Appendix 5A
Drainage Report

Sunset Crossings Residential Project
Initial Study

Submitted To:
City of Moreno Valley

PRELIMINARY DRAINAGE REPORT

To Support:
Tract No. 38442 & Tract No. 38443

Plan Check No:

8/30/2022

Job No. 10.094

Prepared For:

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Dillon Strand Date

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I. INTRODUCTION

A. PURPOSE OF DRAINAGE STUDY

The proposed storm drain improvements are located in the City of Moreno Valley County of Riverside, California. See Vicinity Map. Tract No. 38442 and Tract No. 38443 Project will consist of single-family residential housing. The Moreno Master Drainage Plan, Revision No. 2 April 2015, has been prepared by Riverside County Flood Control and Water Conservation District for the project area. The purpose of this report is to compute the developed condition hydrology calculations to demonstrate compliance with the Moreno Master Drainage Plan.

The proposed development is generally bound by Cottonwood Avenue to the north, residential development and undeveloped land to the west, residential development to the east and undeveloped to the east and Alessandro Boulevard to the south. Existing access to the site is currently provided from Cottonwood Avenue and Alessandro Boulevard.

This preliminary study provides hydrology, detention basin and spillway design calculations, a summary of runoff estimates for the developed condition, and an overview of impacts to existing drainage facilities.

Hydrology calculations for 100-year storm are included in this report. This study was prepared to demonstrate conformance with the Riverside County Flood Control and Water Conservation District Moreno Master Drainage Plan, Revision No. 2 April 2015. A copy of this report has been included in Appendix H.

Two water quality / detention basins are being proposed to pollutants and mitigate developed flows. The basins ensure the total runoff discharged to Line H remains the same as the Moreno Master Drainage Plan.

B. PROJECT OBJECTIVES

The following objectives will be addressed in this drainage study:

- A description of the physical setting of Tract No. 38442 and Tract No. 38443, and the potential for flooding in this area.
- Discussion of existing drainage facilities.
- Watershed storm water runoff analysis utilizing Rational Method, Unit Hydrograph and Flood Routing hydrology calculations.
- Develop in-tract drainage storm drain system layout for Tract No. 38442 and Tract No. 38443.

C. PROJECT DESCRIPTION

Tract No. 38442 and Tract No. 38443 Project drainage boundary encompasses approximately 49 acres. The proposed development will build 241 single family homes, sidewalks, streets, open space areas, two Detention/Extended Detention Basins, and a storm drain network system to convey offsite and onsite runoff.

A new storm drain system will be built in accordance with the Moreno Master Drainage Plan. A new storm drain, Line H, will extend from Cottonwood Avenue through proposed Street A and connect to an existing 90” RCP in Alessandro Boulevard. The proposed Line H section will capture drainage areas upstream of the project site, offsite runoff and project flows. Two new Detention / Extended Detention Basins will convey project runoff to the proposed Line H.

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Detention / Extended Detention Basin No. 1

In the developed condition, a proposed storm drain system will convey runoff from the proposed residential development, Drainage Area A, to proposed Detention / Extended Detention Basin No. 1. The Detention / Extended Detention Basin will control outlet flows and provide runoff treatment. The proposed Detention / Extended Detention Basin will have a bottom section that will be utilized as a BMP to treat the Design Capture Volume (DCV). Runoff will pond over a sand filter section to allow runoff to receive treatment. An outlet structure will be provided within Detention / Extended Detention Basin with orifice openings above the water quality water surface elevation to outlet 100-year storms to the proposed Line H in Street A. The outlet structure will be designed to decrease developed flows before discharging runoff to Line H.

Detention / Extended Detention Basin No. 2

In the developed condition, a proposed storm drain system will convey runoff from the proposed residential development, drainage area B, to proposed Detention / Extended Detention No. 2. The Detention / Extended Detention Basin will control outlet flows and provide runoff treatment. The proposed Detention / Extended Detention Basin will have a bottom section that will be utilized as a BMP to treat the Design Capture Volume (DCV). Runoff will pond over a sand filter section to allow runoff to receive treatment. An outlet structure will be provided within Detention / Extended Detention Basin with orifice openings above the water quality water surface elevation to outlet 100-year storms to the proposed Line H in Street A. The outlet structure will be designed to decrease developed flows before discharging runoff to Line H.

Detention sizing calculations for Detention / Extended Detention Basin No. 1 and 2 are provided in this report. Water Quality and DCV sizing calculations for the Detention / Extended Detention Basin No. 1 and 2 are provided in the separately submitted Water Quality Management Plan (WQMP) for Tract No. 38442 and Tract No. 38443.

See Exhibits in Appendix A for drainage areas and location of proposed drainage facilities.

1. Existing Land Uses

The existing land uses are based on aerial topography of watershed areas. There is an existing house located within Drainage Area A, located south of Cottonwood Avenue. There are 3 houses located south of Drainage Area C. All these residential buildings will be removed. The rest of the project site is undeveloped land, and the existing land cover consists of natural native grass based on aerial photography.

2. Existing Drainage Facilities

There are no existing drainage facilities within the project site. An existing 90" RCP stub, Line H, in Alessandro Boulevard will be utilized for this project. The existing Line H will be extended to Cottonwood Avenue to capture offsite runoff tributary to Line H.

3. Proposed Drainage Facilities

The proposed storm drain improvements in Tract No. 38442 and Tract No. 38443. will include the construction of new drainage facilities. A new storm drain system will convey runoff from Drainage Area A to the proposed Detention / Extended Detention Basin No. 1, the new storm drain system will include new piping, junction structures, and catch basins. Runoff from Detention / Extended Detention Basin No. 1 will ultimately flow to the proposed Line H in Street A. A new storm drain system will convey runoff from Drainage Area B to the proposed Detention / Extended Detention Basin No. 2, the new storm drain system will include new piping, junction structures, and catch basins. Runoff from Detention / Extended Detention Basin No. 2 will ultimately flow to the proposed Line H in Street A.

See Exhibits in Appendix A for drainage areas and location of proposed drainage facilities. Refer to Water Quality Management Plan Study submitted for Tract No. 38442 and Tract No. 38443 for details and location of water quality facilities.

II. HYDROLOGY

A. GENERAL GUIDELINES

Hydrologic Calculations were prepared using methodology outlined by the RCFC&WCD Hydrology Manual dated April, 1978. Onsite hydrology was computed using the Rational Method. The Rational Method is commonly used for determining peak discharge from relatively small drainage areas. For areas in excess of 300 to 500-acres, the Synthetic Unit Hydrograph Method should normally be used. Unit hydrograph calculations and flood routing calculations were computed for the project area to demonstrate conformance with Moreno Master Drainage Plan and to size storm drain facilities. Detailed calculations are provided in Appendix C.

Rational Method includes the effects of infiltration caused by land use and soil surface characteristics. The Hydrologic Soils Map from the RCFC&WCD Hydrology Manual, plate C-1.17. indicates that the project study area consists of soil type B and D. Hydrologic soil ratings are based on a scale of A through D, where D is the least pervious, providing the greatest runoff. The type of vegetation, percent ground cover, and percentage of impervious surfaces also affect the infiltration rate.

Per criteria from the RCFC&WCD Hydrology Manual, Antecedent Moisture Condition (AMC) II was used for the 100-year analysis that reflects the degree of ground saturation from previous rainfall events. An AMC II was used for the 100-year to design drainage structures in sump areas as well as a proposed spillway in the detention basin. The AMC value can range from I to III, with condition III being the most severe, allowing for greater runoff and low infiltration. AMC were selected as indicated in the Riverside County Hydrology Manual Section C.

1-hour, 3-hour, 6-hour and 24-hour storm unit hydrograph calculations were calculated for the project area to ensure the proposed Detention / Extended Detention Basin and storm drain system can safely detain and convey 100-year storms. Unit hydrograph calculation models for Drainage Areas A and B were routed through the Detention / Extended Detention Basins to determine outflow peak flow rates and basin water surface elevations.

B. RATIONAL METHOD HYDROLOGY CALCULATION

To properly design onsite storm drain facilities, the Rational Method was utilized to compute the 100-year peak discharges for the study area. A technical description of the rational method is provided in the RCFC&WCD Hydrology Manual dated April, 1978. The Rational Method is an empirical computation procedure for developing a peak runoff rate (discharge) for small watershed for storms of a specified recurrence interval. The rational method equation is based on the assumption that the peak flow rate is directly proportional to the drainage area, rainfall intensity and a loss coefficient, which describes the effects of land use and soil type. The hydrology map for the study area is included in Appendix A.

The hydrology map shows existing and proposed contours, elevations for streets, and proposed storm drain facilities for Tract No. 38442 and Tract No. 38443Watershed boundaries are ridgelines where identified, with watershed areas are divided into subareas. Flow paths and proposed drainage systems were laid out, and then drainage areas and flow path lengths were estimated. The portion of the soil map from the RCFC&WCD Hydrology Manual, plate C-1.17, was overlaid and the soil map indicated that the study area consists of soil type B and D. Precipitation data for the project location was taken from Plates in the RCFC&WCD Hydrology Manual and are provided in Appendix H of this report.

CivildCadd/CivilDesign Hydrology – Hydraulics Software by CivilDesign Corporation and Joseph E. Bonadiman and Associates, Incorporated was used to compute hydrology calculations. The peak discharges and time of concentration at specified nodes are shown on the hydrology map. To compute Rational Method Calculations, hydrologic information was entered into the CivildCadd/CivilDesign Hydrology – Hydraulics Software. The computer files for the 100-year calculations are included in Appendix B.

C. SYNTHETIC UNIT HYDROGRAPH METHOD CALCULATION

The Synthetic Unit Hydrograph, a computational procedure for developing peak runoff and discharge for storms of a specified recurrence interval, is used in watersheds larger than 300 acres. This procedure calculates effective rainfall, which is the portion of the total rainfall that appears as surface runoff, at a specific concentration point. Because no two drainage basins have the same physical characteristics, the appropriate adjustments must be accounted for 100-year storm frequencies for each of the 1-hour, 3-hour, 6-hour, and 24-hour durations were analyzed. The Synthetic Unit Hydrograph Method calculations were utilized to conduct Detention Basin Routing calculations. The CivildCadd/CivilDesign Hydrology – Hydraulics Software was used to compute Synthetic Unit Hydrograph calculations. The computer files are included in Appendix C.

D. HYDROGRAPH ROUTING METHOD CALCULATION

1. Detention Basin Routing Guidelines

The following assumptions/guidelines were applied in the use of the Detention Basin Routing:

- The Modified Pul's (Storage Indication) Method is used for the detention basin routing studies. The basin routing relationships are based upon the following formula:

$I - O = \Delta S / \Delta t$

Where:

I = basin inflow rate (cfs)
O = basin outflow rate (cfs)
ΔS = change in basin storage during the time step (cubic feet)
Δt = time step (sec)

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- The basin inflow rates are based on the Unit Hydrograph files (See Appendix D).

- Depth-Storage-Discharge Curve is based on Basin Volume and Stage Discharge Rating. See calculations in Appendix D.

- The procedure is repeated for each time step until the basin inflow hydrograph has been completely analyzed and basin outflow becomes negligible.

2. Hydrograph Routing Calculation Software

The Detention Basin Routing (Modified Pul's) Method outlined above were performed using the CivildCadd/CivilDesign Hydrology – Hydraulics Software. Routing calculations were performed for the proposed detention basin. The computer files for the 100-year storm frequencies for each of the 1-hour, 3-hour, 6-hour, and 24-hour durations are included in Appendix D.

E. FLOOD ASSESSMENT

The Federal Emergency Management Agent (FEMA) publishes Flood Insurance Rate Maps (FIRMs) that identify areas where there is flooding potential. The FIRM maps that apply to Tract No. 38442 and Tract No. 38443 are Riverside County Map Number 06065C0765G, dated August 28, 2008 and 06065C0770G dated August 28, 2008. The entire project site is within Flood Hazard Zone "X" (Other Areas) – an area to be outside the 0.2% annual chance floodplain. Applicable maps to this project have been included in Appendix H.

III. HYDRAULICS

A. EMERGENCY SPILLWAY

Overflow runoff from the proposed Detention Basins will enter emergency overflow outlet structures. The emergency overflow outlet structures will operate will convey 100-year storm flows to the proposed LINE H storm drain in Street A. Preliminary hydraulic calculations for emergency spillway are provided in Appendix G.

IV. SUMMARY OF RESULTS

Table 1 shows the total flows for Line H allocated to the study area. Based on aerial topography and the Moreno Master Drainage Plan, it was determined the study area has an allocated flow of 120 cfs for approximately 120 cfs. Table 2 shows the total project flows and offsite areas tributary to the proposed Line H segment. The total project flows is 122 cfs which is only 1.6% more than the total flow allocated per the Moreno Master Drainage Plan. Therefore, the proposed development conforms with Moreno Master Drainage Plan.

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ALLOCATED FLOW TO LINE H (CONTROL FLOWS)

TABLE 1

DRAINAGE AREA ID	ACRES	100-YR CFS
ABCDEF	117.6	120.00
TOTAL FLOW		120.0

NOTES

*OBTAINED FROM RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT - MORENO MASTER DRAINAGE PLAN - LINE H

PEAK OUTLET FLOW SUMMARY

TABLE 2

DRAINAGE AREA ID	ACRES	100-YR CFS	
A	30.1	10.2	**
B	19.9	10.6	**
C1	3.6	5.7	
C2	5.6	9.7	
C3	1.4	2.7	
D	10.3	26.6	
E	8.7	21.5	
F	19.1	35.0	
TOTAL FLOWS		122.0	
G*	15.6	43.30	

NOTES

* AREA G EXCLUDED FROM CONTROL FLOW COMPARISON SINCE IT ENTERS LINE H AT A POINT DOWNSTREAM OF THE PROJECT SITE

** FLOW RATES BASED ON THE 100-YR 6-HR FLOOD ROUTING CALCULATIONS WHICH YIELDS THE HIGHEST PEAK FLOW RATES

**REFER TO APPENDIX C & D FOR DETAILED CALCULATIONS

APPENDIX A

HYDROLOGY MAP

COTTONWOOD AVE
ALESSANDRO BL
MARION RD
PEARL LN
AREA 'A'
AREA 'B'
AREA 'C'
AREA 'D'
AREA 'E'
AREA 'F'
AREA 'G'
AREA 'H'
SCHOOL SITE
3/4 ACRE LOTS
1/2 ACRE LOTS
DEDB NO. 1
DEDB NO. 2
PROP. SPILLWAY
PROP. DITCH ALONG BACK OF THE LOTS TO DRAIN AREA H
PROP. INLET TO DRAIN AREA H
CONNECT OT EXIST. SD IN BAY AVENUE
PROP. LINE H 75" RCP SD
PROP. LINE H 90" RCP SD
EXIST. LINE H 90" RCP SD
A1 4.28
A2 2.73
A3 1.40
A4 2.64
A5 2.65
A6 0.94
A7 2.92
A7 1.77
A8 2.03
A9 1.38
A10 5.17
A12 0.21
A13 1.37
A14 0.58
B1 3.66
B2 0.25
B3 1.31
B4 1.30
B5 4.29
B6 1.38
B7 0.38
B8 0.29
B9 0.97
B10 0.87
B11 0.24
B12 0.93
B13 0.11
B14 1.05
B15 0.52
B15 2.54
C1 3.58
C2 5.58
C3 1.43
D1 1.64
D2 10.30
E1 3.70
E2 5.01
F1 3.73
F2 15.37
G1 2.21
G2 15.56
LEGEND
SUBAREA NO.
SUBAREA AREA – Acre
NODE NO. & ELEVATION
FLOW LINE
DRAINAGE AREA (DA) BOUNDARY
SUBAREA TRIBUTARY BOUNDARY
LOCATION OF INLETS/STENCILING
DETENTION/EXTENDED DETENTION BASIN
DRAINAGE PATH
DEDB NO. 1 DETENTION/EXTENDED DETENTION BASIN NO.
SCALE: 1"=80'
SUNSET CROSSINGS
HYDROLOGY MAP
LINE H
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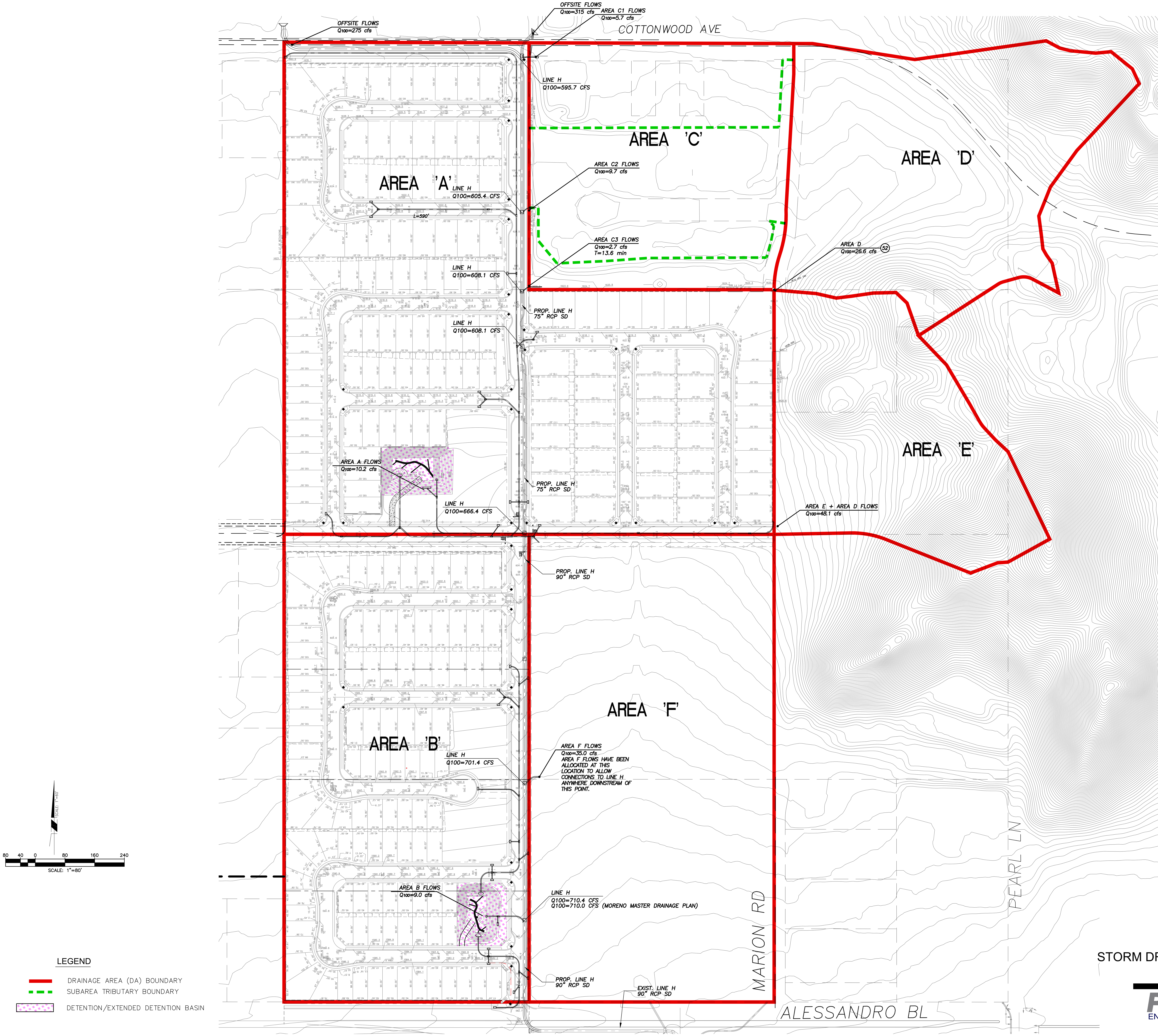
STORM DRAIN AND PEAK FLOW SUMMARY MAP



SUNSET CROSSINGS

STORM DRAIN & PEAK FLOW SUMMARY MAP

LINE H

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APPENDIX B

RATIONAL METHOD ANALYSIS

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            Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
      Rational Hydrology Study       Date: 05/17/22  File:MVAREAA100.out
------------------------------------------------------------------------
AREA A
DEVELOPED CONDITION
100-YR STORM

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

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

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


Program License Serial Number 6094

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

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [ Sunnymead-Moreno ] area used.
10 year storm 10 minute intensity =  2.010(In/Hr)
10 year storm 60 minute intensity =  0.820(In/Hr)
100 year storm 10 minute intensity =  2.940(In/Hr)
100 year storm 60 minute intensity =  1.200(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.200(In/Hr)
Slope of intensity duration curve = 0.5000




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       1.000 to Point/Station       2.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   930.000(Ft.)
Top (of initial area) elevation =  1635.600(Ft.)
Bottom (of initial area) elevation =  1621.500(Ft.)
Difference in elevation =    14.100(Ft.)
Slope =    0.01516  s(percent)=      1.52
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.166 min.
Rainfall intensity =      2.562(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.809
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
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Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      8.865(CFS)
Total initial stream area =        4.280(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        2.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.809
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    13.17 min.
Rainfall intensity =      2.562(In/Hr) for a   100.0 year storm
Subarea runoff =      5.655(CFS) for      2.730(Ac.)
Total runoff =     14.520(CFS)    Total area =       7.010(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1621.500(Ft.)
Downstream point/station elevation =  1602.600(Ft.)
Pipe length  =   590.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    14.520(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    14.520(CFS)
Normal flow depth in pipe =   11.87(In.)
Flow top width inside pipe =   17.06(In.)
Critical Depth =   16.73(In.)
Pipe flow velocity =     11.74(Ft/s)
Travel time through pipe =    0.84 min.
Time of concentration (TC) =    14.00 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      7.010(Ac.)
Runoff from this stream =     14.520(CFS)
Time of concentration =   14.00 min.
Rainfall intensity =     2.484(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        5.000
**** INITIAL AREA EVALUATION ****
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________________________________________________________________________
Initial area flow distance =   653.000(Ft.)
Top (of initial area) elevation =  1639.000(Ft.)
Bottom (of initial area) elevation =  1618.400(Ft.)
Difference in elevation =    20.600(Ft.)
Slope =    0.03155  s(percent)=      3.15
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.871 min.
Rainfall intensity =      2.958(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.818
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.387(CFS)
Total initial stream area =        1.400(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       5.000 to Point/Station       3.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1610.400(Ft.)
Downstream point/station elevation =  1602.600(Ft.)
Pipe length  =    17.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.387(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     3.387(CFS)
Normal flow depth in pipe =    4.41(In.)
Flow top width inside pipe =    5.29(In.)
Critical depth could not be calculated.
Pipe flow velocity =     21.88(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =     9.88 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       5.000 to Point/Station       3.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.400(Ac.)
Runoff from this stream =      3.387(CFS)
Time of concentration =    9.88 min.
Rainfall intensity =     2.957(In/Hr)
Summary of stream data:

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


1       14.520     14.00             2.484
2        3.387      9.88             2.957
Largest stream flow has longer time of concentration
Qp =     14.520 + sum of
```

```
        Qb          Ia/Ib
         3.387 *    0.840 =      2.845
Qp =     17.365

Total of 2 main streams to confluence:
Flow rates before confluence point:
      14.520       3.387
Area of streams before confluence:
        7.010        1.400


Results of confluence:
Total flow rate =     17.365(CFS)
Time of concentration =    14.003 min.
Effective stream area after confluence  =      8.410(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        6.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1602.600(Ft.)
Downstream point/station elevation =  1601.900(Ft.)
Pipe length  =   146.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.365(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    17.365(CFS)
Normal flow depth in pipe =   18.42(In.)
Flow top width inside pipe =   25.14(In.)
Critical Depth =   17.47(In.)
Pipe flow velocity =      6.00(Ft/s)
Travel time through pipe =    0.41 min.
Time of concentration (TC) =    14.41 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        6.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.806
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    14.41 min.
Rainfall intensity =      2.449(In/Hr) for a   100.0 year storm
Subarea runoff =      5.208(CFS) for      2.640(Ac.)
Total runoff =     22.573(CFS)    Total area =      11.050(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station        7.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1601.900(Ft.)
Downstream point/station elevation =  1601.000(Ft.)
Pipe length  =   170.00(Ft.)   Manning's N = 0.013
```

```
No. of pipes = 1  Required pipe flow  =    22.573(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    22.573(CFS)
Normal flow depth in pipe =   22.17(In.)
Flow top width inside pipe =   20.69(In.)
Critical Depth =   19.95(In.)
Pipe flow velocity =      6.46(Ft/s)
Travel time through pipe =    0.44 min.
Time of concentration (TC) =    14.85 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       6.000 to Point/Station       7.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.805
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    14.85 min.
Rainfall intensity =      2.412(In/Hr) for a   100.0 year storm
Subarea runoff =      5.144(CFS) for      2.650(Ac.)
Total runoff =     27.717(CFS)    Total area =      13.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       6.000 to Point/Station       7.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.805
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    14.85 min.
Rainfall intensity =      2.412(In/Hr) for a   100.0 year storm
Subarea runoff =      1.825(CFS) for      0.940(Ac.)
Total runoff =     29.542(CFS)    Total area =      14.640(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       7.000 to Point/Station       8.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1601.000(Ft.)
Downstream point/station elevation =  1599.500(Ft.)
Pipe length  =   298.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    29.542(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    29.542(CFS)
Normal flow depth in pipe =   25.03(In.)
Flow top width inside pipe =   22.30(In.)
Critical Depth =   22.24(In.)
```

```
Pipe flow velocity =      6.75(Ft/s)
Travel time through pipe =    0.74 min.
Time of concentration (TC) =    15.58 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       7.000 to Point/Station       8.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.803
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    15.58 min.
Rainfall intensity =      2.355(In/Hr) for a   100.0 year storm
Subarea runoff =      3.347(CFS) for      1.770(Ac.)
Total runoff =     32.888(CFS)    Total area =      16.410(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       7.000 to Point/Station       8.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.803
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    15.58 min.
Rainfall intensity =      2.355(In/Hr) for a   100.0 year storm
Subarea runoff =      0.397(CFS) for      0.210(Ac.)
Total runoff =     33.285(CFS)    Total area =      16.620(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       8.000 to Point/Station       9.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1599.500(Ft.)
Downstream point/station elevation =  1599.300(Ft.)
Pipe length  =    50.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    33.285(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    33.285(CFS)
Normal flow depth in pipe =   26.91(In.)
Flow top width inside pipe =   25.61(In.)
Critical Depth =   23.02(In.)
Pipe flow velocity =      6.42(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    15.71 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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Process from Point/Station       8.000 to Point/Station        9.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     16.620(Ac.)
Runoff from this stream =     33.285(CFS)
Time of concentration =   15.71 min.
Rainfall intensity =     2.345(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      10.000 to Point/Station       11.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   277.000(Ft.)
Top (of initial area) elevation =  1624.600(Ft.)
Bottom (of initial area) elevation =  1616.700(Ft.)
Difference in elevation =     7.900(Ft.)
Slope =    0.02852  s(percent)=       2.85
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.148 min.
Rainfall intensity =      3.477(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.827
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.968(CFS)
Total initial stream area =       1.380(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      11.000 to Point/Station       12.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =  1616.700(Ft.)
End of street segment elevation =  1605.000(Ft.)
Length of street segment  =   791.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  18.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      9.797(CFS)
Depth of flow =   0.370(Ft.), Average velocity =   3.058(Ft/s)
Streetflow hydraulics at midpoint of street travel:
```

```
Halfstreet flow width =  12.145(Ft.)
Flow velocity =   3.06(Ft/s)
Travel time =    4.31 min.     TC =   11.46  min.
 Adding area flow to street
CONDOMINIUM subarea type
Runoff Coefficient = 0.813
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      2.746(In/Hr) for a   100.0 year storm
Subarea runoff =     11.542(CFS) for      5.170(Ac.)
Total runoff =     15.510(CFS)    Total area =       6.550(Ac.)
Street flow at end of street =     15.510(CFS)
Half street flow at end of street =      7.755(CFS)
Depth of flow =   0.420(Ft.), Average velocity =   3.412(Ft/s)
Flow width (from curb towards crown)=  14.649(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station        9.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1605.000(Ft.)
Downstream point/station elevation =  1599.300(Ft.)
Pipe length  =   115.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.510(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    15.510(CFS)
Normal flow depth in pipe =   10.71(In.)
Flow top width inside pipe =   17.67(In.)
Critical Depth =   16.99(In.)
Pipe flow velocity =     14.15(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =    11.59 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station        9.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      6.550(Ac.)
Runoff from this stream =     15.510(CFS)
Time of concentration =   11.59 min.
Rainfall intensity =     2.730(In/Hr)
Summary of stream data:

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



1       33.285     15.71              2.345
2       15.510     11.59              2.730
Largest stream flow has longer time of concentration
Qp =     33.285 + sum of
       Qb         Ia/Ib
```

```
       15.510 *    0.859 =     13.323
Qp =     46.609

Total of 2 main streams to confluence:
Flow rates before confluence point:
      33.285      15.510
Area of streams before confluence:
       16.620        6.550


Results of confluence:
Total flow rate =     46.609(CFS)
Time of concentration =    15.712 min.
Effective stream area after confluence  =     23.170(Ac.)


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Process from Point/Station       12.000 to Point/Station        9.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.803
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    15.71 min.
Rainfall intensity =      2.345(In/Hr) for a   100.0 year storm
Subarea runoff =      3.821(CFS) for      2.030(Ac.)
Total runoff =     50.430(CFS)    Total area =      25.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        9.000 to Point/Station       13.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1599.300(Ft.)
Downstream point/station elevation =  1597.800(Ft.)
Pipe length  =   297.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    50.430(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    50.430(CFS)
Normal flow depth in pipe =   32.25(In.)
Flow top width inside pipe =   21.99(In.)
Critical Depth =   27.73(In.)
Pipe flow velocity =      7.55(Ft/s)
Travel time through pipe =    0.66 min.
Time of concentration (TC) =    16.37 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        9.000 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     25.200(Ac.)
Runoff from this stream =     50.430(CFS)
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```
Time of concentration =   16.37 min.
Rainfall intensity =     2.298(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       16.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   937.000(Ft.)
Top (of initial area) elevation =  1623.000(Ft.)
Bottom (of initial area) elevation =  1610.500(Ft.)
Difference in elevation =    12.500(Ft.)
Slope =    0.01334  s(percent)=       1.33
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.548 min.
Rainfall intensity =      2.525(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.808
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      5.956(CFS)
Total initial stream area =        2.920(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       13.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1610.500(Ft.)
Downstream point/station elevation =  1597.800(Ft.)
Pipe length  =   258.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.956(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     5.956(CFS)
Normal flow depth in pipe =    7.78(In.)
Flow top width inside pipe =   11.46(In.)
Critical depth could not be calculated.
Pipe flow velocity =     11.06(Ft/s)
Travel time through pipe =    0.39 min.
Time of concentration (TC) =    13.94 min.


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Process from Point/Station       16.000 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.920(Ac.)
Runoff from this stream =      5.956(CFS)
Time of concentration =   13.94 min.
Rainfall intensity =     2.490(In/Hr)
Summary of stream data:
```

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


1       50.430     16.37             2.298
2        5.956     13.94             2.490
Largest stream flow has longer time of concentration
Qp =     50.430 + sum of
       Qb          Ia/Ib
        5.956 *    0.923 =      5.495
Qp =     55.925

Total of 2 main streams to confluence:
Flow rates before confluence point:
      50.430       5.956
Area of streams before confluence:
       25.200        2.920


Results of confluence:
Total flow rate =     55.925(CFS)
Time of concentration =    16.368 min.
Effective stream area after confluence  =     28.120(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1597.800(Ft.)
Downstream point/station elevation =  1597.500(Ft.)
Pipe length  =   100.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    55.925(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    55.925(CFS)
Normal flow depth in pipe =   35.02(In.)
Flow top width inside pipe =   31.28(In.)
Critical Depth =   28.09(In.)
Pipe flow velocity =      6.53(Ft/s)
Travel time through pipe =    0.26 min.
Time of concentration (TC) =    16.62 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.713
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    16.62 min.
Rainfall intensity =      2.280(In/Hr) for a   100.0 year storm
Subarea runoff =      2.226(CFS) for      1.370(Ac.)
Total runoff =     58.152(CFS)    Total area =      29.490(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.713
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    16.62 min.
Rainfall intensity =      2.280(In/Hr) for a   100.0 year storm
Subarea runoff =      0.942(CFS) for      0.580(Ac.)
Total runoff =     59.094(CFS)    Total area =      30.070(Ac.)
End of computations, total study area =           30.07 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.392
Area averaged RI index number =  56.8
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            Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
      Rational Hydrology Study       Date: 08/29/22  File:MVAREAB.out
------------------------------------------------------------------------
AREA B
DEVELOPED CONDITION
100-YR STORM

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

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

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


Program License Serial Number 6094

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

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [ Sunnymead-Moreno ] area used.
10 year storm 10 minute intensity =  2.010(In/Hr)
10 year storm 60 minute intensity =  0.820(In/Hr)
100 year storm 10 minute intensity =  2.940(In/Hr)
100 year storm 60 minute intensity =  1.200(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.200(In/Hr)
Slope of intensity duration curve = 0.5000




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      20.000 to Point/Station      21.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   959.000(Ft.)
Top (of initial area) elevation =  1611.500(Ft.)
Bottom (of initial area) elevation =  1596.900(Ft.)
Difference in elevation =    14.600(Ft.)
Slope =    0.01522  s(percent)=      1.52
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.317 min.
Rainfall intensity =      2.547(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.808
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
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Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      7.534(CFS)
Total initial stream area =        3.660(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       21.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.808
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    13.32 min.
Rainfall intensity =      2.547(In/Hr) for a   100.0 year storm
Subarea runoff =      0.515(CFS) for      0.250(Ac.)
Total runoff =      8.049(CFS)    Total area =       3.910(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       21.000 to Point/Station       22.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1579.100(Ft.)
Downstream point/station elevation =  1578.800(Ft.)
Pipe length  =    68.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.049(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     8.049(CFS)
Normal flow depth in pipe =   13.76(In.)
Flow top width inside pipe =   19.96(In.)
Critical Depth =   12.62(In.)
Pipe flow velocity =      4.82(Ft/s)
Travel time through pipe =    0.24 min.
Time of concentration (TC) =    13.55 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       21.000 to Point/Station       22.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.808
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    13.55 min.
Rainfall intensity =      2.525(In/Hr) for a   100.0 year storm
Subarea runoff =      2.671(CFS) for      1.310(Ac.)
Total runoff =     10.720(CFS)    Total area =       5.220(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      21.000 to Point/Station      22.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.808
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    13.55 min.
Rainfall intensity =      2.525(In/Hr) for a   100.0 year storm
Subarea runoff =      1.876(CFS) for      0.920(Ac.)
Total runoff =     12.596(CFS)    Total area =       6.140(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      22.000 to Point/Station      23.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1578.800(Ft.)
Downstream point/station elevation =  1577.600(Ft.)
Pipe length  =   231.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.596(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    12.596(CFS)
Normal flow depth in pipe =   15.84(In.)
Flow top width inside pipe =   22.74(In.)
Critical Depth =   15.32(In.)
Pipe flow velocity =      5.73(Ft/s)
Travel time through pipe =    0.67 min.
Time of concentration (TC) =    14.22 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      22.000 to Point/Station      23.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.806
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    14.22 min.
Rainfall intensity =      2.465(In/Hr) for a   100.0 year storm
Subarea runoff =      8.522(CFS) for      4.290(Ac.)
Total runoff =     21.119(CFS)    Total area =      10.430(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      22.000 to Point/Station      23.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
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```
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.724
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    14.22 min.
Rainfall intensity =      2.465(In/Hr) for a   100.0 year storm
Subarea runoff =      2.462(CFS) for      1.380(Ac.)
Total runoff =     23.581(CFS)    Total area =      11.810(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       23.000 to Point/Station       24.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1577.600(Ft.)
Downstream point/station elevation =  1576.700(Ft.)
Pipe length  =   182.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    23.581(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    23.581(CFS)
Normal flow depth in pipe =   20.63(In.)
Flow top width inside pipe =   27.81(In.)
Critical Depth =   19.85(In.)
Pipe flow velocity =      6.55(Ft/s)
Travel time through pipe =    0.46 min.
Time of concentration (TC) =    14.69 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       23.000 to Point/Station       24.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.805
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    14.69 min.
Rainfall intensity =      2.425(In/Hr) for a   100.0 year storm
Subarea runoff =      0.742(CFS) for      0.380(Ac.)
Total runoff =     24.323(CFS)    Total area =      12.190(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       23.000 to Point/Station       24.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.805
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
```

```
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    14.69 min.
Rainfall intensity =      2.425(In/Hr) for a   100.0 year storm
Subarea runoff =      0.566(CFS) for      0.290(Ac.)
Total runoff =     24.889(CFS)    Total area =      12.480(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       24.000 to Point/Station       25.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1576.700(Ft.)
Downstream point/station elevation =  1576.300(Ft.)
Pipe length  =    89.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.889(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    24.889(CFS)
Normal flow depth in pipe =   22.36(In.)
Flow top width inside pipe =   26.14(In.)
Critical Depth =   20.39(In.)
Pipe flow velocity =      6.34(Ft/s)
Travel time through pipe =    0.23 min.
Time of concentration (TC) =    14.92 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       24.000 to Point/Station       25.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.804
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    14.92 min.
Rainfall intensity =      2.406(In/Hr) for a   100.0 year storm
Subarea runoff =      1.878(CFS) for      0.970(Ac.)
Total runoff =     26.767(CFS)    Total area =      13.450(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       24.000 to Point/Station       25.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.804
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =    14.92 min.
Rainfall intensity =      2.406(In/Hr) for a   100.0 year storm
Subarea runoff =      1.684(CFS) for      0.870(Ac.)
Total runoff =     28.451(CFS)    Total area =      14.320(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       25.000 to Point/Station       26.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1576.300(Ft.)
Downstream point/station elevation =  1575.800(Ft.)
Pipe length  =   106.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.451(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    28.451(CFS)
Normal flow depth in pipe =   24.84(In.)
Flow top width inside pipe =   22.64(In.)
Critical Depth =   21.82(In.)
Pipe flow velocity =      6.54(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =    15.19 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       26.000 to Point/Station       30.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     14.320(Ac.)
Runoff from this stream =     28.451(CFS)
Time of concentration =   15.19 min.
Rainfall intensity =     2.385(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       27.000 to Point/Station       28.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   351.000(Ft.)
Top (of initial area) elevation =  1589.000(Ft.)
Bottom (of initial area) elevation =  1582.800(Ft.)
Difference in elevation =     6.200(Ft.)
Slope =    0.01766  s(percent)=      1.77
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.648 min.
Rainfall intensity =      3.161(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.822
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      0.623(CFS)
Total initial stream area =        0.240(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       27.000 to Point/Station       28.000
```

```
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.822
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =     8.65 min.
Rainfall intensity =      3.161(In/Hr) for a   100.0 year storm
Subarea runoff =      0.286(CFS) for      0.110(Ac.)
Total runoff =      0.909(CFS)    Total area =       0.350(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       27.000 to Point/Station       28.000
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.822
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =     8.65 min.
Rainfall intensity =      3.161(In/Hr) for a   100.0 year storm
Subarea runoff =      2.415(CFS) for      0.930(Ac.)
Total runoff =      3.324(CFS)    Total area =       1.280(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       28.000 to Point/Station       29.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________
Upstream point/station elevation =  1582.800(Ft.)
Downstream point/station elevation =  1576.300(Ft.)
Pipe length  =   171.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.324(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.324(CFS)
Normal flow depth in pipe =    5.85(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =    9.37(In.)
Pipe flow velocity =      8.75(Ft/s)
Travel time through pipe =    0.33 min.
Time of concentration (TC) =     8.97 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       28.000 to Point/Station       29.000
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
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```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =     8.97 min.
Rainfall intensity =      3.103(In/Hr) for a   100.0 year storm
Subarea runoff =      3.386(CFS) for      1.330(Ac.)
Total runoff =      6.710(CFS)    Total area =       2.610(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       28.000 to Point/Station       29.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
CONDOMINIUM subarea type
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Time of concentration =     8.97 min.
Rainfall intensity =      3.103(In/Hr) for a   100.0 year storm
Subarea runoff =      6.467(CFS) for      2.540(Ac.)
Total runoff =     13.177(CFS)    Total area =       5.150(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       29.000 to Point/Station       30.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1576.300(Ft.)
Downstream point/station elevation =  1575.800(Ft.)
Pipe length  =    97.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.177(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    13.177(CFS)
Normal flow depth in pipe =   16.41(In.)
Flow top width inside pipe =   22.32(In.)
Critical Depth =   15.68(In.)
Pipe flow velocity =      5.76(Ft/s)
Travel time through pipe =    0.28 min.
Time of concentration (TC) =     9.25 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       26.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.150(Ac.)
Runoff from this stream =     13.177(CFS)
Time of concentration =    9.25 min.
Rainfall intensity =     3.055(In/Hr)
Summary of stream data:

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

```
1       28.451     15.19              2.385
2       13.177      9.25              3.055
Largest stream flow has longer time of concentration
Qp =     28.451 + sum of
        Qb         Ia/Ib
        13.177 *    0.781 =     10.285
Qp =     38.736

Total of 2 main streams to confluence:
Flow rates before confluence point:
      28.451      13.177
Area of streams before confluence:
       14.320        5.150


Results of confluence:
Total flow rate =     38.736(CFS)
Time of concentration =    15.191 min.
Effective stream area after confluence  =     19.470(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       26.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.719
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    15.19 min.
Rainfall intensity =      2.385(In/Hr) for a   100.0 year storm
Subarea runoff =      0.892(CFS) for      0.520(Ac.)
Total runoff =     39.628(CFS)    Total area =      19.990(Ac.)
End of computations, total study area =          19.99 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.412
Area averaged RI index number =  57.2
```

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          Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
      Rational Hydrology Study       Date: 04/07/22  File:MVAREAC.out
------------------------------------------------------------------------
AREA C
EXISTING CONDITION
100-YR

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

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

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


Program License Serial Number 6094

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

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [ Sunnymead-Moreno ] area used.
10 year storm 10 minute intensity =  2.010(In/Hr)
10 year storm 60 minute intensity =  0.820(In/Hr)
100 year storm 10 minute intensity =  2.940(In/Hr)
100 year storm 60 minute intensity =  1.200(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.200(In/Hr)
Slope of intensity duration curve = 0.5000




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      40.000 to Point/Station      41.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   661.000(Ft.)
Top (of initial area) elevation =  1644.000(Ft.)
Bottom (of initial area) elevation =  1642.000(Ft.)
Difference in elevation =     2.000(Ft.)
Slope =    0.00303  s(percent)=      0.30
TC = k(0.420)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.996 min.
Rainfall intensity =      2.191(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/2 Acre Lot)
Runoff Coefficient = 0.725
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
```

```
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.600; Impervious fraction =  0.400
Initial subarea runoff =      5.690(CFS)
Total initial stream area =        3.580(Ac.)
Pervious area fraction = 0.600


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       40.000 to Point/Station       41.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      3.580(Ac.)
Runoff from this stream =      5.690(CFS)
Time of concentration =   18.00 min.
Rainfall intensity =     2.191(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       42.000 to Point/Station       43.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   937.000(Ft.)
Top (of initial area) elevation =  1644.000(Ft.)
Bottom (of initial area) elevation =  1632.000(Ft.)
Difference in elevation =    12.000(Ft.)
Slope =    0.01281  s(percent)=       1.28
TC = k(0.420)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.504 min.
Rainfall intensity =      2.361(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/2 Acre Lot)
Runoff Coefficient = 0.734
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.600; Impervious fraction =  0.400
Initial subarea runoff =      9.669(CFS)
Total initial stream area =        5.580(Ac.)
Pervious area fraction = 0.600


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       43.000 to Point/Station       44.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  1632.000(Ft.)
Downstream point/station elevation =  1628.000(Ft.)
Pipe length  =   132.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.669(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     9.669(CFS)
Normal flow depth in pipe =   10.71(In.)
Flow top width inside pipe =   13.56(In.)
Critical Depth =   14.10(In.)
Pipe flow velocity =     10.30(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =    15.72 min.
```

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+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       43.000 to Point/Station       44.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      5.580(Ac.)
Runoff from this stream =      9.669(CFS)
Time of concentration =   15.72 min.
Rainfall intensity =     2.345(In/Hr)


+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       45.000 to Point/Station       46.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   632.000(Ft.)
Top (of initial area) elevation =  1634.000(Ft.)
Bottom (of initial area) elevation =  1627.000(Ft.)
Difference in elevation =     7.000(Ft.)
Slope =    0.01108  s(percent)=       1.11
TC = k(0.420)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.635 min.
Rainfall intensity =      2.517(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/2 Acre Lot)
Runoff Coefficient = 0.741
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.600; Impervious fraction =  0.400
Initial subarea runoff =      2.668(CFS)
Total initial stream area =        1.430(Ac.)
Pervious area fraction = 0.600
End of computations, total study area =           10.59 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged RI index number =  56.0
```

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            Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
      Rational Hydrology Study       Date: 04/07/22  File:MVAREAD.out
------------------------------------------------------------------------
AREA D
EXISTING CONDITION
100-YR

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

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

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


Program License Serial Number 6094

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

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [ Sunnymead-Moreno ] area used.
10 year storm 10 minute intensity =  2.010(In/Hr)
10 year storm 60 minute intensity =  0.820(In/Hr)
100 year storm 10 minute intensity =  2.940(In/Hr)
100 year storm 60 minute intensity =  1.200(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.200(In/Hr)
Slope of intensity duration curve = 0.5000




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      50.000 to Point/Station      51.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   391.000(Ft.)
Top (of initial area) elevation =  1746.000(Ft.)
Bottom (of initial area) elevation =  1652.000(Ft.)
Difference in elevation =    94.000(Ft.)
Slope =    0.24041  s(percent)=     24.04
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.673 min.
Rainfall intensity =      3.356(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.839
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.180
Decimal fraction soil group C = 0.820
```

```
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  84.56
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.618(CFS)
Total initial stream area =        1.640(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       52.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =     15.628(CFS)
Depth of flow =   0.307(Ft.), Average velocity =   3.314(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2             50.00              0.00
      3            100.00              1.00
Manning's 'N' friction factor =   0.020
-----------------------------------------------------------------
Sub-Channel flow  =     15.628(CFS)
  '     '    flow top width =     30.710(Ft.)
  '     '     velocity=    3.314(Ft/s)
  '     '    area =      4.716(Sq.Ft)
  '     '    Froude number =     1.490

Upstream point elevation =  1652.000(Ft.)
Downstream point elevation =  1630.000(Ft.)
Flow length =   909.000(Ft.)
Travel time  =    4.57 min.
Time of concentration =   12.24 min.
Depth of flow =   0.307(Ft.)
Average velocity =   3.314(Ft/s)
Total irregular channel flow =    15.628(CFS)
Irregular channel normal depth above invert elev. =   0.307(Ft.)
Average velocity of channel(s) =   3.314(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.802
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.690
Decimal fraction soil group C = 0.310
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  80.48
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.656(In/Hr) for a   100.0 year storm
Subarea runoff =     21.952(CFS) for     10.300(Ac.)
Total runoff =     26.570(CFS)    Total area =      11.940(Ac.)
Depth of flow =   0.375(Ft.), Average velocity =   3.784(Ft/s)
End of computations, total study area =           11.94 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  81.0
```

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           Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
      Rational Hydrology Study        Date: 04/07/22  File:AREAE.out
------------------------------------------------------------------------
AREA 3
EXISTING CONDITION
100-YR

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

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

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


Program License Serial Number 6094

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

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [ Sunnymead-Moreno ] area used.
10 year storm 10 minute intensity =  2.010(In/Hr)
10 year storm 60 minute intensity =  0.820(In/Hr)
100 year storm 10 minute intensity =  2.940(In/Hr)
100 year storm 60 minute intensity =  1.200(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.200(In/Hr)
Slope of intensity duration curve = 0.5000





++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       60.000 to Point/Station       61.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   615.000(Ft.)
Top (of initial area) elevation =  1784.000(Ft.)
Bottom (of initial area) elevation =  1632.000(Ft.)
Difference in elevation =   152.000(Ft.)
Slope =    0.24715  s(percent)=      24.72
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.146 min.
Rainfall intensity =      3.074(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.836
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.130
Decimal fraction soil group C = 0.870
```

```
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  84.96
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      9.505(CFS)
Total initial stream area =        3.700(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       61.000 to Point/Station       62.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =     15.549(CFS)
Depth of flow =   0.267(Ft.), Average velocity =   4.368(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2             50.00              0.00
      3            100.00              1.00
Manning's 'N' friction factor =   0.020
-----------------------------------------------------------------
Sub-Channel flow  =     15.550(CFS)
  '     '    flow top width =     26.682(Ft.)
  '     '     velocity=    4.368(Ft/s)
  '     '    area =      3.560(Sq.Ft)
  '     '    Froude number =     2.108

Upstream point elevation =  1632.000(Ft.)
Downstream point elevation =  1618.000(Ft.)
Flow length =   276.000(Ft.)
Travel time  =    1.05 min.
Time of concentration =   10.20 min.
Depth of flow =   0.267(Ft.)
Average velocity =   4.368(Ft/s)
Total irregular channel flow =    15.549(CFS)
Irregular channel normal depth above invert elev. =   0.267(Ft.)
Average velocity of channel(s) =   4.368(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.825
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.310
Decimal fraction soil group C = 0.690
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  83.52
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.911(In/Hr) for a   100.0 year storm
Subarea runoff =     12.036(CFS) for      5.010(Ac.)
Total runoff =     21.541(CFS)    Total area =       8.710(Ac.)
Depth of flow =   0.302(Ft.), Average velocity =   4.739(Ft/s)
End of computations, total study area =            8.71 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  84.1
```

```
           Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
      Rational Hydrology Study        Date: 04/07/22  File:AREAG.out
------------------------------------------------------------------------
AREA F
EXISTING CONDITION
100-YR

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

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

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


Program License Serial Number 6094

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

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [ Sunnymead-Moreno ] area used.
10 year storm 10 minute intensity =  2.010(In/Hr)
10 year storm 60 minute intensity =  0.820(In/Hr)
100 year storm 10 minute intensity =  2.940(In/Hr)
100 year storm 60 minute intensity =  1.200(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.200(In/Hr)
Slope of intensity duration curve = 0.5000




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       80.000 to Point/Station       81.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   420.000(Ft.)
Top (of initial area) elevation =  1610.000(Ft.)
Bottom (of initial area) elevation =  1598.000(Ft.)
Difference in elevation =    12.000(Ft.)
Slope =    0.02857  s(percent)=       2.86
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.089 min.
Rainfall intensity =      2.673(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.789
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
```

```
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      7.868(CFS)
Total initial stream area =        3.730(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       81.000 to Point/Station       82.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =     21.482(CFS)
Depth of flow =   0.365(Ft.), Average velocity =   3.229(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2             50.00              0.00
      3            100.00              1.00
Manning's 'N' friction factor =   0.020
-----------------------------------------------------------------
Sub-Channel flow  =     21.482(CFS)
  '     '    flow top width =     36.477(Ft.)
  '     '     velocity=    3.229(Ft/s)
  '     '    area =      6.653(Sq.Ft)
  '     '    Froude number =     1.332

Upstream point elevation =  1598.000(Ft.)
Downstream point elevation =  1582.200(Ft.)
Flow length =   865.000(Ft.)
Travel time  =    4.46 min.
Time of concentration =   16.55 min.
Depth of flow =   0.365(Ft.)
Average velocity =   3.229(Ft/s)
Total irregular channel flow =    21.482(CFS)
Irregular channel normal depth above invert elev. =   0.365(Ft.)
Average velocity of channel(s) =   3.229(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.773
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.285(In/Hr) for a   100.0 year storm
Subarea runoff =     27.136(CFS) for     15.370(Ac.)
Total runoff =     35.004(CFS)    Total area =      19.100(Ac.)
Depth of flow =   0.438(Ft.), Average velocity =   3.648(Ft/s)
End of computations, total study area =           19.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  78.0
```

```
            Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
      Rational Hydrology Study        Date: 04/07/22  File:AREAF.out
------------------------------------------------------------------------
AREA G
EXISTING CONDITION
100-YR

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

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

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


Program License Serial Number 6094

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

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [ Sunnymead-Moreno ] area used.
10 year storm 10 minute intensity =  2.010(In/Hr)
10 year storm 60 minute intensity =  0.820(In/Hr)
100 year storm 10 minute intensity =  2.940(In/Hr)
100 year storm 60 minute intensity =  1.200(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.200(In/Hr)
Slope of intensity duration curve = 0.5000




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       70.000 to Point/Station       71.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   469.000(Ft.)
Top (of initial area) elevation =  1784.000(Ft.)
Bottom (of initial area) elevation =  1627.000(Ft.)
Difference in elevation =   157.000(Ft.)
Slope =    0.33475  s(percent)=      33.48
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.723 min.
Rainfall intensity =      3.345(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
```

```
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.247(CFS)
Total initial stream area =        2.210(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       71.000 to Point/Station       72.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =     24.817(CFS)
Depth of flow =   0.308(Ft.), Average velocity =   5.236(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2             50.00              0.00
      3            100.00              1.00
Manning's 'N' friction factor =   0.020
-----------------------------------------------------------------
Sub-Channel flow  =     24.817(CFS)
  '     '    flow top width =     30.788(Ft.)
  '     '     velocity=    5.236(Ft/s)
  '     '    area =      4.740(Sq.Ft)
  '     '    Froude number =     2.352

Upstream point elevation =  1627.000(Ft.)
Downstream point elevation =  1576.000(Ft.)
Flow length =   847.000(Ft.)
Travel time  =    2.70 min.
Time of concentration =   10.42 min.
Depth of flow =   0.308(Ft.)
Average velocity =   5.236(Ft/s)
Total irregular channel flow =    24.817(CFS)
Irregular channel normal depth above invert elev. =   0.308(Ft.)
Average velocity of channel(s) =   5.236(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.827
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.240
Decimal fraction soil group C = 0.760
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  84.08
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.880(In/Hr) for a   100.0 year storm
Subarea runoff =     37.076(CFS) for     15.560(Ac.)
Total runoff =     43.323(CFS)    Total area =      17.770(Ac.)
Depth of flow =   0.379(Ft.), Average velocity =   6.019(Ft/s)
End of computations, total study area =           17.77 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  84.3
```

APPENDIX C

UNIT HYDROGRAPH CALCULATIONS

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

Study date 04/27/22 File: AREAA1001100.out

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

Program License Serial Number 6094

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

English Units used in output format

AREA A
100-YR 1-HR

Drainage Area = 30.07(Ac.) = 0.047 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 30.07(Ac.) = 0.047 Sq. Mi.
Length along longest watercourse = 2147.00(Ft.)
Length along longest watercourse measured to centroid = 1510.00(Ft.)
Length along longest watercourse = 0.407 Mi.
Length along longest watercourse measured to centroid = 0.286 Mi.
Difference in elevation = 36.10(Ft.)
Slope along watercourse = 88.7788 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.068 Hr.
Lag time = 4.07 Min.
25% of lag time = 1.02 Min.
40% of lag time = 1.63 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.07	0.49	14.73

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.07	1.20	36.08

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.490(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
30.070	56.80	0.608

Total Area Entered = 30.07(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.8	56.8	0.503	0.608	0.228	1.000	0.228
					Sum (F) =	0.228

Area averaged mean soil loss (F) (In/Hr) = 0.228
Minimum soil loss rate ((In/Hr)) = 0.114
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.412

Slope of intensity-duration curve for a 1 hour storm =0.5000

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	122.967	26.052	7.895
2	0.167	245.934	48.616	14.733
3	0.250	368.902	13.055	3.956
4	0.333	491.869	5.887	1.784
5	0.417	614.836	3.289	0.997
6	0.500	737.803	1.843	0.559
7	0.583	860.771	1.257	0.381
			Sum = 100.000	Sum= 30.305

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	4.20	0.605	0.228	(0.249)	0.377
2	0.17	4.30	0.619	0.228	(0.255)	0.391
3	0.25	5.00	0.720	0.228	(0.297)	0.492
4	0.33	5.00	0.720	0.228	(0.297)	0.492
5	0.42	5.80	0.835	0.228	(0.344)	0.607
6	0.50	6.50	0.936	0.228	(0.386)	0.708
7	0.58	7.40	1.065	0.228	(0.439)	0.838
8	0.67	8.60	1.238	0.228	(0.510)	1.010
9	0.75	12.30	1.771	0.228	(0.730)	1.543
10	0.83	29.10	4.189	0.228	(1.726)	3.962

