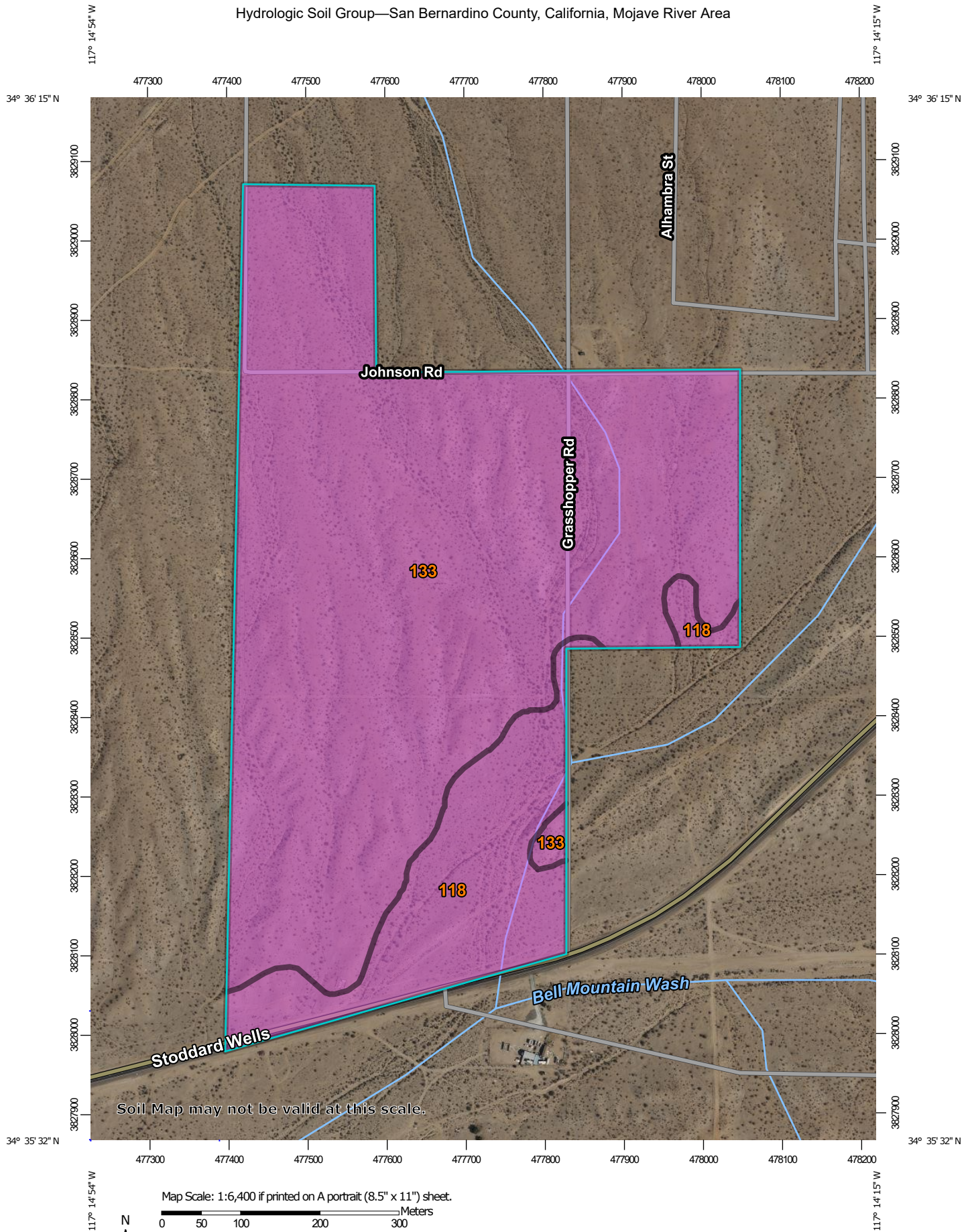
Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

Appendix E

Soil Group Map and NOAA 14 ATLAS

Hydrologic Soil Group—San Bernardino County, California, Mojave River Area



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: San Bernardino County, California, Mojave River Area

Survey Area Data: Version 16, Aug 30, 2024

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

Date(s) aerial images were photographed: Mar 17, 2022—Jun 12, 2022

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
118	CAJON-ARIZO COMPLEX, 2 TO 15 PERCENT SLOPES*	A	18.8	16.7%
133	HELENDALE-BRYMAN LOAMY SANDS, 2 TO 5 PERCENT SLOPES*	A	93.4	83.3%
Totals for Area of Interest			112.1	100.0%