```
 11   0.92     6.80      0.979          0.228    (  0.403)        0.751
 12   1.00     5.00      0.720          0.228    (  0.297)        0.492
          (Loss Rate Not Used)
    Sum =     100.0                                   Sum =    11.7
     Flood volume = Effective rainfall      0.97(In)
      times area      30.1(Ac.)/[(In)/(Ft.)] =       2.4(Ac.Ft)
     Total soil loss =      0.23(In)
     Total soil loss =     0.570(Ac.Ft)
     Total rainfall =     1.20(In)
     Flood volume =      106106.3 Cubic Feet
     Total soil loss =       24843.0 Cubic Feet
     --------------------------------------------------------------------
      Peak flow rate of this hydrograph =     73.708(CFS)
     --------------------------------------------------------------------
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         1 - H O U R    S T O R M
                    R u n o f f     H y d r o g r a p h
     --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

     --------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0       20.0      40.0      60.0      80.0
 -----------------------------------------------------------------------
   0+ 5      0.0205      2.98  VQ        |         |         |         |
   0+10      0.0801      8.65  |V  Q     |         |         |         |
   0+15      0.1569     11.15  | V  Q    |         |         |         |
   0+20      0.2489     13.37  |   V Q   |         |         |         |
   0+25      0.3528     15.08  |    V Q  |         |         |         |
   0+30      0.4766     17.98  |      VQ |         |         |         |
   0+35      0.6225     21.19  |         Q         |         |         |
   0+40      0.7956     25.13  |         | QV      |         |         |
   0+45      1.0210     32.73  |         |     Q   |         |         |
   0+50      1.4396     60.77  |         |         |  V      Q         |
   0+55      1.9472     73.71  |         |         |         |V    Q   |
   1+ 0      2.1892     35.15  |         |      Q  |         |    V    |
   1+ 5      2.3251     19.72  |        Q|         |         |       V |
   1+10      2.3835      8.49  |   Q     |         |         |        V|
   1+15      2.4140      4.43  | Q       |         |         |        V|
   1+20      2.4307      2.42  |Q        |         |         |        V|
   1+25      2.4346      0.56  Q         |         |         |        V|
   1+30      2.4359      0.19  Q         |         |         |         V
-----------------------------------------------------------------------
```

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

Study date 04/27/22 File: AREAA1003100.out

++

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

Program License Serial Number 6094

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

English Units used in output format

AREA A
100-YR 3-HR

Drainage Area = 30.07(Ac.) = 0.047 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 30.07(Ac.) = 0.047 Sq. Mi.
Length along longest watercourse = 2147.00(Ft.)
Length along longest watercourse measured to centroid = 1510.00(Ft.)
Length along longest watercourse = 0.407 Mi.
Length along longest watercourse measured to centroid = 0.286 Mi.
Difference in elevation = 36.10(Ft.)
Slope along watercourse = 88.7788 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.068 Hr.
Lag time = 4.07 Min.
25% of lag time = 1.02 Min.
40% of lag time = 1.63 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.07	0.80	24.06

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.07	1.85	55.63

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.850(In)

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

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
30.070	56.80	0.608

Total Area Entered = 30.07(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.8	56.8	0.503	0.608	0.228	1.000	0.228
					Sum (F) =	0.228

Area averaged mean soil loss (F) (In/Hr) = 0.228
Minimum soil loss rate ((In/Hr)) = 0.114
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.412

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	122.967	26.052	7.895
2	0.167	245.934	48.616	14.733
3	0.250	368.902	13.055	3.956
4	0.333	491.869	5.887	1.784
5	0.417	614.836	3.289	0.997
6	0.500	737.803	1.843	0.559
7	0.583	860.771	1.257	0.381
			Sum = 100.000	Sum= 30.305

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.289	(0.228)	0.119	0.170
2	0.17	1.30	0.289	(0.228)	0.119	0.170
3	0.25	1.10	0.244	(0.228)	0.101	0.144
4	0.33	1.50	0.333	(0.228)	0.137	0.196
5	0.42	1.50	0.333	(0.228)	0.137	0.196
6	0.50	1.80	0.400	(0.228)	0.165	0.235
7	0.58	1.50	0.333	(0.228)	0.137	0.196
8	0.67	1.80	0.400	(0.228)	0.165	0.235
9	0.75	1.80	0.400	(0.228)	0.165	0.235
10	0.83	1.50	0.333	(0.228)	0.137	0.196
11	0.92	1.60	0.355	(0.228)	0.146	0.209
12	1.00	1.80	0.400	(0.228)	0.165	0.235

```
13   1.08     2.20      0.488       (  0.228)       0.201        0.287
14   1.17     2.20      0.488       (  0.228)       0.201        0.287
15   1.25     2.20      0.488       (  0.228)       0.201        0.287
16   1.33     2.00      0.444       (  0.228)       0.183        0.261
17   1.42     2.60      0.577          0.228    (  0.238)        0.350
18   1.50     2.70      0.599          0.228    (  0.247)        0.372
19   1.58     2.40      0.533       (  0.228)       0.219        0.313
20   1.67     2.70      0.599          0.228    (  0.247)        0.372
21   1.75     3.30      0.733          0.228    (  0.302)        0.505
22   1.83     3.10      0.688          0.228    (  0.284)        0.461
23   1.92     2.90      0.644          0.228    (  0.265)        0.416
24   2.00     3.00      0.666          0.228    (  0.274)        0.438
25   2.08     3.10      0.688          0.228    (  0.284)        0.461
26   2.17     4.20      0.932          0.228    (  0.384)        0.705
27   2.25     5.00      1.110          0.228    (  0.457)        0.882
28   2.33     3.50      0.777          0.228    (  0.320)        0.549
29   2.42     6.80      1.509          0.228    (  0.622)        1.282
30   2.50     7.30      1.620          0.228    (  0.668)        1.393
31   2.58     8.20      1.820          0.228    (  0.750)        1.593
32   2.67     5.90      1.310          0.228    (  0.540)        1.082
33   2.75     2.00      0.444       (  0.228)       0.183        0.261
34   2.83     1.80      0.400       (  0.228)       0.165        0.235
35   2.92     1.80      0.400       (  0.228)       0.165        0.235
36   3.00     0.60      0.133       (  0.228)       0.055        0.078
          (Loss Rate Not Used)
   Sum =     100.0                                   Sum =    15.5
    Flood volume = Effective rainfall      1.29(In)
     times area      30.1(Ac.)/[(In)/(Ft.)] =       3.2(Ac.Ft)
    Total soil loss =      0.56(In)
    Total soil loss =     1.395(Ac.Ft)
    Total rainfall =      1.85(In)
    Flood volume =      141157.3 Cubic Feet
    Total soil loss =       60751.2 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =     41.134(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - H O U R    S T O R M
                   R u n o f f      H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       12.5      25.0      37.5      50.0
-----------------------------------------------------------------------
  0+ 5       0.0092      1.34  VQ        |         |         |         |
  0+10       0.0357      3.84  V  Q      |         |         |         |
  0+15       0.0653      4.31  V  Q      |         |         |         |
  0+20       0.0973      4.64  |V Q      |         |         |         |
  0+25       0.1350      5.47  |V  Q     |         |         |         |
  0+30       0.1766      6.04  | V Q     |         |         |         |
  0+35       0.2209      6.44  | V  Q    |         |         |         |
  0+40       0.2647      6.36  |  V Q    |         |         |         |
  0+45       0.3120      6.87  |  V Q    |         |         |         |
  0+50       0.3582      6.71  |   VQ    |         |         |         |
  0+55       0.4015      6.29  |   VQ    |         |         |         |
  1+ 0       0.4467      6.56  |    Q    |         |         |         |
  1+ 5       0.4973      7.35  |    QV   |         |         |         |
  1+10       0.5539      8.22  |     Q   |         |         |         |
  1+15       0.6122      8.46  |     QV  |         |         |         |
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    1+20      0.6698      8.37 |     Q V |         |         |         |
    1+25      0.7301      8.76 |      Q V|         |         |         |
    1+30      0.8002     10.17 |       QV|         |         |         |
    1+35      0.8715     10.36 |       Q V         |         |         |
    1+40      0.9416     10.18 |       Q |V        |         |         |
    1+45      1.0241     11.98 |        Q| V       |         |         |
    1+50      1.1190     13.78 |         |Q V      |         |         |
    1+55      1.2112     13.39 |         Q   V     |         |         |
    2+ 0      1.3008     13.01 |         Q     V   |         |         |
    2+ 5      1.3931     13.40 |         Q      V  |         |         |
    2+10      1.5013     15.72 |         | Q     V |         |         |
    2+15      1.6448     20.83 |         |     Q   V         |         |
    2+20      1.7949     21.80 |         |      Q  | V       |         |
    2+25      1.9591     23.84 |         |        Q|   V     |         |
    2+30      2.1985     34.77 |         |         |      Q  |         |
    2+35      2.4783     40.61 |         |         |         V Q       |
    2+40      2.7615     41.13 |         |         |         | Q V     |
    2+45      2.9594     28.72 |         |         | Q       |     V   |
    2+50      3.0637     15.14 |         | Q       |         |      V  |
    2+55      3.1404     11.14 |       Q |         |         |       V |
    3+ 0      3.1953      7.98 |     Q   |         |         |        V|
    3+ 5      3.2227      3.98 |  Q      |         |         |        V|
    3+10      3.2332      1.52 |Q        |         |         |        V|
    3+15      3.2373      0.60 Q         |         |         |        V|
    3+20      3.2394      0.30 Q         |         |         |        V|
    3+25      3.2403      0.13 Q         |         |         |        V|
    3+30      3.2405      0.03 Q         |         |         |        V|
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/27/22 File: AREAA1006100.out

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

Program License Serial Number 6094

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

English Units used in output format

AREA A
100-YR 6-HR

Drainage Area = 30.07(Ac.) = 0.047 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 30.07(Ac.) = 0.047 Sq. Mi.
Length along longest watercourse = 2147.00(Ft.)
Length along longest watercourse measured to centroid = 1510.00(Ft.)
Length along longest watercourse = 0.407 Mi.
Length along longest watercourse measured to centroid = 0.286 Mi.
Difference in elevation = 36.10(Ft.)
Slope along watercourse = 88.7788 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.068 Hr.
Lag time = 4.07 Min.
25% of lag time = 1.02 Min.
40% of lag time = 1.63 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.07	1.10	33.08

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.07	2.50	75.17

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.100(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
30.070	56.80	0.608

Total Area Entered = 30.07(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.8	56.8	0.503	0.608	0.228	1.000	0.228
					Sum (F) =	0.228

Area averaged mean soil loss (F) (In/Hr) = 0.228
Minimum soil loss rate ((In/Hr)) = 0.114
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.412

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

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	122.967	26.052	7.895
2	0.167	245.934	48.616	14.733
3	0.250	368.902	13.055	3.956
4	0.333	491.869	5.887	1.784
5	0.417	614.836	3.289	0.997
6	0.500	737.803	1.843	0.559
7	0.583	860.771	1.257	0.381
			Sum = 100.000	Sum= 30.305

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.50	0.150	(0.228)	0.062	0.088
2	0.17	0.60	0.180	(0.228)	0.074	0.106
3	0.25	0.60	0.180	(0.228)	0.074	0.106
4	0.33	0.60	0.180	(0.228)	0.074	0.106
5	0.42	0.60	0.180	(0.228)	0.074	0.106
6	0.50	0.70	0.210	(0.228)	0.087	0.123
7	0.58	0.70	0.210	(0.228)	0.087	0.123
8	0.67	0.70	0.210	(0.228)	0.087	0.123
9	0.75	0.70	0.210	(0.228)	0.087	0.123
10	0.83	0.70	0.210	(0.228)	0.087	0.123
11	0.92	0.70	0.210	(0.228)	0.087	0.123
12	1.00	0.80	0.240	(0.228)	0.099	0.141

13	1.08	0.80	0.240	(0.228)	0.099	0.141
14	1.17	0.80	0.240	(0.228)	0.099	0.141
15	1.25	0.80	0.240	(0.228)	0.099	0.141
16	1.33	0.80	0.240	(0.228)	0.099	0.141
17	1.42	0.80	0.240	(0.228)	0.099	0.141
18	1.50	0.80	0.240	(0.228)	0.099	0.141
19	1.58	0.80	0.240	(0.228)	0.099	0.141
20	1.67	0.80	0.240	(0.228)	0.099	0.141
21	1.75	0.80	0.240	(0.228)	0.099	0.141
22	1.83	0.80	0.240	(0.228)	0.099	0.141
23	1.92	0.80	0.240	(0.228)	0.099	0.141
24	2.00	0.90	0.270	(0.228)	0.111	0.159
25	2.08	0.80	0.240	(0.228)	0.099	0.141
26	2.17	0.90	0.270	(0.228)	0.111	0.159
27	2.25	0.90	0.270	(0.228)	0.111	0.159
28	2.33	0.90	0.270	(0.228)	0.111	0.159
29	2.42	0.90	0.270	(0.228)	0.111	0.159
30	2.50	0.90	0.270	(0.228)	0.111	0.159
31	2.58	0.90	0.270	(0.228)	0.111	0.159
32	2.67	0.90	0.270	(0.228)	0.111	0.159
33	2.75	1.00	0.300	(0.228)	0.124	0.176
34	2.83	1.00	0.300	(0.228)	0.124	0.176
35	2.92	1.00	0.300	(0.228)	0.124	0.176
36	3.00	1.00	0.300	(0.228)	0.124	0.176
37	3.08	1.00	0.300	(0.228)	0.124	0.176
38	3.17	1.10	0.330	(0.228)	0.136	0.194
39	3.25	1.10	0.330	(0.228)	0.136	0.194
40	3.33	1.10	0.330	(0.228)	0.136	0.194
41	3.42	1.20	0.360	(0.228)	0.148	0.212
42	3.50	1.30	0.390	(0.228)	0.161	0.229
43	3.58	1.40	0.420	(0.228)	0.173	0.247
44	3.67	1.40	0.420	(0.228)	0.173	0.247
45	3.75	1.50	0.450	(0.228)	0.185	0.265
46	3.83	1.50	0.450	(0.228)	0.185	0.265
47	3.92	1.60	0.480	(0.228)	0.198	0.282
48	4.00	1.60	0.480	(0.228)	0.198	0.282
49	4.08	1.70	0.510	(0.228)	0.210	0.300
50	4.17	1.80	0.540	(0.228)	0.222	0.317
51	4.25	1.90	0.570	0.228	(0.235)	0.342
52	4.33	2.00	0.600	0.228	(0.247)	0.372
53	4.42	2.10	0.630	0.228	(0.260)	0.402
54	4.50	2.10	0.630	0.228	(0.260)	0.402
55	4.58	2.20	0.660	0.228	(0.272)	0.432
56	4.67	2.30	0.690	0.228	(0.284)	0.462
57	4.75	2.40	0.720	0.228	(0.297)	0.492
58	4.83	2.40	0.720	0.228	(0.297)	0.492
59	4.92	2.50	0.750	0.228	(0.309)	0.522
60	5.00	2.60	0.780	0.228	(0.321)	0.552
61	5.08	3.10	0.930	0.228	(0.383)	0.702
62	5.17	3.60	1.080	0.228	(0.445)	0.852
63	5.25	3.90	1.170	0.228	(0.482)	0.942
64	5.33	4.20	1.260	0.228	(0.519)	1.032
65	5.42	4.70	1.410	0.228	(0.581)	1.182
66	5.50	5.60	1.680	0.228	(0.692)	1.452
67	5.58	1.90	0.570	0.228	(0.235)	0.342
68	5.67	0.90	0.270	(0.228)	0.111	0.159
69	5.75	0.60	0.180	(0.228)	0.074	0.106
70	5.83	0.50	0.150	(0.228)	0.062	0.088
71	5.92	0.30	0.090	(0.228)	0.037	0.053
72	6.00	0.20	0.060	(0.228)	0.025	0.035

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          (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    19.9
    Flood volume = Effective rainfall      1.66(In)
     times area      30.1(Ac.)/[(In)/(Ft.)] =       4.2(Ac.Ft)
    Total soil loss =      0.84(In)
    Total soil loss =     2.111(Ac.Ft)
    Total rainfall =      2.50(In)
    Flood volume =      180892.2 Cubic Feet
    Total soil loss =       91964.8 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =     36.120(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        6 - H O U R    S T O R M
                   R u n o f f      H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       10.0      20.0      30.0      40.0
-----------------------------------------------------------------------
  0+ 5       0.0048      0.70  Q         |         |         |         |
  0+10       0.0195      2.14  V Q       |         |         |         |
  0+15       0.0384      2.75  V Q       |         |         |         |
  0+20       0.0589      2.97  V Q       |         |         |         |
  0+25       0.0802      3.09  V  Q      |         |         |         |
  0+30       0.1029      3.30  V  Q      |         |         |         |
  0+35       0.1277      3.60  |V Q      |         |         |         |
  0+40       0.1530      3.68  |V Q      |         |         |         |
  0+45       0.1786      3.71  |V Q      |         |         |         |
  0+50       0.2042      3.73  |V Q      |         |         |         |
  0+55       0.2300      3.74  | VQ      |         |         |         |
  1+ 0       0.2567      3.88  | VQ      |         |         |         |
  1+ 5       0.2852      4.14  | V Q     |         |         |         |
  1+10       0.3143      4.21  |  VQ     |         |         |         |
  1+15       0.3435      4.24  |  VQ     |         |         |         |
  1+20       0.3728      4.26  |  VQ     |         |         |         |
  1+25       0.4023      4.27  |  VQ     |         |         |         |
  1+30       0.4317      4.28  |   Q     |         |         |         |
  1+35       0.4612      4.28  |   Q     |         |         |         |
  1+40       0.4907      4.28  |   Q     |         |         |         |
  1+45       0.5201      4.28  |   QV    |         |         |         |
  1+50       0.5496      4.28  |   QV    |         |         |         |
  1+55       0.5791      4.28  |   QV    |         |         |         |
  2+ 0       0.6095      4.42  |   QV    |         |         |         |
  2+ 5       0.6407      4.54  |   Q V   |         |         |         |
  2+10       0.6716      4.49  |   Q V   |         |         |         |
  2+15       0.7041      4.71  |   Q V   |         |         |         |
  2+20       0.7369      4.77  |   Q  V  |         |         |         |
  2+25       0.7699      4.79  |   Q  V  |         |         |         |
  2+30       0.8030      4.80  |   Q  V  |         |         |         |
  2+35       0.8361      4.81  |   Q   V |         |         |         |
  2+40       0.8692      4.81  |   Q   V |         |         |         |
  2+45       0.9033      4.95  |   Q   V |         |         |         |
  2+50       0.9392      5.21  |    Q   V|         |         |         |
  2+55       0.9756      5.28  |    Q   V|         |         |         |
  3+ 0       1.0122      5.31  |    Q   V|         |         |         |
  3+ 5       1.0489      5.33  |    Q    V         |         |         |
  3+10       1.0867      5.48  |    Q    V         |         |         |
  3+15       1.1262      5.75  |    Q    V         |         |         |
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    3+20       1.1663      5.82  |    Q    |V        |         |         |
    3+25       1.2075      5.99  |    Q    |V        |         |         |
    3+30       1.2516      6.40  |     Q   | V       |         |         |
    3+35       1.2991      6.88  |     Q   | V       |         |         |
    3+40       1.3490      7.25  |      Q  | V       |         |         |
    3+45       1.4007      7.51  |      Q  |  V      |         |         |
    3+50       1.4546      7.83  |      Q  |   V     |         |         |
    3+55       1.5102      8.07  |       Q |   V     |         |         |
    4+ 0       1.5680      8.38  |       Q |    V    |         |         |
    4+ 5       1.6273      8.61  |       Q |    V    |         |         |
    4+10       1.6896      9.05  |        Q|     V   |         |         |
    4+15       1.7558      9.61  |        Q|     V   |         |         |
    4+20       1.8269     10.32  |         Q      V  |         |         |
    4+25       1.9037     11.15  |         |Q      V |         |         |
    4+30       1.9848     11.79  |         |Q       V|         |         |
    4+35       2.0691     12.24  |         | Q      V|         |         |
    4+40       2.1588     13.02  |         |  Q      V         |         |
    4+45       2.2543     13.87  |         |  Q      |V        |         |
    4+50       2.3543     14.52  |         |   Q     | V       |         |
    4+55       2.4574     14.97  |         |   Q     |  V      |         |
    5+ 0       2.5658     15.75  |         |    Q    |   V     |         |
    5+ 5       2.6867     17.55  |         |      Q  |    V    |         |
    5+10       2.8323     21.15  |         |         |Q     V  |         |
    5+15       3.0028     24.76  |         |         |   Q   V |         |
    5+20       3.1936     27.70  |         |         |      Q  V         |
    5+25       3.4072     31.01  |         |         |         |QV       |
    5+30       3.6560     36.12  |         |         |         |    VQ   |
    5+35       3.8785     32.32  |         |         |         | Q    V  |
    5+40       3.9890     16.04  |         |     Q   |         |       V |
    5+45       4.0526      9.24  |        Q|         |         |        V|
    5+50       4.0939      6.00  |    Q    |         |         |        V|
    5+55       4.1217      4.02  |   Q     |         |         |        V|
    6+ 0       4.1389      2.50  | Q       |         |         |        V|
    6+ 5       4.1472      1.21  |Q        |         |         |        V|
    6+10       4.1503      0.44  Q         |         |         |        V|
    6+15       4.1517      0.21  Q         |         |         |        V|
    6+20       4.1523      0.10  Q         |         |         |        V|
    6+25       4.1526      0.04  Q         |         |         |        V|
    6+30       4.1527      0.01  Q         |         |         |         V
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/27/22 File: AREAA10024100.out

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

Program License Serial Number 6094

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

English Units used in output format

AREA A
100-YR 24-HR

Drainage Area = 30.07(Ac.) = 0.047 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 30.07(Ac.) = 0.047 Sq. Mi.
Length along longest watercourse = 2147.00(Ft.)
Length along longest watercourse measured to centroid = 1510.00(Ft.)
Length along longest watercourse = 0.407 Mi.
Length along longest watercourse measured to centroid = 0.286 Mi.
Difference in elevation = 36.10(Ft.)
Slope along watercourse = 88.7788 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.068 Hr.
Lag time = 4.07 Min.
25% of lag time = 1.02 Min.
40% of lag time = 1.63 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.07	1.70	51.12

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.07	4.30	129.30

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 4.300(In)

Point rain (area averaged) = 4.300(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 4.300(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
30.070	56.80	0.608

Total Area Entered = 30.07(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.8	56.8	0.503	0.608	0.228	1.000	0.228
					Sum (F) =	0.228

Area averaged mean soil loss (F) (In/Hr) = 0.228
Minimum soil loss rate ((In/Hr)) = 0.114
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.412

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

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	122.967	26.052	7.895
2	0.167	245.934	48.616	14.733
3	0.250	368.902	13.055	3.956
4	0.333	491.869	5.887	1.784
5	0.417	614.836	3.289	0.997
6	0.500	737.803	1.843	0.559
7	0.583	860.771	1.257	0.381
			Sum = 100.000	Sum= 30.305

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.034	(0.403)	0.014	0.020
2	0.17	0.07	0.034	(0.402)	0.014	0.020
3	0.25	0.07	0.034	(0.400)	0.014	0.020
4	0.33	0.10	0.052	(0.399)	0.021	0.030
5	0.42	0.10	0.052	(0.397)	0.021	0.030
6	0.50	0.10	0.052	(0.396)	0.021	0.030
7	0.58	0.10	0.052	(0.394)	0.021	0.030
8	0.67	0.10	0.052	(0.393)	0.021	0.030
9	0.75	0.10	0.052	(0.391)	0.021	0.030
10	0.83	0.13	0.069	(0.390)	0.028	0.040
11	0.92	0.13	0.069	(0.388)	0.028	0.040
12	1.00	0.13	0.069	(0.386)	0.028	0.040

13	1.08	0.10	0.052	(0.385)	0.021	0.030
14	1.17	0.10	0.052	(0.383)	0.021	0.030
15	1.25	0.10	0.052	(0.382)	0.021	0.030
16	1.33	0.10	0.052	(0.380)	0.021	0.030
17	1.42	0.10	0.052	(0.379)	0.021	0.030
18	1.50	0.10	0.052	(0.377)	0.021	0.030
19	1.58	0.10	0.052	(0.376)	0.021	0.030
20	1.67	0.10	0.052	(0.374)	0.021	0.030
21	1.75	0.10	0.052	(0.373)	0.021	0.030
22	1.83	0.13	0.069	(0.371)	0.028	0.040
23	1.92	0.13	0.069	(0.370)	0.028	0.040
24	2.00	0.13	0.069	(0.368)	0.028	0.040
25	2.08	0.13	0.069	(0.367)	0.028	0.040
26	2.17	0.13	0.069	(0.365)	0.028	0.040
27	2.25	0.13	0.069	(0.364)	0.028	0.040
28	2.33	0.13	0.069	(0.362)	0.028	0.040
29	2.42	0.13	0.069	(0.361)	0.028	0.040
30	2.50	0.13	0.069	(0.359)	0.028	0.040
31	2.58	0.17	0.086	(0.358)	0.035	0.051
32	2.67	0.17	0.086	(0.357)	0.035	0.051
33	2.75	0.17	0.086	(0.355)	0.035	0.051
34	2.83	0.17	0.086	(0.354)	0.035	0.051
35	2.92	0.17	0.086	(0.352)	0.035	0.051
36	3.00	0.17	0.086	(0.351)	0.035	0.051
37	3.08	0.17	0.086	(0.349)	0.035	0.051
38	3.17	0.17	0.086	(0.348)	0.035	0.051
39	3.25	0.17	0.086	(0.346)	0.035	0.051
40	3.33	0.17	0.086	(0.345)	0.035	0.051
41	3.42	0.17	0.086	(0.343)	0.035	0.051
42	3.50	0.17	0.086	(0.342)	0.035	0.051
43	3.58	0.17	0.086	(0.341)	0.035	0.051
44	3.67	0.17	0.086	(0.339)	0.035	0.051
45	3.75	0.17	0.086	(0.338)	0.035	0.051
46	3.83	0.20	0.103	(0.336)	0.043	0.061
47	3.92	0.20	0.103	(0.335)	0.043	0.061
48	4.00	0.20	0.103	(0.333)	0.043	0.061
49	4.08	0.20	0.103	(0.332)	0.043	0.061
50	4.17	0.20	0.103	(0.331)	0.043	0.061
51	4.25	0.20	0.103	(0.329)	0.043	0.061
52	4.33	0.23	0.120	(0.328)	0.050	0.071
53	4.42	0.23	0.120	(0.326)	0.050	0.071
54	4.50	0.23	0.120	(0.325)	0.050	0.071
55	4.58	0.23	0.120	(0.324)	0.050	0.071
56	4.67	0.23	0.120	(0.322)	0.050	0.071
57	4.75	0.23	0.120	(0.321)	0.050	0.071
58	4.83	0.27	0.138	(0.319)	0.057	0.081
59	4.92	0.27	0.138	(0.318)	0.057	0.081
60	5.00	0.27	0.138	(0.317)	0.057	0.081
61	5.08	0.20	0.103	(0.315)	0.043	0.061
62	5.17	0.20	0.103	(0.314)	0.043	0.061
63	5.25	0.20	0.103	(0.313)	0.043	0.061
64	5.33	0.23	0.120	(0.311)	0.050	0.071
65	5.42	0.23	0.120	(0.310)	0.050	0.071
66	5.50	0.23	0.120	(0.308)	0.050	0.071
67	5.58	0.27	0.138	(0.307)	0.057	0.081
68	5.67	0.27	0.138	(0.306)	0.057	0.081
69	5.75	0.27	0.138	(0.304)	0.057	0.081
70	5.83	0.27	0.138	(0.303)	0.057	0.081
71	5.92	0.27	0.138	(0.302)	0.057	0.081
72	6.00	0.27	0.138	(0.300)	0.057	0.081

73	6.08	0.30	0.155	(0.299)	0.064	0.091
74	6.17	0.30	0.155	(0.298)	0.064	0.091
75	6.25	0.30	0.155	(0.296)	0.064	0.091
76	6.33	0.30	0.155	(0.295)	0.064	0.091
77	6.42	0.30	0.155	(0.294)	0.064	0.091
78	6.50	0.30	0.155	(0.292)	0.064	0.091
79	6.58	0.33	0.172	(0.291)	0.071	0.101
80	6.67	0.33	0.172	(0.290)	0.071	0.101
81	6.75	0.33	0.172	(0.289)	0.071	0.101
82	6.83	0.33	0.172	(0.287)	0.071	0.101
83	6.92	0.33	0.172	(0.286)	0.071	0.101
84	7.00	0.33	0.172	(0.285)	0.071	0.101
85	7.08	0.33	0.172	(0.283)	0.071	0.101
86	7.17	0.33	0.172	(0.282)	0.071	0.101
87	7.25	0.33	0.172	(0.281)	0.071	0.101
88	7.33	0.37	0.189	(0.279)	0.078	0.111
89	7.42	0.37	0.189	(0.278)	0.078	0.111
90	7.50	0.37	0.189	(0.277)	0.078	0.111
91	7.58	0.40	0.206	(0.276)	0.085	0.121
92	7.67	0.40	0.206	(0.274)	0.085	0.121
93	7.75	0.40	0.206	(0.273)	0.085	0.121
94	7.83	0.43	0.224	(0.272)	0.092	0.131
95	7.92	0.43	0.224	(0.271)	0.092	0.131
96	8.00	0.43	0.224	(0.269)	0.092	0.131
97	8.08	0.50	0.258	(0.268)	0.106	0.152
98	8.17	0.50	0.258	(0.267)	0.106	0.152
99	8.25	0.50	0.258	(0.266)	0.106	0.152
100	8.33	0.50	0.258	(0.264)	0.106	0.152
101	8.42	0.50	0.258	(0.263)	0.106	0.152
102	8.50	0.50	0.258	(0.262)	0.106	0.152
103	8.58	0.53	0.275	(0.261)	0.113	0.162
104	8.67	0.53	0.275	(0.259)	0.113	0.162
105	8.75	0.53	0.275	(0.258)	0.113	0.162
106	8.83	0.57	0.292	(0.257)	0.120	0.172
107	8.92	0.57	0.292	(0.256)	0.120	0.172
108	9.00	0.57	0.292	(0.255)	0.120	0.172
109	9.08	0.63	0.327	(0.253)	0.135	0.192
110	9.17	0.63	0.327	(0.252)	0.135	0.192
111	9.25	0.63	0.327	(0.251)	0.135	0.192
112	9.33	0.67	0.344	(0.250)	0.142	0.202
113	9.42	0.67	0.344	(0.249)	0.142	0.202
114	9.50	0.67	0.344	(0.247)	0.142	0.202
115	9.58	0.70	0.361	(0.246)	0.149	0.212
116	9.67	0.70	0.361	(0.245)	0.149	0.212
117	9.75	0.70	0.361	(0.244)	0.149	0.212
118	9.83	0.73	0.378	(0.243)	0.156	0.222
119	9.92	0.73	0.378	(0.242)	0.156	0.222
120	10.00	0.73	0.378	(0.240)	0.156	0.222
121	10.08	0.50	0.258	(0.239)	0.106	0.152
122	10.17	0.50	0.258	(0.238)	0.106	0.152
123	10.25	0.50	0.258	(0.237)	0.106	0.152
124	10.33	0.50	0.258	(0.236)	0.106	0.152
125	10.42	0.50	0.258	(0.235)	0.106	0.152
126	10.50	0.50	0.258	(0.233)	0.106	0.152
127	10.58	0.67	0.344	(0.232)	0.142	0.202
128	10.67	0.67	0.344	(0.231)	0.142	0.202
129	10.75	0.67	0.344	(0.230)	0.142	0.202
130	10.83	0.67	0.344	(0.229)	0.142	0.202
131	10.92	0.67	0.344	(0.228)	0.142	0.202
132	11.00	0.67	0.344	(0.227)	0.142	0.202

133	11.08	0.63	0.327	(0.226)	0.135	0.192
134	11.17	0.63	0.327	(0.224)	0.135	0.192
135	11.25	0.63	0.327	(0.223)	0.135	0.192
136	11.33	0.63	0.327	(0.222)	0.135	0.192
137	11.42	0.63	0.327	(0.221)	0.135	0.192
138	11.50	0.63	0.327	(0.220)	0.135	0.192
139	11.58	0.57	0.292	(0.219)	0.120	0.172
140	11.67	0.57	0.292	(0.218)	0.120	0.172
141	11.75	0.57	0.292	(0.217)	0.120	0.172
142	11.83	0.60	0.310	(0.216)	0.128	0.182
143	11.92	0.60	0.310	(0.215)	0.128	0.182
144	12.00	0.60	0.310	(0.214)	0.128	0.182
145	12.08	0.83	0.430	(0.212)	0.177	0.253
146	12.17	0.83	0.430	(0.211)	0.177	0.253
147	12.25	0.83	0.430	(0.210)	0.177	0.253
148	12.33	0.87	0.447	(0.209)	0.184	0.263
149	12.42	0.87	0.447	(0.208)	0.184	0.263
150	12.50	0.87	0.447	(0.207)	0.184	0.263
151	12.58	0.93	0.482	(0.206)	0.198	0.283
152	12.67	0.93	0.482	(0.205)	0.198	0.283
153	12.75	0.93	0.482	(0.204)	0.198	0.283
154	12.83	0.97	0.499	0.203	(0.205)	0.296
155	12.92	0.97	0.499	0.202	(0.205)	0.297
156	13.00	0.97	0.499	0.201	(0.205)	0.298
157	13.08	1.13	0.585	0.200	(0.241)	0.385
158	13.17	1.13	0.585	0.199	(0.241)	0.386
159	13.25	1.13	0.585	0.198	(0.241)	0.387
160	13.33	1.13	0.585	0.197	(0.241)	0.388
161	13.42	1.13	0.585	0.196	(0.241)	0.389
162	13.50	1.13	0.585	0.195	(0.241)	0.390
163	13.58	0.77	0.396	(0.194)	0.163	0.233
164	13.67	0.77	0.396	(0.193)	0.163	0.233
165	13.75	0.77	0.396	(0.192)	0.163	0.233
166	13.83	0.77	0.396	(0.191)	0.163	0.233
167	13.92	0.77	0.396	(0.190)	0.163	0.233
168	14.00	0.77	0.396	(0.189)	0.163	0.233
169	14.08	0.90	0.464	0.188	(0.191)	0.276
170	14.17	0.90	0.464	0.187	(0.191)	0.277
171	14.25	0.90	0.464	0.186	(0.191)	0.278
172	14.33	0.87	0.447	(0.185)	0.184	0.263
173	14.42	0.87	0.447	(0.184)	0.184	0.263
174	14.50	0.87	0.447	0.183	(0.184)	0.264
175	14.58	0.87	0.447	0.182	(0.184)	0.265
176	14.67	0.87	0.447	0.181	(0.184)	0.266
177	14.75	0.87	0.447	0.181	(0.184)	0.267
178	14.83	0.83	0.430	(0.180)	0.177	0.253
179	14.92	0.83	0.430	(0.179)	0.177	0.253
180	15.00	0.83	0.430	(0.178)	0.177	0.253
181	15.08	0.80	0.413	(0.177)	0.170	0.243
182	15.17	0.80	0.413	(0.176)	0.170	0.243
183	15.25	0.80	0.413	(0.175)	0.170	0.243
184	15.33	0.77	0.396	(0.174)	0.163	0.233
185	15.42	0.77	0.396	(0.173)	0.163	0.233
186	15.50	0.77	0.396	(0.172)	0.163	0.233
187	15.58	0.63	0.327	(0.171)	0.135	0.192
188	15.67	0.63	0.327	(0.171)	0.135	0.192
189	15.75	0.63	0.327	(0.170)	0.135	0.192
190	15.83	0.63	0.327	(0.169)	0.135	0.192
191	15.92	0.63	0.327	(0.168)	0.135	0.192
192	16.00	0.63	0.327	(0.167)	0.135	0.192

193	16.08	0.13	0.069	(0.166)	0.028	0.040
194	16.17	0.13	0.069	(0.165)	0.028	0.040
195	16.25	0.13	0.069	(0.165)	0.028	0.040
196	16.33	0.13	0.069	(0.164)	0.028	0.040
197	16.42	0.13	0.069	(0.163)	0.028	0.040
198	16.50	0.13	0.069	(0.162)	0.028	0.040
199	16.58	0.10	0.052	(0.161)	0.021	0.030
200	16.67	0.10	0.052	(0.160)	0.021	0.030
201	16.75	0.10	0.052	(0.160)	0.021	0.030
202	16.83	0.10	0.052	(0.159)	0.021	0.030
203	16.92	0.10	0.052	(0.158)	0.021	0.030
204	17.00	0.10	0.052	(0.157)	0.021	0.030
205	17.08	0.17	0.086	(0.156)	0.035	0.051
206	17.17	0.17	0.086	(0.156)	0.035	0.051
207	17.25	0.17	0.086	(0.155)	0.035	0.051
208	17.33	0.17	0.086	(0.154)	0.035	0.051
209	17.42	0.17	0.086	(0.153)	0.035	0.051
210	17.50	0.17	0.086	(0.153)	0.035	0.051
211	17.58	0.17	0.086	(0.152)	0.035	0.051
212	17.67	0.17	0.086	(0.151)	0.035	0.051
213	17.75	0.17	0.086	(0.150)	0.035	0.051
214	17.83	0.13	0.069	(0.150)	0.028	0.040
215	17.92	0.13	0.069	(0.149)	0.028	0.040
216	18.00	0.13	0.069	(0.148)	0.028	0.040
217	18.08	0.13	0.069	(0.147)	0.028	0.040
218	18.17	0.13	0.069	(0.147)	0.028	0.040
219	18.25	0.13	0.069	(0.146)	0.028	0.040
220	18.33	0.13	0.069	(0.145)	0.028	0.040
221	18.42	0.13	0.069	(0.144)	0.028	0.040
222	18.50	0.13	0.069	(0.144)	0.028	0.040
223	18.58	0.10	0.052	(0.143)	0.021	0.030
224	18.67	0.10	0.052	(0.142)	0.021	0.030
225	18.75	0.10	0.052	(0.142)	0.021	0.030
226	18.83	0.07	0.034	(0.141)	0.014	0.020
227	18.92	0.07	0.034	(0.140)	0.014	0.020
228	19.00	0.07	0.034	(0.140)	0.014	0.020
229	19.08	0.10	0.052	(0.139)	0.021	0.030
230	19.17	0.10	0.052	(0.138)	0.021	0.030
231	19.25	0.10	0.052	(0.138)	0.021	0.030
232	19.33	0.13	0.069	(0.137)	0.028	0.040
233	19.42	0.13	0.069	(0.136)	0.028	0.040
234	19.50	0.13	0.069	(0.136)	0.028	0.040
235	19.58	0.10	0.052	(0.135)	0.021	0.030
236	19.67	0.10	0.052	(0.135)	0.021	0.030
237	19.75	0.10	0.052	(0.134)	0.021	0.030
238	19.83	0.07	0.034	(0.133)	0.014	0.020
239	19.92	0.07	0.034	(0.133)	0.014	0.020
240	20.00	0.07	0.034	(0.132)	0.014	0.020
241	20.08	0.10	0.052	(0.132)	0.021	0.030
242	20.17	0.10	0.052	(0.131)	0.021	0.030
243	20.25	0.10	0.052	(0.130)	0.021	0.030
244	20.33	0.10	0.052	(0.130)	0.021	0.030
245	20.42	0.10	0.052	(0.129)	0.021	0.030
246	20.50	0.10	0.052	(0.129)	0.021	0.030
247	20.58	0.10	0.052	(0.128)	0.021	0.030
248	20.67	0.10	0.052	(0.128)	0.021	0.030
249	20.75	0.10	0.052	(0.127)	0.021	0.030
250	20.83	0.07	0.034	(0.127)	0.014	0.020
251	20.92	0.07	0.034	(0.126)	0.014	0.020
252	21.00	0.07	0.034	(0.126)	0.014	0.020

253	21.08	0.10	0.052	(0.125)	0.021	0.030
254	21.17	0.10	0.052	(0.125)	0.021	0.030
255	21.25	0.10	0.052	(0.124)	0.021	0.030
256	21.33	0.07	0.034	(0.124)	0.014	0.020
257	21.42	0.07	0.034	(0.123)	0.014	0.020
258	21.50	0.07	0.034	(0.123)	0.014	0.020
259	21.58	0.10	0.052	(0.122)	0.021	0.030
260	21.67	0.10	0.052	(0.122)	0.021	0.030
261	21.75	0.10	0.052	(0.121)	0.021	0.030
262	21.83	0.07	0.034	(0.121)	0.014	0.020
263	21.92	0.07	0.034	(0.121)	0.014	0.020
264	22.00	0.07	0.034	(0.120)	0.014	0.020
265	22.08	0.10	0.052	(0.120)	0.021	0.030
266	22.17	0.10	0.052	(0.119)	0.021	0.030
267	22.25	0.10	0.052	(0.119)	0.021	0.030
268	22.33	0.07	0.034	(0.119)	0.014	0.020
269	22.42	0.07	0.034	(0.118)	0.014	0.020
270	22.50	0.07	0.034	(0.118)	0.014	0.020
271	22.58	0.07	0.034	(0.118)	0.014	0.020
272	22.67	0.07	0.034	(0.117)	0.014	0.020
273	22.75	0.07	0.034	(0.117)	0.014	0.020
274	22.83	0.07	0.034	(0.117)	0.014	0.020
275	22.92	0.07	0.034	(0.116)	0.014	0.020
276	23.00	0.07	0.034	(0.116)	0.014	0.020
277	23.08	0.07	0.034	(0.116)	0.014	0.020
278	23.17	0.07	0.034	(0.116)	0.014	0.020
279	23.25	0.07	0.034	(0.115)	0.014	0.020
280	23.33	0.07	0.034	(0.115)	0.014	0.020
281	23.42	0.07	0.034	(0.115)	0.014	0.020
282	23.50	0.07	0.034	(0.115)	0.014	0.020
283	23.58	0.07	0.034	(0.114)	0.014	0.020
284	23.67	0.07	0.034	(0.114)	0.014	0.020
285	23.75	0.07	0.034	(0.114)	0.014	0.020
286	23.83	0.07	0.034	(0.114)	0.014	0.020
287	23.92	0.07	0.034	(0.114)	0.014	0.020
288	24.00	0.07	0.034	(0.114)	0.014	0.020

(Loss Rate Not Used)

Sum = 100.0 Sum = 30.6

Flood volume = Effective rainfall 2.55(In)
times area 30.1(Ac.)/[(In)/(Ft.)] = 6.4(Ac.Ft)
Total soil loss = 1.75(In)
Total soil loss = 4.378(Ac.Ft)
Total rainfall = 4.30(In)
Flood volume = 278635.7 Cubic Feet
Total soil loss = 190699.4 Cubic Feet

Peak flow rate of this hydrograph = 11.750(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))

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---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       5.0      10.0      15.0      20.0
-----------------------------------------------------------------------
  0+ 5      0.0011      0.16  Q          |         |         |         |
  0+10      0.0043      0.46  Q          |         |         |         |
  0+15      0.0080      0.54  VQ         |         |         |         |
```

```
0+20       0.0125      0.65  VQ        |         |         |         |
0+25       0.0181      0.82  VQ        |         |         |         |
0+30       0.0242      0.87  VQ        |         |         |         |
0+35       0.0304      0.90  VQ        |         |         |         |
0+40       0.0366      0.91  VQ        |         |         |         |
0+45       0.0429      0.92  VQ        |         |         |         |
0+50       0.0498      1.00  VQ        |         |         |         |
0+55       0.0577      1.15  V Q       |         |         |         |
1+ 0       0.0659      1.19  V Q       |         |         |         |
1+ 5       0.0737      1.13  V Q       |         |         |         |
1+10       0.0805      0.99  VQ        |         |         |         |
1+15       0.0871      0.95  VQ        |         |         |         |
1+20       0.0935      0.94  VQ        |         |         |         |
1+25       0.0999      0.93  VQ        |         |         |         |
1+30       0.1063      0.92  VQ        |         |         |         |
1+35       0.1126      0.92  VQ        |         |         |         |
1+40       0.1190      0.92  VQ        |         |         |         |
1+45       0.1253      0.92  VQ        |         |         |         |
1+50       0.1322      1.00  VQ        |         |         |         |
1+55       0.1401      1.15  V Q       |         |         |         |
2+ 0       0.1483      1.19  V Q       |         |         |         |
2+ 5       0.1566      1.21  V Q       |         |         |         |
2+10       0.1650      1.22  |VQ       |         |         |         |
2+15       0.1734      1.22  |VQ       |         |         |         |
2+20       0.1818      1.23  |VQ       |         |         |         |
2+25       0.1903      1.23  |VQ       |         |         |         |
2+30       0.1987      1.23  |VQ       |         |         |         |
2+35       0.2077      1.31  |VQ       |         |         |         |
2+40       0.2178      1.46  |VQ       |         |         |         |
2+45       0.2281      1.50  |VQ       |         |         |         |
2+50       0.2385      1.51  |V Q      |         |         |         |
2+55       0.2490      1.52  |V Q      |         |         |         |
3+ 0       0.2595      1.53  |V Q      |         |         |         |
3+ 5       0.2701      1.53  |V Q      |         |         |         |
3+10       0.2806      1.53  |V Q      |         |         |         |
3+15       0.2912      1.53  |V Q      |         |         |         |
3+20       0.3017      1.53  |V Q      |         |         |         |
3+25       0.3123      1.53  |V Q      |         |         |         |
3+30       0.3229      1.53  | VQ      |         |         |         |
3+35       0.3334      1.53  | VQ      |         |         |         |
3+40       0.3440      1.53  | VQ      |         |         |         |
3+45       0.3545      1.53  | VQ      |         |         |         |
3+50       0.3656      1.61  | VQ      |         |         |         |
3+55       0.3778      1.76  | VQ      |         |         |         |
4+ 0       0.3902      1.80  | VQ      |         |         |         |
4+ 5       0.4027      1.82  | VQ      |         |         |         |
4+10       0.4153      1.83  | VQ      |         |         |         |
4+15       0.4280      1.84  | VQ      |         |         |         |
4+20       0.4412      1.92  | VQ      |         |         |         |
4+25       0.4554      2.07  | V Q     |         |         |         |
4+30       0.4700      2.11  | V Q     |         |         |         |
4+35       0.4846      2.13  |  VQ     |         |         |         |
4+40       0.4993      2.14  |  VQ     |         |         |         |
4+45       0.5141      2.14  |  VQ     |         |         |         |
4+50       0.5294      2.23  |  VQ     |         |         |         |
4+55       0.5458      2.38  |  VQ     |         |         |         |
5+ 0       0.5624      2.42  |  VQ     |         |         |         |
5+ 5       0.5781      2.27  |  VQ     |         |         |         |
5+10       0.5918      1.99  |  Q      |         |         |         |
5+15       0.6049      1.91  |  Q      |         |         |         |
```

```
 5+20       0.6184       1.96  |  Q      |         |         |         |
 5+25       0.6328       2.09  |  VQ     |         |         |         |
 5+30       0.6474       2.12  |   Q     |         |         |         |
 5+35       0.6626       2.21  |   Q     |         |         |         |
 5+40       0.6789       2.37  |   Q     |         |         |         |
 5+45       0.6955       2.41  |   Q     |         |         |         |
 5+50       0.7122       2.43  |   Q     |         |         |         |
 5+55       0.7291       2.44  |   Q     |         |         |         |
 6+ 0       0.7459       2.45  |   Q     |         |         |         |
 6+ 5       0.7634       2.53  |   VQ    |         |         |         |
 6+10       0.7818       2.68  |   VQ    |         |         |         |
 6+15       0.8006       2.72  |    Q    |         |         |         |
 6+20       0.8195       2.74  |    Q    |         |         |         |
 6+25       0.8384       2.75  |    Q    |         |         |         |
 6+30       0.8574       2.76  |    Q    |         |         |         |
 6+35       0.8769       2.84  |    Q    |         |         |         |
 6+40       0.8975       2.99  |    Q    |         |         |         |
 6+45       0.9184       3.03  |    VQ   |         |         |         |
 6+50       0.9394       3.05  |    VQ   |         |         |         |
 6+55       0.9604       3.06  |     Q   |         |         |         |
 7+ 0       0.9815       3.06  |     Q   |         |         |         |
 7+ 5       1.0026       3.07  |     Q   |         |         |         |
 7+10       1.0237       3.07  |     Q   |         |         |         |
 7+15       1.0449       3.07  |     Q   |         |         |         |
 7+20       1.0665       3.15  |     Q   |         |         |         |
 7+25       1.0892       3.30  |     Q   |         |         |         |
 7+30       1.1122       3.34  |     Q   |         |         |         |
 7+35       1.1358       3.43  |     QV  |         |         |         |
 7+40       1.1606       3.59  |      Q  |         |         |         |
 7+45       1.1856       3.64  |      Q  |         |         |         |
 7+50       1.2114       3.74  |      Q  |         |         |         |
 7+55       1.2382       3.90  |      Q  |         |         |         |
 8+ 0       1.2654       3.94  |      Q  |         |         |         |
 8+ 5       1.2938       4.13  |       Q |         |         |         |
 8+10       1.3244       4.43  |       Q |         |         |         |
 8+15       1.3555       4.52  |       VQ|         |         |         |
 8+20       1.3869       4.56  |       VQ|         |         |         |
 8+25       1.4184       4.58  |       VQ|         |         |         |
 8+30       1.4501       4.59  |        Q|         |         |         |
 8+35       1.4823       4.68  |        Q|         |         |         |
 8+40       1.5156       4.83  |        Q|         |         |         |
 8+45       1.5491       4.87  |        Q|         |         |         |
 8+50       1.5833       4.97  |        Q|         |         |         |
 8+55       1.6186       5.13  |         Q         |         |         |
 9+ 0       1.6542       5.17  |         Q         |         |         |
 9+ 5       1.6911       5.35  |         Q         |         |         |
 9+10       1.7301       5.66  |         VQ        |         |         |
 9+15       1.7696       5.75  |         |Q        |         |         |
 9+20       1.8100       5.87  |         |Q        |         |         |
 9+25       1.8516       6.04  |         |VQ       |         |         |
 9+30       1.8935       6.09  |         |VQ       |         |         |
 9+35       1.9362       6.19  |         | Q       |         |         |
 9+40       1.9799       6.35  |         | Q       |         |         |
 9+45       2.0240       6.40  |         | Q       |         |         |
 9+50       2.0688       6.50  |         | Q       |         |         |
 9+55       2.1146       6.66  |         |  Q      |         |         |
10+ 0       2.1608       6.70  |         |  Q      |         |         |
10+ 5       2.2033       6.17  |         | QV      |         |         |
10+10       2.2386       5.13  |         Q  V      |         |         |
10+15       2.2721       4.86  |        Q|   V     |         |         |
```