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



NOAA Atlas 14, Volume 6, Version 2
Location name: Apple Valley, California, USA*
Latitude: 34.5972°, Longitude: -117.2444°
Elevation: 2958 ft**

* source: ESRI Maps

** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerals](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.087 (0.071-0.106)	0.121 (0.099-0.148)	0.169 (0.138-0.208)	0.210 (0.171-0.261)	0.270 (0.213-0.346)	0.319 (0.246-0.418)	0.372 (0.280-0.499)	0.430 (0.315-0.592)	0.513 (0.361-0.736)	0.581 (0.396-0.863)
10-min	0.124 (0.102-0.152)	0.173 (0.143-0.213)	0.242 (0.198-0.298)	0.301 (0.245-0.374)	0.387 (0.305-0.496)	0.458 (0.353-0.599)	0.533 (0.402-0.715)	0.616 (0.451-0.848)	0.735 (0.517-1.05)	0.833 (0.567-1.24)
15-min	0.150 (0.124-0.184)	0.209 (0.172-0.257)	0.292 (0.240-0.360)	0.364 (0.296-0.452)	0.468 (0.369-0.600)	0.553 (0.427-0.724)	0.645 (0.486-0.864)	0.745 (0.546-1.03)	0.889 (0.625-1.28)	1.01 (0.686-1.50)
30-min	0.203 (0.168-0.249)	0.284 (0.234-0.349)	0.397 (0.325-0.488)	0.494 (0.402-0.613)	0.635 (0.500-0.814)	0.750 (0.579-0.982)	0.875 (0.659-1.17)	1.01 (0.740-1.39)	1.20 (0.848-1.73)	1.37 (0.930-2.03)
60-min	0.251 (0.207-0.308)	0.351 (0.289-0.431)	0.490 (0.402-0.603)	0.610 (0.497-0.757)	0.785 (0.618-1.01)	0.928 (0.716-1.21)	1.08 (0.815-1.45)	1.25 (0.915-1.72)	1.49 (1.05-2.14)	1.69 (1.15-2.51)
2-hr	0.355 (0.293-0.436)	0.480 (0.395-0.589)	0.652 (0.535-0.802)	0.799 (0.650-0.991)	1.01 (0.796-1.29)	1.18 (0.912-1.54)	1.36 (1.03-1.83)	1.56 (1.14-2.15)	1.84 (1.29-2.64)	2.07 (1.41-3.07)
3-hr	0.430 (0.354-0.527)	0.574 (0.472-0.704)	0.771 (0.633-0.949)	0.940 (0.765-1.17)	1.18 (0.930-1.51)	1.37 (1.06-1.80)	1.58 (1.19-2.11)	1.80 (1.32-2.47)	2.11 (1.48-3.02)	2.36 (1.60-3.50)
6-hr	0.585 (0.482-0.717)	0.774 (0.637-0.950)	1.03 (0.847-1.27)	1.25 (1.02-1.55)	1.55 (1.22-1.99)	1.80 (1.39-2.35)	2.05 (1.55-2.75)	2.32 (1.70-3.20)	2.70 (1.90-3.88)	3.01 (2.05-4.46)
12-hr	0.753 (0.620-0.922)	1.00 (0.825-1.23)	1.34 (1.10-1.64)	1.62 (1.32-2.00)	2.00 (1.58-2.57)	2.31 (1.78-3.02)	2.62 (1.98-3.52)	2.96 (2.17-4.07)	3.42 (2.40-4.90)	3.78 (2.57-5.61)
24-hr	0.986 (0.874-1.13)	1.33 (1.18-1.53)	1.79 (1.58-2.06)	2.16 (1.90-2.52)	2.68 (2.27-3.23)	3.08 (2.56-3.79)	3.50 (2.84-4.41)	3.93 (3.10-5.09)	4.53 (3.42-6.11)	5.00 (3.65-6.98)
2-day	1.16 (1.03-1.33)	1.59 (1.40-1.83)	2.15 (1.90-2.49)	2.62 (2.30-3.05)	3.26 (2.76-3.92)	3.76 (3.12-4.62)	4.27 (3.46-5.38)	4.80 (3.78-6.22)	5.53 (4.18-7.46)	6.10 (4.46-8.53)
3-day	1.26 (1.12-1.45)	1.74 (1.54-2.00)	2.38 (2.10-2.75)	2.90 (2.54-3.38)	3.62 (3.07-4.36)	4.18 (3.47-5.14)	4.75 (3.85-5.98)	5.35 (4.21-6.93)	6.17 (4.66-8.32)	6.81 (4.97-9.52)
4-day	1.34 (1.19-1.54)	1.85 (1.64-2.14)	2.54 (2.24-2.93)	3.10 (2.71-3.61)	3.86 (3.28-4.65)	4.46 (3.70-5.48)	5.07 (4.11-6.38)	5.70 (4.49-7.38)	6.57 (4.97-8.87)	7.25 (5.30-10.1)
7-day	1.46 (1.29-1.68)	2.00 (1.77-2.30)	2.72 (2.40-3.14)	3.32 (2.90-3.86)	4.13 (3.50-4.97)	4.76 (3.95-5.85)	5.40 (4.38-6.81)	6.08 (4.79-7.87)	7.00 (5.29-9.44)	7.72 (5.64-10.8)
10-day	1.54 (1.37-1.77)	2.11 (1.87-2.43)	2.86 (2.52-3.30)	3.48 (3.04-4.05)	4.32 (3.67-5.21)	4.98 (4.14-6.13)	5.66 (4.59-7.13)	6.36 (5.01-8.24)	7.33 (5.54-9.90)	8.09 (5.91-11.3)
20-day	1.77 (1.57-2.03)	2.43 (2.15-2.80)	3.31 (2.92-3.82)	4.04 (3.54-4.70)	5.05 (4.28-6.08)	5.84 (4.85-7.18)	6.66 (5.39-8.38)	7.51 (5.92-9.73)	8.69 (6.57-11.7)	9.62 (7.02-13.4)
30-day	2.00 (1.77-2.30)	2.75 (2.44-3.17)	3.78 (3.34-4.36)	4.64 (4.06-5.40)	5.84 (4.95-7.02)	6.78 (5.63-8.34)	7.76 (6.29-9.78)	8.80 (6.93-11.4)	10.2 (7.74-13.8)	11.4 (8.31-15.9)
45-day	2.34 (2.08-2.69)	3.24 (2.87-3.74)	4.48 (3.96-5.18)	5.53 (4.85-6.44)	7.02 (5.95-8.46)	8.22 (6.82-10.1)	9.48 (7.68-11.9)	10.8 (8.52-14.0)	12.7 (9.59-17.1)	14.2 (10.4-19.8)
60-day	2.56 (2.27-2.94)	3.55 (3.14-4.08)	4.92 (4.34-5.68)	6.09 (5.34-7.09)	7.78 (6.60-9.37)	9.16 (7.60-11.3)	10.6 (8.60-13.4)	12.2 (9.60-15.8)	14.4 (10.9-19.5)	16.3 (11.9-22.7)