```
10+20       2.3047       4.74  |        Q|   V     |         |         |
10+25       2.3368       4.67  |        Q|   V     |         |         |
10+30       2.3687       4.63  |        Q|   V     |         |         |
10+35       2.4031       5.00  |        Q|    V    |         |         |
10+40       2.4427       5.74  |         |Q   V    |         |         |
10+45       2.4836       5.94  |         |Q   V    |         |         |
10+50       2.5252       6.03  |         | Q  V    |         |         |
10+55       2.5671       6.09  |         | Q   V   |         |         |
11+ 0       2.6092       6.11  |         | Q   V   |         |         |
11+ 5       2.6509       6.05  |         | Q   V   |         |         |
11+10       2.6915       5.90  |         |Q    V   |         |         |
11+15       2.7319       5.86  |         |Q     V  |         |         |
11+20       2.7722       5.85  |         |Q     V  |         |         |
11+25       2.8124       5.84  |         |Q     V  |         |         |
11+30       2.8525       5.83  |         |Q     V  |         |         |
11+35       2.8916       5.67  |         |Q      V |         |         |
11+40       2.9285       5.37  |         Q       V |         |         |
11+45       2.9649       5.29  |         Q       V |         |         |
11+50       3.0017       5.33  |         Q       V |         |         |
11+55       3.0393       5.46  |         Q        V|         |         |
12+ 0       3.0771       5.49  |         Q        V|         |         |
12+ 5       3.1188       6.06  |         | Q      V|         |         |
12+10       3.1678       7.11  |         |   Q    V|         |         |
12+15       3.2187       7.40  |         |   Q     V         |         |
12+20       3.2711       7.61  |         |    Q    V         |         |
12+25       3.3251       7.83  |         |    Q    V         |         |
12+30       3.3795       7.91  |         |    Q    |V        |         |
12+35       3.4354       8.11  |         |     Q   |V        |         |
12+40       3.4934       8.42  |         |     Q   |V        |         |
12+45       3.5520       8.51  |         |      Q  | V       |         |
12+50       3.6115       8.65  |         |      Q  | V       |         |
12+55       3.6725       8.86  |         |      Q  | V       |         |
13+ 0       3.7341       8.94  |         |      Q  |  V      |         |
13+ 5       3.8008       9.68  |         |        Q|  V      |         |
13+10       3.8765      10.99  |         |         |Q  V     |         |
13+15       3.9548      11.37  |         |         | Q V     |         |
13+20       4.0343      11.56  |         |         |  Q V    |         |
13+25       4.1147      11.67  |         |         |  Q V    |         |
13+30       4.1957      11.75  |         |         |  Q  V   |         |
13+35       4.2684      10.56  |         |         |Q    V   |         |
13+40       4.3252       8.25  |         |     Q   |      V  |         |
13+45       4.3778       7.63  |         |    Q    |      V  |         |
13+50       4.4285       7.36  |         |   Q     |      V  |         |
13+55       4.4781       7.20  |         |   Q     |       V |         |
14+ 0       4.5270       7.11  |         |   Q     |       V |         |
14+ 5       4.5780       7.40  |         |   Q     |       V |         |
14+10       4.6334       8.05  |         |     Q   |       V |         |
14+15       4.6902       8.24  |         |     Q   |        V|         |
14+20       4.7468       8.22  |         |     Q   |        V|         |
14+25       4.8022       8.04  |         |     Q   |         V         |
14+30       4.8574       8.02  |         |     Q   |         V         |
14+35       4.9127       8.03  |         |     Q   |         V         |
14+40       4.9681       8.04  |         |     Q   |         |V        |
14+45       5.0236       8.06  |         |     Q   |         |V        |
14+50       5.0784       7.96  |         |    Q    |         |V        |
14+55       5.1319       7.77  |         |    Q    |         | V       |
15+ 0       5.1850       7.71  |         |    Q    |         | V       |
15+ 5       5.2374       7.61  |         |    Q    |         | V       |
15+10       5.2887       7.45  |         |   Q     |         |  V      |
15+15       5.3397       7.40  |         |   Q     |         |  V      |
```

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15+20       5.3900      7.30  |         |   Q     |         |  V      |
15+25       5.4392      7.14  |         |   Q     |         |   V     |
15+30       5.4880      7.09  |         |   Q     |         |   V     |
15+35       5.5345      6.75  |         |  Q      |         |   V     |
15+40       5.5769      6.15  |         | Q       |         |   V     |
15+45       5.6180      5.98  |         |Q        |         |    V    |
15+50       5.6587      5.90  |         |Q        |         |    V    |
15+55       5.6991      5.86  |         |Q        |         |    V    |
16+ 0       5.7393      5.84  |         |Q        |         |    V    |
16+ 5       5.7712      4.63  |        Q|         |         |     V   |
16+10       5.7877      2.39  |   Q     |         |         |     V   |
16+15       5.8000      1.79  |  Q      |         |         |     V   |
16+20       5.8105      1.52  |  Q      |         |         |     V   |
16+25       5.8199      1.37  | Q       |         |         |     V   |
16+30       5.8288      1.28  | Q       |         |         |     V   |
16+35       5.8366      1.15  | Q       |         |         |     V   |
16+40       5.8435      1.00  |Q        |         |         |     V   |
16+45       5.8501      0.96  |Q        |         |         |     V   |
16+50       5.8566      0.94  |Q        |         |         |     V   |
16+55       5.8630      0.93  |Q        |         |         |     V   |
17+ 0       5.8693      0.92  |Q        |         |         |     V   |
17+ 5       5.8768      1.08  | Q       |         |         |     V   |
17+10       5.8863      1.38  | Q       |         |         |     V   |
17+15       5.8963      1.46  | Q       |         |         |     V   |
17+20       5.9066      1.49  | Q       |         |         |     V   |
17+25       5.9170      1.51  |  Q      |         |         |      V  |
17+30       5.9275      1.53  |  Q      |         |         |      V  |
17+35       5.9381      1.53  |  Q      |         |         |      V  |
17+40       5.9487      1.53  |  Q      |         |         |      V  |
17+45       5.9592      1.53  |  Q      |         |         |      V  |
17+50       5.9692      1.45  | Q       |         |         |      V  |
17+55       5.9782      1.30  | Q       |         |         |      V  |
18+ 0       5.9869      1.26  | Q       |         |         |      V  |
18+ 5       5.9955      1.25  | Q       |         |         |      V  |
18+10       6.0040      1.24  | Q       |         |         |      V  |
18+15       6.0125      1.23  | Q       |         |         |      V  |
18+20       6.0209      1.23  | Q       |         |         |      V  |
18+25       6.0294      1.23  | Q       |         |         |      V  |
18+30       6.0378      1.23  | Q       |         |         |      V  |
18+35       6.0457      1.15  | Q       |         |         |      V  |
18+40       6.0526      1.00  |Q        |         |         |      V  |
18+45       6.0592      0.96  |Q        |         |         |      V  |
18+50       6.0651      0.86  |Q        |         |         |      V  |
18+55       6.0699      0.70  |Q        |         |         |      V  |
19+ 0       6.0744      0.65  |Q        |         |         |      V  |
19+ 5       6.0793      0.71  |Q        |         |         |       V |
19+10       6.0852      0.85  |Q        |         |         |       V |
19+15       6.0913      0.89  |Q        |         |         |       V |
19+20       6.0981      0.98  |Q        |         |         |       V |
19+25       6.1059      1.14  | Q       |         |         |       V |
19+30       6.1141      1.19  | Q       |         |         |       V |
19+35       6.1218      1.13  | Q       |         |         |       V |
19+40       6.1286      0.99  |Q        |         |         |       V |
19+45       6.1352      0.95  |Q        |         |         |       V |
19+50       6.1411      0.86  |Q        |         |         |       V |
19+55       6.1459      0.70  |Q        |         |         |       V |
20+ 0       6.1505      0.65  |Q        |         |         |  V    V |
20+ 5       6.1554      0.71  |Q        |         |         |       V |
20+10       6.1612      0.85  |Q        |         |         |       V |
20+15       6.1673      0.89  |Q        |         |         |       V |
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   20+20       6.1735       0.90  |Q         |         |         |      V |
   20+25       6.1798       0.91  |Q         |         |         |      V |
   20+30       6.1861       0.92  |Q         |         |         |      V |
   20+35       6.1925       0.92  |Q         |         |         |      V |
   20+40       6.1988       0.92  |Q         |         |         |      V |
   20+45       6.2051       0.92  |Q         |         |         |      V |
   20+50       6.2109       0.84  |Q         |         |         |      V |
   20+55       6.2157       0.69  |Q         |         |         |      V |
   21+ 0       6.2201       0.65  |Q         |         |         |      V |
   21+ 5       6.2251       0.71  |Q         |         |         |      V |
   21+10       6.2309       0.85  |Q         |         |         |      V |
   21+15       6.2370       0.89  |Q         |         |         |       V|
   21+20       6.2427       0.82  |Q         |         |         |       V|
   21+25       6.2474       0.68  |Q         |         |         |       V|
   21+30       6.2518       0.65  |Q         |         |         |       V|
   21+35       6.2567       0.71  |Q         |         |         |       V|
   21+40       6.2626       0.85  |Q         |         |         |       V|
   21+45       6.2687       0.89  |Q         |         |         |       V|
   21+50       6.2744       0.82  |Q         |         |         |       V|
   21+55       6.2790       0.68  |Q         |         |         |       V|
   22+ 0       6.2835       0.65  |Q         |         |         |       V|
   22+ 5       6.2884       0.71  |Q         |         |         |       V|
   22+10       6.2943       0.85  |Q         |         |         |       V|
   22+15       6.3004       0.89  |Q         |         |         |       V|
   22+20       6.3060       0.82  |Q         |         |         |       V|
   22+25       6.3107       0.68  |Q         |         |         |       V|
   22+30       6.3152       0.65  |Q         |         |         |       V|
   22+35       6.3195       0.63  |Q         |         |         |       V|
   22+40       6.3238       0.62  |Q         |         |         |       V|
   22+45       6.3281       0.62  |Q         |         |         |       V|
   22+50       6.3323       0.61  |Q         |         |         |       V|
   22+55       6.3365       0.61  |Q         |         |         |       V|
   23+ 0       6.3407       0.61  |Q         |         |         |       V|
   23+ 5       6.3450       0.61  |Q         |         |         |       V|
   23+10       6.3492       0.61  |Q         |         |         |       V|
   23+15       6.3534       0.61  |Q         |         |         |       V|
   23+20       6.3576       0.61  |Q         |         |         |       V|
   23+25       6.3619       0.61  |Q         |         |         |       V|
   23+30       6.3661       0.61  |Q         |         |         |       V|
   23+35       6.3703       0.61  |Q         |         |         |       V|
   23+40       6.3745       0.61  |Q         |         |         |       V|
   23+45       6.3788       0.61  |Q         |         |         |       V|
   23+50       6.3830       0.61  |Q         |         |         |       V|
   23+55       6.3872       0.61  |Q         |         |         |       V|
   24+ 0       6.3914       0.61  |Q         |         |         |       V|
   24+ 5       6.3946       0.45  Q          |         |         |       V|
   24+10       6.3956       0.16  Q          |         |         |       V|
   24+15       6.3961       0.08  Q          |         |         |       V|
   24+20       6.3964       0.04  Q          |         |         |       V|
   24+25       6.3965       0.02  Q          |         |         |       V|
   24+30       6.3966       0.01  Q          |         |         |        V
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 08/29/22 File: AREAB1001100.out

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

Program License Serial Number 6094

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

English Units used in output format

AREA B
100-YR 1-HR

Drainage Area = 19.99(Ac.) = 0.031 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 19.99(Ac.) = 0.031 Sq. Mi.
Length along longest watercourse = 1640.00(Ft.)
Length along longest watercourse measured to centroid = 1195.00(Ft.)
Length along longest watercourse = 0.311 Mi.
Length along longest watercourse measured to centroid = 0.226 Mi.
Difference in elevation = 35.70(Ft.)
Slope along watercourse = 114.9366 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.053 Hr.
Lag time = 3.20 Min.
25% of lag time = 0.80 Min.
40% of lag time = 1.28 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
19.99	0.49	9.80

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
19.99	1.20	23.99

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.490(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
19.990	57.20	0.590

Total Area Entered = 19.99(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.2	57.2	0.499	0.590	0.234	1.000	0.234
					Sum (F) =	0.234

Area averaged mean soil loss (F) (In/Hr) = 0.234
Minimum soil loss rate ((In/Hr)) = 0.117
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.430

Slope of intensity-duration curve for a 1 hour storm =0.5000

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	156.374	34.683	6.987
2	0.167	312.748	46.539	9.376
3	0.250	469.122	10.823	2.180
4	0.333	625.496	4.691	0.945
5	0.417	781.870	2.294	0.462
6	0.500	938.244	0.971	0.196
			Sum = 100.000	Sum= 20.146

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.605	0.234	(0.260)	0.371
2	0.17	4.30	0.619	0.234	(0.266)	0.385
3	0.25	5.00	0.720	0.234	(0.310)	0.486
4	0.33	5.00	0.720	0.234	(0.310)	0.486
5	0.42	5.80	0.835	0.234	(0.359)	0.601
6	0.50	6.50	0.936	0.234	(0.402)	0.702
7	0.58	7.40	1.065	0.234	(0.458)	0.832
8	0.67	8.60	1.238	0.234	(0.532)	1.004
9	0.75	12.30	1.771	0.234	(0.761)	1.537
10	0.83	29.10	4.190	0.234	(1.802)	3.956
11	0.92	6.80	0.979	0.234	(0.421)	0.745

```
12   1.00     5.00      0.720          0.234    (  0.310)        0.486
          (Loss Rate Not Used)
   Sum =     100.0                                   Sum =    11.6
    Flood volume = Effective rainfall      0.97(In)
     times area      20.0(Ac.)/[(In)/(Ft.)] =      1.6(Ac.Ft)
    Total soil loss =      0.23(In)
    Total soil loss =     0.390(Ac.Ft)
    Total rainfall =      1.20(In)
    Flood volume =       70093.5 Cubic Feet
    Total soil loss =       16967.2 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =     47.142(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        1 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
               Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       12.5      25.0      37.5      50.0
-----------------------------------------------------------------------
  0+ 5       0.0179      2.59  V Q       |         |         |         |
  0+10       0.0604      6.17  |V  Q     |         |         |         |
  0+15       0.1142      7.82  | V   Q   |         |         |         |
  0+20       0.1772      9.15  |   V  Q  |         |         |         |
  0+25       0.2486     10.36  |     V Q |         |         |         |
  0+30       0.3334     12.32  |       VQ|         |         |         |
  0+35       0.4331     14.47  |         VQ        |         |         |
  0+40       0.5518     17.24  |         |  Q      |         |         |
  0+45       0.7103     23.02  |         |      VQ |         |         |
  0+50       1.0236     45.49  |         |         |    V    |     Q   |
  0+55       1.3483     47.14  |         |         |         |  V   Q  |
  1+ 0       1.4936     21.10  |         |     Q   |         |      V  |
  1+ 5       1.5682     10.83  |       Q |         |         |       V |
  1+10       1.5950      3.89  |  Q      |         |         |        V|
  1+15       1.6059      1.58  |Q        |         |         |        V|
  1+20       1.6085      0.37  Q         |         |         |        V|
  1+25       1.6091      0.10  Q         |         |         |        V|
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 08/29/22 File: AREAB1003100.out

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

Program License Serial Number 6094

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

English Units used in output format

AREA B
100-YR 3-HR

Drainage Area = 19.99(Ac.) = 0.031 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 19.99(Ac.) = 0.031 Sq. Mi.
Length along longest watercourse = 1640.00(Ft.)
Length along longest watercourse measured to centroid = 1195.00(Ft.)
Length along longest watercourse = 0.311 Mi.
Length along longest watercourse measured to centroid = 0.226 Mi.
Difference in elevation = 35.70(Ft.)
Slope along watercourse = 114.9366 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.053 Hr.
Lag time = 3.20 Min.
25% of lag time = 0.80 Min.
40% of lag time = 1.28 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
19.99	0.80	15.99

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
19.99	1.85	36.98

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.850(In)

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

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
19.990	57.20	0.590

Total Area Entered = 19.99(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.2	57.2	0.499	0.590	0.234	1.000	0.234
					Sum (F) =	0.234

Area averaged mean soil loss (F) (In/Hr) = 0.234
Minimum soil loss rate ((In/Hr)) = 0.117
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.430

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

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	156.374	34.683	6.987
2	0.167	312.748	46.539	9.376
3	0.250	469.122	10.823	2.180
4	0.333	625.496	4.691	0.945
5	0.417	781.870	2.294	0.462
6	0.500	938.244	0.971	0.196
			Sum = 100.000	Sum= 20.146

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	1.30	0.289	(0.234)	0.124	0.164
2	0.17	1.30	0.289	(0.234)	0.124	0.164
3	0.25	1.10	0.244	(0.234)	0.105	0.139
4	0.33	1.50	0.333	(0.234)	0.143	0.190
5	0.42	1.50	0.333	(0.234)	0.143	0.190
6	0.50	1.80	0.400	(0.234)	0.172	0.228
7	0.58	1.50	0.333	(0.234)	0.143	0.190
8	0.67	1.80	0.400	(0.234)	0.172	0.228
9	0.75	1.80	0.400	(0.234)	0.172	0.228
10	0.83	1.50	0.333	(0.234)	0.143	0.190
11	0.92	1.60	0.355	(0.234)	0.153	0.202
12	1.00	1.80	0.400	(0.234)	0.172	0.228
13	1.08	2.20	0.488	(0.234)	0.210	0.278

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14   1.17     2.20      0.488       (  0.234)       0.210         0.278
15   1.25     2.20      0.488       (  0.234)       0.210         0.278
16   1.33     2.00      0.444       (  0.234)       0.191         0.253
17   1.42     2.60      0.577          0.234    (  0.248)         0.343
18   1.50     2.70      0.599          0.234    (  0.258)         0.366
19   1.58     2.40      0.533       (  0.234)       0.229         0.304
20   1.67     2.70      0.599          0.234    (  0.258)         0.366
21   1.75     3.30      0.733          0.234    (  0.315)         0.499
22   1.83     3.10      0.688          0.234    (  0.296)         0.454
23   1.92     2.90      0.644          0.234    (  0.277)         0.410
24   2.00     3.00      0.666          0.234    (  0.286)         0.432
25   2.08     3.10      0.688          0.234    (  0.296)         0.454
26   2.17     4.20      0.932          0.234    (  0.401)         0.698
27   2.25     5.00      1.110          0.234    (  0.477)         0.876
28   2.33     3.50      0.777          0.234    (  0.334)         0.543
29   2.42     6.80      1.509          0.234    (  0.649)         1.276
30   2.50     7.30      1.620          0.234    (  0.697)         1.387
31   2.58     8.20      1.820          0.234    (  0.783)         1.586
32   2.67     5.90      1.310          0.234    (  0.563)         1.076
33   2.75     2.00      0.444       (  0.234)       0.191         0.253
34   2.83     1.80      0.400       (  0.234)       0.172         0.228
35   2.92     1.80      0.400       (  0.234)       0.172         0.228
36   3.00     0.60      0.133       (  0.234)       0.057         0.076
          (Loss Rate Not Used)
   Sum =     100.0                                  Sum =    15.3
    Flood volume = Effective rainfall      1.27(In)
     times area      20.0(Ac.)/[(In)/(Ft.)] =       2.1(Ac.Ft)
    Total soil loss =      0.58(In)
    Total soil loss =     0.960(Ac.Ft)
    Total rainfall =      1.85(In)
    Flood volume =       92416.3 Cubic Feet
    Total soil loss =       41814.8 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =     27.936(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5      30.0
-----------------------------------------------------------------------
  0+ 5       0.0079      1.15  VQ       |         |         |         |
  0+10       0.0265      2.69  V  Q     |         |         |         |
  0+15       0.0463      2.87  V  Q     |         |         |         |
  0+20       0.0679      3.15  |V  Q    |         |         |         |
  0+25       0.0930      3.64  |V  Q    |         |         |         |
  0+30       0.1208      4.03  | V  Q   |         |         |         |
  0+35       0.1494      4.15  | V  Q   |         |         |         |
  0+40       0.1780      4.16  |  V Q   |         |         |         |
  0+45       0.2089      4.48  |  V Q   |         |         |         |
  0+50       0.2384      4.28  |   VQ   |         |         |         |
  0+55       0.2662      4.04  |    Q   |         |         |         |
  1+ 0       0.2956      4.26  |    Q   |         |         |         |
  1+ 5       0.3290      4.85  |     Q  |         |         |         |
  1+10       0.3660      5.38  |     VQ |         |         |         |
  1+15       0.4040      5.51  |      Q |         |         |         |
  1+20       0.4412      5.40  |      QV|         |         |         |
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    1+25       0.4812      5.82  |      Q V|         |         |         |
    1+30       0.5279      6.77  |        Q|         |         |         |
    1+35       0.5742      6.72  |       Q V         |         |         |
    1+40       0.6203      6.70  |       Q |V        |         |         |
    1+45       0.6763      8.13  |         Q V       |         |         |
    1+50       0.7395      9.17  |         | QV      |         |         |
    1+55       0.7999      8.77  |         |Q   V    |         |         |
    2+ 0       0.8589      8.56  |         |Q    V   |         |         |
    2+ 5       0.9198      8.86  |         |Q     V  |         |         |
    2+10       0.9941     10.78  |         |   Q   V |         |         |
    2+15       1.0930     14.35  |         |        QV         |         |
    2+20       1.1911     14.25  |         |       Q | V       |         |
    2+25       1.3073     16.88  |         |         | Q V     |         |
    2+30       1.4732     24.09  |         |         |      V  | Q       |
    2+35       1.6656     27.94  |         |         |         |V     Q  |
    2+40       1.8520     27.06  |         |         |         |   V Q   |
    2+45       1.9713     17.33  |         |         |  Q      |      V  |
    2+50       2.0312      8.70  |         |Q        |         |       V |
    2+55       2.0747      6.30  |       Q |         |         |        V|
    3+ 0       2.1037      4.21  |    Q    |         |         |        V|
    3+ 5       2.1157      1.75  | Q       |         |         |        V|
    3+10       2.1194      0.54  Q         |         |         |        V|
    3+15       2.1209      0.22  Q         |         |         |        V|
    3+20       2.1215      0.08  Q         |         |         |        V|
    3+25       2.1216      0.01  Q         |         |         |         V
-----------------------------------------------------------------------
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 08/29/22 File: AREAB1006100.out

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

Program License Serial Number 6094

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

English Units used in output format

AREA B
100-YR 6-HR

Drainage Area = 19.99(Ac.) = 0.031 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 19.99(Ac.) = 0.031 Sq. Mi.
Length along longest watercourse = 1640.00(Ft.)
Length along longest watercourse measured to centroid = 1195.00(Ft.)
Length along longest watercourse = 0.311 Mi.
Length along longest watercourse measured to centroid = 0.226 Mi.
Difference in elevation = 35.70(Ft.)
Slope along watercourse = 114.9366 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.053 Hr.
Lag time = 3.20 Min.
25% of lag time = 0.80 Min.
40% of lag time = 1.28 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
19.99	1.10	21.99

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
19.99	2.50	49.97

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.100(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
19.990	57.20	0.590

Total Area Entered = 19.99(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.2	57.2	0.499	0.590	0.234	1.000	0.234
					Sum (F) =	0.234

Area averaged mean soil loss (F) (In/Hr) = 0.234
Minimum soil loss rate ((In/Hr)) = 0.117
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.430

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

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	156.374	34.683	6.987
2	0.167	312.748	46.539	9.376
3	0.250	469.122	10.823	2.180
4	0.333	625.496	4.691	0.945
5	0.417	781.870	2.294	0.462
6	0.500	938.244	0.971	0.196
			Sum = 100.000	Sum= 20.146

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.150	(0.234)	0.064	0.085
2	0.17	0.60	0.180	(0.234)	0.077	0.103
3	0.25	0.60	0.180	(0.234)	0.077	0.103
4	0.33	0.60	0.180	(0.234)	0.077	0.103
5	0.42	0.60	0.180	(0.234)	0.077	0.103
6	0.50	0.70	0.210	(0.234)	0.090	0.120
7	0.58	0.70	0.210	(0.234)	0.090	0.120
8	0.67	0.70	0.210	(0.234)	0.090	0.120
9	0.75	0.70	0.210	(0.234)	0.090	0.120
10	0.83	0.70	0.210	(0.234)	0.090	0.120
11	0.92	0.70	0.210	(0.234)	0.090	0.120
12	1.00	0.80	0.240	(0.234)	0.103	0.137
13	1.08	0.80	0.240	(0.234)	0.103	0.137

14	1.17	0.80	0.240	(0.234)	0.103	0.137
15	1.25	0.80	0.240	(0.234)	0.103	0.137
16	1.33	0.80	0.240	(0.234)	0.103	0.137
17	1.42	0.80	0.240	(0.234)	0.103	0.137
18	1.50	0.80	0.240	(0.234)	0.103	0.137
19	1.58	0.80	0.240	(0.234)	0.103	0.137
20	1.67	0.80	0.240	(0.234)	0.103	0.137
21	1.75	0.80	0.240	(0.234)	0.103	0.137
22	1.83	0.80	0.240	(0.234)	0.103	0.137
23	1.92	0.80	0.240	(0.234)	0.103	0.137
24	2.00	0.90	0.270	(0.234)	0.116	0.154
25	2.08	0.80	0.240	(0.234)	0.103	0.137
26	2.17	0.90	0.270	(0.234)	0.116	0.154
27	2.25	0.90	0.270	(0.234)	0.116	0.154
28	2.33	0.90	0.270	(0.234)	0.116	0.154
29	2.42	0.90	0.270	(0.234)	0.116	0.154
30	2.50	0.90	0.270	(0.234)	0.116	0.154
31	2.58	0.90	0.270	(0.234)	0.116	0.154
32	2.67	0.90	0.270	(0.234)	0.116	0.154
33	2.75	1.00	0.300	(0.234)	0.129	0.171
34	2.83	1.00	0.300	(0.234)	0.129	0.171
35	2.92	1.00	0.300	(0.234)	0.129	0.171
36	3.00	1.00	0.300	(0.234)	0.129	0.171
37	3.08	1.00	0.300	(0.234)	0.129	0.171
38	3.17	1.10	0.330	(0.234)	0.142	0.188
39	3.25	1.10	0.330	(0.234)	0.142	0.188
40	3.33	1.10	0.330	(0.234)	0.142	0.188
41	3.42	1.20	0.360	(0.234)	0.155	0.205
42	3.50	1.30	0.390	(0.234)	0.168	0.222
43	3.58	1.40	0.420	(0.234)	0.181	0.239
44	3.67	1.40	0.420	(0.234)	0.181	0.239
45	3.75	1.50	0.450	(0.234)	0.193	0.256
46	3.83	1.50	0.450	(0.234)	0.193	0.256
47	3.92	1.60	0.480	(0.234)	0.206	0.274
48	4.00	1.60	0.480	(0.234)	0.206	0.274
49	4.08	1.70	0.510	(0.234)	0.219	0.291
50	4.17	1.80	0.540	(0.234)	0.232	0.308
51	4.25	1.90	0.570	0.234	(0.245)	0.336
52	4.33	2.00	0.600	0.234	(0.258)	0.366
53	4.42	2.10	0.630	0.234	(0.271)	0.396
54	4.50	2.10	0.630	0.234	(0.271)	0.396
55	4.58	2.20	0.660	0.234	(0.284)	0.426
56	4.67	2.30	0.690	0.234	(0.297)	0.456
57	4.75	2.40	0.720	0.234	(0.310)	0.486
58	4.83	2.40	0.720	0.234	(0.310)	0.486
59	4.92	2.50	0.750	0.234	(0.322)	0.516
60	5.00	2.60	0.780	0.234	(0.335)	0.546
61	5.08	3.10	0.930	0.234	(0.400)	0.696
62	5.17	3.60	1.080	0.234	(0.464)	0.846
63	5.25	3.90	1.170	0.234	(0.503)	0.936
64	5.33	4.20	1.260	0.234	(0.542)	1.026
65	5.42	4.70	1.410	0.234	(0.606)	1.176
66	5.50	5.60	1.680	0.234	(0.722)	1.446
67	5.58	1.90	0.570	0.234	(0.245)	0.336
68	5.67	0.90	0.270	(0.234)	0.116	0.154
69	5.75	0.60	0.180	(0.234)	0.077	0.103
70	5.83	0.50	0.150	(0.234)	0.064	0.085
71	5.92	0.30	0.090	(0.234)	0.039	0.051
72	6.00	0.20	0.060	(0.234)	0.026	0.034