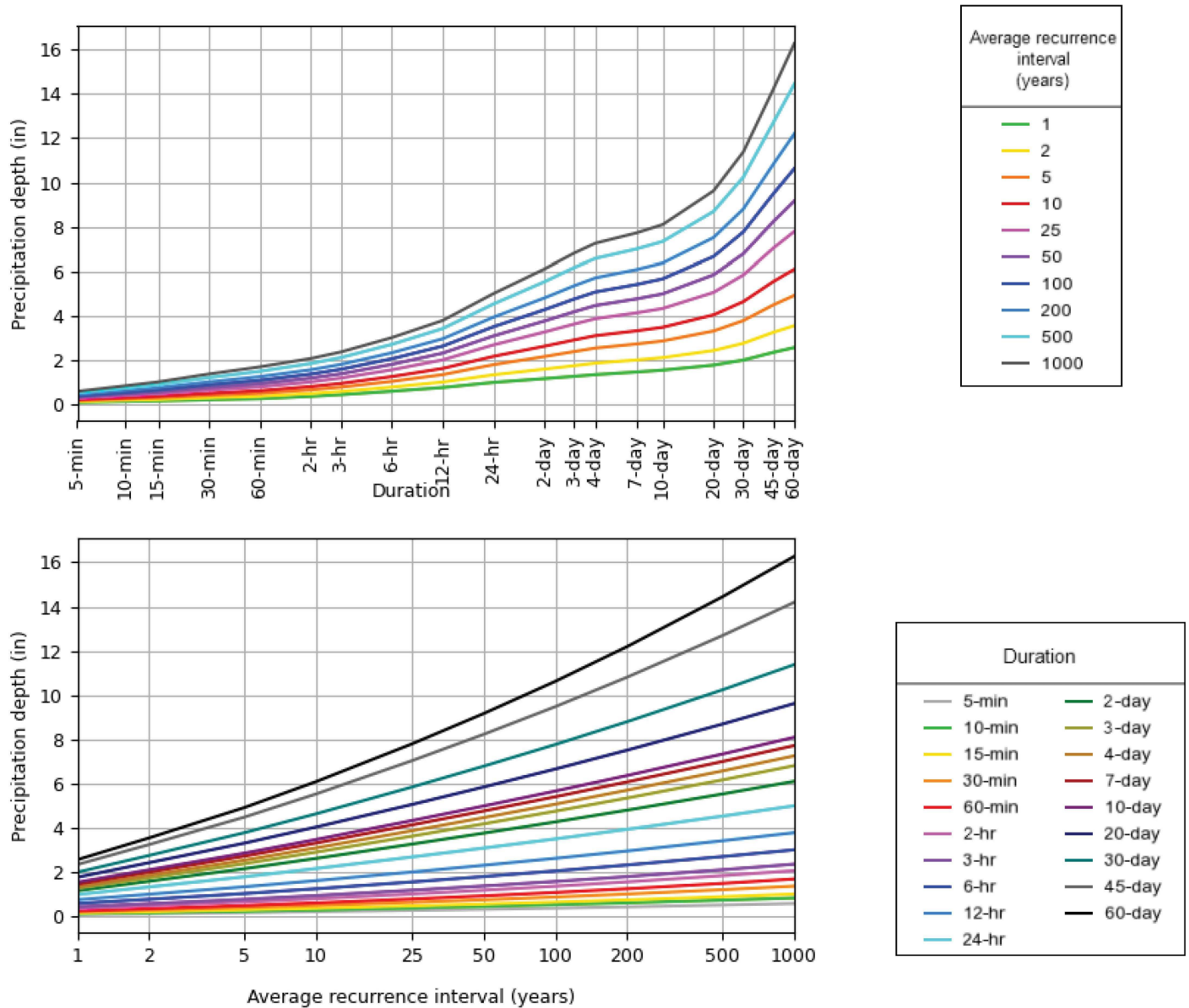
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
 Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.
 Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based depth-duration-frequency (DDF) curves