(Loss Rate Not Used)

```
 Sum =     100.0                                    Sum =    19.5
  Flood volume = Effective rainfall      1.63(In)
   times area      20.0(Ac.)/[(In)/(Ft.)] =       2.7(Ac.Ft)
  Total soil loss =      0.87(In)
  Total soil loss =     1.456(Ac.Ft)
  Total rainfall =      2.50(In)
  Flood volume =      117969.6 Cubic Feet
  Total soil loss =       63427.2 Cubic Feet
  --------------------------------------------------------------------
   Peak flow rate of this hydrograph =     24.792(CFS)
  --------------------------------------------------------------------
  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                      6 - H O U R   S T O R M
                 R u n o f f     H y d r o g r a p h
  --------------------------------------------------------------------
              Hydrograph in   5   Minute intervals ((CFS))

  --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5      30.0
-----------------------------------------------------------------------
  0+ 5       0.0041      0.60  Q         |         |         |         |
  0+10       0.0146      1.52  V Q       |         |         |         |
  0+15       0.0274      1.87  V Q       |         |         |         |
  0+20       0.0411      1.98  V Q       |         |         |         |
  0+25       0.0551      2.04  V Q       |         |         |         |
  0+30       0.0702      2.18  |VQ       |         |         |         |
  0+35       0.0864      2.35  |V Q      |         |         |         |
  0+40       0.1028      2.39  |V Q      |         |         |         |
  0+45       0.1193      2.40  |V Q      |         |         |         |
  0+50       0.1359      2.41  | VQ      |         |         |         |
  0+55       0.1525      2.41  | VQ      |         |         |         |
  1+ 0       0.1700      2.53  | VQ      |         |         |         |
  1+ 5       0.1885      2.69  | VQ      |         |         |         |
  1+10       0.2073      2.73  |  Q      |         |         |         |
  1+15       0.2262      2.75  |  Q      |         |         |         |
  1+20       0.2452      2.75  |  Q      |         |         |         |
  1+25       0.2642      2.76  |  Q      |         |         |         |
  1+30       0.2832      2.76  |  QV     |         |         |         |
  1+35       0.3022      2.76  |  QV     |         |         |         |
  1+40       0.3211      2.76  |  QV     |         |         |         |
  1+45       0.3401      2.76  |  Q V    |         |         |         |
  1+50       0.3591      2.76  |  Q V    |         |         |         |
  1+55       0.3781      2.76  |  Q V    |         |         |         |
  2+ 0       0.3979      2.88  |  Q V    |         |         |         |
  2+ 5       0.4180      2.92  |  Q  V   |         |         |         |
  2+10       0.4381      2.91  |  Q  V   |         |         |         |
  2+15       0.4591      3.05  |   Q V   |         |         |         |
  2+20       0.4803      3.08  |   Q  V  |         |         |         |
  2+25       0.5017      3.09  |   Q  V  |         |         |         |
  2+30       0.5230      3.10  |   Q  V  |         |         |         |
  2+35       0.5444      3.10  |   Q   V |         |         |         |
  2+40       0.5657      3.10  |   Q   V |         |         |         |
  2+45       0.5879      3.22  |   Q   V |         |         |         |
  2+50       0.6112      3.38  |   Q    V|         |         |         |
  2+55       0.6347      3.42  |   Q    V|         |         |         |
  3+ 0       0.6584      3.44  |   Q    V|         |         |         |
  3+ 5       0.6821      3.44  |   Q     V         |         |         |
  3+10       0.7067      3.57  |   Q     V         |         |         |
  3+15       0.7323      3.73  |   Q     V         |         |         |
  3+20       0.7583      3.76  |    Q    |V        |         |         |
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    3+25       0.7851      3.90  |    Q    |V        |         |         |
    3+30       0.8140      4.19  |    Q    | V       |         |         |
    3+35       0.8450      4.51  |     Q   | V       |         |         |
    3+40       0.8775      4.72  |     Q   | V       |         |         |
    3+45       0.9113      4.90  |     Q   |  V      |         |         |
    3+50       0.9463      5.09  |     Q   |  V      |         |         |
    3+55       0.9826      5.26  |      Q  |   V     |         |         |
    4+ 0       1.0200      5.44  |      Q  |    V    |         |         |
    4+ 5       1.0586      5.60  |      Q  |    V    |         |         |
    4+10       1.0993      5.90  |      Q  |     V   |         |         |
    4+15       1.1427      6.31  |       Q |     V   |         |         |
    4+20       1.1898      6.84  |        Q|      V  |         |         |
    4+25       1.2409      7.42  |        Q|       V |         |         |
    4+30       1.2946      7.80  |         Q        V|         |         |
    4+35       1.3505      8.12  |         Q        V|         |         |
    4+40       1.4102      8.66  |         |Q        V         |         |
    4+45       1.4738      9.24  |         | Q       |V        |         |
    4+50       1.5400      9.62  |         | Q       | V       |         |
    4+55       1.6084      9.93  |         |  Q      |  V      |         |
    5+ 0       1.6806     10.47  |         |  Q      |   V     |         |
    5+ 5       1.7624     11.89  |         |    Q    |     V   |         |
    5+10       1.8619     14.44  |         |        Q|      V  |         |
    5+15       1.9780     16.85  |         |         | Q      V|         |
    5+20       2.1075     18.81  |         |         |    Q    |V        |
    5+25       2.2530     21.12  |         |         |       Q |  V      |
    5+30       2.4237     24.79  |         |         |         |  Q V    |
    5+35       2.5618     20.05  |         |         |     Q   |      V  |
    5+40       2.6248      9.15  |         | Q       |         |       V |
    5+45       2.6593      5.01  |     Q   |         |         |        V|
    5+50       2.6807      3.11  |   Q     |         |         |        V|
    5+55       2.6943      1.97  | Q       |         |         |        V|
    6+ 0       2.7022      1.14  |Q        |         |         |        V|
    6+ 5       2.7062      0.59  Q         |         |         |        V|
    6+10       2.7075      0.18  Q         |         |         |        V|
    6+15       2.7080      0.07  Q         |         |         |        V|
    6+20       2.7082      0.03  Q         |         |         |        V|
    6+25       2.7082      0.01  Q         |         |         |         V
-----------------------------------------------------------------------
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 08/29/22 File: AREAB10024100.out

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

Program License Serial Number 6094

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

English Units used in output format

AREA B
100-YR 24-HR

Drainage Area = 19.99(Ac.) = 0.031 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 19.99(Ac.) = 0.031 Sq. Mi.
Length along longest watercourse = 1640.00(Ft.)
Length along longest watercourse measured to centroid = 1195.00(Ft.)
Length along longest watercourse = 0.311 Mi.
Length along longest watercourse measured to centroid = 0.226 Mi.
Difference in elevation = 35.70(Ft.)
Slope along watercourse = 114.9366 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.053 Hr.
Lag time = 3.20 Min.
25% of lag time = 0.80 Min.
40% of lag time = 1.28 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
19.99	1.70	33.98

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
19.99	4.30	85.96

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 4.300(In)

Point rain (area averaged) = 4.300(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.300(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
19.990	57.20	0.590

Total Area Entered = 19.99(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.2	57.2	0.499	0.590	0.234	1.000	0.234
					Sum (F) =	0.234

Area averaged mean soil loss (F) (In/Hr) = 0.234
Minimum soil loss rate ((In/Hr)) = 0.117
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.430

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	156.374	34.683	6.987
2	0.167	312.748	46.539	9.376
3	0.250	469.122	10.823	2.180
4	0.333	625.496	4.691	0.945
5	0.417	781.870	2.294	0.462
6	0.500	938.244	0.971	0.196
			Sum = 100.000	Sum= 20.146

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.034	(0.415)	0.015	0.020
2	0.17	0.07	0.034	(0.413)	0.015	0.020
3	0.25	0.07	0.034	(0.411)	0.015	0.020
4	0.33	0.10	0.052	(0.410)	0.022	0.029
5	0.42	0.10	0.052	(0.408)	0.022	0.029
6	0.50	0.10	0.052	(0.407)	0.022	0.029
7	0.58	0.10	0.052	(0.405)	0.022	0.029
8	0.67	0.10	0.052	(0.403)	0.022	0.029
9	0.75	0.10	0.052	(0.402)	0.022	0.029
10	0.83	0.13	0.069	(0.400)	0.030	0.039
11	0.92	0.13	0.069	(0.399)	0.030	0.039
12	1.00	0.13	0.069	(0.397)	0.030	0.039
13	1.08	0.10	0.052	(0.395)	0.022	0.029

14	1.17	0.10	0.052	(0.394)	0.022	0.029
15	1.25	0.10	0.052	(0.392)	0.022	0.029
16	1.33	0.10	0.052	(0.391)	0.022	0.029
17	1.42	0.10	0.052	(0.389)	0.022	0.029
18	1.50	0.10	0.052	(0.388)	0.022	0.029
19	1.58	0.10	0.052	(0.386)	0.022	0.029
20	1.67	0.10	0.052	(0.385)	0.022	0.029
21	1.75	0.10	0.052	(0.383)	0.022	0.029
22	1.83	0.13	0.069	(0.381)	0.030	0.039
23	1.92	0.13	0.069	(0.380)	0.030	0.039
24	2.00	0.13	0.069	(0.378)	0.030	0.039
25	2.08	0.13	0.069	(0.377)	0.030	0.039
26	2.17	0.13	0.069	(0.375)	0.030	0.039
27	2.25	0.13	0.069	(0.374)	0.030	0.039
28	2.33	0.13	0.069	(0.372)	0.030	0.039
29	2.42	0.13	0.069	(0.371)	0.030	0.039
30	2.50	0.13	0.069	(0.369)	0.030	0.039
31	2.58	0.17	0.086	(0.368)	0.037	0.049
32	2.67	0.17	0.086	(0.366)	0.037	0.049
33	2.75	0.17	0.086	(0.365)	0.037	0.049
34	2.83	0.17	0.086	(0.363)	0.037	0.049
35	2.92	0.17	0.086	(0.362)	0.037	0.049
36	3.00	0.17	0.086	(0.360)	0.037	0.049
37	3.08	0.17	0.086	(0.359)	0.037	0.049
38	3.17	0.17	0.086	(0.357)	0.037	0.049
39	3.25	0.17	0.086	(0.356)	0.037	0.049
40	3.33	0.17	0.086	(0.354)	0.037	0.049
41	3.42	0.17	0.086	(0.353)	0.037	0.049
42	3.50	0.17	0.086	(0.351)	0.037	0.049
43	3.58	0.17	0.086	(0.350)	0.037	0.049
44	3.67	0.17	0.086	(0.348)	0.037	0.049
45	3.75	0.17	0.086	(0.347)	0.037	0.049
46	3.83	0.20	0.103	(0.345)	0.044	0.059
47	3.92	0.20	0.103	(0.344)	0.044	0.059
48	4.00	0.20	0.103	(0.343)	0.044	0.059
49	4.08	0.20	0.103	(0.341)	0.044	0.059
50	4.17	0.20	0.103	(0.340)	0.044	0.059
51	4.25	0.20	0.103	(0.338)	0.044	0.059
52	4.33	0.23	0.120	(0.337)	0.052	0.069
53	4.42	0.23	0.120	(0.335)	0.052	0.069
54	4.50	0.23	0.120	(0.334)	0.052	0.069
55	4.58	0.23	0.120	(0.332)	0.052	0.069
56	4.67	0.23	0.120	(0.331)	0.052	0.069
57	4.75	0.23	0.120	(0.330)	0.052	0.069
58	4.83	0.27	0.138	(0.328)	0.059	0.078
59	4.92	0.27	0.138	(0.327)	0.059	0.078
60	5.00	0.27	0.138	(0.325)	0.059	0.078
61	5.08	0.20	0.103	(0.324)	0.044	0.059
62	5.17	0.20	0.103	(0.323)	0.044	0.059
63	5.25	0.20	0.103	(0.321)	0.044	0.059
64	5.33	0.23	0.120	(0.320)	0.052	0.069
65	5.42	0.23	0.120	(0.318)	0.052	0.069
66	5.50	0.23	0.120	(0.317)	0.052	0.069
67	5.58	0.27	0.138	(0.316)	0.059	0.078
68	5.67	0.27	0.138	(0.314)	0.059	0.078
69	5.75	0.27	0.138	(0.313)	0.059	0.078
70	5.83	0.27	0.138	(0.311)	0.059	0.078
71	5.92	0.27	0.138	(0.310)	0.059	0.078
72	6.00	0.27	0.138	(0.309)	0.059	0.078
73	6.08	0.30	0.155	(0.307)	0.067	0.088

74	6.17	0.30	0.155	(0.306)	0.067	0.088
75	6.25	0.30	0.155	(0.305)	0.067	0.088
76	6.33	0.30	0.155	(0.303)	0.067	0.088
77	6.42	0.30	0.155	(0.302)	0.067	0.088
78	6.50	0.30	0.155	(0.300)	0.067	0.088
79	6.58	0.33	0.172	(0.299)	0.074	0.098
80	6.67	0.33	0.172	(0.298)	0.074	0.098
81	6.75	0.33	0.172	(0.296)	0.074	0.098
82	6.83	0.33	0.172	(0.295)	0.074	0.098
83	6.92	0.33	0.172	(0.294)	0.074	0.098
84	7.00	0.33	0.172	(0.292)	0.074	0.098
85	7.08	0.33	0.172	(0.291)	0.074	0.098
86	7.17	0.33	0.172	(0.290)	0.074	0.098
87	7.25	0.33	0.172	(0.288)	0.074	0.098
88	7.33	0.37	0.189	(0.287)	0.081	0.108
89	7.42	0.37	0.189	(0.286)	0.081	0.108
90	7.50	0.37	0.189	(0.285)	0.081	0.108
91	7.58	0.40	0.206	(0.283)	0.089	0.118
92	7.67	0.40	0.206	(0.282)	0.089	0.118
93	7.75	0.40	0.206	(0.281)	0.089	0.118
94	7.83	0.43	0.224	(0.279)	0.096	0.127
95	7.92	0.43	0.224	(0.278)	0.096	0.127
96	8.00	0.43	0.224	(0.277)	0.096	0.127
97	8.08	0.50	0.258	(0.275)	0.111	0.147
98	8.17	0.50	0.258	(0.274)	0.111	0.147
99	8.25	0.50	0.258	(0.273)	0.111	0.147
100	8.33	0.50	0.258	(0.272)	0.111	0.147
101	8.42	0.50	0.258	(0.270)	0.111	0.147
102	8.50	0.50	0.258	(0.269)	0.111	0.147
103	8.58	0.53	0.275	(0.268)	0.118	0.157
104	8.67	0.53	0.275	(0.267)	0.118	0.157
105	8.75	0.53	0.275	(0.265)	0.118	0.157
106	8.83	0.57	0.292	(0.264)	0.126	0.167
107	8.92	0.57	0.292	(0.263)	0.126	0.167
108	9.00	0.57	0.292	(0.262)	0.126	0.167
109	9.08	0.63	0.327	(0.260)	0.141	0.186
110	9.17	0.63	0.327	(0.259)	0.141	0.186
111	9.25	0.63	0.327	(0.258)	0.141	0.186
112	9.33	0.67	0.344	(0.257)	0.148	0.196
113	9.42	0.67	0.344	(0.255)	0.148	0.196
114	9.50	0.67	0.344	(0.254)	0.148	0.196
115	9.58	0.70	0.361	(0.253)	0.155	0.206
116	9.67	0.70	0.361	(0.252)	0.155	0.206
117	9.75	0.70	0.361	(0.251)	0.155	0.206
118	9.83	0.73	0.378	(0.249)	0.163	0.216
119	9.92	0.73	0.378	(0.248)	0.163	0.216
120	10.00	0.73	0.378	(0.247)	0.163	0.216
121	10.08	0.50	0.258	(0.246)	0.111	0.147
122	10.17	0.50	0.258	(0.245)	0.111	0.147
123	10.25	0.50	0.258	(0.243)	0.111	0.147
124	10.33	0.50	0.258	(0.242)	0.111	0.147
125	10.42	0.50	0.258	(0.241)	0.111	0.147
126	10.50	0.50	0.258	(0.240)	0.111	0.147
127	10.58	0.67	0.344	(0.239)	0.148	0.196
128	10.67	0.67	0.344	(0.237)	0.148	0.196
129	10.75	0.67	0.344	(0.236)	0.148	0.196
130	10.83	0.67	0.344	(0.235)	0.148	0.196
131	10.92	0.67	0.344	(0.234)	0.148	0.196
132	11.00	0.67	0.344	(0.233)	0.148	0.196
133	11.08	0.63	0.327	(0.232)	0.141	0.186

134	11.17	0.63	0.327	(0.231)	0.141	0.186
135	11.25	0.63	0.327	(0.229)	0.141	0.186
136	11.33	0.63	0.327	(0.228)	0.141	0.186
137	11.42	0.63	0.327	(0.227)	0.141	0.186
138	11.50	0.63	0.327	(0.226)	0.141	0.186
139	11.58	0.57	0.292	(0.225)	0.126	0.167
140	11.67	0.57	0.292	(0.224)	0.126	0.167
141	11.75	0.57	0.292	(0.223)	0.126	0.167
142	11.83	0.60	0.310	(0.222)	0.133	0.176
143	11.92	0.60	0.310	(0.220)	0.133	0.176
144	12.00	0.60	0.310	(0.219)	0.133	0.176
145	12.08	0.83	0.430	(0.218)	0.185	0.245
146	12.17	0.83	0.430	(0.217)	0.185	0.245
147	12.25	0.83	0.430	(0.216)	0.185	0.245
148	12.33	0.87	0.447	(0.215)	0.192	0.255
149	12.42	0.87	0.447	(0.214)	0.192	0.255
150	12.50	0.87	0.447	(0.213)	0.192	0.255
151	12.58	0.93	0.482	(0.212)	0.207	0.275
152	12.67	0.93	0.482	(0.211)	0.207	0.275
153	12.75	0.93	0.482	(0.210)	0.207	0.275
154	12.83	0.97	0.499	0.209	(0.214)	0.290
155	12.92	0.97	0.499	0.208	(0.214)	0.291
156	13.00	0.97	0.499	0.206	(0.214)	0.292
157	13.08	1.13	0.585	0.205	(0.251)	0.379
158	13.17	1.13	0.585	0.204	(0.251)	0.380
159	13.25	1.13	0.585	0.203	(0.251)	0.381
160	13.33	1.13	0.585	0.202	(0.251)	0.382
161	13.42	1.13	0.585	0.201	(0.251)	0.383
162	13.50	1.13	0.585	0.200	(0.251)	0.385
163	13.58	0.77	0.396	(0.199)	0.170	0.225
164	13.67	0.77	0.396	(0.198)	0.170	0.225
165	13.75	0.77	0.396	(0.197)	0.170	0.225
166	13.83	0.77	0.396	(0.196)	0.170	0.225
167	13.92	0.77	0.396	(0.195)	0.170	0.225
168	14.00	0.77	0.396	(0.194)	0.170	0.225
169	14.08	0.90	0.464	0.193	(0.200)	0.271
170	14.17	0.90	0.464	0.192	(0.200)	0.272
171	14.25	0.90	0.464	0.191	(0.200)	0.273
172	14.33	0.87	0.447	0.190	(0.192)	0.257
173	14.42	0.87	0.447	0.189	(0.192)	0.258
174	14.50	0.87	0.447	0.188	(0.192)	0.259
175	14.58	0.87	0.447	0.187	(0.192)	0.260
176	14.67	0.87	0.447	0.186	(0.192)	0.261
177	14.75	0.87	0.447	0.185	(0.192)	0.262
178	14.83	0.83	0.430	0.185	(0.185)	0.245
179	14.92	0.83	0.430	0.184	(0.185)	0.246
180	15.00	0.83	0.430	0.183	(0.185)	0.247
181	15.08	0.80	0.413	(0.182)	0.177	0.235
182	15.17	0.80	0.413	(0.181)	0.177	0.235
183	15.25	0.80	0.413	(0.180)	0.177	0.235
184	15.33	0.77	0.396	(0.179)	0.170	0.225
185	15.42	0.77	0.396	(0.178)	0.170	0.225
186	15.50	0.77	0.396	(0.177)	0.170	0.225
187	15.58	0.63	0.327	(0.176)	0.141	0.186
188	15.67	0.63	0.327	(0.175)	0.141	0.186
189	15.75	0.63	0.327	(0.174)	0.141	0.186
190	15.83	0.63	0.327	(0.173)	0.141	0.186
191	15.92	0.63	0.327	(0.173)	0.141	0.186
192	16.00	0.63	0.327	(0.172)	0.141	0.186
193	16.08	0.13	0.069	(0.171)	0.030	0.039

194	16.17	0.13	0.069	(0.170)	0.030	0.039
195	16.25	0.13	0.069	(0.169)	0.030	0.039
196	16.33	0.13	0.069	(0.168)	0.030	0.039
197	16.42	0.13	0.069	(0.167)	0.030	0.039
198	16.50	0.13	0.069	(0.167)	0.030	0.039
199	16.58	0.10	0.052	(0.166)	0.022	0.029
200	16.67	0.10	0.052	(0.165)	0.022	0.029
201	16.75	0.10	0.052	(0.164)	0.022	0.029
202	16.83	0.10	0.052	(0.163)	0.022	0.029
203	16.92	0.10	0.052	(0.162)	0.022	0.029
204	17.00	0.10	0.052	(0.162)	0.022	0.029
205	17.08	0.17	0.086	(0.161)	0.037	0.049
206	17.17	0.17	0.086	(0.160)	0.037	0.049
207	17.25	0.17	0.086	(0.159)	0.037	0.049
208	17.33	0.17	0.086	(0.158)	0.037	0.049
209	17.42	0.17	0.086	(0.157)	0.037	0.049
210	17.50	0.17	0.086	(0.157)	0.037	0.049
211	17.58	0.17	0.086	(0.156)	0.037	0.049
212	17.67	0.17	0.086	(0.155)	0.037	0.049
213	17.75	0.17	0.086	(0.154)	0.037	0.049
214	17.83	0.13	0.069	(0.154)	0.030	0.039
215	17.92	0.13	0.069	(0.153)	0.030	0.039
216	18.00	0.13	0.069	(0.152)	0.030	0.039
217	18.08	0.13	0.069	(0.151)	0.030	0.039
218	18.17	0.13	0.069	(0.151)	0.030	0.039
219	18.25	0.13	0.069	(0.150)	0.030	0.039
220	18.33	0.13	0.069	(0.149)	0.030	0.039
221	18.42	0.13	0.069	(0.148)	0.030	0.039
222	18.50	0.13	0.069	(0.148)	0.030	0.039
223	18.58	0.10	0.052	(0.147)	0.022	0.029
224	18.67	0.10	0.052	(0.146)	0.022	0.029
225	18.75	0.10	0.052	(0.146)	0.022	0.029
226	18.83	0.07	0.034	(0.145)	0.015	0.020
227	18.92	0.07	0.034	(0.144)	0.015	0.020
228	19.00	0.07	0.034	(0.143)	0.015	0.020
229	19.08	0.10	0.052	(0.143)	0.022	0.029
230	19.17	0.10	0.052	(0.142)	0.022	0.029
231	19.25	0.10	0.052	(0.141)	0.022	0.029
232	19.33	0.13	0.069	(0.141)	0.030	0.039
233	19.42	0.13	0.069	(0.140)	0.030	0.039
234	19.50	0.13	0.069	(0.140)	0.030	0.039
235	19.58	0.10	0.052	(0.139)	0.022	0.029
236	19.67	0.10	0.052	(0.138)	0.022	0.029
237	19.75	0.10	0.052	(0.138)	0.022	0.029
238	19.83	0.07	0.034	(0.137)	0.015	0.020
239	19.92	0.07	0.034	(0.136)	0.015	0.020
240	20.00	0.07	0.034	(0.136)	0.015	0.020
241	20.08	0.10	0.052	(0.135)	0.022	0.029
242	20.17	0.10	0.052	(0.135)	0.022	0.029
243	20.25	0.10	0.052	(0.134)	0.022	0.029
244	20.33	0.10	0.052	(0.133)	0.022	0.029
245	20.42	0.10	0.052	(0.133)	0.022	0.029
246	20.50	0.10	0.052	(0.132)	0.022	0.029
247	20.58	0.10	0.052	(0.132)	0.022	0.029
248	20.67	0.10	0.052	(0.131)	0.022	0.029
249	20.75	0.10	0.052	(0.131)	0.022	0.029
250	20.83	0.07	0.034	(0.130)	0.015	0.020
251	20.92	0.07	0.034	(0.130)	0.015	0.020
252	21.00	0.07	0.034	(0.129)	0.015	0.020
253	21.08	0.10	0.052	(0.129)	0.022	0.029

254	21.17	0.10	0.052	(0.128)	0.022	0.029
255	21.25	0.10	0.052	(0.128)	0.022	0.029
256	21.33	0.07	0.034	(0.127)	0.015	0.020
257	21.42	0.07	0.034	(0.127)	0.015	0.020
258	21.50	0.07	0.034	(0.126)	0.015	0.020
259	21.58	0.10	0.052	(0.126)	0.022	0.029
260	21.67	0.10	0.052	(0.125)	0.022	0.029
261	21.75	0.10	0.052	(0.125)	0.022	0.029
262	21.83	0.07	0.034	(0.124)	0.015	0.020
263	21.92	0.07	0.034	(0.124)	0.015	0.020
264	22.00	0.07	0.034	(0.123)	0.015	0.020
265	22.08	0.10	0.052	(0.123)	0.022	0.029
266	22.17	0.10	0.052	(0.123)	0.022	0.029
267	22.25	0.10	0.052	(0.122)	0.022	0.029
268	22.33	0.07	0.034	(0.122)	0.015	0.020
269	22.42	0.07	0.034	(0.122)	0.015	0.020
270	22.50	0.07	0.034	(0.121)	0.015	0.020
271	22.58	0.07	0.034	(0.121)	0.015	0.020
272	22.67	0.07	0.034	(0.120)	0.015	0.020
273	22.75	0.07	0.034	(0.120)	0.015	0.020
274	22.83	0.07	0.034	(0.120)	0.015	0.020
275	22.92	0.07	0.034	(0.120)	0.015	0.020
276	23.00	0.07	0.034	(0.119)	0.015	0.020
277	23.08	0.07	0.034	(0.119)	0.015	0.020
278	23.17	0.07	0.034	(0.119)	0.015	0.020
279	23.25	0.07	0.034	(0.118)	0.015	0.020
280	23.33	0.07	0.034	(0.118)	0.015	0.020
281	23.42	0.07	0.034	(0.118)	0.015	0.020
282	23.50	0.07	0.034	(0.118)	0.015	0.020
283	23.58	0.07	0.034	(0.118)	0.015	0.020
284	23.67	0.07	0.034	(0.117)	0.015	0.020
285	23.75	0.07	0.034	(0.117)	0.015	0.020
286	23.83	0.07	0.034	(0.117)	0.015	0.020
287	23.92	0.07	0.034	(0.117)	0.015	0.020
288	24.00	0.07	0.034	(0.117)	0.015	0.020

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           (Loss Rate Not Used)
    Sum =     100.0                                  Sum =    29.8
     Flood volume = Effective rainfall      2.48(In)
      times area      20.0(Ac.)/[(In)/(Ft.)] =       4.1(Ac.Ft)
     Total soil loss =      1.82(In)
     Total soil loss =     3.029(Ac.Ft)
     Total rainfall =      4.30(In)
     Flood volume =      180055.4 Cubic Feet
     Total soil loss =      131956.3 Cubic Feet
     --------------------------------------------------------------------
      Peak flow rate of this hydrograph =      7.730(CFS)
     --------------------------------------------------------------------
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         24 - H O U R   S T O R M
                    R u n o f f     H y d r o g r a p h
     --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     --------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 -----------------------------------------------------------------------
   0+ 5      0.0009      0.14  Q        |         |         |         |
   0+10      0.0032      0.32  VQ       |         |         |         |
   0+15      0.0057      0.36  VQ       |         |         |         |
   0+20      0.0088      0.45  VQ       |         |         |         |
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0+25       0.0126      0.55  V Q       |         |         |         |
0+30       0.0165      0.58  V Q       |         |         |         |
0+35       0.0206      0.59  V Q       |         |         |         |
0+40       0.0246      0.59  V Q       |         |         |         |
0+45       0.0287      0.59  V Q       |         |         |         |
0+50       0.0333      0.66  V Q       |         |         |         |
0+55       0.0385      0.75  V  Q      |         |         |         |
1+ 0       0.0438      0.77  V  Q      |         |         |         |
1+ 5       0.0487      0.72  V Q       |         |         |         |
1+10       0.0531      0.63  V Q       |         |         |         |
1+15       0.0573      0.61  V Q       |         |         |         |
1+20       0.0614      0.60  V Q       |         |         |         |
1+25       0.0655      0.59  V Q       |         |         |         |
1+30       0.0696      0.59  V Q       |         |         |         |
1+35       0.0736      0.59  V Q       |         |         |         |
1+40       0.0777      0.59  V Q       |         |         |         |
1+45       0.0818      0.59  V Q       |         |         |         |
1+50       0.0864      0.66  V Q       |         |         |         |
1+55       0.0916      0.75  V  Q      |         |         |         |
2+ 0       0.0969      0.77  V  Q      |         |         |         |
2+ 5       0.1023      0.78  V  Q      |         |         |         |
2+10       0.1077      0.79  |V Q      |         |         |         |
2+15       0.1132      0.79  |V Q      |         |         |         |
2+20       0.1186      0.79  |V Q      |         |         |         |
2+25       0.1240      0.79  |V Q      |         |         |         |
2+30       0.1295      0.79  |V Q      |         |         |         |
2+35       0.1354      0.86  |V Q      |         |         |         |
2+40       0.1420      0.95  |V Q      |         |         |         |
2+45       0.1487      0.97  |V Q      |         |         |         |
2+50       0.1554      0.98  |V Q      |         |         |         |
2+55       0.1622      0.99  |V Q      |         |         |         |
3+ 0       0.1690      0.99  |V Q      |         |         |         |
3+ 5       0.1758      0.99  |V Q      |         |         |         |
3+10       0.1826      0.99  |V Q      |         |         |         |
3+15       0.1894      0.99  |V Q      |         |         |         |
3+20       0.1962      0.99  |V Q      |         |         |         |
3+25       0.2030      0.99  |V Q      |         |         |         |
3+30       0.2098      0.99  | VQ      |         |         |         |
3+35       0.2166      0.99  | VQ      |         |         |         |
3+40       0.2234      0.99  | VQ      |         |         |         |
3+45       0.2303      0.99  | VQ      |         |         |         |
3+50       0.2375      1.06  | V Q     |         |         |         |
3+55       0.2454      1.15  | V Q     |         |         |         |
4+ 0       0.2535      1.17  | V Q     |         |         |         |
4+ 5       0.2616      1.18  | V Q     |         |         |         |
4+10       0.2698      1.18  | V Q     |         |         |         |
4+15       0.2779      1.19  | V Q     |         |         |         |
4+20       0.2866      1.25  | V  Q    |         |         |         |
4+25       0.2958      1.35  | V  Q    |         |         |         |
4+30       0.3053      1.37  | V  Q    |         |         |         |
4+35       0.3147      1.38  |  V Q    |         |         |         |
4+40       0.3243      1.38  |  V Q    |         |         |         |
4+45       0.3338      1.38  |  V Q    |         |         |         |
4+50       0.3438      1.45  |  V Q    |         |         |         |
4+55       0.3544      1.54  |  V  Q   |         |         |         |
5+ 0       0.3652      1.57  |  V  Q   |         |         |         |
5+ 5       0.3751      1.44  |  V Q    |         |         |         |
5+10       0.3838      1.26  |  V Q    |         |         |         |
5+15       0.3921      1.22  |  VQ     |         |         |         |
5+20       0.4009      1.27  |  V Q    |         |         |         |
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 5+25       0.4102      1.35  |  V Q    |         |         |         |
 5+30       0.4196      1.37  |   VQ    |         |         |         |
 5+35       0.4295      1.45  |   VQ    |         |         |         |
 5+40       0.4402      1.54  |   V Q   |         |         |         |
 5+45       0.4509      1.57  |   V Q   |         |         |         |
 5+50       0.4618      1.57  |   V Q   |         |         |         |
 5+55       0.4726      1.58  |   V Q   |         |         |         |
 6+ 0       0.4835      1.58  |   V Q   |         |         |         |
 6+ 5       0.4949      1.65  |   V Q   |         |         |         |
 6+10       0.5069      1.74  |   V Q   |         |         |         |
 6+15       0.5190      1.76  |    V Q  |         |         |         |
 6+20       0.5312      1.77  |    V Q  |         |         |         |
 6+25       0.5435      1.78  |    V Q  |         |         |         |
 6+30       0.5557      1.78  |    V Q  |         |         |         |
 6+35       0.5684      1.85  |    V Q  |         |         |         |
 6+40       0.5818      1.94  |    V Q  |         |         |         |
 6+45       0.5953      1.96  |    V Q  |         |         |         |
 6+50       0.6089      1.97  |    V Q  |         |         |         |
 6+55       0.6225      1.97  |     VQ  |         |         |         |
 7+ 0       0.6361      1.98  |     VQ  |         |         |         |
 7+ 5       0.6497      1.98  |     VQ  |         |         |         |
 7+10       0.6633      1.98  |     VQ  |         |         |         |
 7+15       0.6769      1.98  |     VQ  |         |         |         |
 7+20       0.6910      2.04  |     V Q |         |         |         |
 7+25       0.7057      2.14  |     V Q |         |         |         |
 7+30       0.7205      2.16  |     V Q |         |         |         |
 7+35       0.7359      2.24  |      VQ |         |         |         |
 7+40       0.7520      2.33  |      V Q|         |         |         |
 7+45       0.7682      2.36  |      V Q|         |         |         |
 7+50       0.7850      2.43  |      V Q|         |         |         |
 7+55       0.8024      2.53  |      V  Q         |         |         |
 8+ 0       0.8200      2.55  |      V  Q         |         |         |
 8+ 5       0.8386      2.70  |       V Q         |         |         |
 8+10       0.8585      2.89  |       V |Q        |         |         |
 8+15       0.8787      2.93  |       V |Q        |         |         |
 8+20       0.8990      2.95  |       V |Q        |         |         |
 8+25       0.9194      2.96  |       V |Q        |         |         |
 8+30       0.9398      2.96  |        V|Q        |         |         |
 8+35       0.9607      3.03  |        V| Q       |         |         |
 8+40       0.9822      3.12  |        V| Q       |         |         |
 8+45       1.0039      3.15  |        V| Q       |         |         |
 8+50       1.0261      3.22  |        V| Q       |         |         |
 8+55       1.0489      3.32  |         V  Q      |         |         |
 9+ 0       1.0720      3.34  |         V  Q      |         |         |
 9+ 5       1.0960      3.49  |         V  Q      |         |         |
 9+10       1.1213      3.68  |         V   Q     |         |         |
 9+15       1.1470      3.72  |         |V  Q     |         |         |
 9+20       1.1732      3.81  |         |V   Q    |         |         |
 9+25       1.2002      3.91  |         |V   Q    |         |         |
 9+30       1.2273      3.94  |         |V   Q    |         |         |
 9+35       1.2549      4.01  |         | V   Q   |         |         |
 9+40       1.2832      4.11  |         | V   Q   |         |         |
 9+45       1.3117      4.13  |         | V   Q   |         |         |
 9+50       1.3407      4.21  |         | V   Q   |         |         |
 9+55       1.3704      4.31  |         |  V   Q  |         |         |
10+ 0       1.4002      4.33  |         |  V   Q  |         |         |
10+ 5       1.4268      3.86  |         |  V Q    |         |         |
10+10       1.4490      3.22  |         | Q V     |         |         |
10+15       1.4702      3.07  |         | Q V     |         |         |
10+20       1.4909      3.01  |         | Q V     |         |         |
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10+25       1.5114      2.98 |         |Q  V     |         |         |
10+30       1.5318      2.96 |         |Q  V     |         |         |
10+35       1.5546      3.31 |         |  Q V    |         |         |
10+40       1.5805      3.77 |         |    Q    |         |         |
10+45       1.6072      3.87 |         |    Q    |         |         |
10+50       1.6342      3.92 |         |    Q    |         |         |
10+55       1.6613      3.94 |         |    QV   |         |         |
11+ 0       1.6886      3.95 |         |    QV   |         |         |
11+ 5       1.7153      3.88 |         |    QV   |         |         |
11+10       1.7414      3.79 |         |    QV   |         |         |
11+15       1.7674      3.77 |         |    Q V  |         |         |
11+20       1.7933      3.76 |         |    Q V  |         |         |
11+25       1.8192      3.76 |         |    Q V  |         |         |
11+30       1.8450      3.75 |         |    Q V  |         |         |
11+35       1.8699      3.62 |         |   Q   V |         |         |
11+40       1.8936      3.43 |         |  Q    V |         |         |
11+45       1.9169      3.39 |         |  Q    V |         |         |
11+50       1.9406      3.44 |         |  Q    V |         |         |
11+55       1.9649      3.52 |         |   Q    V|         |         |
12+ 0       1.9893      3.54 |         |   Q    V|         |         |
12+ 5       2.0170      4.03 |         |     Q  V|         |         |
12+10       2.0493      4.68 |         |       QV|         |         |
12+15       2.0825      4.83 |         |         QV        |         |
12+20       2.1167      4.96 |         |         QV        |         |
12+25       2.1518      5.09 |         |         Q         |         |
12+30       2.1870      5.12 |         |         QV        |         |
12+35       2.2233      5.27 |         |         |Q        |         |
12+40       2.2609      5.46 |         |         |Q        |         |
12+45       2.2988      5.50 |         |         | Q       |         |
12+50       2.3376      5.63 |         |         | Q       |         |
12+55       2.3775      5.79 |         |         |  Q      |         |
13+ 0       2.4177      5.85 |         |         |  Q      |         |
13+ 5       2.4624      6.48 |         |         |  V Q    |         |
13+10       2.5128      7.32 |         |         |   V    Q|         |
13+15       2.5647      7.53 |         |         |   V     Q         |
13+20       2.6172      7.63 |         |         |    V    Q         |
13+25       2.6702      7.69 |         |         |    V    Q         |
13+30       2.7234      7.73 |         |         |     V   Q         |
13+35       2.7691      6.63 |         |         |     Q   |         |
13+40       2.8045      5.14 |         |         Q      V  |         |
13+45       2.8376      4.80 |         |        Q|      V  |         |
13+50       2.8696      4.65 |         |       Q |      V  |         |
13+55       2.9011      4.58 |         |       Q |       V |         |
14+ 0       2.9324      4.54 |         |       Q |       V |         |
14+ 5       2.9659      4.86 |         |        Q|       V |         |
14+10       3.0024      5.30 |         |         |Q       V|         |
14+15       3.0397      5.42 |         |         |Q       V|         |
14+20       3.0766      5.36 |         |         |Q       V|         |
14+25       3.1127      5.24 |         |         Q         V         |
14+30       3.1487      5.23 |         |         Q         V         |
14+35       3.1847      5.23 |         |         Q         V         |
14+40       3.2208      5.24 |         |         Q         |V        |
14+45       3.2570      5.26 |         |         |Q        |V        |
14+50       3.2925      5.16 |         |         Q         |V        |
14+55       3.3270      5.01 |         |         Q         | V       |
15+ 0       3.3614      5.00 |         |        Q|         | V       |
15+ 5       3.3952      4.91 |         |        Q|         | V       |
15+10       3.4282      4.79 |         |        Q|         |  V      |
15+15       3.4610      4.76 |         |        Q|         |  V      |
15+20       3.4932      4.68 |         |       Q |         |  V      |
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15+25       3.5248      4.58  |         |       Q |         |   V     |
15+30       3.5562      4.56  |         |       Q |         |   V     |
15+35       3.5857      4.28  |         |      Q  |         |   V     |
15+40       3.6126      3.90  |         |    Q    |         |   V     |
15+45       3.6389      3.82  |         |    Q    |         |    V    |
15+50       3.6649      3.78  |         |    Q    |         |    V    |
15+55       3.6908      3.76  |         |    Q    |         |    V    |
16+ 0       3.7167      3.75  |         |    Q    |         |    V    |
16+ 5       3.7354      2.73  |         Q         |         |     V   |
16+10       3.7447      1.35  |    Q    |         |         |     V   |
16+15       3.7518      1.03  |   Q     |         |         |     V   |
16+20       3.7579      0.89  |  Q      |         |         |     V   |
16+25       3.7635      0.82  |  Q      |         |         |     V   |
16+30       3.7690      0.79  |  Q      |         |         |     V   |
16+35       3.7739      0.72  | Q       |         |         |     V   |
16+40       3.7783      0.63  | Q       |         |         |     V   |
16+45       3.7825      0.61  | Q       |         |         |     V   |
16+50       3.7866      0.60  | Q       |         |         |     V   |
16+55       3.7907      0.59  | Q       |         |         |     V   |
17+ 0       3.7948      0.59  | Q       |         |         |     V   |
17+ 5       3.7998      0.73  | Q       |         |         |     V   |
17+10       3.8061      0.91  |  Q      |         |         |     V   |
17+15       3.8127      0.96  |  Q      |         |         |     V   |
17+20       3.8194      0.98  |  Q      |         |         |     V   |
17+25       3.8262      0.98  |  Q      |         |         |      V  |
17+30       3.8330      0.99  |  Q      |         |         |      V  |
17+35       3.8398      0.99  |  Q      |         |         |      V  |
17+40       3.8466      0.99  |  Q      |         |         |      V  |
17+45       3.8534      0.99  |  Q      |         |         |      V  |
17+50       3.8597      0.92  |  Q      |         |         |      V  |
17+55       3.8654      0.83  |  Q      |         |         |      V  |
18+ 0       3.8710      0.81  |  Q      |         |         |      V  |
18+ 5       3.8765      0.80  |  Q      |         |         |      V  |
18+10       3.8819      0.79  |  Q      |         |         |      V  |
18+15       3.8874      0.79  |  Q      |         |         |      V  |
18+20       3.8928      0.79  |  Q      |         |         |      V  |
18+25       3.8983      0.79  |  Q      |         |         |      V  |
18+30       3.9037      0.79  |  Q      |         |         |      V  |
18+35       3.9087      0.72  | Q       |         |         |      V  |
18+40       3.9130      0.63  | Q       |         |         |      V  |
18+45       3.9172      0.61  | Q       |         |         |      V  |
18+50       3.9209      0.53  | Q       |         |         |      V  |
18+55       3.9239      0.43  |Q        |         |         |      V  |
19+ 0       3.9267      0.41  |Q        |         |         |      V  |
19+ 5       3.9299      0.47  |Q        |         |         |       V |
19+10       3.9338      0.56  | Q       |         |         |       V |
19+15       3.9377      0.58  | Q       |         |         |       V |
19+20       3.9422      0.65  | Q       |         |         |       V |
19+25       3.9474      0.75  |  Q      |         |         |       V |
19+30       3.9528      0.77  |  Q      |         |         |       V |
19+35       3.9577      0.72  | Q       |         |         |       V |
19+40       3.9620      0.63  | Q       |         |         |       V |
19+45       3.9662      0.61  | Q       |         |         |       V |
19+50       3.9699      0.53  | Q       |         |         |       V |
19+55       3.9728      0.43  |Q        |         |         |       V |
20+ 0       3.9757      0.41  |Q        |         |         |       V |
20+ 5       3.9789      0.47  |Q        |         |         |       V |
20+10       3.9828      0.56  | Q       |         |         |       V |
20+15       3.9867      0.58  | Q       |         |         |       V |
20+20       3.9908      0.59  | Q       |         |         |       V |
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   20+25       3.9948      0.59  | Q        |         |         |      V |
   20+30       3.9989      0.59  | Q        |         |         |      V |
   20+35       4.0030      0.59  | Q        |         |         |      V |
   20+40       4.0071      0.59  | Q        |         |         |      V |
   20+45       4.0112      0.59  | Q        |         |         |      V |
   20+50       4.0148      0.52  | Q        |         |         |      V |
   20+55       4.0178      0.43  |Q         |         |         |      V |
   21+ 0       4.0206      0.41  |Q         |         |         |      V |
   21+ 5       4.0238      0.47  |Q         |         |         |      V |
   21+10       4.0277      0.56  | Q        |         |         |      V |
   21+15       4.0316      0.58  | Q        |         |         |       V|
   21+20       4.0352      0.52  | Q        |         |         |       V|
   21+25       4.0382      0.43  |Q         |         |         |       V|
   21+30       4.0410      0.41  |Q         |         |         |       V|
   21+35       4.0442      0.47  |Q         |         |         |       V|
   21+40       4.0481      0.56  | Q        |         |         |       V|
   21+45       4.0521      0.58  | Q        |         |         |       V|
   21+50       4.0556      0.52  | Q        |         |         |       V|
   21+55       4.0586      0.43  |Q         |         |         |       V|
   22+ 0       4.0614      0.41  |Q         |         |         |       V|
   22+ 5       4.0647      0.47  |Q         |         |         |       V|
   22+10       4.0685      0.56  | Q        |         |         |       V|
   22+15       4.0725      0.58  | Q        |         |         |       V|
   22+20       4.0760      0.52  | Q        |         |         |       V|
   22+25       4.0790      0.43  |Q         |         |         |       V|
   22+30       4.0818      0.41  |Q         |         |         |       V|
   22+35       4.0846      0.40  |Q         |         |         |       V|
   22+40       4.0873      0.40  |Q         |         |         |       V|
   22+45       4.0901      0.40  |Q         |         |         |       V|
   22+50       4.0928      0.40  |Q         |         |         |       V|
   22+55       4.0955      0.40  |Q         |         |         |       V|
   23+ 0       4.0982      0.40  |Q         |         |         |       V|
   23+ 5       4.1009      0.40  |Q         |         |         |       V|
   23+10       4.1037      0.40  |Q         |         |         |       V|
   23+15       4.1064      0.40  |Q         |         |         |       V|
   23+20       4.1091      0.40  |Q         |         |         |       V|
   23+25       4.1118      0.40  |Q         |         |         |       V|
   23+30       4.1146      0.40  |Q         |         |         |       V|
   23+35       4.1173      0.40  |Q         |         |         |       V|
   23+40       4.1200      0.40  |Q         |         |         |       V|
   23+45       4.1227      0.40  |Q         |         |         |       V|
   23+50       4.1254      0.40  |Q         |         |         |       V|
   23+55       4.1282      0.40  |Q         |         |         |       V|
   24+ 0       4.1309      0.40  |Q         |         |         |       V|
   24+ 5       4.1327      0.26  |Q         |         |         |       V|
   24+10       4.1332      0.07  Q          |         |         |       V|
   24+15       4.1334      0.03  Q          |         |         |       V|
   24+20       4.1335      0.01  Q          |         |         |       V|
   24+25       4.1335      0.00  Q          |         |         |       V|
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APPENDIX D

FLOOD ROUTING CALCULATIONS

TABLE A

AREA A

BASIN NO 1

DETENTION BASIN SIZE

STAGE VS. VOLUME

ELEVATION	DETENTION BASIN DEPTH (ft)	CONTOUR AREA (sf)	AVG. AREA (sf)	VOLUME (cu. ft.)	VOLUME (ac - ft.)	TOTAL VOLUME (ac-ft)	DESIGN FLOW (cfs)	
1594	0	915	0	0	0.000	0.000	0.00	SAND FILTER AREA
1596	2	915	915	641	0.015	0.015	1.25	
1597	3	915	915	320	0.007	0.022	1.57	
1597.5	3.5	6,828	3,872	1,195	0.027	0.049	1.70	
1598	4	7,434	7,131	3,566	0.082	0.131	1.89	
1599	5	8,703	8,069	8,069	0.185	0.317	2.17	
1600	6	10,047	9,375	9,375	0.215	0.532	2.41	
1601	7	11,465	10,756	10,756	0.247	0.779	2.63	
1602	8	12,946	12,206	12,206	0.280	1.059	2.83	
1603	9	14,501	13,724	13,724	0.315	1.374	4.91	
1604	10	16,125	15,313	15,313	0.352	1.725	7.42	
1605	11	17,820	16,973	16,973	0.390	2.115	9.03	
1606	12	19,584	18,702	18,702	0.429	2.544	10.33	
1607	13	21,568	20,576	20,576	0.472	3.017	11.46	

NOTES:

TABLE B
DETENTION BASIN OUTLET
AREA A
BASIN NO 1

RISER 1

ORIFICE 1			ORIFICE 2			ORIFICE 3			ORIFICE 4		
Rectangular Outlet			Circular Outlet			Circular Outlet			Circular Outlet		
WQ Outlet (Orifice)			WQ Outlet (Orifice)			WQ Outlet (Orifice)			WQ Outlet (Orifice)		
Q(WQ)=CA(2gH)^0.5			Q(WQ)=CA(2gH)^0.5			Q(WQ)=CA(2gH)^0.5			Q(WQ)=CA(2gH)^0.5		
C=	0.6		C=	0.6		C=	0.6		C=	0.6	
Area Total=	0.00	sq-ft	Area Total=	0.20	sq-ft	Area Total=	0.02	sq-ft	Area Total=	0.79	sq-ft
W=	4	in	Hole Diameter =	6	in	Hole Diameter =	1.9	in	Hole Diameter =	6	in
H=	4	in	# of holes =	1		# of holes =	1		# of holes =	4	
# of holes =	0										
Elevation =	1595	ft	Elevation =	1594	ft	Elevation =	1597.5	ft	Elevation =	1602.50	ft

ELEVATION	DEPTH (H) ABOVE ORIFICE	Q(WQ) (cfs)	DEPTH (H) ABOVE ORIFICE 2	Q(WQ) (cfs)	DEPTH (H) ABOVE ORIFICE 3	Q(WQ) (cfs)	DEPTH (H) ABOVE ORIFICE 4	Q(WQ) (cfs)	Q TOTAL (cfs)
1594	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1596	2.00	0.00	2.00	1.25	0.00	0.00	0.00	0.00	1.25
1597	3.00	0.00	3.00	1.57	0.00	0.00	0.00	0.00	1.57
1597.5	3.50	0.00	3.50	1.70	0.00	0.00	0.00	0.00	1.70
1598	4.00	0.00	4.00	1.83	0.50	0.06	0.00	0.00	1.89
1599	5.00	0.00	5.00	2.06	1.50	0.11	0.00	0.00	2.17
1600	6.00	0.00	6.00	2.27	2.50	0.15	0.00	0.00	2.41
1601	7.00	0.00	7.00	2.46	3.50	0.18	0.00	0.00	2.63
1602	8.00	0.00	8.00	2.63	4.50	0.20	0.00	0.00	2.83
1603	9.00	0.00	9.00	2.80	5.50	0.22	0.50	1.89	4.91
1604	10.00	0.00	10.00	2.95	6.50	0.24	1.50	4.23	7.42
1605	11.00	0.00	11.00	3.10	7.50	0.26	2.50	5.67	9.03
1606	12.00	0.00	12.00	3.24	8.50	0.27	3.50	6.81	10.33
1607	13.00	0.00	13.00	3.37	9.50	0.29	4.50	7.79	11.46

TABLE A
AREA A
BASIN NO 1
DETENTION BASIN SIZE

STAGE VS. VOLUME

ELEVATION	DETENTION BASIN DEPTH (ft)	CONTOUR AREA (sf)	AVG. AREA (sf)	VOLUME (cu. ft.)	VOLUME (ac - ft.)	TOTAL VOLUME (ac-ft)	DESIGN FLOW (cfs)	
1572.5	0	795	0	0	0.000	0.000	0.00	SAND FILTER AREA
1574	1.5	795	795	417	0.010	0.010	1.06	
1575	2.5	795	795	278	0.006	0.016	1.42	
1576	3.5	5,220	3,008	1,827	0.042	0.058	1.70	
1577	4.5	6,287	5,754	5,754	0.132	0.190	2.01	
1578	5.5	7,418	6,853	6,853	0.157	0.347	2.25	
1579	6.5	8,613	8,016	8,016	0.184	0.531	2.46	
1580	7.5	9,872	9,243	9,243	0.212	0.743	2.66	
1581	8.5	11,196	10,534	10,534	0.242	0.985	6.12	
1582	9.5	12,583	11,890	11,890	0.273	1.258	8.02	
1583	10.5	14,034	13,309	13,309	0.306	1.564	9.45	
1584	11.5	15,549	14,792	14,792	0.340	1.903	10.66	

NOTES:

TABLE B
DETENTION BASIN OUTLET
AREA B
BASIN NO 2

RISER 1

ORIFICE 1
Rectangular Outlet
WQ Outlet (Orifice)
Q(WQ)=CA(2gH)^0.5
C= 0.6
Area Total= 0.00 sq-ft
W= 4 in
H= 4 in
# of holes = 0
Elevation = 1572.5 ft

ORIFICE 2
Circular Outlet
WQ Outlet (Orifice)
Q(WQ)=CA(2gH)^0.5
C= 0.6
Area Total= 0.20 sq-ft
Hole Diameter = 6 in
# of holes = 1
Elevation = 1572.5 ft

ORIFICE 3
Circular Outlet
WQ Outlet (Orifice)
Q(WQ)=CA(2gH)^0.5
C= 0.6
Area Total= 0.01 sq-ft
Hole Diameter = 1.5 in
# of holes = 1
Elevation = 1576 ft

ORIFICE 4
Circular Outlet
WQ Outlet (Orifice)
Q(WQ)=CA(2gH)^0.5
C= 0.6
Area Total= 0.79 sq-ft
Hole Diameter = 6 in
# of holes = 4
Elevation = 1580.00 ft

ELEVATION	DEPTH (H) ABOVE ORIFICE	Q(WQ) (cfs)	DEPTH (H) ABOVE ORIFICE 2	Q(WQ) (cfs)	DEPTH (H) ABOVE ORIFICE 3	Q(WQ) (cfs)	DEPTH (H) ABOVE ORIFICE 4	Q(WQ) (cfs)	Q TOTAL (cfs)
1572.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1574	1.50	0.00	1.50	1.06	0.00	0.00	0.00	0.00	1.06
1575	2.50	0.00	2.50	1.42	0.00	0.00	0.00	0.00	1.42
1576	3.50	0.00	3.50	1.70	0.00	0.00	0.00	0.00	1.70
1577	4.50	0.00	4.50	1.95	1.00	0.06	0.00	0.00	2.01
1578	5.50	0.00	5.50	2.17	2.00	0.08	0.00	0.00	2.25
1579	6.50	0.00	6.50	2.36	3.00	0.10	0.00	0.00	2.46
1580	7.50	0.00	7.50	2.54	4.00	0.12	0.00	0.00	2.66
1581	8.50	0.00	8.50	2.71	5.00	0.13	1.00	3.27	6.12
1582	9.50	0.00	9.50	2.87	6.00	0.14	2.00	5.00	8.02
1583	10.50	0.00	10.50	3.03	7.00	0.16	3.00	6.27	9.45
1584	11.50	0.00	11.50	3.17	8.00	0.17	4.00	7.32	10.66

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 08/29/22

100-YR 1-HR

AREA A
100-YR STORM
1-HR

Program License Serial Number 6094

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

From study/file name: AREAA.rte
****************************HYDROGRAPH DATA****************************
Number of intervals = 18
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 73.708 (CFS)
Total volume = 2.436 (Ac.Ft)
Status of hydrographs being held in storage

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

****

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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 = 18
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
2.000	0.015	1.250	0.011	0.019
3.000	0.022	1.570	0.017	0.027
3.500	0.049	1.700	0.043	0.055

4.000	0.131	1.890	0.124	0.138
5.000	0.317	2.170	0.310	0.324
6.000	0.532	2.410	0.524	0.540
7.000	0.779	2.630	0.770	0.788
8.000	1.059	2.830	1.049	1.069
9.000	1.374	4.910	1.357	1.391
10.000	1.725	7.420	1.699	1.751
11.000	2.115	9.030	2.084	2.146
12.000	2.544	10.330	2.508	2.580
13.000	3.017	11.460	2.978	3.056

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     ---------------------------------------------------------------------
                 Hydrograph Detention Basin Routing
     ----------------------------------------------------------------------

     Graph values: 'I'= unit inflow; 'O'=outflow at time shown
     ----------------------------------------------------------------------
 Time   Inflow  Outflow    Storage                                      Depth
(Hours)  (CFS)   (CFS)     (Ac.Ft) .0      18.4   36.85   55.28   73.71 (Ft.)
 0.083    2.98    0.66      0.008  OI      |       |       |       |     1.06
 0.167    8.65    1.66      0.040  O  I    |       |       |       |     3.33
 0.250   11.15    1.81      0.096  O   I   |       |       |       |     3.79
 0.333   13.37    1.95      0.168  O    I  |       |       |       |     4.20
 0.417   15.08    2.07      0.252  O     I |       |       |       |     4.65
 0.500   17.98    2.21      0.351  O      I|       |       |       |     5.16
 0.583   21.19    2.34      0.470  |O      |I      |       |       |     5.71
 0.667   25.13    2.48      0.613  |O      | I     |       |       |     6.33
 0.750   32.73    2.64      0.795  |O      |     I |       |       |     7.06
 0.833   60.77    3.08      1.097  |O      |       |       | I     |     8.12
 0.917   73.71    6.02      1.529  | O     |       |       |      I|     9.44
 1.000   35.15    7.96      1.855  |  O    |      I|       |       |    10.33
 1.083   19.72    8.50      1.988  |  O    I       |       |       |    10.67
 1.167    8.49    8.66      2.026  |  O    |       |       |       |    10.77
 1.250    4.43    8.60      2.011  |I O    |       |       |       |    10.73
 1.333    2.42    8.45      1.976  |I O    |       |       |       |    10.64
 1.417    0.56    8.26      1.928  I  O    |       |       |       |    10.52
 1.500    0.19    8.04      1.875  I  O    |       |       |       |    10.38
 1.583    0.00    7.82      1.821  I  O    |       |       |       |    10.25
 1.667    0.00    7.60      1.768  I  O    |       |       |       |    10.11
 1.750    0.00    7.36      1.716  I  O    |       |       |       |     9.98
 1.833    0.00    7.00      1.667  I  O    |       |       |       |     9.83
 1.917    0.00    6.67      1.620  I O     |       |       |       |     9.70
 2.000    0.00    6.35      1.575  I O     |       |       |       |     9.57
 2.083    0.00    6.04      1.532  I O     |       |       |       |     9.45
 2.167    0.00    5.75      1.492  I O     |       |       |       |     9.34
 2.250    0.00    5.47      1.453  I O     |       |       |       |     9.23
 2.333    0.00    5.21      1.416  I O     |       |       |       |     9.12
 2.417    0.00    4.96      1.381  I O     |       |       |       |     9.02
 2.500    0.00    4.74      1.348  I O     |       |       |       |     8.92
 2.583    0.00    4.53      1.316  IO      |       |       |       |     8.82
 2.667    0.00    4.32      1.285  IO      |       |       |       |     8.72
 2.750    0.00    4.13      1.256  IO      |       |       |       |     8.63
 2.833    0.00    3.95      1.228  IO      |       |       |       |     8.54
 2.917    0.00    3.77      1.202  IO      |       |       |       |     8.45
 3.000    0.00    3.61      1.176  IO      |       |       |       |     8.37
 3.083    0.00    3.45      1.152  IO      |       |       |       |     8.30
 3.167    0.00    3.29      1.129  IO      |       |       |       |     8.22
 3.250    0.00    3.15      1.107  IO      |       |       |       |     8.15
 3.333    0.00    3.01      1.086  IO      |       |       |       |     8.08
 3.417    0.00    2.87      1.065  IO      |       |       |       |     8.02
 3.500    0.00    2.82      1.046  IO      |       |       |       |     7.95
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3.583    0.00    2.81      1.026  IO       |       |       |       |      7.88
3.667    0.00    2.79      1.007  IO       |       |       |       |      7.81
3.750    0.00    2.78      0.988  IO       |       |       |       |      7.75
3.833    0.00    2.77      0.969  IO       |       |       |       |      7.68
3.917    0.00    2.75      0.950  IO       |       |       |       |      7.61
4.000    0.00    2.74      0.931  IO       |       |       |       |      7.54
4.083    0.00    2.73      0.912  IO       |       |       |       |      7.48
4.167    0.00    2.71      0.893  IO       |       |       |       |      7.41
4.250    0.00    2.70      0.875  IO       |       |       |       |      7.34
4.333    0.00    2.69      0.856  IO       |       |       |       |      7.28
4.417    0.00    2.67      0.838  IO       |       |       |       |      7.21
4.500    0.00    2.66      0.819  IO       |       |       |       |      7.14
4.583    0.00    2.65      0.801  IO       |       |       |       |      7.08
4.667    0.00    2.63      0.783  IO       |       |       |       |      7.01
4.750    0.00    2.62      0.765  IO       |       |       |       |      6.94
4.833    0.00    2.60      0.747  IO       |       |       |       |      6.87
4.917    0.00    2.59      0.729  IO       |       |       |       |      6.80
5.000    0.00    2.57      0.711  IO       |       |       |       |      6.73
5.083    0.00    2.55      0.694  IO       |       |       |       |      6.65
5.167    0.00    2.54      0.676  IO       |       |       |       |      6.58
5.250    0.00    2.52      0.659  IO       |       |       |       |      6.51
5.333    0.00    2.51      0.641  IO       |       |       |       |      6.44
5.417    0.00    2.49      0.624  IO       |       |       |       |      6.37
5.500    0.00    2.48      0.607  IO       |       |       |       |      6.30
5.583    0.00    2.46      0.590  IO       |       |       |       |      6.23
5.667    0.00    2.45      0.573  IO       |       |       |       |      6.17
5.750    0.00    2.43      0.556  IO       |       |       |       |      6.10
5.833    0.00    2.42      0.540  IO       |       |       |       |      6.03
5.917    0.00    2.40      0.523  IO       |       |       |       |      5.96
6.000    0.00    2.38      0.507  IO       |       |       |       |      5.88
6.083    0.00    2.36      0.490  IO       |       |       |       |      5.81
6.167    0.00    2.35      0.474  IO       |       |       |       |      5.73
6.250    0.00    2.33      0.458  IO       |       |       |       |      5.66
6.333    0.00    2.31      0.442  IO       |       |       |       |      5.58
6.417    0.00    2.29      0.426  O        |       |       |       |      5.51
6.500    0.00    2.27      0.410  O        |       |       |       |      5.43
6.583    0.00    2.26      0.395  O        |       |       |       |      5.36
6.667    0.00    2.24      0.379  O        |       |       |       |      5.29
6.750    0.00    2.22      0.364  O        |       |       |       |      5.22
6.833    0.00    2.21      0.349  O        |       |       |       |      5.15
6.917    0.00    2.19      0.334  O        |       |       |       |      5.08
7.000    0.00    2.17      0.319  O        |       |       |       |      5.01
7.083    0.00    2.15      0.304  O        |       |       |       |      4.93
7.167    0.00    2.13      0.289  O        |       |       |       |      4.85
7.250    0.00    2.11      0.274  O        |       |       |       |      4.77
7.333    0.00    2.08      0.260  O        |       |       |       |      4.69
7.417    0.00    2.06      0.246  O        |       |       |       |      4.62
7.500    0.00    2.04      0.232  O        |       |       |       |      4.54
7.583    0.00    2.02      0.218  O        |       |       |       |      4.47
7.667    0.00    2.00      0.204  O        |       |       |       |      4.39
7.750    0.00    1.98      0.190  O        |       |       |       |      4.32
7.833    0.00    1.96      0.176  O        |       |       |       |      4.24
7.917    0.00    1.94      0.163  O        |       |       |       |      4.17
8.000    0.00    1.92      0.150  O        |       |       |       |      4.10
8.083    0.00    1.90      0.137  O        |       |       |       |      4.03
8.167    0.00    1.87      0.124  O        |       |       |       |      3.96
8.250    0.00    1.84      0.111  O        |       |       |       |      3.88
8.333    0.00    1.81      0.098  O        |       |       |       |      3.80
8.417    0.00    1.79      0.086  O        |       |       |       |      3.72
8.500    0.00    1.76      0.074  O        |       |       |       |      3.65
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  8.583    0.00    1.73      0.062  O       |       |       |       |      3.58
  8.667    0.00    1.70      0.050  O       |       |       |       |      3.51
  8.750    0.00    1.65      0.038  O       |       |       |       |      3.30
  8.833    0.00    1.59      0.027  O       |       |       |       |      3.09
  8.917    0.00    1.34      0.017  O       |       |       |       |      2.29
  9.000    0.00    0.80      0.010  O       |       |       |       |      1.28
  9.083    0.00    0.44      0.005  O       |       |       |       |      0.71
  9.167    0.00    0.25      0.003  O       |       |       |       |      0.39
  9.250    0.00    0.14      0.002  O       |       |       |       |      0.22
  9.333    0.00    0.08      0.001  O       |       |       |       |      0.12
  9.417    0.00    0.04      0.001  O       |       |       |       |      0.07
  9.500    0.00    0.02      0.000  O       |       |       |       |      0.04
  9.583    0.00    0.01      0.000  O       |       |       |       |      0.02
  9.667    0.00    0.01      0.000  O       |       |       |       |      0.01
  9.750    0.00    0.00      0.000  O       |       |       |       |      0.01
  9.833    0.00    0.00      0.000  O       |       |       |       |      0.00
  9.917    0.00    0.00      0.000  O       |       |       |       |      0.00
 10.000    0.00    0.00      0.000  O       |       |       |       |      0.00

     ****************************HYDROGRAPH DATA****************************
                Number of intervals =   120
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =       8.661 (CFS)
                Total volume =       2.436 (Ac.Ft)
          Status of hydrographs being held in storage
                     Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
          Peak (CFS)      0.000     0.000     0.000     0.000     0.000
          Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
     ***********************************************************************

     --------------------------------------------------------------------
```

```
                    FLOOD HYDROGRAPH ROUTING PROGRAM
           Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
                       Study date: 08/29/22
```

100-YR 3-HR

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


AREA A
100-YR STORM
3-HR

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


Program License Serial Number 6094

--------------------------------------------------------------------
********************* HYDROGRAPH INFORMATION **********************

           From study/file name: AREAA.rte
****************************HYDROGRAPH DATA****************************
           Number of intervals =    42
           Time interval =    5.0 (Min.)
           Maximum/Peak flow rate =       41.134 (CFS)
           Total volume =       3.241 (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 = 42
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)
--------------------------------------------------------------------
--------------------------------------------------------------------
Initial basin depth =   0.00 (Ft.)
Initial basin storage =      0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)
---------------------------------------------------------------------
--------------------------------------------------------------------
Depth vs. Storage and Depth vs. Discharge data:
 Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
     (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)    (Ac.Ft)
---------------------------------------------------------------------
    0.000      0.000      0.000      0.000        0.000
    2.000      0.015      1.250      0.011        0.019
    3.000      0.022      1.570      0.017        0.027
    3.500      0.049      1.700      0.043        0.055
```

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         4.000     0.131      1.890      0.124        0.138
         5.000     0.317      2.170      0.310        0.324
         6.000     0.532      2.410      0.524        0.540
         7.000     0.779      2.630      0.770        0.788
         8.000     1.059      2.830      1.049        1.069
         9.000     1.374      4.910      1.357        1.391
        10.000     1.725      7.420      1.699        1.751
        11.000     2.115      9.030      2.084        2.146
        12.000     2.544     10.330      2.508        2.580
        13.000     3.017     11.460      2.978        3.056
     --------------------------------------------------------------------
                Hydrograph Detention Basin Routing
     ---------------------------------------------------------------------

     Graph values: 'I'= unit inflow; 'O'=outflow at time shown
     ---------------------------------------------------------------------
 Time   Inflow  Outflow    Storage                                        Depth
(Hours)  (CFS)   (CFS)     (Ac.Ft) .0      10.3   20.57   30.85   41.13 (Ft.)
 0.083    1.34    0.30      0.004  OI      |       |       |       |     0.48
 0.167    3.84    1.29      0.016  |OI     |       |       |       |     2.14
 0.250    4.31    1.63      0.034  |O I    |       |       |       |     3.22
 0.333    4.64    1.71      0.053  |O I    |       |       |       |     3.53
 0.417    5.47    1.76      0.076  |O  I   |       |       |       |     3.67
 0.500    6.04    1.83      0.103  |O  I   |       |       |       |     3.83
 0.583    6.44    1.89      0.134  |O   I  |       |       |       |     4.01
 0.667    6.36    1.94      0.164  |O  I   |       |       |       |     4.18
 0.750    6.87    1.99      0.196  |O   I  |       |       |       |     4.35
 0.833    6.71    2.04      0.229  |O   I  |       |       |       |     4.53
 0.917    6.29    2.08      0.260  |O  I   |       |       |       |     4.69
 1.000    6.56    2.13      0.290  |O   I  |       |       |       |     4.85
 1.083    7.35    2.18      0.323  |O   I  |       |       |       |     5.03
 1.167    8.22    2.22      0.361  |O    I |       |       |       |     5.21
 1.250    8.46    2.27      0.403  |O    I |       |       |       |     5.40
 1.333    8.37    2.31      0.445  |O    I |       |       |       |     5.60
 1.417    8.76    2.36      0.488  |O    I |       |       |       |     5.80
 1.500   10.17    2.41      0.537  |O     I|       |       |       |     6.02
 1.583   10.36    2.46      0.591  |O      I       |       |       |     6.24
 1.667   10.18    2.51      0.644  |O     I|       |       |       |     6.46
 1.750   11.98    2.56      0.703  |O      |I      |       |       |     6.69
 1.833   13.78    2.63      0.774  | O     | I     |       |       |     6.98
 1.917   13.39    2.68      0.849  | O     | I     |       |       |     7.25
 2.000   13.01    2.73      0.922  | O     | I     |       |       |     7.51
 2.083   13.40    2.78      0.994  | O     | I     |       |       |     7.77
 2.167   15.72    2.93      1.074  | O     |   I   |       |       |     8.05
 2.250   20.83    3.61      1.177  | O     |       I       |       |     8.38
 2.333   21.80    4.40      1.297  |  O    |       I       |       |     8.75
 2.417   23.84    5.24      1.421  |   O   |       | I     |       |     9.13
 2.500   34.77    6.40      1.582  |   O   |       |       |  I    |     9.59
 2.583   40.61    7.70      1.793  |    O  |       |       |      I|    10.18
 2.667   41.13    8.63      2.019  |     O |       |       |       I    10.75
 2.750   28.72    9.28      2.198  |      O|       |     I |       |    11.19
 2.833   15.14    9.54      2.284  |      O|  I    |       |       |    11.39
 2.917   11.14    9.62      2.308  |      OI       |       |       |    11.45
 3.000    7.98    9.61      2.308  |     IO|       |       |       |    11.45
 3.083    3.98    9.54      2.283  |  I   O|       |       |       |    11.39
 3.167    1.52    9.40      2.237  |I     O|       |       |       |    11.28
 3.250    0.60    9.23      2.180  I      O|       |       |       |    11.15
 3.333    0.30    9.05      2.120  I      O|       |       |       |    11.01
 3.417    0.13    8.80      2.060  I     O |       |       |       |    10.86
 3.500    0.03    8.56      2.001  I     O |       |       |       |    10.71
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3.583    0.00    8.32      1.943  I     O |       |       |       |    10.56
3.667    0.00    8.09      1.886  I     O |       |       |       |    10.41
3.750    0.00    7.86      1.832  I     O |       |       |       |    10.27
3.833    0.00    7.64      1.778  I    O  |       |       |       |    10.14
3.917    0.00    7.43      1.726  I    O  |       |       |       |    10.00
4.000    0.00    7.07      1.676  I    O  |       |       |       |     9.86
4.083    0.00    6.73      1.629  I    O  |       |       |       |     9.73
4.167    0.00    6.41      1.584  I   O   |       |       |       |     9.60
4.250    0.00    6.10      1.541  I   O   |       |       |       |     9.47
4.333    0.00    5.81      1.500  I   O   |       |       |       |     9.36
4.417    0.00    5.53      1.460  I   O   |       |       |       |     9.25
4.500    0.00    5.26      1.423  I   O   |       |       |       |     9.14
4.583    0.00    5.01      1.388  I  O    |       |       |       |     9.04
4.667    0.00    4.78      1.354  I  O    |       |       |       |     8.94
4.750    0.00    4.57      1.322  I  O    |       |       |       |     8.84
4.833    0.00    4.36      1.291  I  O    |       |       |       |     8.74
4.917    0.00    4.17      1.262  I  O    |       |       |       |     8.64
5.000    0.00    3.98      1.234  I  O    |       |       |       |     8.56
5.083    0.00    3.81      1.207  I O     |       |       |       |     8.47
5.167    0.00    3.64      1.181  I O     |       |       |       |     8.39
5.250    0.00    3.48      1.157  I O     |       |       |       |     8.31
5.333    0.00    3.32      1.133  I O     |       |       |       |     8.24
5.417    0.00    3.17      1.111  I O     |       |       |       |     8.17
5.500    0.00    3.03      1.090  I O     |       |       |       |     8.10
5.583    0.00    2.90      1.069  I O     |       |       |       |     8.03
5.667    0.00    2.82      1.050  I O     |       |       |       |     7.97
5.750    0.00    2.81      1.030  I O     |       |       |       |     7.90
5.833    0.00    2.80      1.011  I O     |       |       |       |     7.83
5.917    0.00    2.78      0.992  I O     |       |       |       |     7.76
6.000    0.00    2.77      0.973  I O     |       |       |       |     7.69
6.083    0.00    2.75      0.954  I O     |       |       |       |     7.62
6.167    0.00    2.74      0.935  I O     |       |       |       |     7.56
6.250    0.00    2.73      0.916  I O     |       |       |       |     7.49
6.333    0.00    2.71      0.897  I O     |       |       |       |     7.42
6.417    0.00    2.70      0.878  I O     |       |       |       |     7.36
6.500    0.00    2.69      0.860  I O     |       |       |       |     7.29
6.583    0.00    2.67      0.841  I O     |       |       |       |     7.22
6.667    0.00    2.66      0.823  I O     |       |       |       |     7.16
6.750    0.00    2.65      0.805  I O     |       |       |       |     7.09
6.833    0.00    2.64      0.787  I O     |       |       |       |     7.03
6.917    0.00    2.62      0.768  I O     |       |       |       |     6.96
7.000    0.00    2.60      0.750  I O     |       |       |       |     6.88
7.083    0.00    2.59      0.733  I O     |       |       |       |     6.81
7.167    0.00    2.57      0.715  I O     |       |       |       |     6.74
7.250    0.00    2.56      0.697  IO      |       |       |       |     6.67
7.333    0.00    2.54      0.680  IO      |       |       |       |     6.60
7.417    0.00    2.53      0.662  IO      |       |       |       |     6.53
7.500    0.00    2.51      0.645  IO      |       |       |       |     6.46
7.583    0.00    2.50      0.628  IO      |       |       |       |     6.39
7.667    0.00    2.48      0.610  IO      |       |       |       |     6.32
7.750    0.00    2.46      0.593  IO      |       |       |       |     6.25
7.833    0.00    2.45      0.576  IO      |       |       |       |     6.18
7.917    0.00    2.43      0.560  IO      |       |       |       |     6.11
8.000    0.00    2.42      0.543  IO      |       |       |       |     6.04
8.083    0.00    2.40      0.526  IO      |       |       |       |     5.97
8.167    0.00    2.39      0.510  IO      |       |       |       |     5.90
8.250    0.00    2.37      0.493  IO      |       |       |       |     5.82
8.333    0.00    2.35      0.477  IO      |       |       |       |     5.75
8.417    0.00    2.33      0.461  IO      |       |       |       |     5.67
8.500    0.00    2.31      0.445  IO      |       |       |       |     5.60
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  8.583    0.00    2.30      0.429  IO      |       |       |       |      5.52
  8.667    0.00    2.28      0.413  IO      |       |       |       |      5.45
  8.750    0.00    2.26      0.398  IO      |       |       |       |      5.38
  8.833    0.00    2.24      0.382  IO      |       |       |       |      5.30
  8.917    0.00    2.23      0.367  IO      |       |       |       |      5.23
  9.000    0.00    2.21      0.352  IO      |       |       |       |      5.16
  9.083    0.00    2.19      0.337  IO      |       |       |       |      5.09
  9.167    0.00    2.18      0.322  IO      |       |       |       |      5.02
  9.250    0.00    2.15      0.307  IO      |       |       |       |      4.94
  9.333    0.00    2.13      0.292  IO      |       |       |       |      4.86
  9.417    0.00    2.11      0.277  IO      |       |       |       |      4.79
  9.500    0.00    2.09      0.263  IO      |       |       |       |      4.71
  9.583    0.00    2.07      0.248  IO      |       |       |       |      4.63
  9.667    0.00    2.05      0.234  IO      |       |       |       |      4.56
  9.750    0.00    2.02      0.220  IO      |       |       |       |      4.48
  9.833    0.00    2.00      0.206  IO      |       |       |       |      4.41
  9.917    0.00    1.98      0.193  IO      |       |       |       |      4.33
 10.000    0.00    1.96      0.179  IO      |       |       |       |      4.26
 10.083    0.00    1.94      0.166  IO      |       |       |       |      4.19
 10.167    0.00    1.92      0.152  IO      |       |       |       |      4.11
 10.250    0.00    1.90      0.139  IO      |       |       |       |      4.04
 10.333    0.00    1.88      0.126  IO      |       |       |       |      3.97
 10.417    0.00    1.85      0.113  IO      |       |       |       |      3.89
 10.500    0.00    1.82      0.101  IO      |       |       |       |      3.82
 10.583    0.00    1.79      0.088  IO      |       |       |       |      3.74
 10.667    0.00    1.76      0.076  IO      |       |       |       |      3.66
 10.750    0.00    1.73      0.064  IO      |       |       |       |      3.59
 10.833    0.00    1.71      0.052  IO      |       |       |       |      3.52
 10.917    0.00    1.66      0.041  IO      |       |       |       |      3.34
 11.000    0.00    1.61      0.029  IO      |       |       |       |      3.14
 11.083    0.00    1.43      0.019  IO      |       |       |       |      2.55
 11.167    0.00    0.90      0.011  O       |       |       |       |      1.44
 11.250    0.00    0.50      0.006  O       |       |       |       |      0.80
 11.333    0.00    0.28      0.003  O       |       |       |       |      0.44
 11.417    0.00    0.15      0.002  O       |       |       |       |      0.25
 11.500    0.00    0.09      0.001  O       |       |       |       |      0.14
 11.583    0.00    0.05      0.001  O       |       |       |       |      0.08
 11.667    0.00    0.03      0.000  O       |       |       |       |      0.04
 11.750    0.00    0.01      0.000  O       |       |       |       |      0.02
 11.833    0.00    0.01      0.000  O       |       |       |       |      0.01
 11.917    0.00    0.00      0.000  O       |       |       |       |      0.01
 12.000    0.00    0.00      0.000  O       |       |       |       |      0.00
 12.083    0.00    0.00      0.000  O       |       |       |       |      0.00
 12.167    0.00    0.00      0.000  O       |       |       |       |      0.00

     ****************************HYDROGRAPH DATA****************************
                Number of intervals =   146
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =       9.616 (CFS)
                Total volume =      3.241 (Ac.Ft)
          Status of hydrographs being held in storage
                     Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
          Peak (CFS)      0.000     0.000     0.000     0.000     0.000
          Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
     ***********************************************************************

     --------------------------------------------------------------------
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FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 08/29/22

100-YR 6-HR

AREA A
100-YR STORM
6-HR

Program License Serial Number 6094

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

From study/file name: AREAA.rte
***************************HYDROGRAPH DATA***************************
Number of intervals = 78
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 36.120 (CFS)
Total volume = 4.153 (Ac.Ft)
Status of hydrographs being held in storage

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

****

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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 = 78
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
2.000	0.015	1.250	0.011	0.019
3.000	0.022	1.570	0.017	0.027
3.500	0.049	1.700	0.043	0.055

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        4.000      0.131      1.890      0.124        0.138
        5.000      0.317      2.170      0.310        0.324
        6.000      0.532      2.410      0.524        0.540
        7.000      0.779      2.630      0.770        0.788
        8.000      1.059      2.830      1.049        1.069
        9.000      1.374      4.910      1.357        1.391
       10.000      1.725      7.420      1.699        1.751
       11.000      2.115      9.030      2.084        2.146
       12.000      2.544     10.330      2.508        2.580
       13.000      3.017     11.460      2.978        3.056
     -------------------------------------------------------------------
                Hydrograph Detention Basin Routing
     --------------------------------------------------------------------

     Graph values: 'I'= unit inflow; 'O'=outflow at time shown
     --------------------------------------------------------------------
 Time   Inflow  Outflow    Storage                                 Depth
(Hours)  (CFS)   (CFS)     (Ac.Ft) .0       9.0   18.06   27.09   36.12 (Ft.)
 0.083    0.70    0.16      0.002  O       |       |       |       |     0.25
 0.167    2.14    0.72      0.009  OI      |       |       |       |     1.15
 0.250    2.75    1.39      0.018  |OI     |       |       |       |     2.45
 0.333    2.97    1.60      0.028  |OI     |       |       |       |     3.10
 0.417    3.09    1.64      0.037  |OI     |       |       |       |     3.28
 0.500    3.30    1.69      0.048  |OI     |       |       |       |     3.48
 0.583    3.60    1.72      0.060  |O I    |       |       |       |     3.57
 0.667    3.68    1.76      0.073  |O I    |       |       |       |     3.65
 0.750    3.71    1.79      0.086  |O I    |       |       |       |     3.73
 0.833    3.73    1.82      0.099  |O I    |       |       |       |     3.81
 0.917    3.74    1.85      0.112  |O I    |       |       |       |     3.89
 1.000    3.88    1.88      0.126  |O I    |       |       |       |     3.97
 1.083    4.14    1.90      0.140  |O I    |       |       |       |     4.05
 1.167    4.21    1.93      0.156  |O I    |       |       |       |     4.13
 1.250    4.24    1.95      0.172  |O I    |       |       |       |     4.22
 1.333    4.26    1.98      0.188  |O I    |       |       |       |     4.30
 1.417    4.27    2.00      0.203  |O I    |       |       |       |     4.39
 1.500    4.28    2.02      0.219  |O I    |       |       |       |     4.47
 1.583    4.28    2.05      0.234  |O I    |       |       |       |     4.56
 1.667    4.28    2.07      0.250  |O I    |       |       |       |     4.64
 1.750    4.28    2.09      0.265  |O I    |       |       |       |     4.72
 1.833    4.28    2.11      0.280  |O I    |       |       |       |     4.80
 1.917    4.28    2.14      0.295  |O I    |       |       |       |     4.88
 2.000    4.42    2.16      0.310  |O I    |       |       |       |     4.96
 2.083    4.54    2.18      0.326  |O  I   |       |       |       |     5.04
 2.167    4.49    2.20      0.342  |O I    |       |       |       |     5.11
 2.250    4.71    2.22      0.358  |O  I   |       |       |       |     5.19
 2.333    4.77    2.24      0.375  |O  I   |       |       |       |     5.27
 2.417    4.79    2.25      0.393  |O  I   |       |       |       |     5.35
 2.500    4.80    2.27      0.410  | O I   |       |       |       |     5.43
 2.583    4.81    2.29      0.428  | O I   |       |       |       |     5.51
 2.667    4.81    2.31      0.445  | O I   |       |       |       |     5.59
 2.750    4.95    2.33      0.462  | O I   |       |       |       |     5.68
 2.833    5.21    2.35      0.481  | O I   |       |       |       |     5.76
 2.917    5.28    2.38      0.501  | O I   |       |       |       |     5.86
 3.000    5.31    2.40      0.521  | O I   |       |       |       |     5.95
 3.083    5.33    2.42      0.541  | O I   |       |       |       |     6.04
 3.167    5.48    2.44      0.562  | O I   |       |       |       |     6.12
 3.250    5.75    2.46      0.584  | O  I  |       |       |       |     6.21
 3.333    5.82    2.48      0.607  | O  I  |       |       |       |     6.30
 3.417    5.99    2.50      0.630  | O  I  |       |       |       |     6.40
 3.500    6.40    2.52      0.655  | O  I  |       |       |       |     6.50
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3.583    6.88    2.55      0.684  | O   I |       |       |       |     6.61
3.667    7.25    2.57      0.715  | O   I |       |       |       |     6.74
3.750    7.51    2.60      0.748  | O   I |       |       |       |     6.87
3.833    7.83    2.63      0.783  | O   I |       |       |       |     7.01
3.917    8.07    2.66      0.819  | O    I|       |       |       |     7.14
4.000    8.38    2.69      0.857  | O    I|       |       |       |     7.28
4.083    8.61    2.71      0.897  | O    I|       |       |       |     7.42
4.167    9.05    2.74      0.939  | O     I       |       |       |     7.57
4.250    9.61    2.78      0.985  | O     I       |       |       |     7.73
4.333   10.32    2.81      1.034  | O     |I      |       |       |     7.91
4.417   11.15    3.02      1.088  | O     |I      |       |       |     8.09
4.500   11.79    3.40      1.145  |  O    | I     |       |       |     8.27
4.583   12.24    3.78      1.203  |  O    | I     |       |       |     8.46
4.667   13.02    4.17      1.262  |  O    |  I    |       |       |     8.65
4.750   13.87    4.58      1.325  |   O   |   I   |       |       |     8.84
4.833   14.52    5.02      1.389  |   O   |   I   |       |       |     9.04
4.917   14.97    5.49      1.455  |   O   |    I  |       |       |     9.23
5.000   15.75    5.96      1.521  |    O  |    I  |       |       |     9.42
5.083   17.55    6.48      1.593  |    O  |      I|       |       |     9.62
5.167   21.15    7.09      1.679  |     O |       | I     |       |     9.87
5.250   24.76    7.67      1.787  |     O |       |    I  |       |    10.16
5.333   27.70    8.19      1.913  |      O|       |       I       |    10.48
5.417   31.01    8.79      2.056  |      O|       |       |  I    |    10.85
5.500   36.12    9.36      2.225  |       O       |       |       I    11.26
5.583   32.32    9.88      2.394  |       O       |       |   I   |    11.65
5.667   16.04   10.17      2.492  |       |O    I |       |       |    11.88
5.750    9.24   10.22      2.509  |       IO      |       |       |    11.92
5.833    6.00   10.17      2.491  |    I  |O      |       |       |    11.88
5.917    4.02   10.06      2.456  |  I    O       |       |       |    11.79
6.000    2.50    9.92      2.409  | I     O       |       |       |    11.69
6.083    1.21    9.76      2.355  |I      O       |       |       |    11.56
6.167    0.44    9.57      2.294  I       O       |       |       |    11.42
6.250    0.21    9.38      2.231  I       O       |       |       |    11.27
6.333    0.10    9.19      2.168  I       O       |       |       |    11.12
6.417    0.04    8.99      2.106  I      O|       |       |       |    10.98
6.500    0.01    8.74      2.045  I      O|       |       |       |    10.82
6.583    0.00    8.50      1.985  I      O|       |       |       |    10.67
6.667    0.00    8.26      1.928  I      O|       |       |       |    10.52
6.750    0.00    8.03      1.872  I      O|       |       |       |    10.38
6.833    0.00    7.80      1.817  I     O |       |       |       |    10.24
6.917    0.00    7.58      1.764  I     O |       |       |       |    10.10
7.000    0.00    7.33      1.713  I     O |       |       |       |     9.97
7.083    0.00    6.98      1.664  I     O |       |       |       |     9.82
7.167    0.00    6.65      1.617  I    O  |       |       |       |     9.69
7.250    0.00    6.33      1.572  I    O  |       |       |       |     9.56
7.333    0.00    6.02      1.529  I    O  |       |       |       |     9.44
7.417    0.00    5.73      1.489  I    O  |       |       |       |     9.33
7.500    0.00    5.46      1.450  I   O   |       |       |       |     9.22
7.583    0.00    5.19      1.414  I   O   |       |       |       |     9.11
7.667    0.00    4.94      1.379  I   O   |       |       |       |     9.01
7.750    0.00    4.72      1.346  I   O   |       |       |       |     8.91
7.833    0.00    4.51      1.314  I  O    |       |       |       |     8.81
7.917    0.00    4.31      1.283  I  O    |       |       |       |     8.71
8.000    0.00    4.12      1.254  I  O    |       |       |       |     8.62
8.083    0.00    3.94      1.227  I  O    |       |       |       |     8.53
8.167    0.00    3.76      1.200  I  O    |       |       |       |     8.45
8.250    0.00    3.59      1.175  I  O    |       |       |       |     8.37
8.333    0.00    3.43      1.151  I  O    |       |       |       |     8.29
8.417    0.00    3.28      1.127  I O     |       |       |       |     8.22
8.500    0.00    3.14      1.105  I O     |       |       |       |     8.15
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  8.583    0.00    3.00      1.084  I O      |       |       |       |      8.08
  8.667    0.00    2.86      1.064  I O      |       |       |       |      8.02
  8.750    0.00    2.82      1.044  I O      |       |       |       |      7.95
  8.833    0.00    2.81      1.025  I O      |       |       |       |      7.88
  8.917    0.00    2.79      1.006  I O      |       |       |       |      7.81
  9.000    0.00    2.78      0.987  I O      |       |       |       |      7.74
  9.083    0.00    2.76      0.968  I O      |       |       |       |      7.67
  9.167    0.00    2.75      0.949  I O      |       |       |       |      7.61
  9.250    0.00    2.74      0.930  I O      |       |       |       |      7.54
  9.333    0.00    2.72      0.911  I O      |       |       |       |      7.47
  9.417    0.00    2.71      0.892  I O      |       |       |       |      7.40
  9.500    0.00    2.70      0.874  I O      |       |       |       |      7.34
  9.583    0.00    2.68      0.855  I O      |       |       |       |      7.27
  9.667    0.00    2.67      0.837  I O      |       |       |       |      7.21
  9.750    0.00    2.66      0.818  I O      |       |       |       |      7.14
  9.833    0.00    2.64      0.800  I O      |       |       |       |      7.07
  9.917    0.00    2.63      0.782  I O      |       |       |       |      7.01
 10.000    0.00    2.62      0.764  I O      |       |       |       |      6.94
 10.083    0.00    2.60      0.746  I O      |       |       |       |      6.87
 10.167    0.00    2.58      0.728  I O      |       |       |       |      6.79
 10.250    0.00    2.57      0.710  I O      |       |       |       |      6.72
 10.333    0.00    2.55      0.692  I O      |       |       |       |      6.65
 10.417    0.00    2.54      0.675  I O      |       |       |       |      6.58
 10.500    0.00    2.52      0.658  I O      |       |       |       |      6.51
 10.583    0.00    2.51      0.640  I O      |       |       |       |      6.44
 10.667    0.00    2.49      0.623  I O      |       |       |       |      6.37
 10.750    0.00    2.48      0.606  I O      |       |       |       |      6.30
 10.833    0.00    2.46      0.589  I O      |       |       |       |      6.23
 10.917    0.00    2.45      0.572  I O      |       |       |       |      6.16
 11.000    0.00    2.43      0.555  I O      |       |       |       |      6.09
 11.083    0.00    2.42      0.539  I O      |       |       |       |      6.03
 11.167    0.00    2.40      0.522  I O      |       |       |       |      5.95
 11.250    0.00    2.38      0.505  I O      |       |       |       |      5.88
 11.333    0.00    2.36      0.489  I O      |       |       |       |      5.80
 11.417    0.00    2.34      0.473  I O      |       |       |       |      5.73
 11.500    0.00    2.33      0.457  I O      |       |       |       |      5.65
 11.583    0.00    2.31      0.441  I O      |       |       |       |      5.58
 11.667    0.00    2.29      0.425  I O      |       |       |       |      5.50
 11.750    0.00    2.27      0.409  I O      |       |       |       |      5.43
 11.833    0.00    2.26      0.394  IO       |       |       |       |      5.36
 11.917    0.00    2.24      0.378  IO       |       |       |       |      5.29
 12.000    0.00    2.22      0.363  IO       |       |       |       |      5.21
 12.083    0.00    2.20      0.348  IO       |       |       |       |      5.14
 12.167    0.00    2.19      0.333  IO       |       |       |       |      5.07
 12.250    0.00    2.17      0.318  IO       |       |       |       |      5.00
 12.333    0.00    2.15      0.303  IO       |       |       |       |      4.92
 12.417    0.00    2.13      0.288  IO       |       |       |       |      4.84
 12.500    0.00    2.10      0.273  IO       |       |       |       |      4.77
 12.583    0.00    2.08      0.259  IO       |       |       |       |      4.69
 12.667    0.00    2.06      0.245  IO       |       |       |       |      4.61
 12.750    0.00    2.04      0.231  IO       |       |       |       |      4.54
 12.833    0.00    2.02      0.217  IO       |       |       |       |      4.46
 12.917    0.00    2.00      0.203  IO       |       |       |       |      4.39
 13.000    0.00    1.98      0.189  IO       |       |       |       |      4.31
 13.083    0.00    1.96      0.176  IO       |       |       |       |      4.24
 13.167    0.00    1.94      0.162  IO       |       |       |       |      4.17
 13.250    0.00    1.92      0.149  IO       |       |       |       |      4.10
 13.333    0.00    1.90      0.136  IO       |       |       |       |      4.03
 13.417    0.00    1.87      0.123  IO       |       |       |       |      3.95
 13.500    0.00    1.84      0.110  IO       |       |       |       |      3.87
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13.583    0.00    1.81      0.097  IO       |       |       |       |      3.80
13.667    0.00    1.78      0.085  IO       |       |       |       |      3.72
13.750    0.00    1.76      0.073  IO       |       |       |       |      3.65
13.833    0.00    1.73      0.061  IO       |       |       |       |      3.57
13.917    0.00    1.70      0.049  IO       |       |       |       |      3.50
14.000    0.00    1.64      0.038  IO       |       |       |       |      3.29
14.083    0.00    1.59      0.026  IO       |       |       |       |      3.08
14.167    0.00    1.31      0.016  IO       |       |       |       |      2.20
14.250    0.00    0.77      0.009  O        |       |       |       |      1.23
14.333    0.00    0.43      0.005  O        |       |       |       |      0.68
14.417    0.00    0.24      0.003  O        |       |       |       |      0.38
14.500    0.00    0.13      0.002  O        |       |       |       |      0.21
14.583    0.00    0.07      0.001  O        |       |       |       |      0.12
14.667    0.00    0.04      0.000  O        |       |       |       |      0.06
14.750    0.00    0.02      0.000  O        |       |       |       |      0.04
14.833    0.00    0.01      0.000  O        |       |       |       |      0.02
14.917    0.00    0.01      0.000  O        |       |       |       |      0.01
15.000    0.00    0.00      0.000  O        |       |       |       |      0.01
15.083    0.00    0.00      0.000  O        |       |       |       |      0.00
15.167    0.00    0.00      0.000  O        |       |       |       |      0.00
15.250    0.00    0.00      0.000  O        |       |       |       |      0.00

     ****************************HYDROGRAPH DATA****************************
                Number of intervals =   183
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =       10.223 (CFS)
                Total volume =       4.153 (Ac.Ft)
          Status of hydrographs being held in storage
                     Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
          Peak (CFS)      0.000     0.000     0.000     0.000     0.000
          Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
     ***********************************************************************

     --------------------------------------------------------------------
```

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 08/29/22

100-YR 24-HR

AREA A
100-YR STORM
24-HR

Program License Serial Number 6094

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

From study/file name: AREAA.rte
****************************HYDROGRAPH DATA****************************
Number of intervals = 294
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 11.750 (CFS)
Total volume = 6.397 (Ac.Ft)
Status of hydrographs being held in storage

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

****

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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 = 294
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
2.000	0.015	1.250	0.011	0.019
3.000	0.022	1.570	0.017	0.027
3.500	0.049	1.700	0.043	0.055

```
         4.000      0.131      1.890      0.124        0.138
         5.000      0.317      2.170      0.310        0.324
         6.000      0.532      2.410      0.524        0.540
         7.000      0.779      2.630      0.770        0.788
         8.000      1.059      2.830      1.049        1.069
         9.000      1.374      4.910      1.357        1.391
        10.000      1.725      7.420      1.699        1.751
        11.000      2.115      9.030      2.084        2.146
        12.000      2.544     10.330      2.508        2.580
        13.000      3.017     11.460      2.978        3.056
     --------------------------------------------------------------------
                Hydrograph Detention Basin Routing
     ---------------------------------------------------------------------

     Graph values: 'I'= unit inflow; 'O'=outflow at time shown
     ---------------------------------------------------------------------
 Time   Inflow  Outflow    Storage                                    Depth
(Hours)  (CFS)   (CFS)     (Ac.Ft) .0       2.9    5.87    8.81   11.75 (Ft.)
 0.083    0.16    0.04     0.000  O       |       |       |       |     0.06
 0.167    0.46    0.16     0.002  OI      |       |       |       |     0.25
 0.250    0.54    0.31     0.004  OI      |       |       |       |     0.49
 0.333    0.65    0.44     0.005  |O      |       |       |       |     0.70
 0.417    0.82    0.57     0.007  |OI     |       |       |       |     0.91
 0.500    0.87    0.70     0.008  |OI     |       |       |       |     1.11
 0.583    0.90    0.78     0.009  | O     |       |       |       |     1.25
 0.667    0.91    0.84     0.010  | O     |       |       |       |     1.34
 0.750    0.92    0.87     0.010  | O     |       |       |       |     1.39
 0.833    1.00    0.91     0.011  | O     |       |       |       |     1.46
 0.917    1.15    0.98     0.012  | OI    |       |       |       |     1.57
 1.000    1.19    1.07     0.013  | OI    |       |       |       |     1.71
 1.083    1.13    1.11     0.013  |  O    |       |       |       |     1.77
 1.167    0.99    1.08     0.013  | O     |       |       |       |     1.74
 1.250    0.95    1.03     0.012  | O     |       |       |       |     1.65
 1.333    0.94    1.00     0.012  | O     |       |       |       |     1.59
 1.417    0.93    0.97     0.012  | O     |       |       |       |     1.55
 1.500    0.92    0.95     0.011  | O     |       |       |       |     1.52
 1.583    0.92    0.94     0.011  | O     |       |       |       |     1.50
 1.667    0.92    0.93     0.011  | O     |       |       |       |     1.49
 1.750    0.92    0.93     0.011  | O     |       |       |       |     1.48
 1.833    1.00    0.94     0.011  | O     |       |       |       |     1.51
 1.917    1.15    1.00     0.012  | OI    |       |       |       |     1.60
 2.000    1.19    1.08     0.013  | OI    |       |       |       |     1.72
 2.083    1.21    1.13     0.014  |  O    |       |       |       |     1.81
 2.167    1.22    1.17     0.014  |  O    |       |       |       |     1.87
 2.250    1.22    1.19     0.014  |  O    |       |       |       |     1.90
 2.333    1.23    1.21     0.014  |  O    |       |       |       |     1.93
 2.417    1.23    1.21     0.015  |  O    |       |       |       |     1.94
 2.500    1.23    1.22     0.015  |  O    |       |       |       |     1.95
 2.583    1.31    1.24     0.015  |  O    |       |       |       |     1.99
 2.667    1.46    1.28     0.016  |  O    |       |       |       |     2.10
 2.750    1.50    1.34     0.017  |  OI   |       |       |       |     2.27
 2.833    1.51    1.38     0.018  |  OI   |       |       |       |     2.41
 2.917    1.52    1.42     0.019  |  OI   |       |       |       |     2.53
 3.000    1.53    1.45     0.019  |  OI   |       |       |       |     2.62
 3.083    1.53    1.47     0.020  |   O   |       |       |       |     2.69
 3.167    1.53    1.49     0.020  |   O   |       |       |       |     2.74
 3.250    1.53    1.50     0.020  |   O   |       |       |       |     2.78
 3.333    1.53    1.51     0.021  |   O   |       |       |       |     2.81
 3.417    1.53    1.52     0.021  |   O   |       |       |       |     2.83
 3.500    1.53    1.52     0.021  |   O   |       |       |       |     2.84
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3.583    1.53     1.52      0.021  |   O   |       |       |       |     2.86
3.667    1.53     1.53      0.021  |   O   |       |       |       |     2.86
3.750    1.53     1.53      0.021  |   O   |       |       |       |     2.87
3.833    1.61     1.54      0.021  |   O   |       |       |       |     2.91
3.917    1.76     1.57      0.022  |   O   |       |       |       |     3.00
4.000    1.80     1.58      0.024  |   O   |       |       |       |     3.03
4.083    1.82     1.59      0.025  |   O   |       |       |       |     3.06
4.167    1.83     1.59      0.027  |   O   |       |       |       |     3.09
4.250    1.84     1.60      0.029  |   OI  |       |       |       |     3.12
4.333    1.92     1.61      0.030  |   OI  |       |       |       |     3.16
4.417    2.07     1.62      0.033  |   OI  |       |       |       |     3.20
4.500    2.11     1.64      0.036  |   OI  |       |       |       |     3.26
4.583    2.13     1.65      0.039  |   OI  |       |       |       |     3.32
4.667    2.14     1.67      0.043  |   OI  |       |       |       |     3.38
4.750    2.14     1.68      0.046  |   OI  |       |       |       |     3.44
4.833    2.23     1.70      0.049  |   O I |       |       |       |     3.50
4.917    2.38     1.71      0.053  |   O I |       |       |       |     3.53
5.000    2.42     1.72      0.058  |   O I |       |       |       |     3.55
5.083    2.27     1.73      0.062  |   O I |       |       |       |     3.58
5.167    1.99     1.74      0.065  |   OI  |       |       |       |     3.60
5.250    1.91     1.74      0.066  |   OI  |       |       |       |     3.61
5.333    1.96     1.74      0.068  |   OI  |       |       |       |     3.61
5.417    2.09     1.75      0.070  |   OI  |       |       |       |     3.63
5.500    2.12     1.75      0.072  |   OI  |       |       |       |     3.64
5.583    2.21     1.76      0.075  |   O I |       |       |       |     3.66
5.667    2.37     1.77      0.078  |   O I |       |       |       |     3.68
5.750    2.41     1.78      0.083  |   O I |       |       |       |     3.71
5.833    2.43     1.79      0.087  |   O I |       |       |       |     3.73
5.917    2.44     1.80      0.092  |   O I |       |       |       |     3.76
6.000    2.45     1.81      0.096  |   O I |       |       |       |     3.79
6.083    2.53     1.82      0.101  |   O I |       |       |       |     3.81
6.167    2.68     1.83      0.106  |   O  I|       |       |       |     3.85
6.250    2.72     1.85      0.112  |    O I|       |       |       |     3.88
6.333    2.74     1.86      0.118  |    O I|       |       |       |     3.92
6.417    2.75     1.87      0.124  |    O I|       |       |       |     3.96
6.500    2.76     1.89      0.130  |    O I|       |       |       |     3.99
6.583    2.84     1.90      0.136  |    O I|       |       |       |     4.03
6.667    2.99     1.91      0.143  |    O  I       |       |       |     4.07
6.750    3.03     1.92      0.151  |    O  I       |       |       |     4.11
6.833    3.05     1.93      0.158  |    O  I       |       |       |     4.15
6.917    3.06     1.94      0.166  |    O  I       |       |       |     4.19
7.000    3.06     1.95      0.174  |    O  I       |       |       |     4.23
7.083    3.07     1.97      0.181  |    O  I       |       |       |     4.27
7.167    3.07     1.98      0.189  |    O  I       |       |       |     4.31
7.250    3.07     1.99      0.196  |    O  I       |       |       |     4.35
7.333    3.15     2.00      0.204  |    O  I       |       |       |     4.39
7.417    3.30     2.01      0.212  |    O  I       |       |       |     4.44
7.500    3.34     2.03      0.221  |    O  |I      |       |       |     4.49
7.583    3.43     2.04      0.231  |    O  |I      |       |       |     4.54
7.667    3.59     2.06      0.241  |    O  |I      |       |       |     4.59
7.750    3.64     2.07      0.251  |    O  |I      |       |       |     4.65
7.833    3.74     2.09      0.263  |    O  | I     |       |       |     4.71
7.917    3.90     2.11      0.274  |    O  | I     |       |       |     4.77
8.000    3.94     2.12      0.287  |    O  | I     |       |       |     4.84
8.083    4.13     2.14      0.300  |    O  |  I    |       |       |     4.91
8.167    4.43     2.17      0.315  |    O  |   I   |       |       |     4.99
8.250    4.52     2.18      0.330  |    O  |   I   |       |       |     5.06
8.333    4.56     2.20      0.347  |    O  |   I   |       |       |     5.14
8.417    4.58     2.22      0.363  |     O |   I   |       |       |     5.21
8.500    4.59     2.24      0.379  |     O |   I   |       |       |     5.29
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   8.583    4.68    2.26      0.395  |     O |   I   |       |       |     5.36
   8.667    4.83    2.28      0.413  |     O |    I  |       |       |     5.44
   8.750    4.87    2.30      0.430  |     O |    I  |       |       |     5.53
   8.833    4.97    2.32      0.448  |     O |    I  |       |       |     5.61
   8.917    5.13    2.34      0.467  |     O |    I  |       |       |     5.70
   9.000    5.17    2.36      0.486  |     O |     I |       |       |     5.79
   9.083    5.35    2.38      0.506  |     O |     I |       |       |     5.88
   9.167    5.66    2.41      0.528  |     O |      I|       |       |     5.98
   9.250    5.75    2.43      0.550  |     O |      I|       |       |     6.07
   9.333    5.87    2.45      0.573  |     O |      I|       |       |     6.17
   9.417    6.04    2.47      0.598  |     O |       I       |       |     6.27
   9.500    6.09    2.49      0.622  |     O |       I       |       |     6.37
   9.583    6.19    2.51      0.647  |     O |       I       |       |     6.47
   9.667    6.35    2.54      0.673  |     O |       |I      |       |     6.57
   9.750    6.40    2.56      0.699  |     O |       |I      |       |     6.68
   9.833    6.50    2.58      0.726  |      O|       |I      |       |     6.79
   9.917    6.66    2.61      0.754  |      O|       | I     |       |     6.90
  10.000    6.70    2.63      0.782  |      O|       | I     |       |     7.01
  10.083    6.17    2.65      0.808  |      O|       I       |       |     7.10
  10.167    5.13    2.67      0.828  |      O|    I  |       |       |     7.18
  10.250    4.86    2.68      0.844  |      O|    I  |       |       |     7.23
  10.333    4.74    2.69      0.859  |      O|   I   |       |       |     7.29
  10.417    4.67    2.70      0.873  |      O|   I   |       |       |     7.33
  10.500    4.63    2.71      0.886  |      O|   I   |       |       |     7.38
  10.583    5.00    2.72      0.901  |      O|    I  |       |       |     7.43
  10.667    5.74    2.73      0.919  |      O|      I|       |       |     7.50
  10.750    5.94    2.75      0.940  |      O|       I       |       |     7.58
  10.833    6.03    2.76      0.963  |      O|       I       |       |     7.66
  10.917    6.09    2.78      0.985  |      O|       I       |       |     7.74
  11.000    6.11    2.79      1.008  |      O|       I       |       |     7.82
  11.083    6.05    2.81      1.031  |      O|       I       |       |     7.90
  11.167    5.90    2.83      1.052  |      O|       I       |       |     7.98
  11.250    5.86    2.92      1.073  |      O|      I|       |       |     8.04
  11.333    5.85    3.05      1.093  |       O      I|       |       |     8.11
  11.417    5.84    3.18      1.112  |       O      I|       |       |     8.17
  11.500    5.83    3.30      1.129  |       O      I|       |       |     8.22
  11.583    5.67    3.40      1.146  |       |O     I|       |       |     8.28
  11.667    5.37    3.50      1.160  |       |O    I |       |       |     8.32
  11.750    5.29    3.58      1.173  |       |O    I |       |       |     8.36
  11.833    5.33    3.66      1.184  |       |O    I |       |       |     8.40
  11.917    5.46    3.73      1.196  |       | O   I |       |       |     8.43
  12.000    5.49    3.81      1.208  |       | O   I |       |       |     8.47
  12.083    6.06    3.90      1.221  |       | O     I       |       |     8.51
  12.167    7.11    4.02      1.239  |       | O     |  I    |       |     8.57
  12.250    7.40    4.16      1.261  |       |  O    |   I   |       |     8.64
  12.333    7.61    4.31      1.283  |       |  O    |   I   |       |     8.71
  12.417    7.83    4.46      1.306  |       |   O   |    I  |       |     8.78
  12.500    7.91    4.61      1.329  |       |   O   |    I  |       |     8.86
  12.583    8.11    4.76      1.352  |       |   O   |     I |       |     8.93
  12.667    8.42    4.92      1.376  |       |    O  |     I |       |     9.00
  12.750    8.51    5.09      1.399  |       |    O  |      I|       |     9.07
  12.833    8.65    5.26      1.423  |       |     O |      I|       |     9.14
  12.917    8.86    5.43      1.446  |       |     O |       I       |     9.21
  13.000    8.94    5.59      1.470  |       |      O|       I       |     9.27
  13.083    9.68    5.77      1.495  |       |      O|       | I     |     9.34
  13.167   10.99    5.99      1.525  |       |       O       |    I  |     9.43
  13.250   11.37    6.24      1.560  |       |       O       |     I |     9.53
  13.333   11.56    6.49      1.595  |       |       |O      |      I|     9.63
  13.417   11.67    6.74      1.630  |       |       | O     |      I|     9.73
  13.500   11.75    6.98      1.663  |       |       |  O    |       I     9.82
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13.583   10.56    7.18      1.691  |       |       |  O    |   I   |     9.90
13.667    8.25    7.29      1.706  |       |       |  O  I |       |     9.95
13.750    7.63    7.32      1.711  |       |       |  OI   |       |     9.96
13.833    7.36    7.33      1.712  |       |       |  OI   |       |     9.96
13.917    7.20    7.32      1.711  |       |       |  O    |       |     9.96
14.000    7.11    7.32      1.710  |       |       |  O    |       |     9.96
14.083    7.40    7.31      1.710  |       |       |  OI   |       |     9.96
14.167    8.05    7.33      1.713  |       |       |  O I  |       |     9.96
14.250    8.24    7.37      1.718  |       |       |   O I |       |     9.98
14.333    8.22    7.41      1.724  |       |       |   O I |       |    10.00
14.417    8.04    7.44      1.729  |       |       |   OI  |       |    10.01
14.500    8.02    7.45      1.733  |       |       |   OI  |       |    10.02
14.583    8.03    7.47      1.737  |       |       |   OI  |       |    10.03
14.667    8.04    7.48      1.741  |       |       |   OI  |       |    10.04
14.750    8.06    7.50      1.744  |       |       |   OI  |       |    10.05
14.833    7.96    7.51      1.748  |       |       |   OI  |       |    10.06
14.917    7.77    7.52      1.750  |       |       |   OI  |       |    10.06
15.000    7.71    7.53      1.752  |       |       |   OI  |       |    10.07
15.083    7.61    7.53      1.753  |       |       |   O   |       |    10.07
15.167    7.45    7.53      1.753  |       |       |   O   |       |    10.07
15.250    7.40    7.53      1.752  |       |       |   O   |       |    10.07
15.333    7.30    7.53      1.751  |       |       |  IO   |       |    10.07
15.417    7.14    7.52      1.749  |       |       |  IO   |       |    10.06
15.500    7.09    7.51      1.746  |       |       |  IO   |       |    10.05
15.583    6.75    7.49      1.742  |       |       | I O   |       |    10.04
15.667    6.15    7.46      1.735  |       |       I   O   |       |    10.03
15.750    5.98    7.42      1.725  |       |       I   O   |       |    10.00
15.833    5.90    7.35      1.715  |       |       I   O   |       |     9.97
15.917    5.86    7.28      1.706  |       |      I|  O    |       |     9.94
16.000    5.84    7.21      1.696  |       |      I|  O    |       |     9.92
16.083    4.63    7.12      1.683  |       |   I   |  O    |       |     9.88
16.167    2.39    6.94      1.658  |     I |       | O     |       |     9.81
16.250    1.79    6.71      1.626  |   I   |       | O     |       |     9.72
16.333    1.52    6.47      1.592  |   I   |       |O      |       |     9.62
16.417    1.37    6.23      1.558  |  I    |       O       |       |     9.52
16.500    1.28    5.99      1.525  |  I    |       O       |       |     9.43
16.583    1.15    5.76      1.493  |  I    |      O|       |       |     9.34
16.667    1.00    5.54      1.461  | I     |      O|       |       |     9.25
16.750    0.96    5.32      1.431  | I     |     O |       |       |     9.16
16.833    0.94    5.11      1.401  | I     |    O  |       |       |     9.08
16.917    0.93    4.91      1.373  | I     |    O  |       |       |     9.00
17.000    0.92    4.73      1.347  | I     |   O   |       |       |     8.91
17.083    1.08    4.56      1.322  | I     |   O   |       |       |     8.83
17.167    1.38    4.42      1.299  |  I    |   O   |       |       |     8.76
17.250    1.46    4.28      1.279  |  I    |  O    |       |       |     8.70
17.333    1.49    4.16      1.260  |   I   |  O    |       |       |     8.64
17.417    1.51    4.04      1.242  |   I   |  O    |       |       |     8.58
17.500    1.53    3.93      1.225  |   I   | O     |       |       |     8.53
17.583    1.53    3.82      1.209  |   I   | O     |       |       |     8.48
17.667    1.53    3.72      1.194  |   I   | O     |       |       |     8.43
17.750    1.53    3.62      1.179  |   I   |O      |       |       |     8.38
17.833    1.45    3.53      1.165  |  I    |O      |       |       |     8.34
17.917    1.30    3.43      1.150  |  I    |O      |       |       |     8.29
18.000    1.26    3.34      1.136  |  I    |O      |       |       |     8.24
18.083    1.25    3.24      1.122  |  I    O       |       |       |     8.20
18.167    1.24    3.15      1.108  |  I    O       |       |       |     8.16
18.250    1.23    3.07      1.095  |  I    O       |       |       |     8.11
18.333    1.23    2.99      1.083  |  I    O       |       |       |     8.08
18.417    1.23    2.91      1.071  |  I   O|       |       |       |     8.04
18.500    1.23    2.83      1.060  |  I   O|       |       |       |     8.00
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18.583    1.15    2.82      1.048  |  I   O|       |       |       |    7.96
18.667    1.00    2.81      1.036  | I    O|       |       |       |    7.92
18.750    0.96    2.80      1.024  | I    O|       |       |       |    7.87
18.833    0.86    2.80      1.011  | I    O|       |       |       |    7.83
18.917    0.70    2.79      0.997  |I     O|       |       |       |    7.78
19.000    0.65    2.78      0.982  |I     O|       |       |       |    7.73
19.083    0.71    2.76      0.968  |I     O|       |       |       |    7.67
19.167    0.85    2.76      0.954  | I    O|       |       |       |    7.63
19.250    0.89    2.75      0.941  | I    O|       |       |       |    7.58
19.333    0.98    2.74      0.929  | I    O|       |       |       |    7.54
19.417    1.14    2.73      0.917  |  I   O|       |       |       |    7.49
19.500    1.19    2.72      0.907  |  I   O|       |       |       |    7.46
19.583    1.13    2.71      0.896  |  I   O|       |       |       |    7.42
19.667    0.99    2.71      0.885  | I    O|       |       |       |    7.38
19.750    0.95    2.70      0.873  | I    O|       |       |       |    7.33
19.833    0.86    2.69      0.860  | I    O|       |       |       |    7.29
19.917    0.70    2.68      0.847  |I     O|       |       |       |    7.24
20.000    0.65    2.67      0.833  |I     O|       |       |       |    7.19
20.083    0.71    2.66      0.820  |I     O|       |       |       |    7.15
20.167    0.85    2.65      0.807  | I    O|       |       |       |    7.10
20.250    0.89    2.64      0.795  | I    O|       |       |       |    7.06
20.333    0.90    2.63      0.783  | I    O|       |       |       |    7.01
20.417    0.91    2.62      0.771  | I    O|       |       |       |    6.97
20.500    0.92    2.61      0.759  | I    O|       |       |       |    6.92
20.583    0.92    2.60      0.747  | I    O|       |       |       |    6.87
20.667    0.92    2.59      0.736  | I    O|       |       |       |    6.83
20.750    0.92    2.58      0.724  | I    O|       |       |       |    6.78
20.833    0.84    2.57      0.713  | I    O|       |       |       |    6.73
20.917    0.69    2.56      0.700  |I    O |       |       |       |    6.68
21.000    0.65    2.55      0.687  |I    O |       |       |       |    6.63
21.083    0.71    2.54      0.675  |I    O |       |       |       |    6.58
21.167    0.85    2.53      0.662  | I   O |       |       |       |    6.53
21.250    0.89    2.52      0.651  | I   O |       |       |       |    6.48
21.333    0.82    2.51      0.640  | I   O |       |       |       |    6.44
21.417    0.68    2.50      0.628  |I    O |       |       |       |    6.39
21.500    0.65    2.48      0.615  |I    O |       |       |       |    6.34
21.583    0.71    2.47      0.603  |I    O |       |       |       |    6.29
21.667    0.85    2.46      0.591  | I   O |       |       |       |    6.24
21.750    0.89    2.45      0.580  | I   O |       |       |       |    6.19
21.833    0.82    2.44      0.569  | I   O |       |       |       |    6.15
21.917    0.68    2.43      0.558  |I    O |       |       |       |    6.10
22.000    0.65    2.42      0.545  |I    O |       |       |       |    6.05
22.083    0.71    2.41      0.533  |I    O |       |       |       |    6.01
22.167    0.85    2.40      0.522  | I   O |       |       |       |    5.95
22.250    0.89    2.39      0.512  | I   O |       |       |       |    5.91
22.333    0.82    2.38      0.501  | I   O |       |       |       |    5.86
22.417    0.68    2.36      0.490  |I    O |       |       |       |    5.81
22.500    0.65    2.35      0.478  |I    O |       |       |       |    5.75
22.583    0.63    2.34      0.467  |I    O |       |       |       |    5.70
22.667    0.62    2.32      0.455  |I    O |       |       |       |    5.64
22.750    0.62    2.31      0.443  |I    O |       |       |       |    5.59
22.833    0.61    2.30      0.432  |I    O |       |       |       |    5.53
22.917    0.61    2.29      0.420  |I    O |       |       |       |    5.48
23.000    0.61    2.27      0.409  |I    O |       |       |       |    5.43
23.083    0.61    2.26      0.397  |I    O |       |       |       |    5.37
23.167    0.61    2.25      0.386  |I    O |       |       |       |    5.32
23.250    0.61    2.23      0.375  |I    O |       |       |       |    5.27
23.333    0.61    2.22      0.364  |I    O |       |       |       |    5.22
23.417    0.61    2.21      0.353  |I    O |       |       |       |    5.17
23.500    0.61    2.20      0.342  |I   O  |       |       |       |    5.11
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23.583    0.61    2.19      0.331  |I   O  |       |       |       |      5.06
23.667    0.61    2.17      0.320  |I   O  |       |       |       |      5.01
23.750    0.61    2.16      0.309  |I   O  |       |       |       |      4.96
23.833    0.61    2.14      0.299  |I   O  |       |       |       |      4.90
23.917    0.61    2.13      0.288  |I   O  |       |       |       |      4.85
24.000    0.61    2.11      0.278  |I   O  |       |       |       |      4.79
24.083    0.45    2.09      0.267  |I   O  |       |       |       |      4.73
24.167    0.16    2.08      0.255  I    O  |       |       |       |      4.67
24.250    0.08    2.06      0.241  I    O  |       |       |       |      4.59
24.333    0.04    2.04      0.228  I    O  |       |       |       |      4.52
24.417    0.02    2.01      0.214  I    O  |       |       |       |      4.45
24.500    0.01    1.99      0.200  I    O  |       |       |       |      4.37
24.583    0.00    1.97      0.187  I    O  |       |       |       |      4.30
24.667    0.00    1.95      0.173  I    O  |       |       |       |      4.23
24.750    0.00    1.93      0.160  I    O  |       |       |       |      4.15
24.833    0.00    1.91      0.146  I    O  |       |       |       |      4.08
24.917    0.00    1.89      0.133  I    O  |       |       |       |      4.01
25.000    0.00    1.87      0.120  I    O  |       |       |       |      3.93
25.083    0.00    1.84      0.108  I   O   |       |       |       |      3.86
25.167    0.00    1.81      0.095  I   O   |       |       |       |      3.78
25.250    0.00    1.78      0.083  I   O   |       |       |       |      3.71
25.333    0.00    1.75      0.071  I   O   |       |       |       |      3.63
25.417    0.00    1.72      0.059  I   O   |       |       |       |      3.56
25.500    0.00    1.69      0.047  I   O   |       |       |       |      3.46
25.583    0.00    1.63      0.035  I   O   |       |       |       |      3.25
25.667    0.00    1.58      0.024  I   O   |       |       |       |      3.04
25.750    0.00    1.22      0.015  I  O    |       |       |       |      1.96
25.833    0.00    0.68      0.008  IO      |       |       |       |      1.08
25.917    0.00    0.38      0.005  IO      |       |       |       |      0.60
26.000    0.00    0.21      0.002  O       |       |       |       |      0.33
26.083    0.00    0.12      0.001  O       |       |       |       |      0.18
26.167    0.00    0.06      0.001  O       |       |       |       |      0.10
26.250    0.00    0.04      0.000  O       |       |       |       |      0.06
26.333    0.00    0.02      0.000  O       |       |       |       |      0.03
26.417    0.00    0.01      0.000  O       |       |       |       |      0.02
26.500    0.00    0.01      0.000  O       |       |       |       |      0.01
26.583    0.00    0.00      0.000  O       |       |       |       |      0.01
26.667    0.00    0.00      0.000  O       |       |       |       |      0.00
26.750    0.00    0.00      0.000  O       |       |       |       |      0.00
26.833    0.00    0.00      0.000  O       |       |       |       |      0.00

     ****************************HYDROGRAPH DATA****************************
                Number of intervals =   322
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =       7.534 (CFS)
                Total volume =       6.397 (Ac.Ft)
           Status of hydrographs being held in storage
                      Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
           Peak (CFS)      0.000     0.000     0.000     0.000     0.000
           Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
     ***********************************************************************

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FLOOD HYDROGRAPH ROUTING PROGRAM

Study date: 08/29/22

100-YR 1-HR

AREA B
100-YR STORM
1-HR

Program License Serial Number 6094

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

From study/file name: AREAB.rte
****************************HYDROGRAPH DATA****************************
Number of intervals = 17
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 47.142 (CFS)
Total volume = 1.609 (Ac.Ft)
Status of hydrographs being held in storage

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

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Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 17
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
1.500	0.010	0.600	0.008	0.012
2.500	0.016	1.350	0.011	0.021
3.500	0.058	1.800	0.052	0.064

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         4.500      0.190      2.170      0.183        0.197
         5.500      0.347      2.480      0.338        0.356
         6.500      0.531      2.760      0.521        0.541
         7.500      0.743      3.010      0.733        0.753
         8.500      0.985      5.540      0.966        1.004
         9.500      1.258      6.870      1.234        1.282
        10.500      1.564     15.540      1.510        1.618
        11.500      1.903     48.490      1.736        2.070
    ---------------------------------------------------------------------
                Hydrograph Detention Basin Routing
    ----------------------------------------------------------------------

    Graph values: 'I'= unit inflow; 'O'=outflow at time shown
    ----------------------------------------------------------------------
 Time   Inflow  Outflow    Storage                                     Depth
(Hours)  (CFS)   (CFS)     (Ac.Ft) .0      11.8   23.57   35.36   47.14 (Ft.)
 0.083    2.59    0.44      0.007  OI      |       |       |       |     1.11
 0.167    6.17    1.51      0.031  |O  I   |       |       |       |     2.85
 0.250    7.82    1.83      0.068  |O   I  |       |       |       |     3.57
 0.333    9.15    1.95      0.113  |O    I |       |       |       |     3.92
 0.417   10.36    2.10      0.166  |O     I|       |       |       |     4.32
 0.500   12.32    2.25      0.229  |O      I       |       |       |     4.75
 0.583   14.47    2.40      0.306  |O      |I      |       |       |     5.24
 0.667   17.24    2.56      0.398  |O      |  I    |       |       |     5.78
 0.750   23.02    2.74      0.518  |O      |      I|       |       |     6.43
 0.833   45.49    3.00      0.734  | O     |       |       |     I |     7.46
 0.917   47.14    5.73      1.023  |  O    |       |       |       I     8.64
 1.000   21.10    6.66      1.215  |   O   |     I |       |       |     9.34
 1.083   10.83    7.41      1.277  |    O I|       |       |       |     9.56
 1.167    3.89    7.40      1.277  | I  O  |       |       |       |     9.56
 1.250    1.58    6.81      1.247  |I  O   |       |       |       |     9.46
 1.333    0.37    6.62      1.207  I   O   |       |       |       |     9.31
 1.417    0.10    6.41      1.164  I   O   |       |       |       |     9.15
 1.500    0.00    6.20      1.121  I   O   |       |       |       |     9.00
 1.583    0.00    6.00      1.079  I   O   |       |       |       |     8.84
 1.667    0.00    5.80      1.038  I  O    |       |       |       |     8.69
 1.750    0.00    5.61      0.999  I  O    |       |       |       |     8.55
 1.833    0.00    5.29      0.961  I  O    |       |       |       |     8.40
 1.917    0.00    4.92      0.926  I  O    |       |       |       |     8.26
 2.000    0.00    4.58      0.893  I  O    |       |       |       |     8.12
 2.083    0.00    4.26      0.863  I O     |       |       |       |     8.00
 2.167    0.00    3.97      0.835  I O     |       |       |       |     7.88
 2.250    0.00    3.69      0.808  I O     |       |       |       |     7.77
 2.333    0.00    3.43      0.784  I O     |       |       |       |     7.67
 2.417    0.00    3.20      0.761  I O     |       |       |       |     7.57
 2.500    0.00    3.01      0.739  I O     |       |       |       |     7.48
 2.583    0.00    2.98      0.719  I O     |       |       |       |     7.39
 2.667    0.00    2.96      0.698  I O     |       |       |       |     7.29
 2.750    0.00    2.93      0.678  IO      |       |       |       |     7.19
 2.833    0.00    2.91      0.658  IO      |       |       |       |     7.10
 2.917    0.00    2.89      0.638  IO      |       |       |       |     7.00
 3.000    0.00    2.86      0.618  IO      |       |       |       |     6.91
 3.083    0.00    2.84      0.599  IO      |       |       |       |     6.82
 3.167    0.00    2.82      0.579  IO      |       |       |       |     6.73
 3.250    0.00    2.79      0.560  IO      |       |       |       |     6.64
 3.333    0.00    2.77      0.541  IO      |       |       |       |     6.55
 3.417    0.00    2.75      0.522  IO      |       |       |       |     6.45
 3.500    0.00    2.72      0.503  IO      |       |       |       |     6.35
 3.583    0.00    2.69      0.484  IO      |       |       |       |     6.25
 3.667    0.00    2.66      0.466  IO      |       |       |       |     6.15
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3.750	0.00	2.63	0.448	IO	|	|	|	|	6.05
3.833	0.00	2.61	0.429	IO	|	|	|	|	5.95
3.917	0.00	2.58	0.412	IO	|	|	|	|	5.85
4.000	0.00	2.55	0.394	IO	|	|	|	|	5.76
4.083	0.00	2.52	0.376	IO	|	|	|	|	5.66
4.167	0.00	2.50	0.359	IO	|	|	|	|	5.57
4.250	0.00	2.47	0.342	IO	|	|	|	|	5.47
4.333	0.00	2.44	0.325	IO	|	|	|	|	5.36
4.417	0.00	2.40	0.309	IO	|	|	|	|	5.25
4.500	0.00	2.37	0.292	IO	|	|	|	|	5.15
4.583	0.00	2.34	0.276	IO	|	|	|	|	5.05
4.667	0.00	2.31	0.260	IO	|	|	|	|	4.94
4.750	0.00	2.28	0.244	IO	|	|	|	|	4.84
4.833	0.00	2.25	0.228	IO	|	|	|	|	4.75
4.917	0.00	2.22	0.213	IO	|	|	|	|	4.65
5.000	0.00	2.19	0.198	IO	|	|	|	|	4.55
5.083	0.00	2.15	0.183	IO	|	|	|	|	4.45
5.167	0.00	2.11	0.168	IO	|	|	|	|	4.34
5.250	0.00	2.07	0.154	IO	|	|	|	|	4.23
5.333	0.00	2.03	0.140	IO	|	|	|	|	4.12
5.417	0.00	1.99	0.126	IO	|	|	|	|	4.02
5.500	0.00	1.95	0.112	IO	|	|	|	|	3.91
5.583	0.00	1.92	0.099	IO	|	|	|	|	3.81
5.667	0.00	1.88	0.086	IO	|	|	|	|	3.71
5.750	0.00	1.84	0.073	IO	|	|	|	|	3.62
5.833	0.00	1.81	0.061	IO	|	|	|	|	3.52
5.917	0.00	1.70	0.049	IO	|	|	|	|	3.28
6.000	0.00	1.58	0.037	IO	|	|	|	|	3.01
6.083	0.00	1.47	0.027	O	|	|	|	|	2.76
6.167	0.00	1.36	0.017	O	|	|	|	|	2.53
6.250	0.00	0.63	0.010	O	|	|	|	|	1.54
6.333	0.00	0.40	0.007	O	|	|	|	|	1.00
6.417	0.00	0.26	0.004	O	|	|	|	|	0.66
6.500	0.00	0.17	0.003	O	|	|	|	|	0.43
6.583	0.00	0.11	0.002	O	|	|	|	|	0.29
6.667	0.00	0.07	0.001	O	|	|	|	|	0.19
6.750	0.00	0.05	0.001	O	|	|	|	|	0.12
6.833	0.00	0.03	0.001	O	|	|	|	|	0.08
6.917	0.00	0.02	0.000	O	|	|	|	|	0.05
7.000	0.00	0.01	0.000	O	|	|	|	|	0.04
7.083	0.00	0.01	0.000	O	|	|	|	|	0.02
7.167	0.00	0.01	0.000	O	|	|	|	|	0.02
7.250	0.00	0.00	0.000	O	|	|	|	|	0.01
7.333	0.00	0.00	0.000	O	|	|	|	|	0.01
7.417	0.00	0.00	0.000	O	|	|	|	|	0.00
7.500	0.00	0.00	0.000	O	|	|	|	|	0.00
7.583	0.00	0.00	0.000	O	|	|	|	|	0.00

```
***************************HYDROGRAPH DATA***************************
          Number of intervals =    91
          Time interval =    5.0 (Min.)
          Maximum/Peak flow rate =       7.408 (CFS)
          Total volume =       1.609 (Ac.Ft)
     Status of hydrographs being held in storage
               Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
     Peak (CFS)      0.000     0.000     0.000     0.000     0.000
     Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
*********************************************************************

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FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 08/29/22

100-YR 3-HR

AREA B
100-YR STORM
3-HR

Program License Serial Number 6094

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

From study/file name: AREAB.rte
****************************HYDROGRAPH DATA****************************
Number of intervals = 41
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 27.936 (CFS)
Total volume = 2.122 (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 2.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 41
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
1.500	0.010	0.600	0.008	0.012
2.500	0.016	1.350	0.011	0.021
3.500	0.058	1.800	0.052	0.064

```
         4.500      0.190      2.170      0.183        0.197
         5.500      0.347      2.480      0.338        0.356
         6.500      0.531      2.760      0.521        0.541
         7.500      0.743      3.010      0.733        0.753
         8.500      0.985      5.540      0.966        1.004
         9.500      1.258      6.870      1.234        1.282
        10.500      1.564     15.540      1.510        1.618
        11.500      1.903     48.490      1.736        2.070
     --------------------------------------------------------------------
                Hydrograph Detention Basin Routing
     ---------------------------------------------------------------------

     Graph values: 'I'= unit inflow; 'O'=outflow at time shown
     ---------------------------------------------------------------------
 Time   Inflow  Outflow    Storage                                      Depth
(Hours)  (CFS)   (CFS)     (Ac.Ft) .0      7.0   13.97   20.95   27.94 (Ft.)
 0.083    1.15    0.20      0.003  OI      |       |       |       |     0.49
 0.167    2.69    0.93      0.013  |O I    |       |       |       |     1.94
 0.250    2.87    1.43      0.024  |O I    |       |       |       |     2.68
 0.333    3.15    1.54      0.034  |O I    |       |       |       |     2.93
 0.417    3.64    1.68      0.046  |O  I   |       |       |       |     3.22
 0.500    4.03    1.81      0.061  | O I   |       |       |       |     3.52
 0.583    4.15    1.85      0.076  | O I   |       |       |       |     3.64
 0.667    4.16    1.90      0.092  | O I   |       |       |       |     3.76
 0.750    4.48    1.94      0.109  | O  I  |       |       |       |     3.88
 0.833    4.28    1.99      0.125  | O I   |       |       |       |     4.01
 0.917    4.04    2.03      0.140  | O I   |       |       |       |     4.12
 1.000    4.26    2.07      0.155  | O I   |       |       |       |     4.23
 1.083    4.85    2.12      0.172  | O  I  |       |       |       |     4.36
 1.167    5.38    2.17      0.192  | O   I |       |       |       |     4.51
 1.250    5.51    2.22      0.214  | O   I |       |       |       |     4.66
 1.333    5.40    2.26      0.237  | O   I |       |       |       |     4.80
 1.417    5.82    2.31      0.259  | O   I |       |       |       |     4.94
 1.500    6.77    2.36      0.287  | O    I|       |       |       |     5.12
 1.583    6.72    2.42      0.317  | O    I|       |       |       |     5.31
 1.667    6.70    2.48      0.346  | O    I|       |       |       |     5.49
 1.750    8.13    2.53      0.380  | O     |I      |       |       |     5.68
 1.833    9.17    2.59      0.422  | O     | I     |       |       |     5.91
 1.917    8.77    2.66      0.466  |  O    | I     |       |       |     6.14
 2.000    8.56    2.72      0.507  |  O    |I      |       |       |     6.37
 2.083    8.86    2.78      0.548  |  O    | I     |       |       |     6.58
 2.167   10.78    2.84      0.596  |  O    |   I   |       |       |     6.81
 2.250   14.35    2.92      0.663  |  O    |       I       |       |     7.12
 2.333   14.25    3.01      0.741  |  O    |       I       |       |     7.49
 2.417   16.88    3.86      0.824  |   O   |       |  I    |       |     7.84
 2.500   24.09    5.02      0.935  |    O  |       |       |  I    |     8.29
 2.583   27.94    5.98      1.076  |     O |       |       |      I|     8.83
 2.667   27.06    6.69      1.222  |      O|       |       |     I |     9.37
 2.750   17.33    8.68      1.322  |       |O      |  I    |       |     9.71
 2.833    8.70    9.45      1.349  |       |IO     |       |       |     9.80
 2.917    6.30    9.10      1.337  |      I| O     |       |       |     9.76
 3.000    4.21    8.42      1.313  |   I   |O      |       |       |     9.68
 3.083    1.75    7.45      1.279  | I     O       |       |       |     9.57
 3.167    0.54    6.77      1.237  I      O|       |       |       |     9.42
 3.250    0.22    6.56      1.194  I      O|       |       |       |     9.27
 3.333    0.08    6.35      1.151  I      O|       |       |       |     9.11
 3.417    0.01    6.14      1.108  I      O|       |       |       |     8.95
 3.500    0.00    5.94      1.067  I     O |       |       |       |     8.80
 3.583    0.00    5.74      1.026  I     O |       |       |       |     8.65
 3.667    0.00    5.55      0.987  I     O |       |       |       |     8.51
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3.750	0.00	5.18	0.950	I O	8.36
3.833	0.00	4.82	0.916	I O	8.22
3.917	0.00	4.48	0.884	I O	8.08
4.000	0.00	4.17	0.854	I O	7.96
4.083	0.00	3.88	0.826	I O	7.84
4.167	0.00	3.61	0.801	I O	7.74
4.250	0.00	3.36	0.777	I O	7.64
4.333	0.00	3.13	0.754	I O	7.55
4.417	0.00	3.00	0.733	I O	7.45
4.500	0.00	2.97	0.713	I O	7.36
4.583	0.00	2.95	0.692	I O	7.26
4.667	0.00	2.93	0.672	I O	7.17
4.750	0.00	2.90	0.652	I O	7.07
4.833	0.00	2.88	0.632	I O	6.98
4.917	0.00	2.86	0.612	I O	6.88
5.000	0.00	2.83	0.593	I O	6.79
5.083	0.00	2.81	0.573	I O	6.70
5.167	0.00	2.79	0.554	I O	6.61
5.250	0.00	2.76	0.535	I O	6.52
5.333	0.00	2.74	0.516	I O	6.42
5.417	0.00	2.71	0.497	I O	6.32
5.500	0.00	2.68	0.479	I O	6.22
5.583	0.00	2.65	0.460	I O	6.12
5.667	0.00	2.62	0.442	I O	6.02
5.750	0.00	2.60	0.424	I O	5.92
5.833	0.00	2.57	0.406	I O	5.82
5.917	0.00	2.54	0.389	I O	5.73
6.000	0.00	2.52	0.371	I O	5.63
6.083	0.00	2.49	0.354	I O	5.54
6.167	0.00	2.46	0.337	I O	5.44
6.250	0.00	2.43	0.320	I O	5.33
6.333	0.00	2.39	0.304	I O	5.22
6.417	0.00	2.36	0.287	I O	5.12
6.500	0.00	2.33	0.271	I O	5.02
6.583	0.00	2.30	0.255	I O	4.91
6.667	0.00	2.27	0.239	I O	4.81
6.750	0.00	2.24	0.224	I O	4.72
6.833	0.00	2.21	0.209	I O	4.62
6.917	0.00	2.18	0.193	I O	4.52
7.000	0.00	2.14	0.179	I O	4.41
7.083	0.00	2.10	0.164	I O	4.30
7.167	0.00	2.06	0.150	I O	4.19
7.250	0.00	2.02	0.136	I O	4.09
7.333	0.00	1.98	0.122	I O	3.98
7.417	0.00	1.94	0.108	I O	3.88
7.500	0.00	1.90	0.095	I O	3.78
7.583	0.00	1.87	0.082	I O	3.68
7.667	0.00	1.83	0.069	I O	3.59
7.750	0.00	1.79	0.057	I O	3.48
7.833	0.00	1.66	0.045	IO	3.19
7.917	0.00	1.54	0.034	IO	2.93
8.000	0.00	1.43	0.024	IO	2.69
8.083	0.00	1.19	0.015	IO	2.29
8.167	0.00	0.53	0.009	O	1.32
8.250	0.00	0.35	0.006	O	0.87
8.333	0.00	0.23	0.004	O	0.57
8.417	0.00	0.15	0.003	O	0.38
8.500	0.00	0.10	0.002	O	0.25
8.583	0.00	0.07	0.001	O	0.16
8.667	0.00	0.04	0.001	O	0.11

```
8.750    0.00    0.03      0.000  O        |       |       |       |     0.07
8.833    0.00    0.02      0.000  O        |       |       |       |     0.05
8.917    0.00    0.01      0.000  O        |       |       |       |     0.03
9.000    0.00    0.01      0.000  O        |       |       |       |     0.02
9.083    0.00    0.01      0.000  O        |       |       |       |     0.01
9.167    0.00    0.00      0.000  O        |       |       |       |     0.01
9.250    0.00    0.00      0.000  O        |       |       |       |     0.01
9.333    0.00    0.00      0.000  O        |       |       |       |     0.00
9.417    0.00    0.00      0.000  O        |       |       |       |     0.00

    ****************************HYDROGRAPH DATA****************************
               Number of intervals =   113
               Time interval =    5.0 (Min.)
               Maximum/Peak flow rate =        9.448 (CFS)
               Total volume =       2.122 (Ac.Ft)
          Status of hydrographs being held in storage
                    Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
          Peak (CFS)      0.000     0.000     0.000     0.000     0.000
          Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
    ***********************************************************************