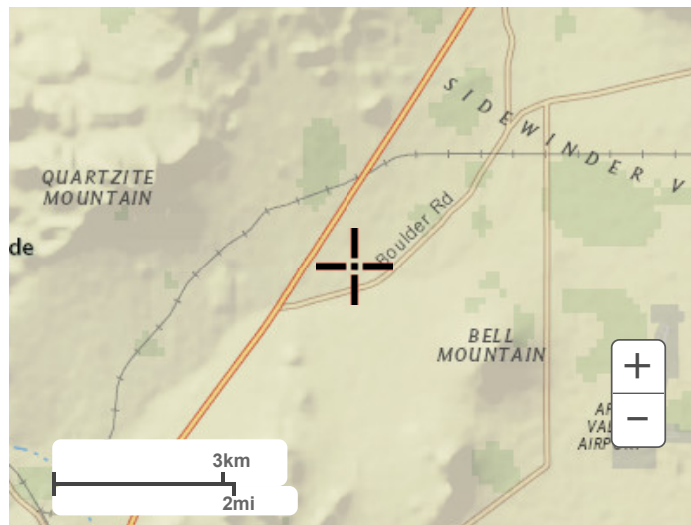
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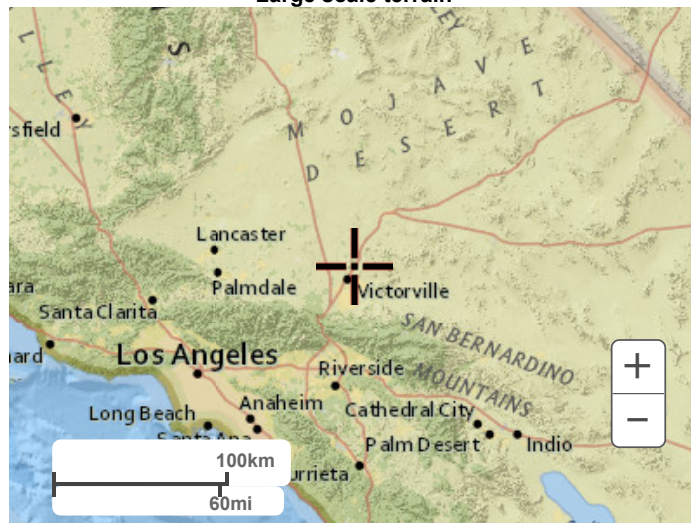
NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Tue Jan 21 18:07:22 2025