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FLOOD HYDROGRAPH ROUTING PROGRAM

Study date: 08/29/22

100-YR 6-HR

AREA B
100-YR STORM
6-HR

Program License Serial Number 6094

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

From study/file name: AREAB.rte
***************************HYDROGRAPH DATA***************************
Number of intervals = 77
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 24.792 (CFS)
Total volume = 2.708 (Ac.Ft)
Status of hydrographs being held in storage

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

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++
Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 77
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
1.500	0.010	0.600	0.008	0.012
2.500	0.016	1.350	0.011	0.021
3.500	0.058	1.800	0.052	0.064

4.500	0.190	2.170	0.183	0.197
5.500	0.347	2.480	0.338	0.356
6.500	0.531	2.760	0.521	0.541
7.500	0.743	3.010	0.733	0.753
8.500	0.985	5.540	0.966	1.004
9.500	1.258	6.870	1.234	1.282
10.500	1.564	15.540	1.510	1.618
11.500	1.903	48.490	1.736	2.070

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    ----------------------------------------------------------------------
               Hydrograph Detention Basin Routing
    ----------------------------------------------------------------------

    Graph values: 'I'= unit inflow; 'O'=outflow at time shown
    ----------------------------------------------------------------------
 Time    Inflow  Outflow    Storage                                     Depth
(Hours)  (CFS)   (CFS)     (Ac.Ft) .0       6.2   12.40   18.59   24.79 (Ft.)
 0.083    0.60    0.10      0.002  O        |       |       |       |     0.26
 0.167    1.52    0.43      0.007  OI       |       |       |       |     1.07
 0.250    1.87    1.06      0.014  |OI      |       |       |       |     2.11
 0.333    1.98    1.38      0.019  |OI      |       |       |       |     2.56
 0.417    2.04    1.42      0.023  |OI      |       |       |       |     2.66
 0.500    2.18    1.47      0.027  |OI      |       |       |       |     2.77
 0.583    2.35    1.53      0.033  |O I     |       |       |       |     2.90
 0.667    2.39    1.59      0.038  | OI     |       |       |       |     3.03
 0.750    2.40    1.65      0.044  | OI     |       |       |       |     3.16
 0.833    2.41    1.70      0.049  | OI     |       |       |       |     3.28
 0.917    2.41    1.75      0.053  | OI     |       |       |       |     3.39
 1.000    2.53    1.80      0.058  | OI     |       |       |       |     3.50
 1.083    2.69    1.82      0.064  | OI     |       |       |       |     3.54
 1.167    2.73    1.83      0.070  | OI     |       |       |       |     3.59
 1.250    2.75    1.85      0.076  | OI     |       |       |       |     3.64
 1.333    2.75    1.87      0.082  | OI     |       |       |       |     3.68
 1.417    2.76    1.88      0.088  | OI     |       |       |       |     3.73
 1.500    2.76    1.90      0.094  | OI     |       |       |       |     3.77
 1.583    2.76    1.92      0.100  | OI     |       |       |       |     3.82
 1.667    2.76    1.93      0.106  | OI     |       |       |       |     3.86
 1.750    2.76    1.95      0.111  | OI     |       |       |       |     3.90
 1.833    2.76    1.96      0.117  | OI     |       |       |       |     3.95
 1.917    2.76    1.98      0.122  | OI     |       |       |       |     3.99
 2.000    2.88    2.00      0.128  | OI     |       |       |       |     4.03
 2.083    2.92    2.01      0.134  | OI     |       |       |       |     4.08
 2.167    2.91    2.03      0.140  | OI     |       |       |       |     4.12
 2.250    3.05    2.05      0.147  | OI     |       |       |       |     4.17
 2.333    3.08    2.07      0.154  | OI     |       |       |       |     4.22
 2.417    3.09    2.09      0.161  | OI     |       |       |       |     4.28
 2.500    3.10    2.11      0.167  | OI     |       |       |       |     4.33
 2.583    3.10    2.13      0.174  | O I    |       |       |       |     4.38
 2.667    3.10    2.14      0.181  | O I    |       |       |       |     4.43
 2.750    3.22    2.16      0.188  | O I    |       |       |       |     4.48
 2.833    3.38    2.18      0.196  | O I    |       |       |       |     4.54
 2.917    3.42    2.20      0.204  | O I    |       |       |       |     4.59
 3.000    3.44    2.21      0.212  | O I    |       |       |       |     4.64
 3.083    3.44    2.23      0.221  | O I    |       |       |       |     4.70
 3.167    3.57    2.25      0.229  | O I    |       |       |       |     4.75
 3.250    3.73    2.27      0.239  | O I    |       |       |       |     4.81
 3.333    3.76    2.29      0.249  | O I    |       |       |       |     4.88
 3.417    3.90    2.31      0.260  | O  I   |       |       |       |     4.94
 3.500    4.19    2.33      0.272  |  O I   |       |       |       |     5.02
 3.583    4.51    2.36      0.285  |  O I   |       |       |       |     5.11
 3.667    4.72    2.39      0.301  |  O  I |       |       |       |     5.21
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3.750    4.90    2.42      0.317  |  O  I |       |       |       |     5.31
3.833    5.09    2.46      0.335  |  O  I |       |       |       |     5.42
3.917    5.26    2.49      0.354  |  O  I |       |       |       |     5.54
4.000    5.44    2.52      0.373  |  O   I|       |       |       |     5.64
4.083    5.60    2.55      0.394  |  O   I|       |       |       |     5.75
4.167    5.90    2.58      0.416  |  O   I|       |       |       |     5.87
4.250    6.31    2.62      0.440  |  O    I       |       |       |     6.00
4.333    6.84    2.66      0.467  |  O    I       |       |       |     6.15
4.417    7.42    2.71      0.497  |  O    |I      |       |       |     6.32
4.500    7.80    2.76      0.531  |  O    | I     |       |       |     6.50
4.583    8.12    2.80      0.567  |  O    | I     |       |       |     6.67
4.667    8.66    2.85      0.605  |  O    |  I    |       |       |     6.85
4.750    9.24    2.90      0.647  |  O    |  I    |       |       |     7.05
4.833    9.62    2.95      0.692  |  O    |   I   |       |       |     7.26
4.917    9.93    3.00      0.739  |  O    |   I   |       |       |     7.48
5.000   10.47    3.47      0.787  |   O   |    I  |       |       |     7.68
5.083   11.89    4.00      0.838  |    O  |      I|       |       |     7.89
5.167   14.44    4.64      0.899  |    O  |       | I     |       |     8.14
5.250   16.85    5.40      0.972  |     O |       |    I  |       |     8.45
5.333   18.81    5.89      1.056  |      O|       |       I       |     8.76
5.417   21.12    6.35      1.151  |       O       |       |  I    |     9.11
5.500   24.79    7.02      1.263  |       |O      |       |      I|     9.52
5.583   20.05    9.76      1.360  |       |   O   |       |I      |     9.83
5.667    9.15   10.62      1.390  |       |  I O  |       |       |     9.93
5.750    5.01    9.99      1.368  |     I |   O   |       |       |     9.86
5.833    3.11    8.94      1.331  |   I   |  O    |       |       |     9.74
5.917    1.97    7.80      1.291  | I     | O     |       |       |     9.61
6.000    1.14    6.84      1.251  |I      O       |       |       |     9.47
6.083    0.59    6.64      1.211  I       O       |       |       |     9.33
6.167    0.18    6.43      1.168  I       O       |       |       |     9.17
6.250    0.07    6.22      1.126  I       O       |       |       |     9.01
6.333    0.03    6.02      1.084  I      O|       |       |       |     8.86
6.417    0.01    5.82      1.043  I      O|       |       |       |     8.71
6.500    0.00    5.63      1.004  I      O|       |       |       |     8.57
6.583    0.00    5.34      0.966  I     O |       |       |       |     8.42
6.667    0.00    4.97      0.930  I     O |       |       |       |     8.27
6.750    0.00    4.62      0.897  I    O  |       |       |       |     8.14
6.833    0.00    4.30      0.867  I    O  |       |       |       |     8.01
6.917    0.00    4.00      0.838  I    O  |       |       |       |     7.89
7.000    0.00    3.73      0.811  I   O   |       |       |       |     7.78
7.083    0.00    3.47      0.787  I   O   |       |       |       |     7.68
7.167    0.00    3.23      0.764  I   O   |       |       |       |     7.59
7.250    0.00    3.01      0.742  I  O    |       |       |       |     7.50
7.333    0.00    2.98      0.721  I  O    |       |       |       |     7.40
7.417    0.00    2.96      0.701  I  O    |       |       |       |     7.30
7.500    0.00    2.94      0.681  I  O    |       |       |       |     7.21
7.583    0.00    2.91      0.661  I  O    |       |       |       |     7.11
7.667    0.00    2.89      0.641  I  O    |       |       |       |     7.02
7.750    0.00    2.87      0.621  I  O    |       |       |       |     6.92
7.833    0.00    2.84      0.601  I  O    |       |       |       |     6.83
7.917    0.00    2.82      0.582  I  O    |       |       |       |     6.74
8.000    0.00    2.80      0.562  I  O    |       |       |       |     6.65
8.083    0.00    2.77      0.543  I  O    |       |       |       |     6.56
8.167    0.00    2.75      0.524  I  O    |       |       |       |     6.46
8.250    0.00    2.72      0.505  I  O    |       |       |       |     6.36
8.333    0.00    2.69      0.487  I  O    |       |       |       |     6.26
8.417    0.00    2.66      0.468  I  O    |       |       |       |     6.16
8.500    0.00    2.64      0.450  I  O    |       |       |       |     6.06
8.583    0.00    2.61      0.432  I  O    |       |       |       |     5.96
8.667    0.00    2.58      0.414  I  O    |       |       |       |     5.86
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  8.750    0.00    2.55      0.396  I  O     |       |       |       |     5.77
  8.833    0.00    2.53      0.379  I  O     |       |       |       |     5.67
  8.917    0.00    2.50      0.361  I  O     |       |       |       |     5.58
  9.000    0.00    2.47      0.344  I  O     |       |       |       |     5.48
  9.083    0.00    2.44      0.327  I  O     |       |       |       |     5.37
  9.167    0.00    2.41      0.311  I  O     |       |       |       |     5.27
  9.250    0.00    2.38      0.294  I  O     |       |       |       |     5.16
  9.333    0.00    2.34      0.278  I  O     |       |       |       |     5.06
  9.417    0.00    2.31      0.262  I O      |       |       |       |     4.96
  9.500    0.00    2.28      0.246  I O      |       |       |       |     4.86
  9.583    0.00    2.25      0.230  I O      |       |       |       |     4.76
  9.667    0.00    2.22      0.215  I O      |       |       |       |     4.66
  9.750    0.00    2.19      0.200  I O      |       |       |       |     4.56
  9.833    0.00    2.16      0.185  I O      |       |       |       |     4.46
  9.917    0.00    2.11      0.170  I O      |       |       |       |     4.35
 10.000    0.00    2.07      0.156  I O      |       |       |       |     4.24
 10.083    0.00    2.03      0.142  I O      |       |       |       |     4.13
 10.167    0.00    2.00      0.128  I O      |       |       |       |     4.03
 10.250    0.00    1.96      0.114  I O      |       |       |       |     3.93
 10.333    0.00    1.92      0.101  I O      |       |       |       |     3.82
 10.417    0.00    1.88      0.088  I O      |       |       |       |     3.73
 10.500    0.00    1.85      0.075  I O      |       |       |       |     3.63
 10.583    0.00    1.81      0.062  I O      |       |       |       |     3.53
 10.667    0.00    1.72      0.050  I O      |       |       |       |     3.31
 10.750    0.00    1.59      0.039  I O      |       |       |       |     3.04
 10.833    0.00    1.48      0.028  IO       |       |       |       |     2.79
 10.917    0.00    1.37      0.018  IO       |       |       |       |     2.56
 11.000    0.00    0.73      0.011  O        |       |       |       |     1.68
 11.083    0.00    0.42      0.007  O        |       |       |       |     1.06
 11.167    0.00    0.28      0.005  O        |       |       |       |     0.70
 11.250    0.00    0.18      0.003  O        |       |       |       |     0.46
 11.333    0.00    0.12      0.002  O        |       |       |       |     0.30
 11.417    0.00    0.08      0.001  O        |       |       |       |     0.20
 11.500    0.00    0.05      0.001  O        |       |       |       |     0.13
 11.583    0.00    0.03      0.001  O        |       |       |       |     0.09
 11.667    0.00    0.02      0.000  O        |       |       |       |     0.06
 11.750    0.00    0.01      0.000  O        |       |       |       |     0.04
 11.833    0.00    0.01      0.000  O        |       |       |       |     0.02
 11.917    0.00    0.01      0.000  O        |       |       |       |     0.02
 12.000    0.00    0.00      0.000  O        |       |       |       |     0.01
 12.083    0.00    0.00      0.000  O        |       |       |       |     0.01
 12.167    0.00    0.00      0.000  O        |       |       |       |     0.00
 12.250    0.00    0.00      0.000  O        |       |       |       |     0.00
 12.333    0.00    0.00      0.000  O        |       |       |       |     0.00

     ****************************HYDROGRAPH DATA****************************
                Number of intervals =   148
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =      10.619 (CFS)
                Total volume =      2.708 (Ac.Ft)
          Status of hydrographs being held in storage
                     Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
          Peak (CFS)      0.000     0.000     0.000     0.000     0.000
          Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
     ***********************************************************************

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FLOOD HYDROGRAPH ROUTING PROGRAM

Study date: 08/29/22

100-YR 24-HR

AREA B
100-YR STORM
24-HR

Program License Serial Number 6094

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

From study/file name: AREAB.rte
***************************HYDROGRAPH DATA***************************
Number of intervals = 293
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 7.730 (CFS)
Total volume = 4.134 (Ac.Ft)
Status of hydrographs being held in storage

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

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Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 293
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
1.500	0.010	0.600	0.008	0.012
2.500	0.016	1.350	0.011	0.021
3.500	0.058	1.800	0.052	0.064

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         4.500      0.190      2.170      0.183        0.197
         5.500      0.347      2.480      0.338        0.356
         6.500      0.531      2.760      0.521        0.541
         7.500      0.743      3.010      0.733        0.753
         8.500      0.985      5.540      0.966        1.004
         9.500      1.258      6.870      1.234        1.282
        10.500      1.564     15.540      1.510        1.618
        11.500      1.903     48.490      1.736        2.070
     -------------------------------------------------------------------
                Hydrograph Detention Basin Routing
     --------------------------------------------------------------------

     Graph values: 'I'= unit inflow; 'O'=outflow at time shown
     --------------------------------------------------------------------
 Time   Inflow  Outflow    Storage                                Depth
(Hours)  (CFS)   (CFS)     (Ac.Ft) .0       1.9    3.87    5.80    7.73 (Ft.)
 0.083    0.14    0.02      0.000  O       |       |       |       |     0.06
 0.167    0.32    0.09      0.002  OI      |       |       |       |     0.23
 0.250    0.36    0.18      0.003  OI      |       |       |       |     0.45
 0.333    0.45    0.26      0.004  |O      |       |       |       |     0.64
 0.417    0.55    0.34      0.006  |OI     |       |       |       |     0.85
 0.500    0.58    0.42      0.007  |OI     |       |       |       |     1.04
 0.583    0.59    0.47      0.008  |OI     |       |       |       |     1.18
 0.667    0.59    0.51      0.009  | O     |       |       |       |     1.28
 0.750    0.59    0.54      0.009  | O     |       |       |       |     1.35
 0.833    0.66    0.57      0.009  | O     |       |       |       |     1.42
 0.917    0.75    0.63      0.010  | OI    |       |       |       |     1.54
 1.000    0.77    0.71      0.011  | OI    |       |       |       |     1.65
 1.083    0.72    0.73      0.011  | IO    |       |       |       |     1.68
 1.167    0.63    0.70      0.011  | O     |       |       |       |     1.63
 1.250    0.61    0.65      0.010  | O     |       |       |       |     1.57
 1.333    0.60    0.62      0.010  | O     |       |       |       |     1.53
 1.417    0.59    0.61      0.010  | O     |       |       |       |     1.51
 1.500    0.59    0.60      0.010  | O     |       |       |       |     1.50
 1.583    0.59    0.60      0.010  | O     |       |       |       |     1.49
 1.667    0.59    0.60      0.010  | O     |       |       |       |     1.49
 1.750    0.59    0.59      0.010  | O     |       |       |       |     1.49
 1.833    0.66    0.61      0.010  | O     |       |       |       |     1.51
 1.917    0.75    0.67      0.011  | OI    |       |       |       |     1.59
 2.000    0.77    0.73      0.011  |  O    |       |       |       |     1.67
 2.083    0.78    0.76      0.011  |  O    |       |       |       |     1.71
 2.167    0.79    0.78      0.011  |  O    |       |       |       |     1.73
 2.250    0.79    0.78      0.011  |  O    |       |       |       |     1.74
 2.333    0.79    0.79      0.012  |  O    |       |       |       |     1.75
 2.417    0.79    0.79      0.012  |  O    |       |       |       |     1.75
 2.500    0.79    0.79      0.012  |  O    |       |       |       |     1.75
 2.583    0.86    0.81      0.012  |  O    |       |       |       |     1.78
 2.667    0.95    0.87      0.012  |  O    |       |       |       |     1.86
 2.750    0.97    0.92      0.013  |  OI   |       |       |       |     1.93
 2.833    0.98    0.96      0.013  |  OI   |       |       |       |     1.97
 2.917    0.99    0.97      0.013  |   O   |       |       |       |     2.00
 3.000    0.99    0.98      0.013  |   O   |       |       |       |     2.01
 3.083    0.99    0.99      0.013  |   O   |       |       |       |     2.01
 3.167    0.99    0.99      0.013  |   O   |       |       |       |     2.02
 3.250    0.99    0.99      0.013  |   O   |       |       |       |     2.02
 3.333    0.99    0.99      0.013  |   O   |       |       |       |     2.02
 3.417    0.99    0.99      0.013  |   O   |       |       |       |     2.02
 3.500    0.99    0.99      0.013  |   O   |       |       |       |     2.02
 3.583    0.99    0.99      0.013  |   O   |       |       |       |     2.02
 3.667    0.99    0.99      0.013  |   O   |       |       |       |     2.02
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3.750    0.99    0.99      0.013  |   O   |       |       |       |     2.02
3.833    1.06    1.01      0.013  |   O   |       |       |       |     2.04
3.917    1.15    1.07      0.014  |   O   |       |       |       |     2.12
4.000    1.17    1.12      0.014  |   O   |       |       |       |     2.20
4.083    1.18    1.15      0.014  |   O   |       |       |       |     2.24
4.167    1.18    1.17      0.015  |   O   |       |       |       |     2.26
4.250    1.19    1.18      0.015  |   O   |       |       |       |     2.27
4.333    1.25    1.20      0.015  |   OI  |       |       |       |     2.30
4.417    1.35    1.26      0.015  |    O  |       |       |       |     2.38
4.500    1.37    1.32      0.016  |    O  |       |       |       |     2.46
4.583    1.38    1.35      0.016  |    O  |       |       |       |     2.50
4.667    1.38    1.35      0.016  |    O  |       |       |       |     2.50
4.750    1.38    1.35      0.016  |    O  |       |       |       |     2.51
4.833    1.45    1.36      0.017  |    OI |       |       |       |     2.52
4.917    1.54    1.37      0.018  |    OI |       |       |       |     2.54
5.000    1.57    1.38      0.019  |    OI |       |       |       |     2.57
5.083    1.44    1.39      0.020  |    O  |       |       |       |     2.59
5.167    1.26    1.39      0.019  |    O  |       |       |       |     2.58
5.250    1.22    1.38      0.018  |    O  |       |       |       |     2.56
5.333    1.27    1.37      0.018  |    O  |       |       |       |     2.54
5.417    1.35    1.36      0.017  |    O  |       |       |       |     2.53
5.500    1.37    1.36      0.017  |    O  |       |       |       |     2.53
5.583    1.45    1.37      0.017  |    O  |       |       |       |     2.54
5.667    1.54    1.37      0.018  |    OI |       |       |       |     2.56
5.750    1.57    1.39      0.020  |    OI |       |       |       |     2.58
5.833    1.57    1.40      0.021  |    OI |       |       |       |     2.61
5.917    1.58    1.41      0.022  |    OI |       |       |       |     2.64
6.000    1.58    1.42      0.023  |    OI |       |       |       |     2.67
6.083    1.65    1.44      0.024  |    OI |       |       |       |     2.70
6.167    1.74    1.46      0.026  |     OI|       |       |       |     2.74
6.250    1.76    1.48      0.028  |     OI|       |       |       |     2.78
6.333    1.77    1.50      0.030  |     OI|       |       |       |     2.83
6.417    1.78    1.52      0.032  |     OI|       |       |       |     2.87
6.500    1.78    1.54      0.033  |     OI|       |       |       |     2.91
6.583    1.85    1.56      0.035  |     OI|       |       |       |     2.96
6.667    1.94    1.58      0.037  |     O I       |       |       |     3.01
6.750    1.96    1.61      0.040  |     O I       |       |       |     3.07
6.833    1.97    1.63      0.042  |     O I       |       |       |     3.13
6.917    1.97    1.66      0.045  |     O I       |       |       |     3.18
7.000    1.98    1.68      0.047  |     O I       |       |       |     3.23
7.083    1.98    1.70      0.049  |      OI       |       |       |     3.28
7.167    1.98    1.72      0.050  |      OI       |       |       |     3.32
7.250    1.98    1.74      0.052  |      OI       |       |       |     3.36
7.333    2.04    1.76      0.054  |      OI       |       |       |     3.41
7.417    2.14    1.78      0.056  |      OI       |       |       |     3.46
7.500    2.16    1.80      0.059  |      OI       |       |       |     3.51
7.583    2.24    1.81      0.061  |      O|I      |       |       |     3.53
7.667    2.33    1.82      0.065  |      O|I      |       |       |     3.55
7.750    2.36    1.83      0.068  |      O|I      |       |       |     3.58
7.833    2.43    1.84      0.072  |      O| I     |       |       |     3.61
7.917    2.53    1.85      0.076  |      O| I     |       |       |     3.64
8.000    2.55    1.86      0.081  |      O| I     |       |       |     3.68
8.083    2.70    1.88      0.086  |      O|  I    |       |       |     3.71
8.167    2.89    1.90      0.093  |      O|  I    |       |       |     3.76
8.250    2.93    1.92      0.099  |      O|   I   |       |       |     3.81
8.333    2.95    1.94      0.106  |       O   I   |       |       |     3.87
8.417    2.96    1.96      0.113  |       O   I   |       |       |     3.92
8.500    2.96    1.97      0.120  |       O   I   |       |       |     3.97
8.583    3.03    1.99      0.127  |       O   I   |       |       |     4.02
8.667    3.12    2.01      0.135  |       O   I   |       |       |     4.08
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 8.750    3.15    2.04      0.142  |       O    I  |       |       |     4.14
 8.833    3.22    2.06      0.150  |       O    I  |       |       |     4.20
 8.917    3.32    2.08      0.158  |       O    I  |       |       |     4.26
 9.000    3.34    2.11      0.167  |       O    I  |       |       |     4.33
 9.083    3.49    2.13      0.176  |       O     I |       |       |     4.39
 9.167    3.68    2.16      0.186  |       O      I|       |       |     4.47
 9.250    3.72    2.18      0.196  |       |O     I|       |       |     4.54
 9.333    3.81    2.20      0.207  |       |O     I|       |       |     4.61
 9.417    3.91    2.23      0.219  |       |O      I       |       |     4.68
 9.500    3.94    2.25      0.230  |       |O      I       |       |     4.76
 9.583    4.01    2.27      0.242  |       |O      I       |       |     4.83
 9.667    4.11    2.30      0.254  |       |O      |I      |       |     4.91
 9.750    4.13    2.32      0.267  |       |O      |I      |       |     4.99
 9.833    4.21    2.35      0.279  |       |O      |I      |       |     5.07
 9.917    4.31    2.37      0.292  |       |O      |I      |       |     5.15
10.000    4.33    2.40      0.306  |       |O      |I      |       |     5.24
10.083    3.86    2.42      0.317  |       | O    I|       |       |     5.31
10.167    3.22    2.44      0.325  |       | O  I  |       |       |     5.36
10.250    3.07    2.45      0.330  |       | O I   |       |       |     5.39
10.333    3.01    2.45      0.334  |       | O I   |       |       |     5.42
10.417    2.98    2.46      0.338  |       | O I   |       |       |     5.44
10.500    2.96    2.47      0.341  |       | O I   |       |       |     5.46
10.583    3.31    2.48      0.346  |       | O  I  |       |       |     5.49
10.667    3.77    2.49      0.353  |       | O    I|       |       |     5.53
10.750    3.87    2.50      0.362  |       | O     I       |       |     5.58
10.833    3.92    2.52      0.372  |       | O     I       |       |     5.63
10.917    3.94    2.53      0.381  |       | O     I       |       |     5.69
11.000    3.95    2.55      0.391  |       | O     I       |       |     5.74
11.083    3.88    2.56      0.400  |       | O     I       |       |     5.79
11.167    3.79    2.57      0.409  |       | O    I|       |       |     5.84
11.250    3.77    2.59      0.417  |       | O    I|       |       |     5.88
11.333    3.76    2.60      0.425  |       | O    I|       |       |     5.93
11.417    3.76    2.61      0.433  |       | O    I|       |       |     5.97
11.500    3.75    2.62      0.441  |       | O    I|       |       |     6.01
11.583    3.62    2.63      0.449  |       | O   I |       |       |     6.05
11.667    3.43    2.64      0.455  |       | O   I |       |       |     6.09
11.750    3.39    2.65      0.460  |       | O   I |       |       |     6.11
11.833    3.44    2.66      0.465  |       |  O  I |       |       |     6.14
11.917    3.52    2.67      0.471  |       |  O  I |       |       |     6.17
12.000    3.54    2.68      0.477  |       |  O  I |       |       |     6.20
12.083    4.03    2.69      0.484  |       |  O    I       |       |     6.25
12.167    4.68    2.71      0.496  |       |  O    |  I    |       |     6.31
12.250    4.83    2.73      0.510  |       |  O    |  I    |       |     6.38
12.333    4.96    2.75      0.525  |       |  O    |   I   |       |     6.47
12.417    5.09    2.77      0.540  |       |  O    |    I  |       |     6.54
12.500    5.12    2.79      0.556  |       |  O    |    I  |       |     6.62
12.583    5.27    2.81      0.573  |       |  O    |    I  |       |     6.70
12.667    5.46    2.83      0.590  |       |  O    |     I |       |     6.78
12.750    5.50    2.85      0.608  |       |  O    |     I |       |     6.87
12.833    5.63    2.87      0.627  |       |  O    |      I|       |     6.95
12.917    5.79    2.90      0.646  |       |  O    |      I|       |     7.04
13.000    5.85    2.92      0.667  |       |   O   |       I       |     7.14
13.083    6.48    2.95      0.689  |       |   O   |       | I     |     7.24
13.167    7.32    2.98      0.716  |       |   O   |       |     I |     7.37
13.250    7.53    3.04      0.746  |       |   O   |       |      I|     7.51
13.333    7.63    3.36      0.776  |       |    O  |       |      I|     7.64
13.417    7.69    3.66      0.805  |       |      O|       |      I|     7.76
13.500    7.73    3.94      0.832  |       |       O       |       I     7.87
13.583    6.63    4.17      0.854  |       |       |O      |  I    |     7.96
13.667    5.14    4.29      0.865  |       |       |O   I  |       |     8.00
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13.750    4.80    4.33      0.870  |       |       |O I    |       |     8.02
13.833    4.65    4.36      0.872  |       |       | OI    |       |     8.03
13.917    4.58    4.38      0.874  |       |       | O     |       |     8.04
14.000    4.54    4.39      0.875  |       |       | O     |       |     8.05
14.083    4.86    4.41      0.877  |       |       | O I   |       |     8.05
14.167    5.30    4.46      0.882  |       |       | O  I  |       |     8.07
14.250    5.42    4.52      0.888  |       |       | O   I |       |     8.10
14.333    5.36    4.58      0.893  |       |       | O   I |       |     8.12
14.417    5.24    4.63      0.898  |       |       |  O I  |       |     8.14
14.500    5.23    4.67      0.902  |       |       |  O I  |       |     8.16
14.583    5.23    4.71      0.906  |       |       |  O I  |       |     8.17
14.667    5.24    4.75      0.909  |       |       |  O I  |       |     8.19
14.750    5.26    4.78      0.913  |       |       |  O I  |       |     8.20
14.833    5.16    4.81      0.915  |       |       |  O I  |       |     8.21
14.917    5.01    4.83      0.917  |       |       |  OI   |       |     8.22
15.000    5.00    4.84      0.918  |       |       |   O   |       |     8.22
15.083    4.91    4.85      0.919  |       |       |   O   |       |     8.23
15.167    4.79    4.85      0.919  |       |       |  IO   |       |     8.23
15.250    4.76    4.85      0.919  |       |       |  IO   |       |     8.23
15.333    4.68    4.84      0.918  |       |       |  IO   |       |     8.22
15.417    4.58    4.82      0.916  |       |       | IO    |       |     8.22
15.500    4.56    4.81      0.915  |       |       | IO    |       |     8.21
15.583    4.28    4.78      0.912  |       |       |I O    |       |     8.20
15.667    3.90    4.73      0.908  |       |       I  O    |       |     8.18
15.750    3.82    4.67      0.902  |       |      I|  O    |       |     8.16
15.833    3.78    4.61      0.896  |       |      I|  O    |       |     8.13
15.917    3.76    4.55      0.890  |       |      I| O     |       |     8.11
16.000    3.75    4.50      0.885  |       |      I| O     |       |     8.09
16.083    2.73    4.41      0.877  |       |  I    | O     |       |     8.05
16.167    1.35    4.24      0.861  |    I  |       |O      |       |     7.99
16.250    1.03    4.03      0.841  |   I   |       O       |       |     7.90
16.333    0.89    3.82      0.820  |  I    |      O|       |       |     7.82
16.417    0.82    3.61      0.801  |  I    |     O |       |       |     7.74
16.500    0.79    3.42      0.782  |  I    |     O |       |       |     7.66
16.583    0.72    3.23      0.764  | I     |    O  |       |       |     7.59
16.667    0.63    3.05      0.747  | I     |   O   |       |       |     7.52
16.750    0.61    3.00      0.731  | I     |   O   |       |       |     7.44
16.833    0.60    2.98      0.714  | I     |   O   |       |       |     7.36
16.917    0.59    2.96      0.698  | I     |   O   |       |       |     7.29
17.000    0.59    2.94      0.682  | I     |   O   |       |       |     7.21
17.083    0.73    2.92      0.666  |  I    |   O   |       |       |     7.14
17.167    0.91    2.90      0.652  |  I    |   O   |       |       |     7.07
17.250    0.96    2.89      0.638  |  I    |  O    |       |       |     7.01
17.333    0.98    2.87      0.625  |   I   |  O    |       |       |     6.94
17.417    0.98    2.86      0.612  |   I   |  O    |       |       |     6.88
17.500    0.99    2.84      0.599  |   I   |  O    |       |       |     6.82
17.583    0.99    2.83      0.587  |   I   |  O    |       |       |     6.76
17.667    0.99    2.81      0.574  |   I   |  O    |       |       |     6.70
17.750    0.99    2.80      0.561  |   I   |  O    |       |       |     6.64
17.833    0.92    2.78      0.549  |  I    |  O    |       |       |     6.58
17.917    0.83    2.77      0.536  |  I    |  O    |       |       |     6.52
18.000    0.81    2.75      0.522  |  I    |  O    |       |       |     6.45
18.083    0.80    2.73      0.509  |  I    |  O    |       |       |     6.38
18.167    0.79    2.71      0.496  |  I    |  O    |       |       |     6.31
18.250    0.79    2.69      0.483  |  I    |  O    |       |       |     6.24
18.333    0.79    2.67      0.470  |  I    |  O    |       |       |     6.17
18.417    0.79    2.65      0.457  |  I    | O     |       |       |     6.10
18.500    0.79    2.63      0.444  |  I    | O     |       |       |     6.03
18.583    0.72    2.61      0.431  | I     | O     |       |       |     5.96
18.667    0.63    2.59      0.418  | I     | O     |       |       |     5.89
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18.750    0.61    2.57      0.405  | I     | O     |       |       |     5.81
18.833    0.53    2.55      0.391  | I     | O     |       |       |     5.74
18.917    0.43    2.53      0.377  |I      | O     |       |       |     5.66
19.000    0.41    2.50      0.362  |I      | O     |       |       |     5.58
19.083    0.47    2.48      0.348  |I      | O     |       |       |     5.51
19.167    0.56    2.46      0.335  | I     | O     |       |       |     5.42
19.250    0.58    2.43      0.322  | I     | O     |       |       |     5.34
19.333    0.65    2.41      0.309  | I     |O      |       |       |     5.26
19.417    0.75    2.38      0.298  |  I    |O      |       |       |     5.19
19.500    0.77    2.36      0.287  |  I    |O      |       |       |     5.12
19.583    0.72    2.34      0.276  | I     |O      |       |       |     5.05
19.667    0.63    2.32      0.264  | I     |O      |       |       |     4.97
19.750    0.61    2.29      0.253  | I     |O      |       |       |     4.90
19.833    0.53    2.27      0.241  | I     |O      |       |       |     4.82
19.917    0.43    2.25      0.229  |I      |O      |       |       |     4.75
20.000    0.41    2.22      0.216  |I      |O      |       |       |     4.67
20.083    0.47    2.20      0.204  |I      |O      |       |       |     4.59
20.167    0.56    2.17      0.192  | I     |O      |       |       |     4.52
20.250    0.58    2.15      0.181  | I     O       |       |       |     4.44
20.333    0.59    2.12      0.171  | I     O       |       |       |     4.35
20.417    0.59    2.09      0.160  | I     O       |       |       |     4.28
20.500    0.59    2.06      0.150  | I     O       |       |       |     4.20
20.583    0.59    2.03      0.140  | I     O       |       |       |     4.12
20.667    0.59    2.00      0.130  | I     O       |       |       |     4.05
20.750    0.59    1.98      0.121  | I     O       |       |       |     3.98
20.833    0.52    1.95      0.111  | I     O       |       |       |     3.90
20.917    0.43    1.92      0.101  |I     O|       |       |       |     3.83
21.000    0.41    1.89      0.091  |I     O|       |       |       |     3.75
21.083    0.47    1.86      0.081  |I     O|       |       |       |     3.67
21.167    0.56    1.84      0.072  | I    O|       |       |       |     3.60
21.250    0.58    1.81      0.063  | I    O|       |       |       |     3.54
21.333    0.52    1.76      0.054  | I    O|       |       |       |     3.42
21.417    0.43    1.67      0.046  |I    O |       |       |       |     3.21
21.500    0.41    1.58      0.038  |I    O |       |       |       |     3.01
21.583    0.47    1.50      0.030  |I    O |       |       |       |     2.83
21.667    0.56    1.43      0.023  | I  O  |       |       |       |     2.68
21.750    0.58    1.37      0.018  | I  O  |       |       |       |     2.54
21.833    0.52    1.02      0.013  | I O   |       |       |       |     2.05
21.917    0.43    0.69      0.011  |IO     |       |       |       |     1.62
22.000    0.41    0.56      0.009  |IO     |       |       |       |     1.40
22.083    0.47    0.52      0.009  |IO     |       |       |       |     1.30
22.167    0.56    0.52      0.009  | O     |       |       |       |     1.29
22.250    0.58    0.53      0.009  | O     |       |       |       |     1.34
22.333    0.52    0.54      0.009  | O     |       |       |       |     1.35
22.417    0.43    0.52      0.009  |IO     |       |       |       |     1.29
22.500    0.41    0.48      0.008  |IO     |       |       |       |     1.21
22.583    0.40    0.46      0.008  |O      |       |       |       |     1.14
22.667    0.40    0.44      0.007  |O      |       |       |       |     1.09
22.750    0.40    0.42      0.007  |O      |       |       |       |     1.06
22.833    0.40    0.41      0.007  |O      |       |       |       |     1.03
22.917    0.40    0.41      0.007  |O      |       |       |       |     1.02
23.000    0.40    0.40      0.007  |O      |       |       |       |     1.01
23.083    0.40    0.40      0.007  |O      |       |       |       |     1.00
23.167    0.40    0.40      0.007  |O      |       |       |       |     1.00
23.250    0.40    0.40      0.007  |O      |       |       |       |     0.99
23.333    0.40    0.40      0.007  |O      |       |       |       |     0.99
23.417    0.40    0.40      0.007  |O      |       |       |       |     0.99
23.500    0.40    0.40      0.007  |O      |       |       |       |     0.99
23.583    0.40    0.40      0.007  |O      |       |       |       |     0.99
23.667    0.40    0.40      0.007  |O      |       |       |       |     0.99
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23.750    0.40    0.40      0.007  |O       |       |       |       |      0.99
23.833    0.40    0.40      0.007  |O       |       |       |       |      0.99
23.917    0.40    0.40      0.007  |O       |       |       |       |      0.99
24.000    0.40    0.40      0.007  |O       |       |       |       |      0.99
24.083    0.26    0.37      0.006  |O       |       |       |       |      0.93
24.167    0.07    0.30      0.005  IO       |       |       |       |      0.75
24.250    0.03    0.22      0.004  O        |       |       |       |      0.54
24.333    0.01    0.15      0.002  O        |       |       |       |      0.37
24.417    0.00    0.10      0.002  O        |       |       |       |      0.25
24.500    0.00    0.07      0.001  O        |       |       |       |      0.17
24.583    0.00    0.04      0.001  O        |       |       |       |      0.11
24.667    0.00    0.03      0.000  O        |       |       |       |      0.07
24.750    0.00    0.02      0.000  O        |       |       |       |      0.05
24.833    0.00    0.01      0.000  O        |       |       |       |      0.03
24.917    0.00    0.01      0.000  O        |       |       |       |      0.02
25.000    0.00    0.01      0.000  O        |       |       |       |      0.01
25.083    0.00    0.00      0.000  O        |       |       |       |      0.01
25.167    0.00    0.00      0.000  O        |       |       |       |      0.01
25.250    0.00    0.00      0.000  O        |       |       |       |      0.00
25.333    0.00    0.00      0.000  O        |       |       |       |      0.00
25.417    0.00    0.00      0.000  O        |       |       |       |      0.00

     ****************************HYDROGRAPH DATA****************************
                Number of intervals =   305
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =        4.851 (CFS)
                Total volume =       4.133 (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
     ***********************************************************************

     --------------------------------------------------------------------
```
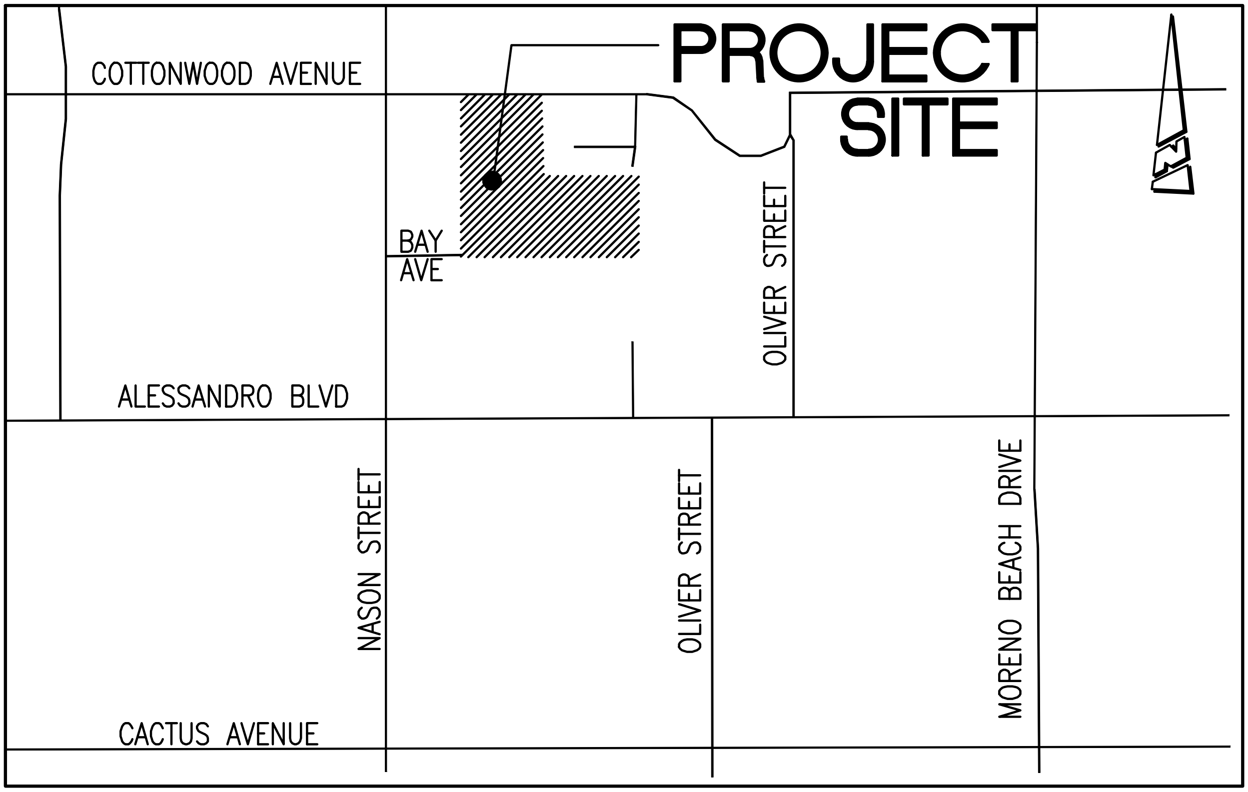

APPENDIX E

SITE PLAN

APPENDIX F

VICINITY MAP



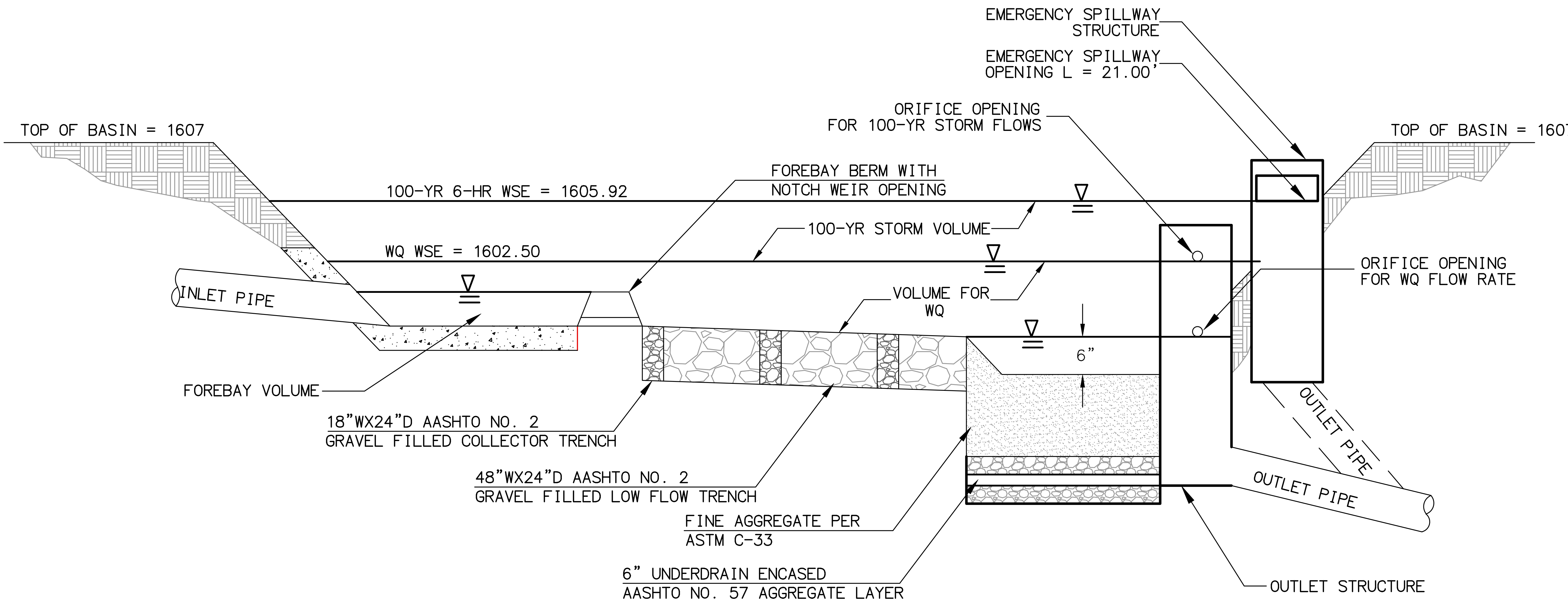
VICINITY MAP

N.T.S.

APPENDIX G

HYDRAULIC CALCULATIONS

EMERGENCY SPILLWAY CALCULATIONS



DETENTION / EXTENDED BASIN NO. 1 DETAIL

NTS

PROACTIVE
ENGINEERING CONSULTANTS

Plotted: Aug 31, 2022 – 12:52pm by: PEC–LT–21 Drawing Name: Z:\10.094–Moreno Valley 68_Highpointe\Hydro\EXHIBITS\BASIN SECTION DETAILS.dwg

8/31/2022

Worksheet for BASIN NO 1 - EMERGENCY SPILLWAY

Project Description

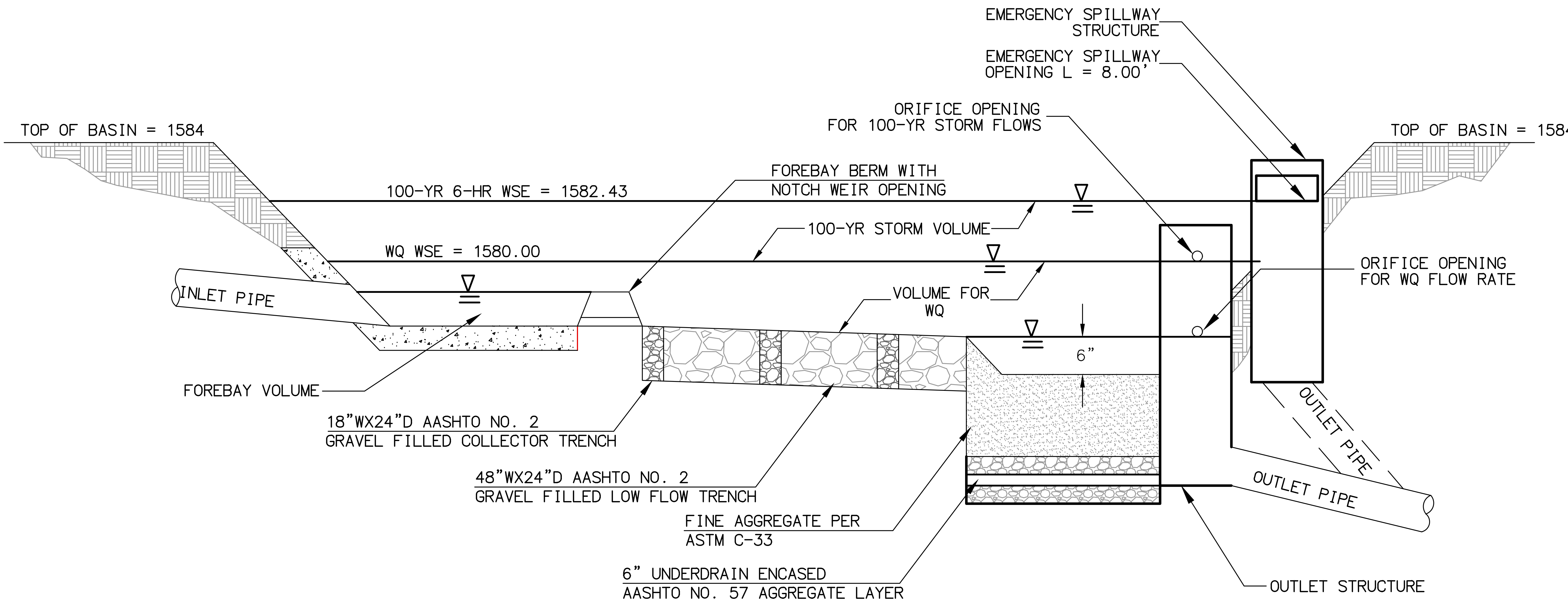
Solve For	Headwater Elevation

Input Data

Discharge	73.70	ft³/s
Crest Elevation	0.00	ft
Tailwater Elevation	0.00	ft
Weir Coefficient	3.09	US
Crest Length	21.00	ft
Number Of Contractions	0	

Results

Headwater Elevation	1.09	ft
Headwater Height Above Crest	1.09	ft
Tailwater Height Above Crest	0.00	ft
Flow Area	22.86	ft²
Velocity	3.22	ft/s
Wetted Perimeter	23.18	ft
Top Width	21.00	ft



DETENTION / EXTENDED BASIN NO. 2 DETAIL

NTS

PROACTIVE
ENGINEERING CONSULTANTS

Plotted: Aug 31, 2022 – 12:54pm by: PEC-LT-21-01 Drawing Name: Z:\10.094-Moreno Valley 68_Highpointe\Hydro\EXHIBITS\BASIN SECTION DETAILS.dwg

8/31/2022

Worksheet for BASIN NO 2 - EMERGENCY SPILLWAY

Project Description

Solve For	Headwater Elevation	

Input Data

Discharge	47.10	ft³/s
Crest Elevation	0.00	ft
Tailwater Elevation	0.00	ft
Weir Coefficient	3.09	US
Crest Length	8.00	ft
Number Of Contractions	0	

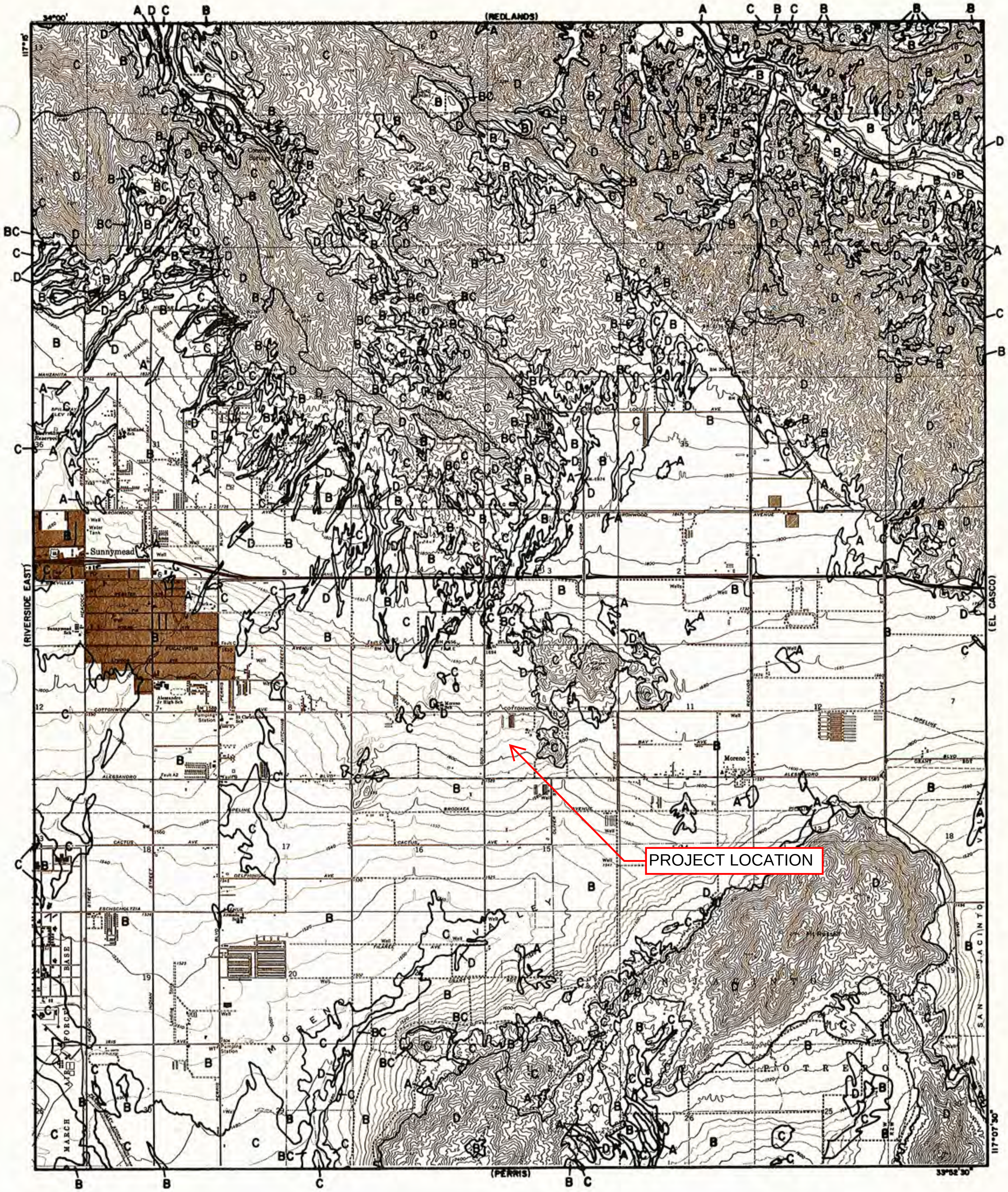
Results

Headwater Elevation	1.54	ft
Headwater Height Above Crest	1.54	ft
Tailwater Height Above Crest	0.00	ft
Flow Area	12.30	ft²
Velocity	3.83	ft/s
Wetted Perimeter	11.07	ft
Top Width	8.00	ft

APPENDIX H

REFERENCE DOCUMENTS

SOILS MAP



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC & WCD

HYDROLOGY MANUAL

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR SUNNYMEAD

PLATE C-1.17

RAINFALL DATA

MORENO MASTER PLAN OF DRAINAGE

RIVERSIDE COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT
Riverside, California

MORENO

MASTER DRAINAGE PLAN

ZONE FOUR

Original Plan – September 1980
Revision No. 2 – April 2015

WARREN D. WILLIAMS
General Manager-Chief Engineer

MORENO
MASTER DRAINAGE PLAN
(Revision No. 2)

TABLE OF CONTENTS

TABLES

APPENDIX

MAP

SECTION I - PURPOSE

The purpose of this report is to identify the network of drainage facilities needed to alleviate currently known and anticipated drainage problems within the eastern portion of the City of Moreno Valley. A Master Drainage Plan (MDP) was originally adopted for the Moreno watershed in 1980 and was later revised in 1991 due to the development of the watershed at a higher density than anticipated. Since the 1991 revision, the City of Moreno Valley has updated its general plan, approved zone changes, and continued to grow significantly; prompting the District to once again revise the Moreno MDP to address these changes. In addition, this new revision seeks to address changes in regulation that favor the incorporation of flood control facilities which encourage infiltration.

Readers should bear in mind that the drainage network presented herein is conceptual in nature. Simply stated, the MDP provides a conceptual solution that addresses the known and anticipated drainage problems in the Moreno area based on various engineering, environmental, and economic considerations. By no means does the proposed MDP represent the only feasible solution.

The alignment and location of the facilities proposed in this MDP are approximate. Precise locations will be dictated by site specific conditions and other factors existing at the time of detailed design. Similarly, the facility sizing information shown on the enclosed map is preliminary. More detailed analysis performed at the facility design stage will determine the final facility sizing.

SECTION II - SCOPE

Tasks involved in the development of this master plan include:

1. Determination of the points of concentration and quantity of storm water runoff produced at various locations.

2. Determination of the quantity of debris produced by major canyons in the watershed.

3. Determination of the location and size of the proposed drainage facilities.

4. Investigation of alternative routes and conveyance methods as a basis for selecting the most economical, environmental, and soundly engineered plan.

5. Preparation of a drainage facility map.

6. Preparation of preliminary plan and profile sheets.

7. Preparation of individual facility cost estimates.

SECTION III – GENERAL DISCUSSION

The Moreno MDP encompasses a portion of the City of Moreno Valley and surrounding Riverside County lands. The watershed is generally bounded by Lasselle Street on the west, Theodore Street on the east, the Badlands on the north, and the city boundary on the south.

The proposed drainage plan involves the construction of detention basins, debris basins, open channels, and a network of underground storm drains. The drainage system will collect local urban runoff and transport the flows through this developing community to an outlet at the upper terminus of the Kitching Street Channel.

The revision presented here is a re-evaluation and expansion of the 1991 Moreno MDP Revision (Adopted MDP). The proposed plan shall supersede all past plans and reports. The plan presented herein will provide flood protection from the 100-year flood to the community when implemented, serve as a guide for the long term construction scheduling of the primary drainage facilities, and serve the basis for revising the existing Moreno Area Drainage Plan (ADP). The plan will also act as a planning guide for the location and sizing of local drainage facilities to be constructed by developers and others within the area.

SECTION IV – MASTER DRAINAGE PLAN OBJECTIVES

The following objectives were established for the Moreno Master Drainage Plan Revision:

1. Revise the Moreno MDP to provide a drainage plan which supports the existing and proposed land use as set forth in the "Riverside County General Plan" updated in 2008, "City of Moreno Valley General Plan" updated in July 2006, and any proposed amendments thereto.

2. The fully implemented plan should, in conjunction with ultimate street improvements for the area within the boundaries of the Moreno MDP, contain the 100-year frequency flows and alleviate the primary sources of flooding.

3. Identify preferred facility alignments, sizing, and right-of-way required for the future construction of MDP facilities to protect existing and future development.

4. Identify the most economical combination of facilities considering right-of-way acquisition, construction, and maintenance costs.

5. Develop a plan which, when implemented, will result in the elimination of FEMA designated Special Flood Hazard Areas within the boundaries of the Moreno MDP.

6. Revise the Moreno MDP to minimize major diversions and perpetuate the natural drainage pattern of the area to the maximum extent practicable.

7. Where feasible, incorporate facilities which encourage infiltration.

8. Minimize environmental impacts to the maximum extent practicable.

SECTION V – HYDROLOGY

Revision Studies:

This section outlines methodology, assumptions, and rainfall values used for new studies within the drainage area boundary for this MDP revision. The areas restudied were those tributary to Line F north of Cactus Avenue, areas tributary to Quincy Channel (Line G), and areas north of California State Route 60 (SR 60) not tributary to Nason Basin. New studies for the western portion of the plan (west of the Line G system) were not performed during the revision since many of the facilities here have already been constructed and were designed based on the Adopted MDP flow rates and alignments (see Previous Studies section below for additional information).

Two methods were used to develop the hydrology for this MDP revision: the Rational Method and the Synthetic Unit Hydrograph Method. The Rational Method was used to determine the peak discharges (cubic feet per second) generated from smaller watersheds less than 300 to 500 acres in size. For watersheds larger than 500 acres, the Synthetic Unit Hydrograph Method was used. To account for the attenuating effects of channel and basin storage, the Convex Routing Method and Modified Puls Methods were used, respectively. Methodology and supportive data for both the Rational and Synthetic Unit Hydrograph Methods may be found in the *Riverside County Flood Control and Water Conservation District Hydrology Manual*, dated April 1978 (District Hydrology Manual).

Future land use assumptions were based on the following:

- "The City of Moreno Valley General Plan," updated July 2006
- “The Riverside County General Plan,” updated December 2008
- Potential changes to areas currently zoned under the “Moreno Highlands Specific Plan,” adopted in 1992.

NOAA Atlas 14 Version 4 rainfall values were used in the hydrology calculations performed for this MDP revision. The rainfall frequencies examined were the 2-year (50% annual chance) and the 100-year (1% annual chance) recurrence intervals with 1, 3, 6 and 24 hour durations. The calculated slope of the intensity-duration curve is 0.577. Table 1 highlights the NOAA Atlas 14 Version 4 area weighted point rainfall values used to develop the revision studies:

TABLE 1 – NOAA Atlas 14 Point Rainfall Values

Storm Frequency and Duration	Area Weighted Point Rainfall (Inches)
2 Year – 1 Hour	0.52
2 Year – 3 Hour	0.90
2 Year – 6 Hour	1.29
2 Year – 24 Hour	2.29
100 Year – 1 Hour	1.57
100 Year – 3 Hour	2.42
100 Year – 6 Hour	3.38
100 Year – 24 Hour	6.43

Previous Studies:

Line K System – The flow rates for the Line K system have remained the same as in the Adopted Plan. No changes were proposed to the alignment and no major changes in land use have occurred. Hydrology backup calculations for this line are from studies performed for the Adopted MDP. Line K was sized in these studies using NOAA Atlas 2 rainfall values.

Line H System – Hydrology for this system comes from the approved hydrology study for Tract 31128 and 31129 performed by PHB & Associates, Inc. This study reflects changes to the Adopted MDP alignment. This study uses NOAA Atlas 2 rainfall values.

SECTION VI – EXISTING FACILITIES

In preparing this master drainage plan revision an inventory of known existing facilities was made and is summarized in Table 2. Those facilities serving as part of revised Moreno MDP drainage system are shown on the updated Moreno MDP map.

TABLE 2 – Existing Facilities

Facility	Drawing Number	Maintenance
Line A	4-473	RCFC
Line D	4-1007	RCFC
Line D-5	4-1007	RCFC
Line D-6	4-1007	RCFC
Line F	4-502,4-5271 4-1007, 4-912(Future RCFC)	RCFC
Line F-2	4-491,4-847	RCFC
Line F-3	4-501, 4-506	RCFC
Line F-4	4-501	RCFC
Line F-5	4-570	RCFC
Line F-6	4-528	RCFC
Line F-7	4-501	RCFC
Line F-8	4-509	RCFC
Line F-9	-	MV
Line F-9	4-1007	RCFC
Line F-11	4-847	RCFC
Line F-12	4-847	RCFC
Line F-14	4-719	RCFC
Line G	4-526, 4-886	RCFC
Line G-5 (Auto Mall Dr Lateral)	4-526	MV
Line G-7	4-879	RCFC
Line H-1	4-885	RCFC
Line H-2	4-875	RCFC
Line H-3	-	MV

Facility	Drawing Number	Maintenance
Line H-6	4-875	RCFC
Line H-7	4-867	RCFC
Line H-8	4-875	RCFC
Line H-9	4-834	RCFC
Line I	4-583, 4-647, 4-738, 7-405, 4-904, 4-905	RCFC
Line J	4-858, (4-955 Future RCFC)	RCFC
Line J-2	4-858	RCFC
Line J-3	4-858	RCFC
Line J-4	4-858	RCFC
Line J-5	4-858	MV
Line J-6	4-858	RCFC
Line J-9	4-1027	(Future RCFC)
Line J-10	4-646, 4-647	RCFC
Line K-1	-	MV
Line K-3	-	MV
Moreno Cold Creek SD - Line A	4-929	RCFC

SECTION VII – FACILITY SIZING CRITERIA

Underground Storm Drains

The underground facilities proposed in this MDP are located within existing or assumed future right-of-way, whenever possible, and consists of reinforced concrete pipe (RCP) ranging in size from 27 inches to 108 inches in diameter and reinforced concrete boxes (RCB) ranging in dimensions from 7'W x 7'D to 10'W x 8'D. Underground storm drain facilities were sized based on their full flow capacity.

Open Channels

The open channel facilities proposed are generally located along existing drainage ditches, washes, and where the proposed construction of the channel would have minimal impacts on adjacent properties. The open channels serve as flow conveyors and provide outlets for underground facilities proposed in the plan. Two types of open channels are proposed in this MDP, concrete lined channels and earthen bottomed channels with rock lined side slopes (unlined). The hydraulic sizing of open channels is based on normal depth calculations. The right-of-way requirements for both lined and unlined facilities include the full channel width, maintenance access roads, as well as a 5 foot buffer on either side for anticipated cut and fill. Channels with top widths of less than 20 feet require one 15 foot maintenance access road; where the top width exceeds 20 feet, two maintenance access roads are necessary.

Detention Basins

The detention basins proposed in this MDP are located upstream existing facilities with limited hydraulic capacity (e.g. freeway culverts, Line F). The purpose of the detention basin is to attenuate peak flow rates to match the capacity of downstream existing facilities through the use of temporary detention storage. It should be noted that the detention basins proposed in this plan are sized for the 1% annual chance ("100-year" storm) event. Flows exceeding the design capacity of the basin would pass over an emergency spillway in flow patterns approximating present conditions.

Debris Basins

Debris basins are proposed in watersheds where significant amount of debris would be expected and are generally located upstream of the proposed facilities to capture the debris before it enters the downstream conveyance system. The proposed debris basins were sized using the Tatum Method by the U.S. Army Corps of Engineers Los Angeles District, dated 1963.

SECTION VIII – PROPOSED IMPROVEMENTS

The improvements proposed in this MDP are shown on the enclosed map found at the back of this report. Supporting data for proposed facilities is available at the Riverside County Flood Control and Water Conservation District's Office.

The design engineer should be aware that a detailed utility search was not completed. This means that, while the major known facilities were considered during the development of this MDP, a more thorough search may reveal additional or newly placed utilities that may necessitate minor alignment and size changes, or utility relocations during final design.

Line A – Line A begins approximately 300 feet west of the intersection of Locust Avenue and Quincy Street as a 4.5 foot deep concrete lined trapezoidal channel with side slopes of 1.5:1 and a base width of 6 feet. The channel extends southerly and connects to an existing section of Line A which continues southerly and southeasterly to a confluence point with the proposed Line A-1 just south of Kalmia Street. At the confluence point Line A transitions into a 8'W x 7'D RCB and continues southerly. The RCB then transitions into a 9'W x 7'D and continues southerly to an outlet into the proposed Sinclair Basin just north of California State Route 60 (SR 60).

Line A-1 – Line A-1 begins at a point approximately 1,315 feet north and 235 feet east of the intersection of Locust Avenue and Quincy Street as a 72-inch RCP. The 72-inch RCP extends westerly to Quincy Street and southerly in Quincy Street. At Kalmia Avenue, the 72-inch RCP transitions into a 78-inch RCP until the confluence with Line A.

Line A-2 – Line A-2 begins approximately 650 feet east of the intersection of Locust Avenue and Quincy Street as a 42-inch RCP. The 42-inch RCP extends westerly until the confluence with the proposed Line A-1.

Line A-3 – Line A-3 begins at the intersection of Edmonson Avenue and Kalmia Avenue as a 42-inch RCP. The 42-inch RCP extends easterly in Kalmia Avenue until the confluence with an existing portion of Line A.

Line A-6 – Line A-6 begins at a point approximately 1,300 feet west and 1,300 feet north of the intersection of Quincy Street and Ironwood Avenue as a 36-inch RCP. The 36-inch RCP extends southerly and transitions into a 42-inch and then a 48-inch RCP. At Hemlock Avenue the 48-inch RCP continues easterly and transitions into a 78-inch RCP, then into a 84-inch RCP, and finally into a 7'W x 7'D RCB until the confluence with Line A.

Line A-7 – The upstream origin of Line A-7 begins approximately 850 feet east of the intersection of Petit Street and Ironwood Avenue as a 42-inch RCP. The 42-inch RCP extends to the westerly until the confluence with line A-6.

Line A-8 – Line A-8 begins approximately at the intersection of Hinson Street and Hemlock Avenue as a 42-inch RCP. The 42-inch RCP extends easterly and transitions into a 54-inch RCP until the confluence with Line A-6.

Line B – Line B begins approximately 1,200 feet southeast of the intersection of Redlands Boulevard and Highland Boulevard as a 66-inch RCP. The 66-inch RCP extends easterly for 720 feet and then transitions into an 8'W x 7'D RCB following Highland Boulevard southeasterly for 1850 feet. The facility then extends southerly to Ironwood Avenue. From here the facility transitions into an 8'W x 8'D RCB extending easterly for approximately 740 feet before heading southerly for 1,310 feet to the confluence with Line C. At the confluence, the facility transitions into a 10'W x 8'D RCB which continues southerly to an outlet into the proposed Sinclair Basin just North of SR 60.

Line B-1 – Line B-1 begins approximately 730 feet west of the intersection of Theodore Street and Ironwood Avenue along Ironwood Avenue Street as a 78-inch RCP. The 78-inch RCP extends westerly along Ironwood Avenue until the confluence with Line B.

Line B-2 – Line B-2 begins approximately 850 feet west of the intersection of Juniper Avenue and Highland Boulevard as a 54-inch RCP. The 54-inch RCP extends easterly in Juniper Avenue until the confluence with Line B.

Line B-3 – Line B-3 begins approximately 2,110 feet east of the intersection of Redlands Boulevard and Ironwood Avenue as a 42-inch RCP. The 42-inch RCP extends easterly in Ironwood Avenue until the confluence with Line B.

Line C – The upstream origin of Line C begins at the outlet of the proposed Ironwood Debris Basin as a 66-inch RCP. The 66-inch RCP extends southerly in Theodore Street for 930 feet before transitioning into a 78-inch RCP and heading easterly until the confluence with Line B.

Line D-1 – Line D-1 begins approximately 820 feet west of the intersection of Locust Avenue and Redlands Boulevard as a 42-inch RCP. The 42-inch RCP extends easterly in Locust Avenue and transitions into a 48-inch RCP until the confluence with Redlands Boulevard.

Line D-2 – Line D-2 begins approximately 1,750 feet west of the intersection of Kalmia Avenue and Redlands Boulevard as a 42-inch RCP. The 42-inch RCP extends easterly and transitions into a 48-inch RCP, to a 60-inch RCP, and finally to a 66-inch RCP until the confluence with Line D-5.

Line D-3 – Line D-3 begins approximately 1,750 feet west of the intersection of Juniper Avenue and Redlands Boulevard as a 42-inch RCP. The 42-inch RCP extends easterly and transitions into a 48-inch RCP, to a 60-inch RCP, and finally to a 66-inch RCP until the confluence with Line D-5.

Line D-4 – Line D-4 begins approximately 670 feet east of the intersection of Juniper Avenue and Redlands Boulevard as a 42-inch RCP. The 42-inch RCP extends westerly until the confluence with Line D-5.

Line D-5 – Line D-5 begins at the intersection of Locust Avenue and Redlands Boulevard as a 48-inch RCP. The 48-inch RCP extends southerly in Redlands Boulevard, transitioning into a 66-inch RCP until Ironwood Avenue where the 66-inch RCP transitions into a 90-inch RCP and turns easterly for approximately 1,310 feet. At this point the 90-inch RCP turns southerly for 1,300 feet, easterly for 690 feet, and finally southerly for 530 feet to an outlet into the proposed Sinclair Basin just north of SR 60.

Line D-7 – Line D-7 begins approximately 1,750 feet west of the intersection of Ironwood Avenue and Redlands Boulevard as a 36-inch RCP. The 36-inch RCP extends easterly and transitions into a 48-inch RCP, to a 60-inch RCP, and finally to a 66-inch RCP until the confluence with Line D-5.

Line D-8 – The upstream origin of Line D-8 begins at a point approximately 1,300 feet south and 240 feet east of the intersection of Ironwood Avenue and Redlands Boulevard as a 42-inch RCP. From there the 42-inch RCP extends easterly and transitions into a 54-inch RCP until the confluence with Line D-5.

Line D-9 – Line D-9 begins at a point approximately 1,640 feet east of the intersection of Redlands Boulevard and Ironwood Avenue as a 36-inch RCP. The 36-inch RCP extends westerly until the confluence with Line D-5.

Line E-1 – Line E-1 begins at a point approximately 2,600 feet south of State Route 60 and 250 feet east of Redlands Boulevard as a 36-inch RCP. The 36-inch pipe extends easterly and transitions into a 54-inch RCP and then to a 66-inch RCP until the confluence with Line F.

Line E-2 – Line E-2 begins at a point approximately 2,600 feet south of State Route 60 and 1,750 feet west of the Theodore Street as a 36-inch RCP. The 36-inch RCP extends westerly and transitions into a 54-inch RCP, to a 60-inch RCP, and then finally to a 66-inch RCP until the confluence with Line F.

Line E-3 – Line E-3 begins at a point approximately 250 feet east of the intersection of Redlands Boulevard and Dracaea Avenue as a 42-inch RCP. The 42-inch RCP extends easterly and transitions into a 54-inch RCP, to a 66-inch RCP, and finally into a 72-inch RCP until the confluence with Line F.

Line E-4 – Line E-4 begins at a point approximately 2,000 feet west of the intersection of Theodore Street and Dracaea Avenue as a 48-inch RCP. The 48-inch RCP extends westerly and transitions into a 60-inch RCP and finally to a 66-inch RCP until the confluence with Line F.

Line E-5 – Line E-5 begins at a point approximately 250 feet east of the intersection of Redlands Boulevard and Cottonwood Avenue as a 42-inch RCP. The 42-inch RCP extends easterly and transitions into a 48-inch RCP, to a 66-inch RCP, and finally to a 72-inch RCP until the confluence with Line F.

Line E-6 – Line E-6 begins at a point approximately 1,975 feet west of the intersection of Theodore Street and Cottonwood Avenue as a 48-inch RCP. The 48-inch RCP extends westerly and transitions into a 60-inch RCP and finally into a 66-inch RCP until the confluence with Line F.

Line E-7 – Line E-7 begins at a point approximately 275 feet east of the intersection of Redlands Boulevard and Bay Avenue as a 42-inch RCP. The 42-inch RCP extends easterly and transitions into a 60-inch RCP, to a 66-inch RCP, and finally to a 72-inch RCP until the confluence with Line F.

Line E-8 – Line E-8 begins at a point approximately 1,975 feet west of the intersection of Theodore Street and Bay Avenue as a 48-inch RCP. The 48-inch RCP extends westerly and transitions into a 54-inch RCP and finally into a 66-inch RCP until the confluence with Line F.

Line E-10 – Line E-10 begins at a point approximately 1,975 feet east of the intersection of Merwin Street and Alessandro Boulevard as a 36-inch RCP. The 36-inch RCP transitions into a 54-inch RCP and finally into a 60-inch RCP until the confluence with Line F.

Line F – Line F begins approximately 1,350 feet south of SR 60 and 1,600 feet east of Redlands Boulevard as an earthen bottom trapezoidal channel with rock-lined side slopes. The earthen channel runs southerly to Alessandro Boulevard and southwesterly from below Alessandro Boulevard to Redlands Boulevard where it connects to an existing box culvert in Redlands Boulevard. Typical channel sections in this reach have a depth of 8 feet, base widths of 6 to 38 feet, and side slopes of 2:1. There is another proposed section of Line F which begins approximately 500 feet north of the intersection of Oliver Street and John F. Kennedy Drive running southwesterly for 850 feet before connecting to existing Line F.

Line F-2 – Line F-2 begins at the intersection of Ironwood Ave. and Redlands Boulevard as a 54-inch RCP and connects to Line F-15. The 54-inch RCP extends southerly to an existing 60-inch Caltrans culvert which extends the pipe to the south side of the State Route 60 Redlands Boulevard off ramp. Line F-2 resumes from the downstream terminus of the existing culvert as a 66-inch RCP which continues southerly transitioning to a 72-inch RCP, to a 78-inch RCP, to a 84-inch RCP, to a 90-inch RCP, to a 96-inch RCP, and finally into a 108-inch RCP until an outlet into the proposed Cactus Basin.

Line F-5 – Line F-5 begins approximately 100 feet south of the intersection of Oliver Street and John F. Kennedy Drive at the downstream terminus of an existing portion of Line F-5 as a double 8'W x 4'D RCB. The RCB extends westerly for 700 feet to the confluence with existing Line F.

Line F-13 – Line F-13 begins at a point approximately 1,330 feet north of the intersection of Moreno Beach Drive and Cactus Boulevard as a 33-inch RCP. The 33-inch RCP extends southerly and transitions into a 39-inch RCP until the confluence with existing Line F-4.

Line F-15 – Line F-15 begins at a point approximately 1,310 feet south and 1,750 feet west of the intersection of Redlands Boulevard and Ironwood Avenue as a 36-inch RCP. The 36-inch RCP extends easterly and transitions into a 48-inch RCP and then to a 54-inch RCP until the confluence with Line F-2 at Redlands Boulevard.

Line F-16 – Line F-16 begins at a point approximately 1,350 feet south of SR 60 and 2,250 feet west of the Redlands Boulevard as a 42-inich RCP. The 42-inch RCP extends easterly and transitions into a 48-inch RCP, to a 54-inch RCP and finally to a 72-inch RCP until the confluence with Line F-2.

Line F-17 – Line F-17 begins at a point approximately 2,630 feet south of SR 60 and 2,250 feet west of the Redlands Boulevard as a 42-inch RCP. From there the 42-inch RCP extends easterly and transitions into a 48-inch RCP, to a 54-inch RCP, and finally to a 60-inch RCP until the confluence with Line F-2.

Line F-18 – Line F-18 begins at a point approximately 1,000 feet east of the intersection of Redlands Boulevard and Alessandro Boulevard as a 48-inch RCP. The 48-inch RCP extends westerly and transitions into a 60-inch RCP until the confluence with Line F-2.

Line F-19 – Line F-19 begins at a point approximately 500 feet east of the intersection of Redlands Boulevard and Brodiaea Avenue as a 60-inch RCP. The 60-inch RCP extends westerly until the confluence with Line F-2.

Line G – Line G begins approximately 850 feet south and 450 feet east of the intersection of Eucalyptus Avenue and Auto Mall Drive as an earthen bottom trapezoidal channel with rock-lined side slopes. The earthen channel runs southeasterly until a confluence with proposed Line G-7, approximately 400 feet north of the intersection of Cottonwood Avenue and Quincy Street. Line G continues southerly, parallel to Quincy Street, until an outlet into existing Line F. Typical channel sections in this reach have depths of 6 to 8 feet, base widths of 6 to 16 feet, and side slopes of 2:1.

Line G-1 – Line G-1 begins at a point approximately 1,200 feet north of SR 60 and 250 feet east of the Moreno Beach Drive as a 42-inch RCP. The 42-inch RCP extends easterly until the confluence with Line G-4.

Line G-2 – Line G-2 begins at the intersection of Hemlock Avenue and Petit Street as a 42-inch RCP. The 42-inch RCP extends westerly and transitions into a 54-inch RCP until the confluence with Line G-4.

Line G-3 – Line G-3 begins at a point approximately 1,975 feet east of Moreno Beach Drive immediately north of SR 60 as a concrete lined rectangular channel. The channel extends westerly until the confluence with Line G-4. Typical sections for this channel have a depth of 6.5 feet and a base width of 10 feet.
Line G-4 – Line G-4 begins at a point approximately 1,200 feet north of SR 60 and 500 feet east of Moreno Beach Drive as a 54-inch RCP. The 54-inch RCP extends southerly until it transitions and connects with the existing Caltrans culvert crossing under SR 60.

Line G-7 –Line G-7 begins at a point approximately 2,600 feet west of Redlands Boulevard, just south of SR 60, as an earthen bottom trapezoidal channel with rock-lined side slopes. The channel extends southerly until the confluence with Line G approximately 400 feet north of the intersection of Quincy Street and Cottonwood Avenue. Typical sections for this channel have a depth of 5 feet, base widths of 5 feet, and side slopes of 2:1.

Line G-8 – Line G-8 begins at a point approximately 500 feet east of the intersection of Quincy Street and Bay Avenue as a 48-inch RCP. The 48-inch RCP extends westerly until the confluence with Line G.

Line G-9 – Line G-9 begins at a point approximately 1,300 feet east of the intersection of Quincy Street and Alessandro Avenue as a 48-inch RCP. The 48-inch RCP extends westerly and transitions to a 54-inch RCP and then to a 60-inch RCP until the confluence with Line G.

Line G-10 – Line G-10 begins at a point approximately 750 feet east of the intersection of Quincy Street and Brodiaea Avenue as a 48-inch RCP. The 48-inch RCP extends easterly and transitions into a 54-inch RCP until the confluence with Line G.

Line G-11 – Line G-11 begins at a point approximately 1,250 feet east of the intersection of Quincy Street and Cactus Avenue as a 36-inch RCP. From there the 36-inch RCP extends easterly and transitions into a 48-inch RCP and then to a 54-inch RCP until the confluence with Line G.

Line H – Line H begins at the intersection of Mill Creek Road and Dracaea Avenue as a 42-inch RCP. The 42-inch RCP extends southerly to Cottonwood Avenue and then transitions to an 8.25'W x 5'D RCB which extends easterly in Cottonwood Avenue for 610 feet. Here the line runs southerly, transitions to a 75-inch RCP, to a 87-inch RCP, and continues southerly until Alessandro Boulevard. The 87-inch RCP then runs easterly in Alessandro Boulevard to Oliver Street, southerly in Oliver Street to Brodiaea Avenue, transitions to a 90-inch RCP, and continues southerly until the confluence with existing Line H at Cactus Avenue.

Line H-1 – Line H-1 begins at a point approximately 1,020 feet east of the intersection of Moreno Beach Drive and Alessandro Boulevard at the downstream terminus of an existing portion of Line H-1 as a 48-inch RCP. The 48-inch RCP extends westerly and transitions into a 63-inch RCP and then to a 75-inch RCP until the confluence with Line H-2 and H-1a approximately 650 feet east of Pearl Lane.

Line H-1a – Line H-1a begins at a point approximately 370 feet east of the intersection of Pearl Lane and Alessandro Boulevard as a 36-inch RCP. The 36-inch RCP extends easterly for 280 feet until the confluence with Line H-1 and H-2.

Line H-2 – Line H-2 begins at the intersection of Bethany Road and Cottonwood Avenue as a 33-inch RCP. The 33-inch RCP extends southerly and transitions into a 39-inch RCP, to a 42-inch RCP, and finally to a 54-inch RCP until the confluence with Line H-1 at Alessandro Boulevard. Line H-2 then resumes from the confluence with Line H-1 and Line H-1a approximately 650 feet east of Pearl Lane on Alessandro Boulevard as an 84-inch RCP. The 84-inch RCP extends southerly until the confluence with an existing portion of Line H-2 at Brodiaea Avenue.

Line H-3 – Line H-3 begins at the intersection of Moreno Beach Drive and Cottonwood Avenue as a 42-inch RCP. The 42-inch RCP extends southerly and transitions into a 45-inch RCP until the confluence with Line H-1 at Alessandro Boulevard.

Line H-4 – Line H-4 begins at a point approximately 1,550 feet east of the intersection of Nason Street and Bay Avenue as a 30-inch RCP. The 30-inch RCP extends westerly until the confluence with a Line H.

Line H-5 – Line H-5 begins at a point approximately 1,350 feet west of the intersection of Olive Street and Brodiaea Avenue as a 30-inch RCP. The 30-inch RCP extends easterly and transitions into a 33-inch RCP until the confluence with Line H.

Line H-5a – Line H-5a begins at a point approximately 290 feet east of the intersection of Olive Street and Brodiaea Avenue as a 36-inch RCP and extends westerly until the confluence with Line H.

Line H-6 – Line H-6 begins at a point approximately 1,130 feet east of the intersection of Landon Road and Brodiaea Ave as a 36-inch RCP. From there the 36-inch extends westerly until the confluence with the existing portion of Line H-6 approximately 500 feet east of the intersection of Landon Road and Brodiaea Avenue.

Line H-11 – Line H-11 begins at a point approximately 1,050 feet east of the intersection of Mill Creek Road and Dracaea Avenue at the terminus of Cold Creek Court Storm Drain Line A as a 60-inch RCP. The 60-inch RCP extends westerly for approximately 430 feet and then southerly until the confluence with line H at Cottonwood Avenue.

Line J – Line J begins at the intersection of Morrison Street and Dracaea Avenue at the confluence with Line J-1 as a 48-inch RCP. The 48-inch RCP extends southerly until connecting to the existing portion of Line J at the intersection of Morrison Street and Rockport Drive. Line J then resumes at the intersection of Morrison Street and Alessandro Boulevard at the terminus of the existing underground Line J facility as a 78-inch RCP. The 78-inch RCP extends southerly and transitions into a 84-inch RCP until Cactus Avenue where it connects with an existing portion of Line J.

Line J-1 – Line J-1 begins at a point approximately 1400 feet east of the intersection of Morrison Street and Dracaea Avenue as a 27-inch RCP. The 27-inch RCP extends westerly and transitions into a 39-inch RCP until the confluence with Line J at the intersection of Morrison Street and Dracaea Avenue.

Line J-7 – Line J-7 begins at a point approximately 1350 feet south and 810 feet west of the intersection of Morrison Street and Alessandro Boulevard as a 24-inch RCP. The 24-inch RCP extends easterly until the confluence with Line J.

Line J-8 – Line J-8 begins at a point approximately 1350 feet south and 1450 feet east of the intersection of Morrison Street and Alessandro Boulevard as a 39-inch RCP. The 39-inch RCP extends westerly and transitions into a 42-inch RCP until the confluence with Line J.

Line K – Line K begins at the outlet of the proposed Reche Canyon Debris Basin, approximately 1500 feet east and 350 feet north of the intersection of Moreno Beach Drive and Locust Drive, as a concrete lined trapezoidal channel located on the southerly side of Reche Canyon Road. The channel extends southeasterly along Reche Canyon Road and easterly on Locust Avenue until the intersection with Moreno Beach Drive.

Typical channel sections for this reach have a depth of 7 feet, base widths of 10 feet, and side slopes of 1.5:1. From the intersection the channel transitions into a 14'W x 7'D RCB for 160 feet as it turns southerly along Moreno Beach Drive. The 14'W x 7'D RCB then transitions to a 9.5'W x 7'D RCB and continues southerly until a point approximately 300 feet north of Juniper Avenue. At this point Line K extends southeasterly, transitions to an earthen channel with rock-lined side slopes and continues past Ironwood Avenue until an outlet into the existing Nason Basin. Typical channel sections for this reach have a depth of 6 feet, bottom widths of 25 to 30 feet, and side slopes of 2:1.

Line K-1 – Line K-1 begins at the intersection of Locust Avenue and Carrie Lane as a 42-inch RCP. The 42-inch RCP extends southerly to Kalmia Avenue, transitions to a 51-inch RCP as it extends westerly along Kalmia Avenue to Petit Street, and then southerly along Petit Street to the existing portion of Line K-1 approximately 665 feet north of the intersection of Petit Street and Juniper Avenue. Line K-1 then resumes at the downstream terminus of the existing Line K-1 facility at the intersection of Petit Street and Juniper Avenue as a 63-inch RCP. The 63-inch RCP extends southerly to Ironwood Avenue and then transitions to a 90-inch RCP as it extends westerly until the confluence with Line K.

Line K-2 –Line K-2 begins at a point approximately 640 feet east of the intersection of Petit Street and Juniper Avenue as a 33-inch RCP. The 33-inch RCP extends westerly until the confluence with Line K-1.

Line K-4 – Line K-4 begins at a point approximately 240 feet east of the intersection of Carrie Lane and Locust Avenue and extends westerly until the confluence with Line K-1.

Reche Canyon Debris Basin – The Reche Canyon Debris Basin is located at a point approximately 1500 feet east and 350 feet north of the intersection of Locust Avenue and Moreno Beach Drive, just upstream of proposed Line K. The debris basin will require approximately 7.5 acres of right-of-way.

Ironwood Debris Basin – The Ironwood Debris Basin is located just north of the intersection of Theodore Street Ironwood Avenue. The basin will require approximately 2.3 acres of right-of-way.

Quincy Basin – The proposed Quincy Basin is located approximately 2600 feet west of Redlands Boulevard just north of SR 60. The basin has a right-of-way footprint of approximately 22.5 acres, a storage volume of 150 ac-ft, and an embankment height of approximately 12.5 feet. The basin outlet is proposed as one 60-inch RCP which will connect to an existing 60-inch CMP culvert crossing under SR 60.

Cactus Basin – The proposed Cactus Basin is located between Redlands Boulevard and Wilmot Street just north of Cactus Avenue. The basin has a right-of-way footprint of approximately 21.7 acres, a storage volume of 100 ac-ft, and an embankment height of approximately 8 feet. The basin outlet utilizes the existing quadruple 8'W x 6'D RCB culverts under Cactus Avenue.

Sinclair Basin – The proposed Sinclair Basin is located approximately 2600 feet east of Theodore Street just north of SR 60. The basin has a right-of-way footprint of approximately 25 acres, a storage volume of 170 acre-ft, and an embankment height of approximately 12.5 feet. The basin outlet is proposed as two 60-inch RCPs which connect to two existing 72-inch CMP culverts crossing under SR 60.