[Back to Top](#)**Maps & aerials****Small scale terrain**



Large scale terrain



Large scale map



Large scale aerial



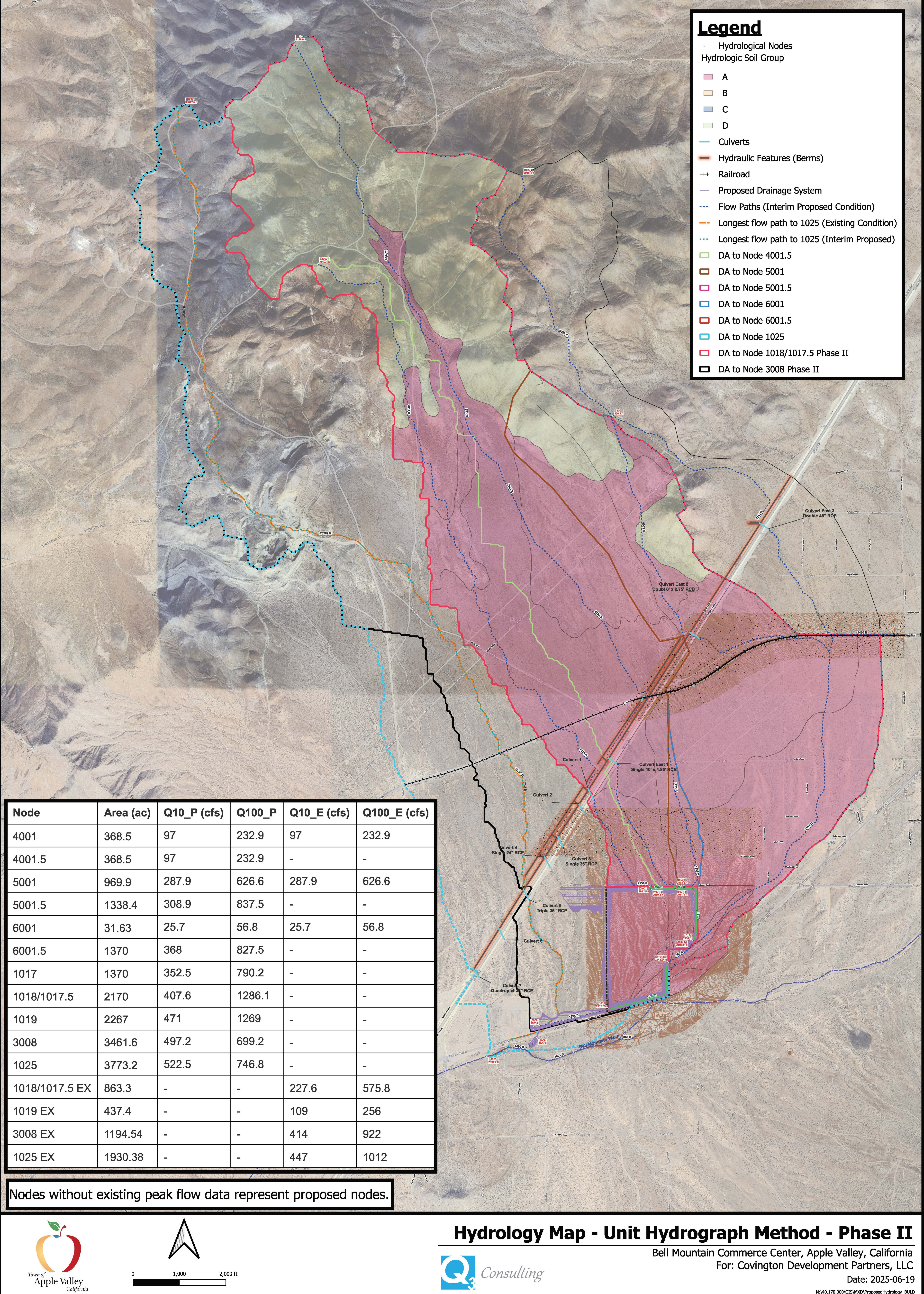
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Appendix F

Off-site Drainage Map



Node	Area (ac)	Q10_P (cfs)	Q100_P	Q10_E (cfs)	Q100_E (cfs)
4001	368.5	97	232.9	97	232.9
4001.5	368.5	97	232.9	-	-
5001	969.9	287.9	626.6	287.9	626.6
5001.5	1338.4	308.9	837.5	-	-
6001	31.63	25.7	56.8	25.7	56.8
6001.5	1370	368	827.5	-	-
1017	1370	352.5	790.2	-	-
1018/1017.5	2170	407.6	1286.1	-	-
1019	2267	471	1269	-	-
3008	3461.6	497.2	699.2	-	-
1025	3773.2	522.5	746.8	-	-
1018/1017.5 EX	863.3	-	-	227.6	575.8
1019 EX	437.4	-	-	109	256
3008 EX	1194.54	-	-	414	922
1025 EX	1930.38	-	-	447	1012

Nodes without existing peak flow data represent proposed nodes.