SECTION IX – ALTERNATIVES

Given that this Master Drainage Plan (MDP) update is essentially a refinement of the adopted Moreno MDP, a relatively narrow range of alternatives was considered. Nonetheless, several alternatives were developed and evaluated against the project objectives established by the District and the City of Moreno Valley. The following section provides a brief summary of each alternative and indicates the preferred alternative. For the full alternative analysis and discussion, see appendix A.

Alternatives Overview

The following paragraphs describe the major components of each alternative developed during the MDP revision. Each description is supplemented with an exhibit in the appendix which displays the layout of facilities and basin locations. It should also be noted that, while the MDP update was being developed, the District and City mutually agreed that the existing Line F-2 storm drain facility, which is currently sized as a 10-year facility, would be reconstructed to provide 100-year flood capacity. Thus, the proposed reconstruction of Line F-2 was assumed to be a part of each alternative considered for the Moreno MDP Revision.

Alternative 1: This alternative consists of the same types of facilities and alignments as in the Adopted MDP. Two detention basins are proposed along the Line F channel alignment: 1) Sinclair Basin just north of SR 60; and 2) Bay Avenue Basin located on the north side of Bay Avenue. In addition, Reche Canyon Debris Basin has been added to capture debris upstream of Line K. It should be noted that, similar to the Adopted MDP, this alternative proposes 1) concrete lining for all channel segments; and 2) makes use of the existing highway drainage culverts located under SR 60. See Exhibit 1 in the appendix for further detail.

Alternative 2a and 2b: The principal difference between these two alternatives and Alternative 1 is the realignment of proposed facilities upstream of SR 60 in an effort to maintain the current natural drainage patterns within the upper watershed. This was accomplished by realigning the mainline facilities, specifically Line A, to convey flows from the foothills southerly to the existing culverts at SR 60 instead of diverting flows into the proposed Sinclair Basin. Both of these alternatives propose Lines F, G, and K as earthen channels with rock-lined side slopes (unlined channels) in place of the concrete lined channels proposed in Alternative 1. Reche Canyon Debris Basin has been included to capture debris upstream of Line K. Alternatives 2a and 2b differ from each other primarily in the size, number, and location of proposed detention basins. See Exhibit 2A and 2B for further detail.

Alternative 3: This alternative retains the major realignment of Line A, as proposed in Alternatives 2a and 2b, but proposes three detention basins downstream of SR 60 in place of the various basins proposed in Alternatives 2a and 2b. This option would require the upsizing the existing highway drainage culverts under SR 60 to convey the 100-year flows to the proposed basin locations. The three detention basins proposed in Alternative 3 are: 1) Brodiaea Basin along Line G just north of Brodiaea Avenue; 2) Fir Basin just south of SR 60 along Line G-7; and 3) Cactus Basin at the downstream end of proposed Line F. This alternative also proposes Lines F, G, and K as earthen channels with rock-lined side slopes in place of the concrete lined channels proposed in Alternative 1. Reche Canyon Debris Basin has been included to capture debris upstream of Line K. See Exhibit 3 for further detail.

Alternative 4 – Preferred Alternative: Similar to Alternatives 2a, 2b and 3, this alternative also calls for the realignment of proposed facilities upstream of SR 60 in an effort to maintain the current natural drainage patterns of the area. Alternative 4 proposes the implementation of three detention basins: 1) Quincy Basin located along Line A just north of the freeway; 2) Sinclair Basin located just north of SR 60 at the upstream end of Line F; and 3) Cactus Basin located at the confluence of Line F and Line F-2 just north of Cactus

Avenue. Similar to Alternative 2a, 2b, and 3, this alternative also proposes Lines F, G and K as earthen channels with rock-lined side slopes in place of the concrete lined channels proposed in Alternative 1. Reche Canyon Debris Basin has been included to capture the expected debris upstream of Line K, as well as Ironwood Debris Basin to capture expected debris upstream of Line C. See Exhibit 4 for further detail.

SECTION X – ESTIMATED COST

A cost summary for the MDP facilities is shown in Table 3. Cost estimates were based on 2013 Planning Unit Cost Sheets and include construction, right-of-way, and 40% for engineering, administration, and environmental mitigation and contingencies.

The costs estimates for the proposed facilities include the cost of manholes, catch basins and pipe installations. Manholes are located as necessary with a maximum spacing of 500 feet. Catch basins are not specifically located but the total number of lineal feet is included in the cost estimate. The cost for the open channel facilities includes the cost of access roads and right-of-way requirements. Channel access roads are assumed to be 15 feet wide and two (2) access roads were included where channel top widths exceed 20 feet. An additional 5 foot buffer has been included on either side of channel access roads for anticipated cut and fill. Detention basin costs include the cost of a 20 foot wide access road around the perimeter.

TABLE 3
MORENO MASTER DRAINAGE PLAN REVISION 2
COST SUMMARY

Facility	Construction Cost	Right-of-Way Cost	Total Cost
Line A	$4,941,000	$10,000	$4,951,000
Line A-1	$2,658,000	-	$2,658,000
Line A-2	$302,000	-	$302,000
Line A-3	$297,000	-	$297,000
Line A-6	$2,366,000	-	$2,366,000
Line A-7	$224,000	-	$224,000
Line A-8	$447,000	-	$447,000
Line B	$7,967,000	-	$7,967,000
Line B-1	$1,269,000	-	$1,269,000
Line B-2	$482,000	-	$482,000
Line B-3	$263,000	-	$263,000
Line C	$2,091,000	-	$2,091,000
Line D-1	$404,000	-	$404,000
Line D-2	$973,000	-	$973,000
Line D-3	$973,000	-	$973,000
Line D-4	$310,000	-	$310,000
Line D-5	$6,014,000	-	$6,014,000

Facility	Construction Cost	Right-of-Way Cost	Total Cost
Line D-7	$951,000	-	$951,000
Line D-8	$538,000	-	$538,000
Line D-9	$145,000	-	$145,000
Line F	$13,675,000	$1,055,000	$14,730,000
Line F-2	$8,804,000	-	$8,804,000
Line F-5	$1,430,000	-	$1,430,000
Line F-13	$613,000	-	$613,000
Line F-15	$886,000	-	$886,000
Line F-16	$1,401,000	-	$1,401,000
Line F-17	$1,149,000	-	$1,149,000
Line F-18	$588,000	-	$588,000
Line F-19	$347,000	-	$347,000
Line E-1	$885,000	-	$885,000
Line E-2	$885,000	-	$885,000
Line E-3	$1,092,000	-	$1,092,000
Line E-4	$801,000	-	$801,000
Line E-5	$1,052,000	-	$1,052,000
Line E-6	$788,000	-	$788,000
Line E-7	$1,109,000	-	$1,109,000
Line E-8	$745,000	-	$745,000
Line E-10	$624,000	-	$624,000
Line G	$10,121,000	$935,000	$11,056,000
Line G-1	$129,000	-	$129,000
Line G-2	$431,000	-	$431,000
Line G-3	$1,664,000	$50,000	$1,714,000
Line G-4	$617,000	-	$617,000
Line G-7	$2,913,000	$305,000	$3,218,000
Line G-8	$264,000		$264,000
Line G-9	$735,000	-	$735,000
Line G-10	$420,000	-	$420,000
Line G-11	$647,000	-	$647,000
Line H	$7,367,000	-	$7,367,000
Line H-1	$1,841,000	-	$1,841,000
Line H-1a	$115,000	-	$115,000
Line H-2	$2,507,000	-	$2,507,000
Line H-3	$1,251,000	-	$1,251,000
Line H-4	$177,000	-	$177,000
Line H-5	$525,000	-	$525,000

Facility	Construction Cost	Right-of-Way Cost	Total Cost
Line H-5a	$132,000	-	$132,000
Line H-6	$278,000	-	$278,000
Line H-11	$981,000	-	$981,000
Line J	$11,776,000	-	$11,776,000
Line J-1	$591,000	-	$591,000
Line J-7	$258,000	-	$258,000
Line J-8	$682,000	-	$682,000
Line K	$9,816,000	$570,000	$10,386,000
Line K-1	$4,240,000	-	$4,240,000
Line K-2	$283,000	-	$283,000
Line K-4	$138,000	-	$138,000
Cactus Basin	$5,047,000	$3,300,000	$8,347,000
Sinclair Basin	$6,014,000	$2,400,000	$8,414,000
Quincy Basin	$5,174,000	$2,150,000	$7,324,000
Reche Canyon Debris Basin	$706,000	$713,000	$1,419,000
Ironwood Debris Basin	$197,000	$219,000	$416,000
Total	**$148,526,000**	**$11,707,000**	**$160,233,000**

NOTE: Total Costs include 40% for Engineering, Administration, MSHCP Fee and Contingencies.

SECTION XI - CONCLUSIONS

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

1. The Moreno Valley area has experienced serious flooding problems in the past. The fully implemented plan should, in conjunction with ultimate street improvements for the area within the boundaries of the Moreno MDP, contain the 100-year frequency flows and alleviate the primary sources of flooding.

2. The proposed plan addresses the denser development anticipated in the Moreno Valley area and provides network of drainage facilities which, when implemented, will provide adequate flood protection to the community as development continues.

3. The proposed MDP lends itself to a staged construction as funds become available.

4. The total cost of the recommended improvements, including right-of-way, engineering, environmental mitigation, administration, and contingencies is estimated to be $160,233,000.

SECTION XII - RECOMMENDATIONS

It is recommended that:

1. The Moreno Master Drainage Plan revision, as set forth herein, be adopted by the City of Moreno Valley and the District's Board of Supervisors.

2. The revisions to the Moreno Master Drainage Plan, as set forth herein, replace the Master Drainage Plan adopted in April 1991.

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

4. Right-of-way necessary for the implementation of the MDP be protected from encroachment.

APPENDIX A

ALTERNATIVES ANALYSIS

Alternatives Overview

Given that this Master Drainage Plan (MDP) update is essentially a refinement of the adopted Moreno MDP, a relatively narrow range of alternatives was considered. Nonetheless, several alternatives were developed and evaluated against the project objectives established by the District and the City of Moreno Valley. This section provides a brief description of the major components of each alternative and indicates preferred alternative.
Each description is supplemented with an exhibit in the appendix which displays the layout of facilities and basin locations.

It should also be noted that, while the MDP update was being developed, the District and City mutually agreed that the existing Line F-2 storm drain facility, which is currently sized as a 10-year facility, would be reconstructed to provide 100-year flood capacity. Thus, the proposed reconstruction of Line F-2 was assumed to be a part of each alternative considered for the Moreno MDP Revision.

Alternative 1: This alternative consists of the same types of facilities and alignments as in the currently adopted Moreno MDP (Adopted MDP). Two detention basins are proposed along the Line F channel alignment: 1) Sinclair Basin just north of California State Route 60 (SR 60); and 2) Bay Avenue Basin located on the north side of Bay Avenue. In addition, Reche Canyon Debris Basin has been added to capture debris upstream of Line K. It should be noted that, similar to the Adopted MDP, this alternative proposes 1) concrete lining for all channel segments; and 2) makes use of the existing highway drainage culverts located under SR 60. See Exhibit 1 in the appendix for further detail.

Alternative 2a and 2b: The principal difference between these two alternatives and Alternative 1 is the realignment of proposed facilities upstream of SR 60 in an effort to maintain the current natural drainage patterns within the upper watershed. This was accomplished by realigning the mainline facilities, specifically Line A, to convey flows from the foothills southerly to the existing culverts at SR 60 instead of diverting flows into the proposed Sinclair Basin. Both of these alternatives propose Lines F, G, and K as earthen channels with rock-lined side slopes (unlined channels) in place of the concrete lined channels proposed in Alternative 1. Reche Canyon Debris Basin has been included to capture debris upstream of Line K. Alternatives 2a and 2b differ from each other primarily in the size, number, and location of proposed detention basins. See Exhibit 2A and 2B for further detail.

Alternative 3: This alternative retains the major realignment of Line A, as proposed in Alternatives 2a and 2b, but proposes three detention basins downstream of SR 60 in place of the various basins proposed in Alternatives 2a and 2b. This option would require the upsizing the existing highway drainage culverts under SR 60 to convey the 100-year flows to the proposed basin locations. The three detention basins proposed in Alternative 3 are: 1) Brodiaea Basin along Line G just north of Brodiaea Avenue; 2) Fir Basin just south of SR 60 along Line G-7; and 3) Cactus Basin at the downstream end of proposed Line F. This alternative also proposes Lines F, G, and K as earthen channels with rock-lined side slopes in place of the concrete lined channels proposed in Alternative 1. Reche Canyon Debris Basin has been included to capture debris upstream of Line K. See Exhibit 3 for further detail.

Alternative 4 – Preferred Alternative: Similar to Alternatives 2a, 2b and 3, this alternative also calls for the realignment of proposed facilities upstream of SR 60 in an effort to maintain the current natural drainage patterns of the area. Alternative 4 proposes the implementation of three detention basins: 1) Quincy Basin located along Line A just north of the freeway; 2) Sinclair Basin located just north of SR 60 at the upstream end of Line F; and 3) Cactus Basin located at the confluence of Line F and Line F-2 just north of Cactus Avenue. Similar to Alternative 2a, 2b, and 3, this alternative also proposes Lines F, G and K as earthen channels with rock-lined side slopes in place of the concrete lined channels proposed in Alternative 1. Reche Canyon Debris Basin has been included to capture the expected debris upstream of Line K, as well as Ironwood Debris Basin to capture expected debris upstream of Line C. See Exhibit 4 for further detail.

Comparing Alternatives: Total Project Footprint

Given that this MDP update is essentially a refinement of an adopted MDP, a relatively narrow range of alternatives was considered. One way of analyzing the potential for impacts or expected plan benefits is by comparing the overall project footprint of each alternative. In order to do so the following observations and assumptions were made:

1) Each of the four conceptual alternatives has the same drainage boundary and provides a similar level of flood protection.
2) The overall footprint of proposed lateral facilities is similar between the four alternatives.
3) In comparison to concrete lined channels, unlined channels provide greater infiltration potential.
4) In comparison to concrete lined channels, unlined channels will have larger footprints.
5) The principal difference between the four alternatives is the size, number, and location of proposed detention and debris basins.
6) The relative differences in project footprint for the detention and debris basins may be used to develop comparative rankings of the alternatives against the project objectives.

A summary of the approximate total basin footprints is shown in Table 4.

TABLE 4: Alternatives: Basin Footprint Summary

Moreno MDP Revision Alternatives: Approximate Basin Footprint Summary			
Alternative	**Proposed Basin**		**Basin Footprints (Detention and Debris) in acres**
1	Sinclair Basin*		28.5
	Bay Basin*		36.8
	Reche Canyon Debris Basin*		10.0
		Total	***75.3***
2a	Sinclair Basin*		14.0
	Bay Basin*		17.4
	Redlands Basin*		6.0
	Quincy Basin*		13.2
	Brodiaea Basin*		11.3
	Reche Canyon Debris Basin*		10.0
		Total	***71.9***
2b	Highland Basin*		14.4
	Bay Basin*		30.5
	Ironwood Basin*		13.6
	Eucalyptus Basin*		6.4
	Reche Canyon Debris Basin*		10.0
		Total	***74.9***
3	Brodiaea Basin*		10.5
	Fir Basin*		28.3
	Cactus Basin*		29.5
	Reche Canyon Debris Basin*		10.0
		Total	**78.3**
4	Sinclair Basin		25.0
	Cactus Basin		21.7
	Quincy Basin		22.5
	Reche Canyon Debris Basin*		10.0
	Ironwood Debris Basin*		3.1
		Total	***82.3***

Note: *These basin footprint acreages have been adjusted by a factor 1.33 to account for additional right-of-way requirements (e.g., access road right-of-way, embankment slopes, property boundaries, basin grading, existing topography, spillway requirements, etc.) that were included in the more detailed footprint estimations developed for the Alternative 4 detention basins. The factor was based on comparisons of basin modeling methodologies for Alternative 4 and engineering judgment.*

Alternative Analysis

A decision matrix was developed in order to evaluate the alternatives against the project objectives established by the District and the City of Moreno Valley. Criteria for the matrix were selected to represent aspects of the project objectives which could be qualitatively evaluated between the alternatives. The matrix is shown in Table 5.

Criteria Descriptions:

1) **Provide 100 Year Flood Protection**: This criterion represents the ability of an alternative to provide 100 year flood protection in conjunction with ultimate street improvements.

2) **Removal of FEMA mapped Special Flood Hazard Areas**: This criterion represents the ability of an alternative to remove FEMA mapped Special Flood Hazard Areas within the drainage boundary.

3) **Potential for Infiltration:** This criterion represents the extent to which an alternative is able to promote infiltration of runoff back into the ground through the presence of basins and earthen bottomed channels.

4) **Perpetuating Natural Drainage Course:** This criterion represents the extent to which an alternative reduces the major diversion upstream of SR 60 proposed in the Adopted MDP.

5) **Providing Noise Buffer for the Community:** The basins located adjacent to SR 60 have the potential to serve as buffer zones for the noise generated by traffic on SR 60. This criterion represents the extent to which an alternative incorporates this benefit into its proposed basin locations.

6) **Minimizing Potential Disturbances (Project Footprint):** Alternatives with larger footprints were viewed as having a higher potential of environmental impacts during construction (e.g. air quality, disturbing natural habitats, cultural resources, etc...). This criterion represents the relative potential for such disturbances based upon a comparison of anticipated project footprints for each alternative.

7) **Sediment/Debris Reduction:** This criterion represents how well each alternative achieves the reduction of debris from watersheds with high debris producing potential. The prevention of debris and sediment at its source will remove the need to use bulking factors for design flow rates of downstream facilities and reduce the final size of the mainline facilities as well as improve water quality.

8) **Ease of Maintenance:** This criterion represents the relative amount of maintenance which can be expected of each alternative in regards to logistics and routine/non-routine maintenance.

Scoring:

Each alternative was scored against the criteria according to the following schematic:

- Alternatives were compared and assigned a score of 2 if their ability to satisfy a criterion is reasonably comparable to any other alternative.
- Alternatives which satisfy a criterion more than those alternatives assigned a score of 2 were be assigned a score of 3.
- Alternatives which satisfy a criterion less than those alternatives assigned a score of 2 were be assigned a score of 1.
- All criteria was given a weight of 1.
- The total sum of the criteria scores for each alternative represents the overall ability of each alternative to satisfy the objectives of the MDP revision.
- Criteria for “Providing 100-year Flood Protection” and “Removal of FEMA Mapped Special Flood Hazard Areas” were included solely as reminders of key project objectives and were not scored according to the schematic described above.

TABLE 5: Decision Matrix

Name	1) Provide 100 Year Flood Protection	2) Removal of FEMA Mapped Special Flood Hazzard Areas	3) Potential for Infiltration	4) Perpetuating the Natural Drainage Course	5) Providing Noise Buffer for the Community	6) Project Footprint (Potential Disturbances)	7) Sediment/Debris Reduction	8) Ease of Maintainence	Totals
Score Range	N/A	N/A	More = 3 Comparable = 2 Less = 1	More = 3 Comparable = 2 Less = 1	More = 3 Comparable = 2 Less = 1	More = 3 Comparable = 2 Less = 1	More = 3 Comparable = 2 Less = 1	More = 3 Comparable = 2 Less = 1	MAX 18
Alternative1	YES	YES	1	1	2	2	2	3	11
Alternative 2a	YES	YES	2	3	2	3	2	1	13
Alternative 2b	YES	YES	2	2	1	2	2	1	10
Alternative 3	YES	YES	3	2	2	1	2	2	12
Alternative 4*	YES	YES	3	2	3	1	3	2	14

*Alternative 4 was selected as the preferred alternative and has received concurrance from the City of Moreno Valley.

Criteria Scoring Discussion

1) Provide 100 Year Flood Protection:

- Each alternative was developed to provide the same level of flood protection in conjunction with ultimate street improvements.

2) Removal of FEMA mapped Special Flood Hazard Areas:

- Each alternative was developed to reduce flooding and allow the removal FEMA mapped Special Flood Hazard Areas within the drainage boundary.

3) Potential for Infiltration:

- It was assumed that larger basin footprints and earthen channels in lieu of concrete channels would better facilitate the infiltration of runoff.
- Alternatives were scored for this criterion based upon the estimated total basin footprint required for the full implementation of each alternative with the exception of Alternative 1 which automatically received a lower score (see next point for further details).
- Alternative 1, 2a and 2b all have comparable basin footprints; however, Alternative 1 proposes concrete lined channels (as in the Adopted MDP) and Alternatives 2a and 2b propose earthen bottom channels. Alternative 1 therefore has a lower potential for infiltration and received a score of 1. Alternatives 2a and 2b both received a score of 2.
- Alternatives 3 and 4 both received a score of 3 for having larger total basin footprints than Alternative 2a and 2b. Alternatives 3 and 4 also proposed earthen bottom channels.

4) Perpetuating Natural Drainage Course:

- Alternatives 2b, 3, and 4 all include the realignment of facilities to reduce the major Line A diversion proposed in the Adopted MDP; however, all alternatives still include minor diversions primarily related to their proposed Line D alignments. Alternatives 2b, 3 and 4 received a score of 2.
- Alternative 1 received a score of 1 because it would maintain the Line A diversion proposed in the Adopted MDP.
- Alternative 2a received a score of 3 because it most effectively removes the Line A diversion proposed in the Adopted MDP and minimizes diversions within the drainage area better than all other alternatives.

5) Providing Noise Buffer for the Community:

- Alternatives 1, 2a, and 3 received a score of 2 because they all propose one basin to be located immediately adjacent to SR 60 and would provide the community with some buffer from the noise generated by the freeway.
- Alternative 2b received a score of 1 because it proposes no basins immediately next to SR 60 and would not provide any noise buffer.

- Alternative 4 received a score of 3 because it proposes 2 basins to be located immediately next to SR 60 and would provide the most buffer area for the future residential communities.

6) Minimizing Potential Disturbances (Project Footprint):

- Each alternative was scored based upon the relative differences between their anticipated project footprints.
- The relative anticipated project footprints for each alternative were compared using approximate total basin footprint acreages (see previous Comparing Alternatives section).
- The largest difference between the largest and the smallest total basin footprint is approximately 15% (71.9 Ac. vs. 82.3 Ac.).
- Alternative 1, 2a and 2b all have comparable basin footprints; however, Alternative 1 proposes concrete lined channels (as in the Adopted MDP) and Alternatives 2a and 2b propose earthen bottom channels. Alternative 1 therefore has a smaller anticipated project footprint, less potential for environmental impacts during construction, and received a score of 3. Alternatives 2a and 2b both received a score of 2.
- Alternatives 3 and 4 both received a score of 1 for having the largest anticipated project footprints.

7) Sediment/Debris Reduction:

- Alternatives 1, 2a, 2b, and 3 received a score of 2 because they propose Reche Canyon Debris Basin to capture debris and sediment from the watershed with the most debris producing potential.
- Alternative 4 received a score of 3 because it proposes Reche Canyon Debris Basin and Ironwood Debris basin to capture debris from the two watersheds with the most debris producing potential.

8) Ease of Maintenance:

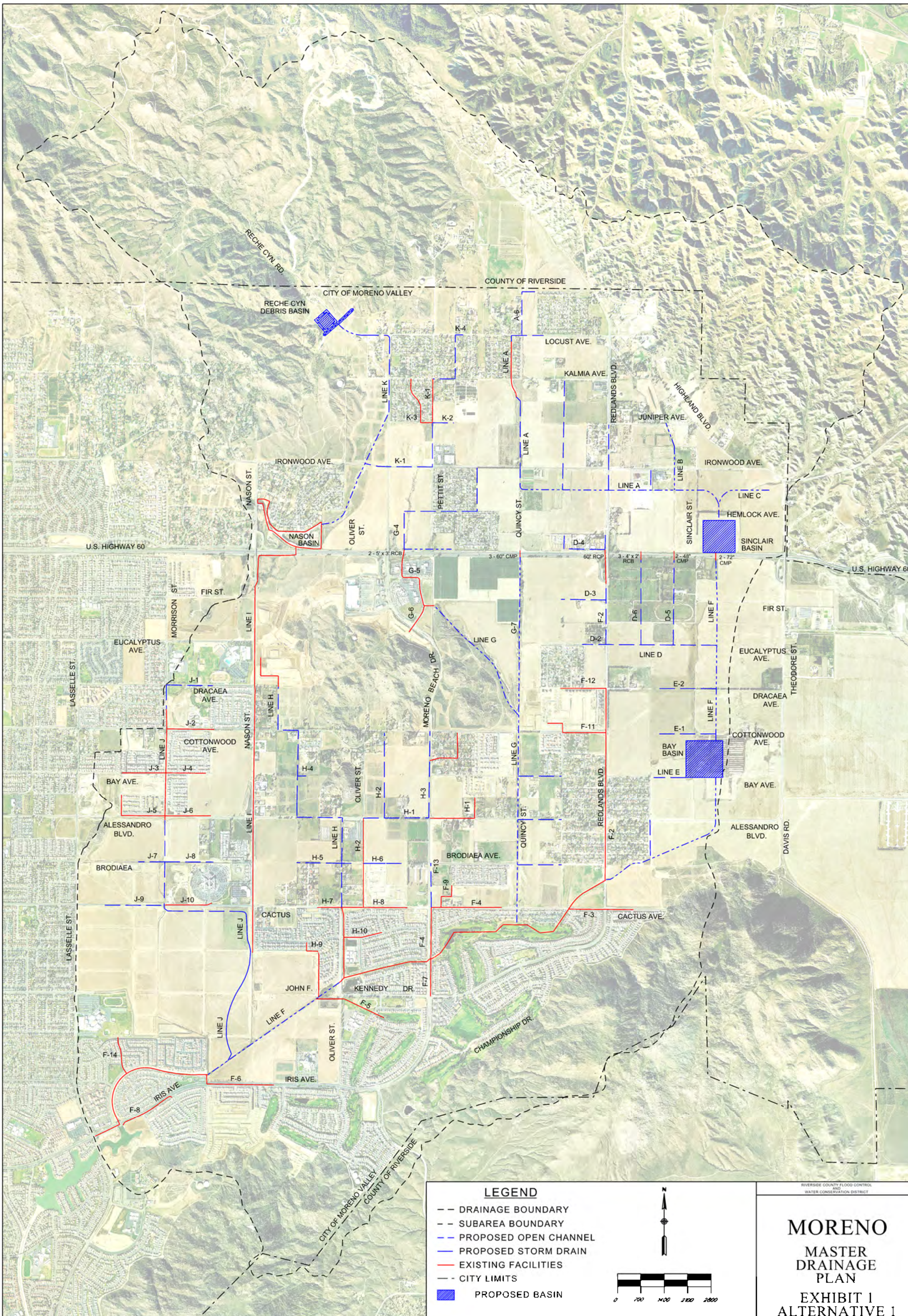
- Detention basins were assumed to require routine maintenance for mowing/weed abatement and erosion control.
- Debris basins were assumed to require routine maintenance for sediment removal from the basins themselves while reducing the amount of sediment deposited in underground facilities.
- Earthen channels were assumed require routine maintenance for mowing/weed abatement.
- The complexity of scheduling for maintenance activities was expected to increase with the number of basins proposed in an alternative.
- Alternative 1 received a score of 3 because it proposed the fewest basins which, when coupled with the proposed concrete lined channels, would require the least amount of routine maintenance of all four alternatives.
- Alternatives 3 and 4 were viewed as comparable and received a score of 2 under this criterion. Alternative 3 proposes 3 detention basins and 1 debris basin while Alternative 4 proposes 3 detention basins and 2 debris basins. While an additional debris basin in Alternative 4 may require additional maintenance on the basin itself it reduces the potential for downstream facilities to clog and require maintenance.

- Alternatives 2a and 2b received scores of 1 for proposing the largest number of basins. Alterative 2a proposes 5 detention basins and 1 debris basin and Alternative 2b proposes 4 detention basins and 1 debris basin.

Preferred Alternative

Table 5 shows the completed matrix with the total scores for each alternative. Based upon the evaluation, and as highlighted by the matrix, Alternative 4 best fits the objectives set forth for the project and was selected as the Preferred Alternative. Although the anticipated project footprint for Alternative 4 is slightly larger than the other alternatives, Alternative 4 would provide more opportunities for infiltration of runoff; it would provide a noise buffer for the surrounding community; and would reduce the amount of sediment and debris in the drainage system by capturing it at its source. Alternative 4 was discussed with City of Moreno Valley staff and they provided their concurrence with its selection as the Preferred Alternative.

APPENDIX B



COUNTY OF RIVERSIDE
CITY OF MORENO VALLEY
RECHE CYN. RD
RECHE CYN
DEBRIS BASIN
LOCUST AVE.
KALMIA AVE.
REDLANDS BLVD.
HIGHLAND BLVD.
JUNIPER AVE.
IRONWOOD AVE.
NASON ST.
NASON BASIN
OLIVER ST.
PETTIT ST.
QUINCY ST.
SINCLAIR ST.
HEMLOCK AVE.
SINCLAIR BASIN
U.S. HIGHWAY 60
2 - 5' x 3' RCB
3 - 60" CMP
60" RCP
3 - 4' x 2' RCB
2 - 48" CMP
2 - 72" CMP
FIR ST.
MORRISON ST.
EUCALYPTUS AVE.
LASSELLE ST.
DRACAEA AVE.
COTTONWOOD AVE.
BAY AVE.
ALESSANDRO BLVD.
BRODIAEA
BRODIAEA AVE.
CACTUS
CACTUS AVE.
MORENO BEACH DR.
BAY BASIN
THEODORE ST.
DAVIS RD.
JOHN F.
KENNEDY DR
CHAMPIONSHIP DR.
IRIS AVE.
CITY OF MORENO VALLEY
COUNTY OF RIVERSIDE
LINE A
LINE B
LINE C
LINE D
LINE E
LINE F
LINE G
LINE H
LINE I
LINE J
LINE K
A-6
K-1
K-2
K-3
K-4
D-2
D-3
D-4
D-5
D-6
E-1
E-2
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H-8
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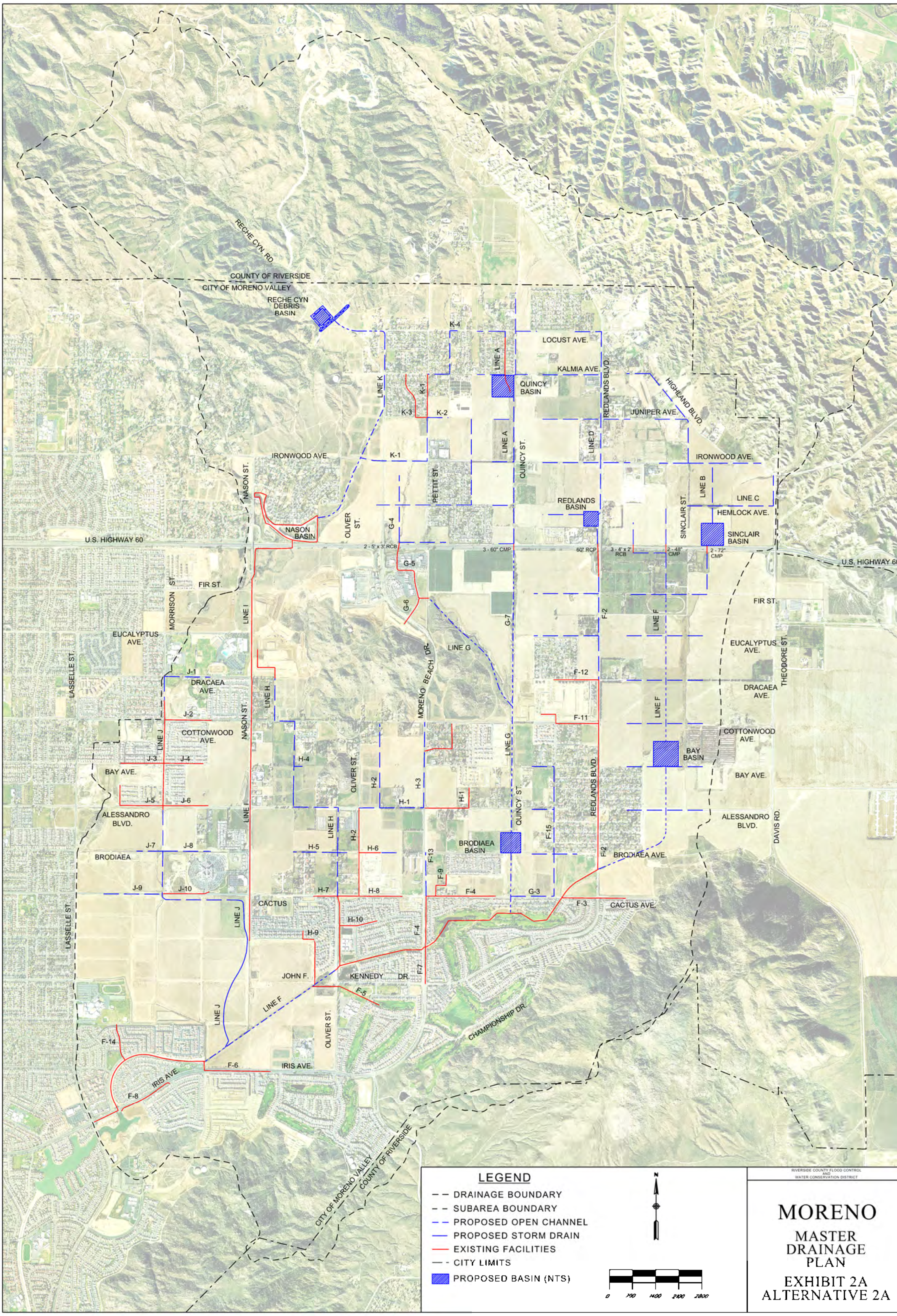
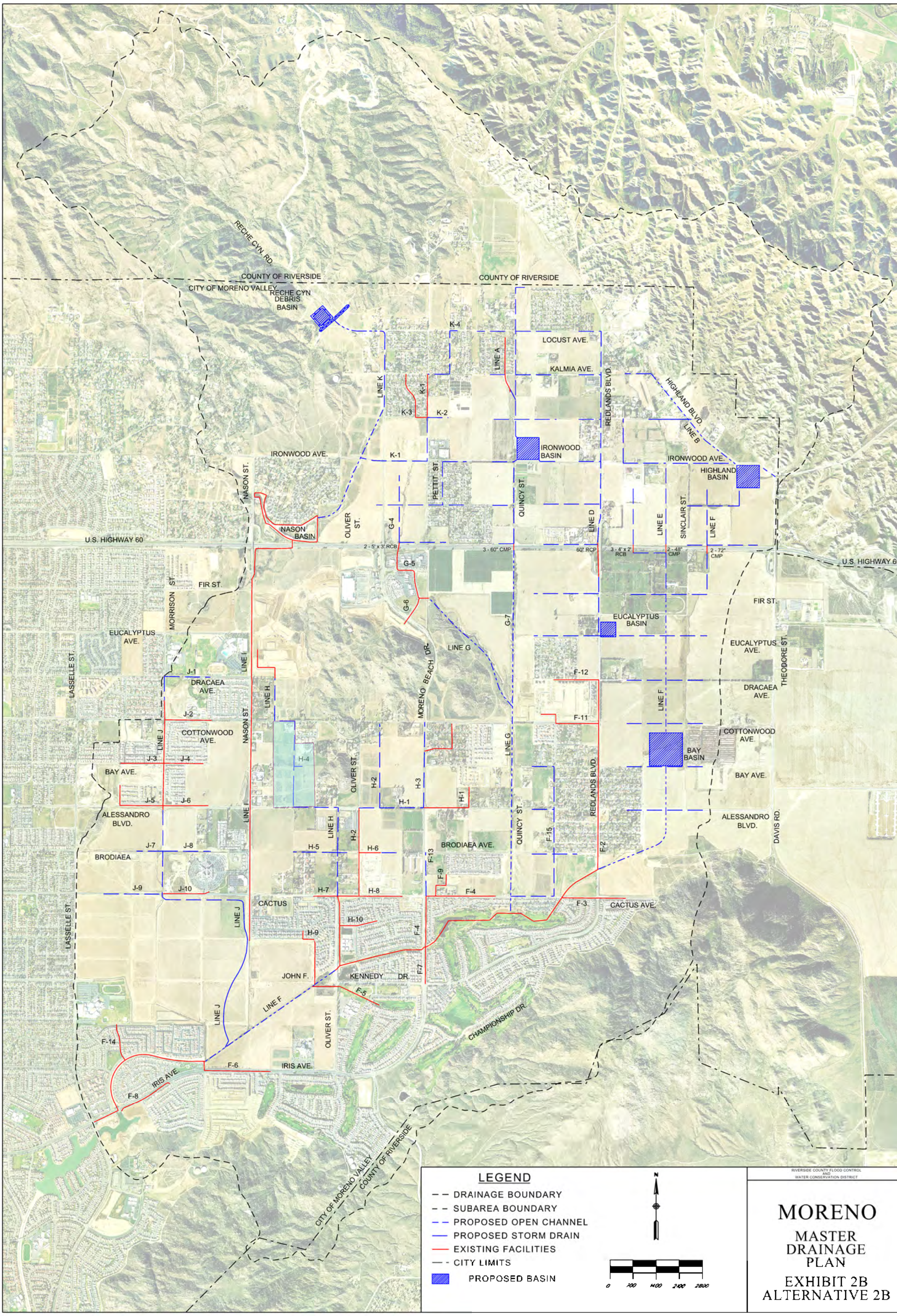
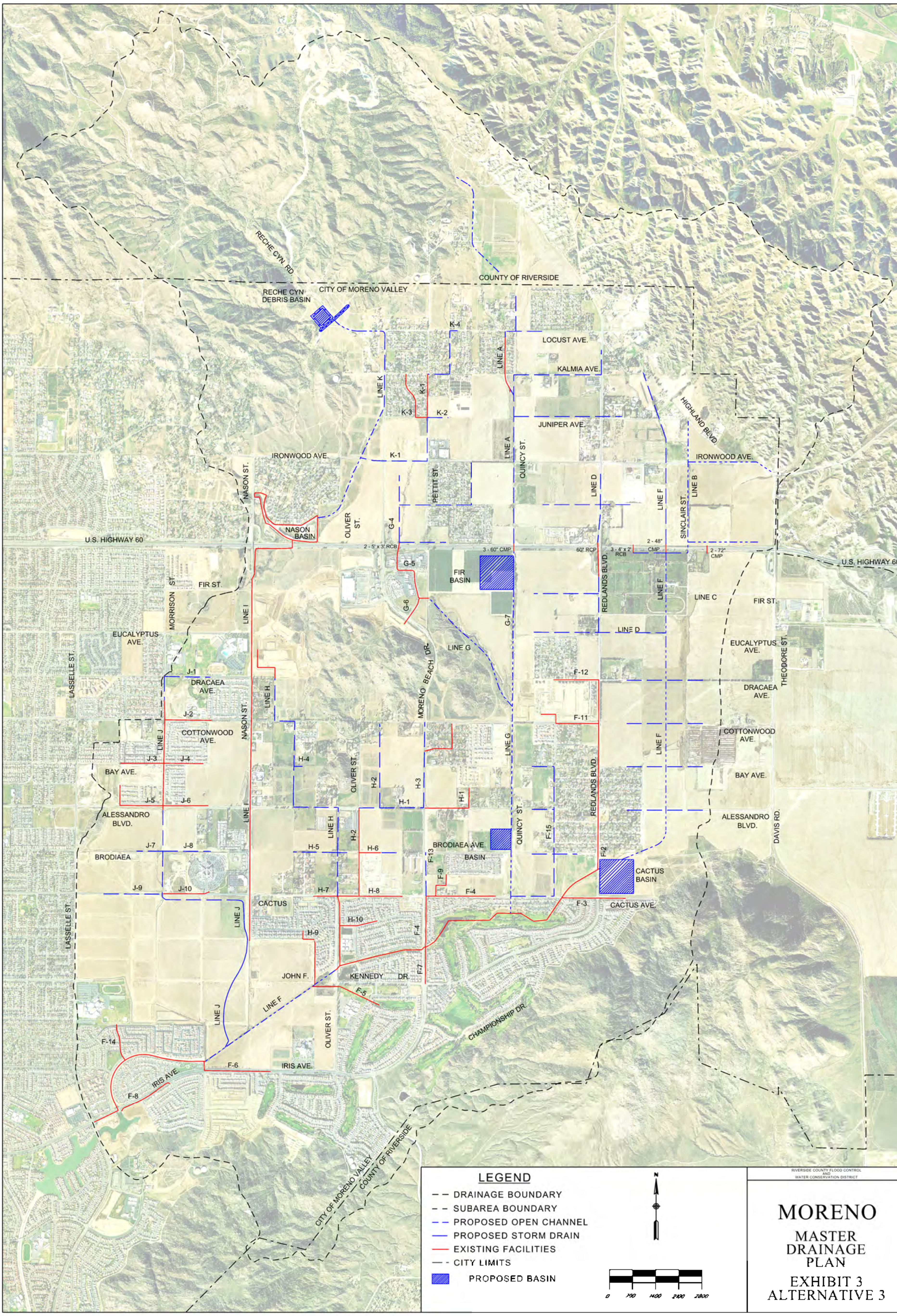
H-10
J-1
J-2
J-3
J-4
J-5
J-6
J-7
J-8
J-9
J-10
LEGEND
DRAINAGE BOUNDARY
SUBAREA BOUNDARY
PROPOSED OPEN CHANNEL
PROPOSED STORM DRAIN
EXISTING FACILITIES
CITY LIMITS
PROPOSED BASIN
N
0
700
1400
2100
2800
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
MORENO
MASTER DRAINAGE PLAN
EXHIBIT 1
ALTERNATIVE 1



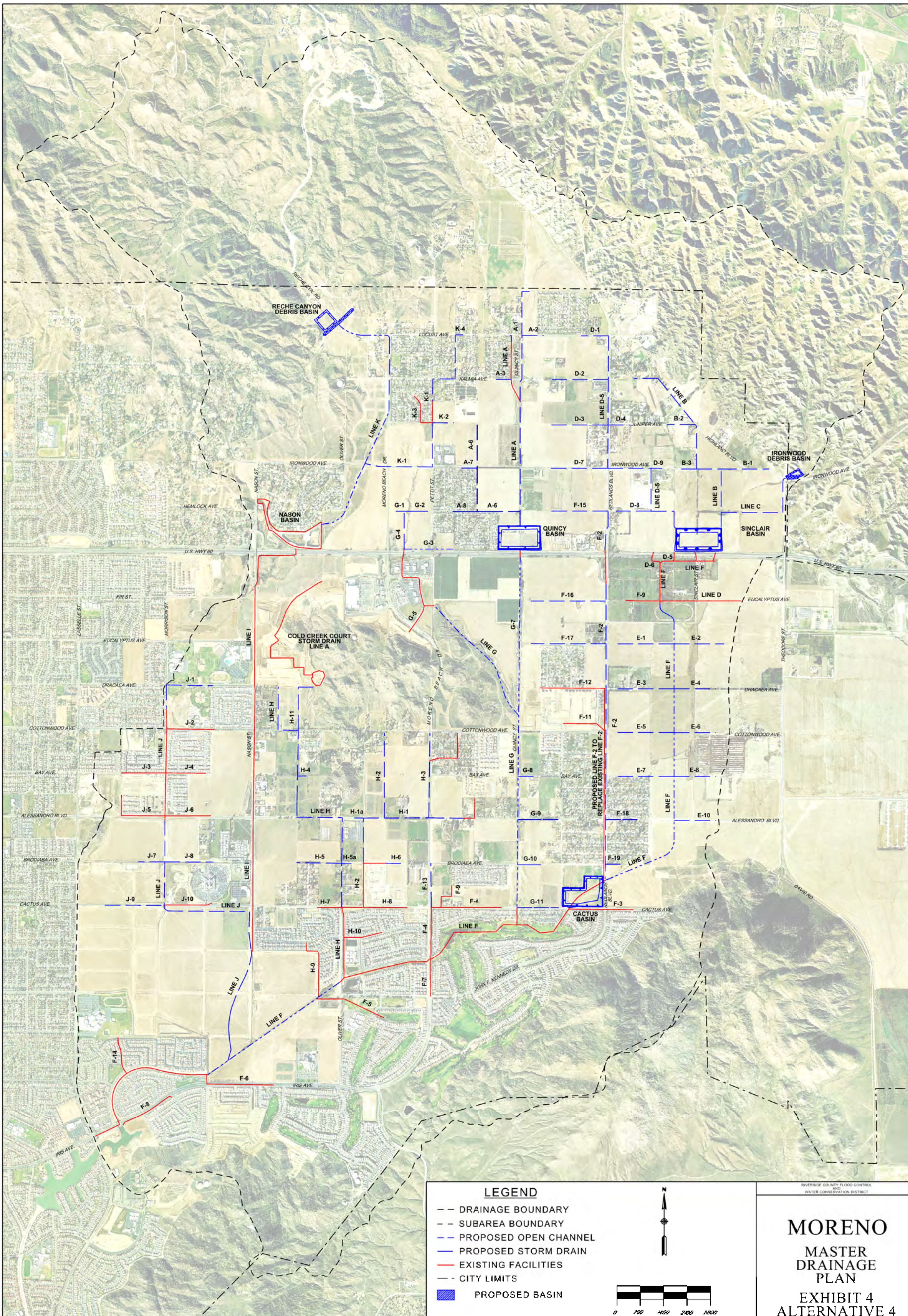
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
MORENO
MASTER DRAINAGE PLAN
EXHIBIT 2A
ALTERNATIVE 2A
LEGEND
DRAINAGE BOUNDARY
SUBAREA BOUNDARY
PROPOSED OPEN CHANNEL
PROPOSED STORM DRAIN
EXISTING FACILITIES
CITY LIMITS
PROPOSED BASIN (NTS)
N
0
700
1400
2100
2800
COUNTY OF RIVERSIDE
CITY OF MORENO VALLEY
RECHE CYN RD
RECHE CYN DEBRIS BASIN
QUINCY BASIN
REDLANDS BASIN
NASON BASIN
SINCLAIR BASIN
BAY BASIN
BRODIAEA BASIN
LOCUST AVE.
KALMIA AVE.
JUNIPER AVE.
HIGHLAND BLVD.
IRONWOOD AVE.
HEMLOCK AVE.
U.S. HIGHWAY 60
FIR ST.
EUCALYPTUS AVE.
DRACAEA AVE.
COTTONWOOD AVE.
BAY AVE.
ALESSANDRO BLVD.
BRODIAEA AVE.
CACTUS AVE.
JOHN F. KENNEDY DR
IRIS AVE.
CHAMPIONSHIP DR.
LASSELLE ST.
MORRISON ST.
NASON ST.
OLIVER ST.
PETTIT ST.
QUINCY ST.
REDLANDS BLVD.
SINCLAIR ST.
THEODORE ST.
DAVIS RD.
MORENO BEACH DR.
LINE A
LINE B
LINE C
LINE D
LINE E
LINE F
LINE G
LINE H
LINE I
LINE J
LINE K
2 - 5' x 3' RCB
3 - 60" CMP
60" RCP
3 - 4' x 2' RCB
2 - 48" CMP
2 - 72" CMP

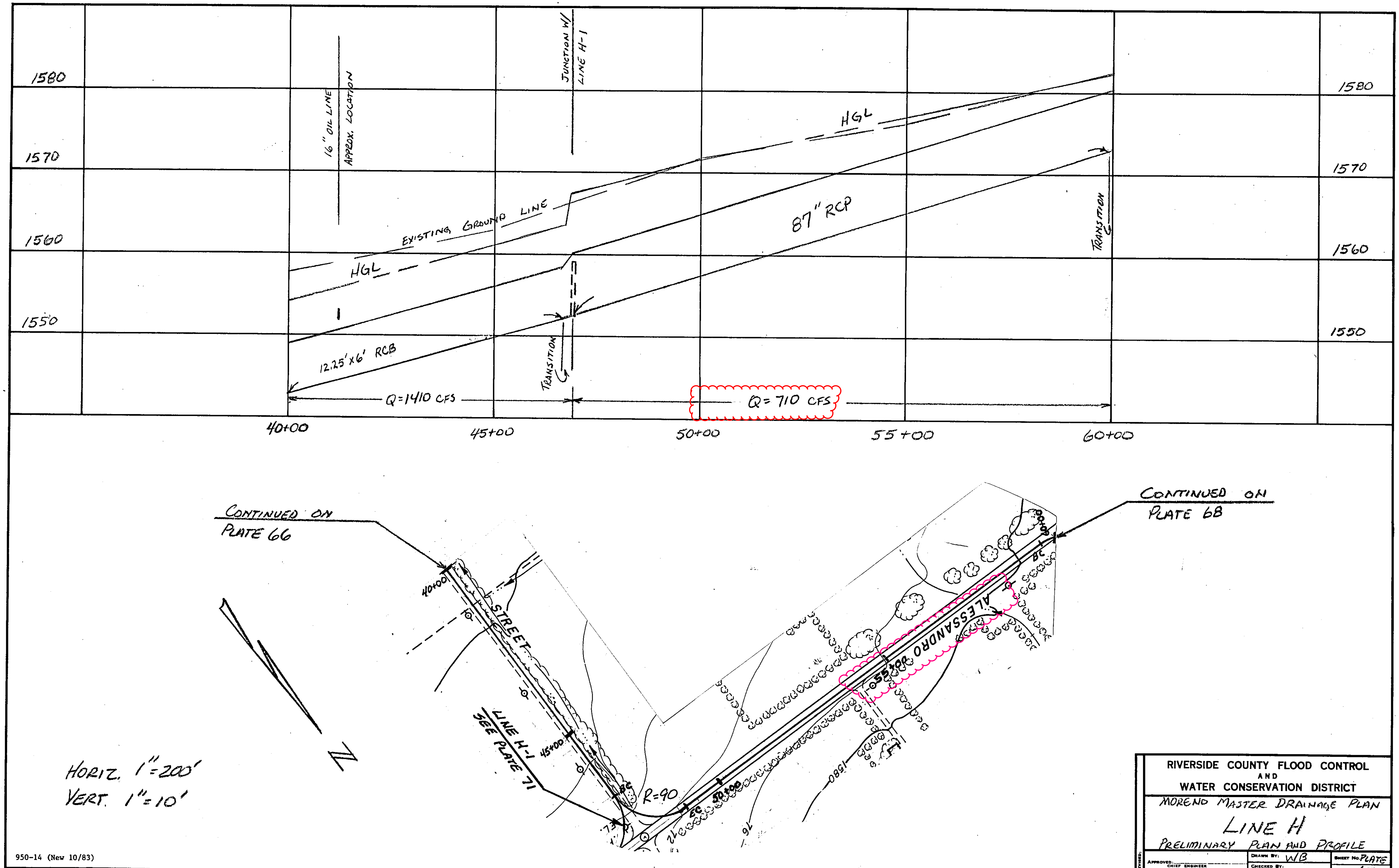


MORENO
MASTER
DRAINAGE
PLAN
EXHIBIT 2B
ALTERNATIVE 2B
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
LEGEND
DRAINAGE BOUNDARY
SUBAREA BOUNDARY
PROPOSED OPEN CHANNEL
PROPOSED STORM DRAIN
EXISTING FACILITIES
CITY LIMITS
PROPOSED BASIN
0
700
1400
2100
2800
N
COUNTY OF RIVERSIDE
CITY OF MORENO VALLEY
REECHE CYN RD.
REECHE CYN DEBRIS BASIN
LOCUST AVE.
KALMIA AVE.
IRONWOOD AVE.
IRONWOOD BASIN
HIGHLAND BLVD.
HIGHLAND BASIN
NASON BASIN
EUCALYPTUS BASIN
BAY BASIN
U.S. HIGHWAY 60
FIR ST.
EUCALYPTUS AVE.
DRACAEA AVE.
COTTONWOOD AVE.
BAY AVE.
ALESSANDRO BLVD.
BRODIAEA AVE.
BRODIAEA
CACTUS
CACTUS AVE.
JOHN F.
KENNEDY DR
IRIS AVE.
CHAMPIONSHIP DR.
LASSELLE ST.
MORRISON ST.
NASON ST.
OLIVER ST.
PETTIT ST.
QUINCY ST.
REDLANDS BLVD.
SINCLAIR ST.
THEODORE ST.
DAVIS RD.
MORENO BEACH DR.
LINE A
LINE B
LINE D
LINE E
LINE F
LINE G
LINE H
LINE I
LINE J
LINE K
K-1
K-2
K-3
K-4
G-4
G-5
G-6
G-7
H-1
H-2
H-3
H-4
H-5
H-6
H-7
H-8
H-9
H-10
J-1
J-2
J-3
J-4
J-5
J-6
J-7
J-8
J-9
J-10
F-2
F-3
F-4
F-5
F-6
F-7
F-8
F-9
F-11
F-12
F-13
F-14
F-15
2 - 5' x 3' RCB
3 - 60" CMP
60" RCP
3 - 4' x 2' RCB
2 - 48" CMP
2 - 72" CMP



COUNTY OF RIVERSIDE
CITY OF MORENO VALLEY
RECHE CYN. RD.
RECHE CYN DEBRIS BASIN
LOCUST AVE.
KALMIA AVE.
JUNIPER AVE.
IRONWOOD AVE.
HIGHLAND BLVD.
NASON ST.
NASON BASIN
OLIVER ST.
PETTIT ST.
QUINCY ST.
SINCLAIR ST.
U.S. HIGHWAY 60
2 - 5' x 3' RCB
3 - 60" CMP
60" RCP
3 - 4' x 2' RCB
2 - 48" CMP
2 - 72" CMP
FIR BASIN
FIR ST.
MORRISON ST.
EUCALYPTUS AVE.
LASSELLE ST.
DRACAEA AVE.
COTTONWOOD AVE.
BAY AVE.
ALESSANDRO BLVD.
BRODIAEA
BRODIAEA AVE.
BASIN
CACTUS BASIN
CACTUS AVE.
CACTUS
MORENO BEACH DR.
REDLANDS BLVD.
THEODORE ST.
DAVIS RD.
JOHN F.
KENNEDY DR
CHAMPIONSHIP DR.
IRIS AVE.
LINE A
LINE B
LINE C
LINE D
LINE F
LINE G
LINE H
LINE I
LINE J
K-1
K-2
K-3
K-4
G-4
G-5
G-6
G-7
H-1
H-2
H-3
H-4
H-5
H-6
H-7
H-8
H-9
H-10
J-1
J-2
J-3
J-4
J-5
J-6
J-7
J-8
J-9
J-10
F-2
F-3
F-4
F-5
F-6
F-7
F-8
F-9
F-11
F-12
F-13
F-14
F-15
CITY OF MORENO VALLEY
COUNTY OF RIVERSIDE
LEGEND
DRAINAGE BOUNDARY
SUBAREA BOUNDARY
PROPOSED OPEN CHANNEL
PROPOSED STORM DRAIN
EXISTING FACILITIES
CITY LIMITS
PROPOSED BASIN
N
0
700
1400
2100
2800
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
MORENO
MASTER DRAINAGE PLAN
EXHIBIT 3
ALTERNATIVE 3


LEGEND
DRAINAGE BOUNDARY
SUBAREA BOUNDARY
PROPOSED OPEN CHANNEL
PROPOSED STORM DRAIN
EXISTING FACILITIES
CITY LIMITS
PROPOSED BASIN
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
MORENO
MASTER DRAINAGE PLAN
EXHIBIT 4
ALTERNATIVE 4
RECHE CANYON DEBRIS BASIN
NASON BASIN
QUINCY BASIN
SINCLAIR BASIN
IRONWOOD DEBRIS BASIN
CACTUS BASIN
COLD CREEK COURT STORM DRAIN LINE A
PROPOSED LINE F-2 TO REPLACE EXISTING LINE F-2
U.S. HWY 60



950-14 (New 10/83)

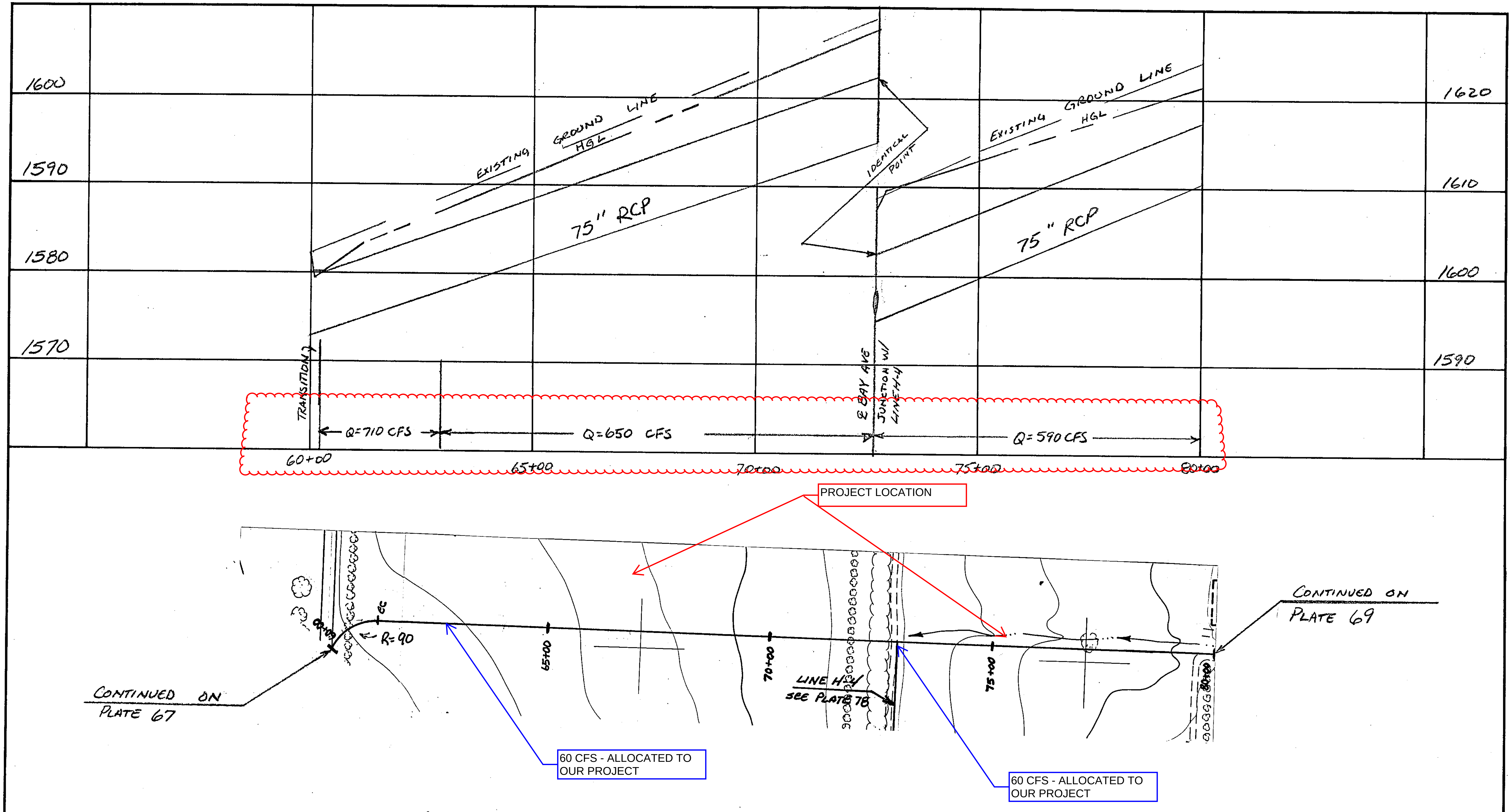
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

MORENO MASTER DRAINAGE PLAN

LINE H

PRELIMINARY PLAN AND PROFILE

REVISED: APPROVED: CHIEF ENGINEER DATE:	DRAWN BY: WB CHECKED BY: DATE DRAWN:	SHEET NO. PLATE DR. NO. 67



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

TOTAL STUDY AREA FLOWS ALLOCATED FOR THIS PROJECT = 120 CFS

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

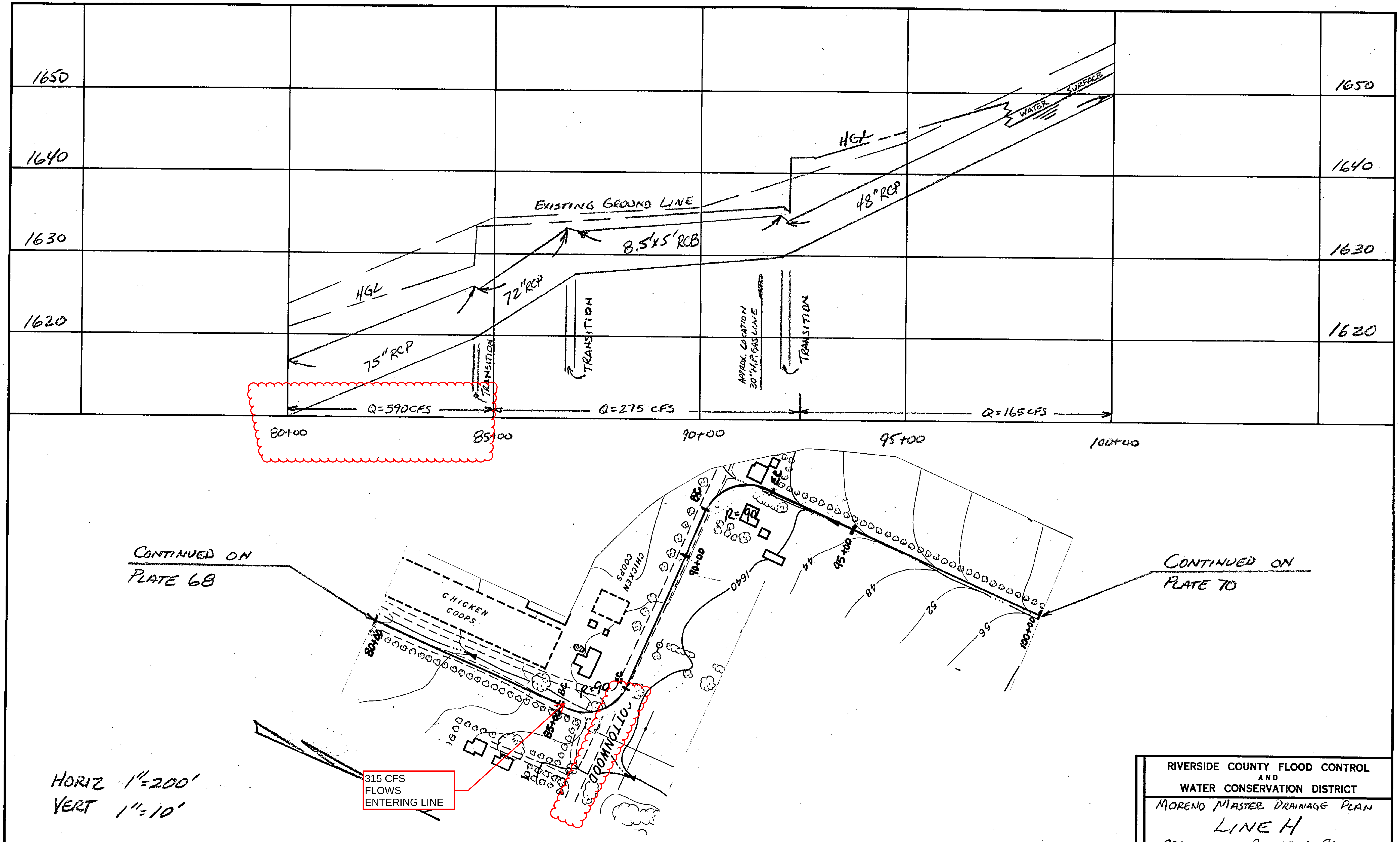
MORENO MASTER DRAINAGE PLAN

LINE H

PRELIMINARY PLAN AND PROFILE

REVISED: APPROVED: CHIEF ENGINEER DATE: DRAWN BY: CHECKED BY: DATE DRAWN: SHEET NO. PLATE DR. NO. 68

950-14 (New 10/83)



RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

MORENO MASTER DRAINAGE PLAN

LINE H

PRELIMINARY PLAN AND PROFILE

APPROVED: CHIEF ENGINEER	DRAWN BY: WB	SHEET NO. PLATE
DATE:	CHECKED BY: / DATE DRAWN:	DR. NO. 69

950-14 (New 10/83)

FIRM MAP

NOTES TO USERS

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Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

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Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

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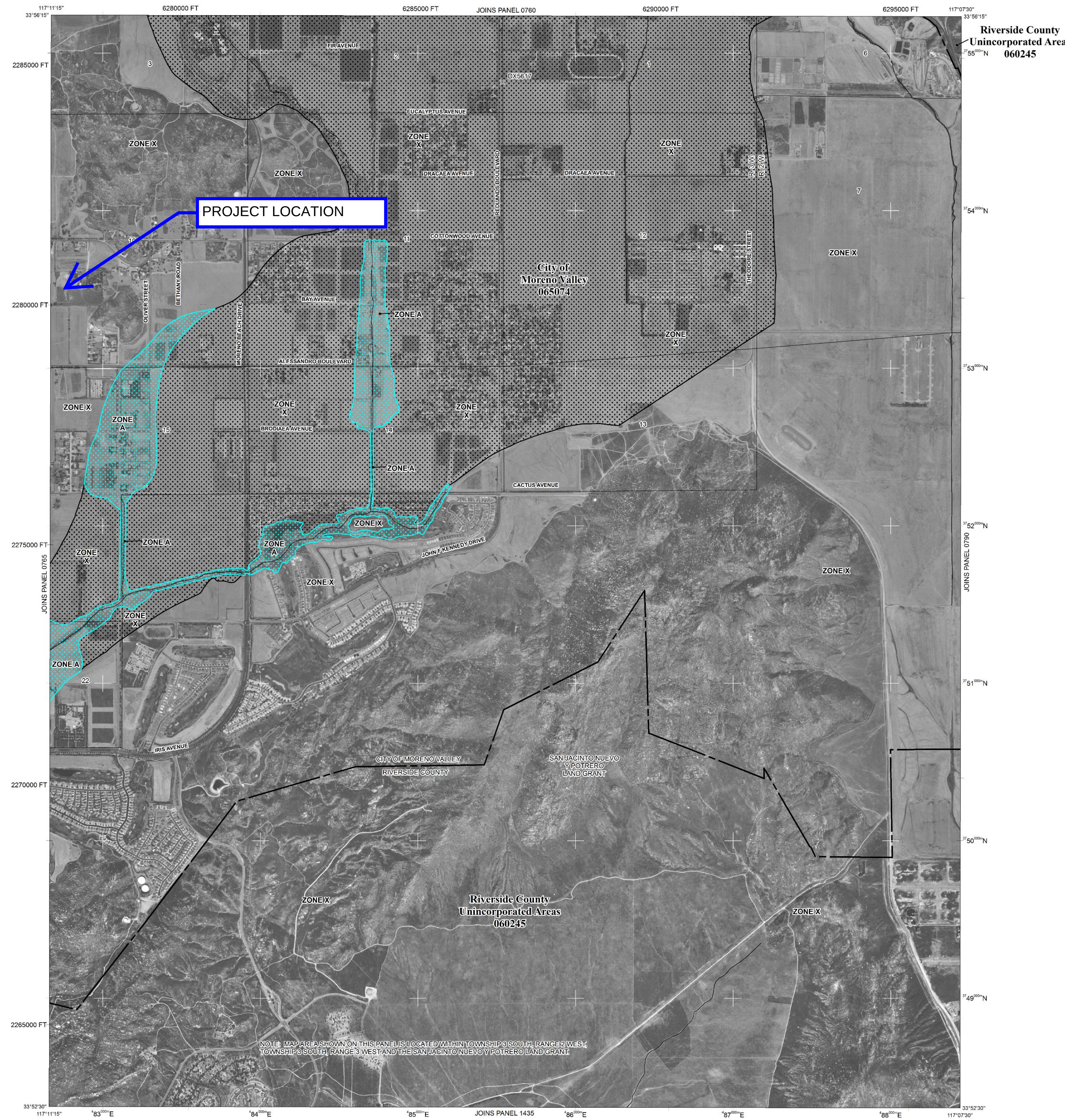

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
$^{24}76^{000m}$N	1000-meter Universal Transverse Mercator grid values, zone 11N
600000 FT	5000-foot grid ticks: California State Plane coordinate system, zone VI (FIPSZONE 0406), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 28, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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N

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

PANEL 0770G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 770 OF 3805
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MORENO VALLEY, CITY OF	065074	0770	G
RIVERSIDE COUNTY	060245	0770	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06065C0770G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

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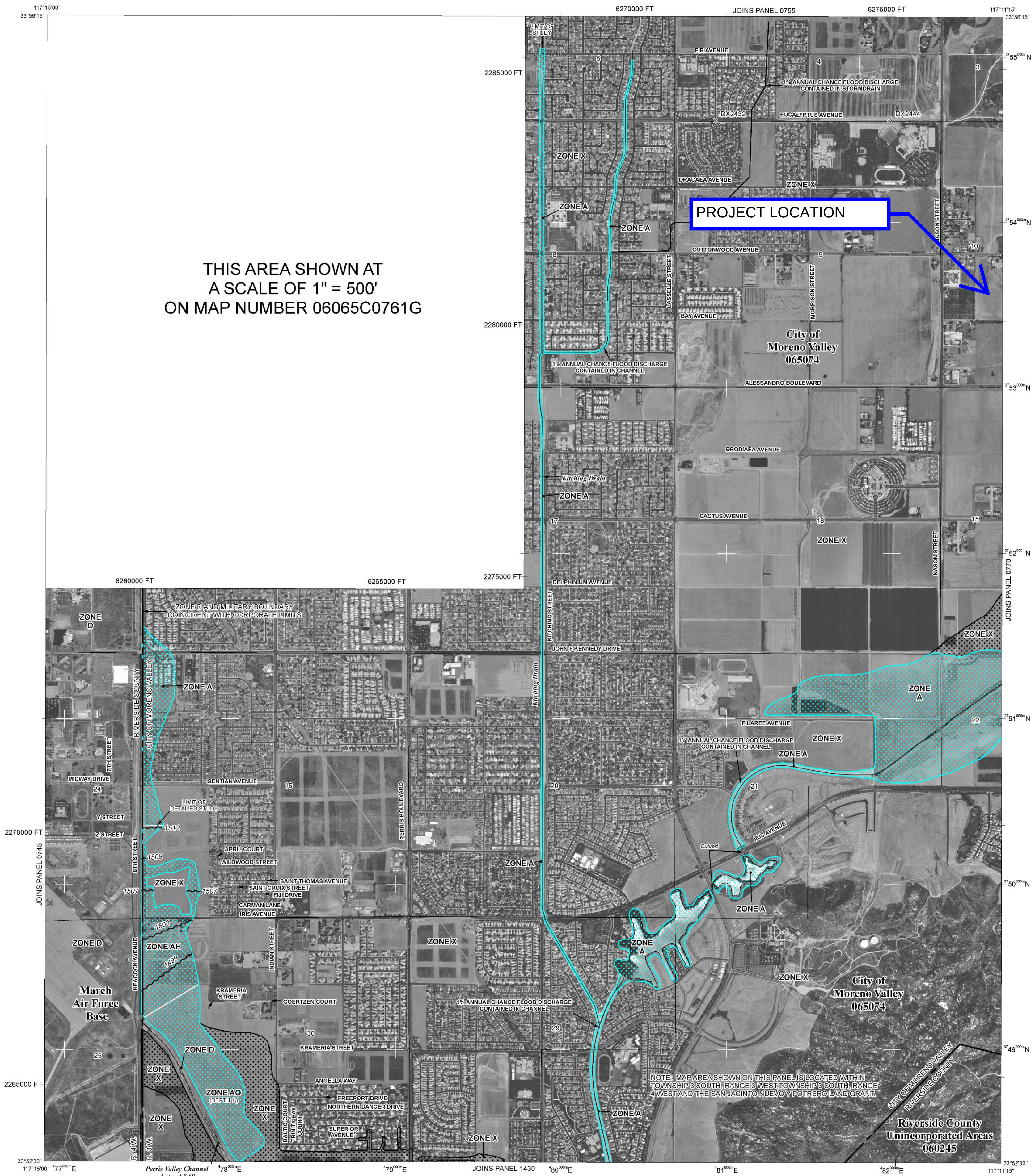

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	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
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(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

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600000 FT	5000-foot grid ticks: California State Plane coordinate system, zone VI (FIPSZONE 0406), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
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EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 28, 2008

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N

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500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0765G

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 765 OF 3805
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MORENO VALLEY, CITY OF	065074	0765	G
RIVERSIDE COUNTY	060245	0765	G

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MAP NUMBER
06065C0765G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

REFERENCE PLANS

TENTATIVE TRACT MAP NO. 38442

IN THE CITY OF MORENO VALLEY, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

APPLICANT / OWNER

HIGHPOINTE MV, LLC
530 TECHNOLOGY, SUITE 100
IRVINE, CA 92618
ROSS YAMAGUCHI | 949.472.0800

TOPO SOURCE:

DON READ CORPORATION
501 MERCURY LANE
BREA, CA 92821
(714) 529-9599
JUNE 25, 2021

ENGINEER

PROACTIVE ENGINEERING
200 S. MAIN STREET, STE 300
CORONA, CA 92882
DILLON STRAND | 951.280.3319

SOILS ENGINEER

LEIGHTON GROUP
17781 COWAN
IRVINE, CA 92614
JEFF L. HULL | 949.681.4265

UTILITIES

WATER	EASTERN MUNICIPAL WATER DISTRICT
SEWER	EASTERN MUNICIPAL WATER DISTRICT
ELECTRIC	SOUTHERN CALIFORNIA EDISON COMPANY
GAS	SOUTHERN CALIFORNIA GAS COMPANY
TELEPHONE	VERIZON
TELEVISION	COMCAST

ASSESSOR'S PARCEL NO'S

488-210-006 & 488-210-020

LAND USE

TOTAL AREA GROSS:	19.1 AC
TOTAL AREA NET:	15.1 AC
DENSITY (DU/AC NET):	7.15
EXISTING LAND USE:	VACANT
PROPOSED LAND USE:	SINGLE FAMILY REIDENTIAL
EXISTING ZONING:	DOWNTOWN CENTER
PROPOSED ZONING:	DOWNTOWN CENTER
EXISTING GENERAL PLAN:	DOWNTOWN CENTER
PROPOSED GENERAL PLAN:	DOWNTOWN CENTER

NOTES

1. THIS AREA IS WITHIN THE MORENO VALLEY UNIFIED SCHOOL DISTRICT.
2. PROJECT SITE IS LOCATED WITHIN ZONE X, AREA OF MINIMAL FLOODING, PER FLOOD INSURANCE RATE MAP COMMUNITY PANEL NUMBER 065074 0765 DATED AUGUST 28, 2008 (RIVERSIDE COUNTY - PANEL 765 OF 3805).
3. ALL GRADING AND DRAINAGE SHALL BE CONSISTENT WITH THE REQUIREMENTS OF THE CITY OF MORENO VALLEY.
4. IMPROVEMENTS SHALL BE PER THE CITY OF MORENO VALLEY.
5. NO KNOWN EXISTING WATER WELLS ARE ON THE PROPERTY, OR WITHIN 200 FEET OF THE PROPERTY BOUNDARY.
6. THIS TRACT CONSISTS OF 108 SINGLE-FAMILY LOTS WITH TWO DIFFERENT LOT SIZES, 64 UNITS WITH A MINIMUM SIZE OF 3200 SF AND 44 UNITS WITH A MINIMUM SIZE OF 4500 SF, LOT AREAS SHOWN IN THE TABLE ON THE RIGHT.
7. THIS TRACT IS LOCATED IN A NON-VHFHSZ ZONE, IN A STATE OR FEDERAL RESPONSIBILITY AREA,
8. THE TENTATIVE MAP INCLUDES THE ENTIRE CONTIGUOUS OWNERSHIP OF THE LAND.
9. THE ONGOING MAINTENANCE OF ANY WATER QUALITY BMP CONSTRUCTED IN THE PUBLIC RIGHT OF WAY SHALL BE THE RESPONSIBILITY OF A PROPERTY OWNER ASSOCIATION OR THE PROPERTY OWNER.
10. ALL ADJACENT BUILDINGS AND STRUCTURES ARE TO REMAIN IN PLACE.
11. ALL EXISTING DWELLINGS WITHIN THE SUBJECT PROPERTY ARE TO BE REMOVED.
12. POWER POLES TO BE UNDERGROUNDED ALONG ALESSANDRO BLVD.

BENCHMARK

RIVERSIDE COUNTY BENCHMARK: (M-40-4 RESET) AT THE SOUTHEAST CORNER OF NASON STREET AND ALESSANDRO BOULEVARD; 56.0 FEET EAST IF CENTERLINE OF NASON STREET; 48 FEET SOUTH OF ALESSANDRO BOULEVARD; 3' WEST OF PO;E #GT-70306, 1.0 FEET NORTH OF A 4"X4" MARKER POST; A BRASS DISK SET IN TOP OF A CONCRETE POST AND MARKED M-40-4 RESET 1976,
ELEVATION (FEET): 1588.42 (NGVD29)

BASIS OF BEARINGS

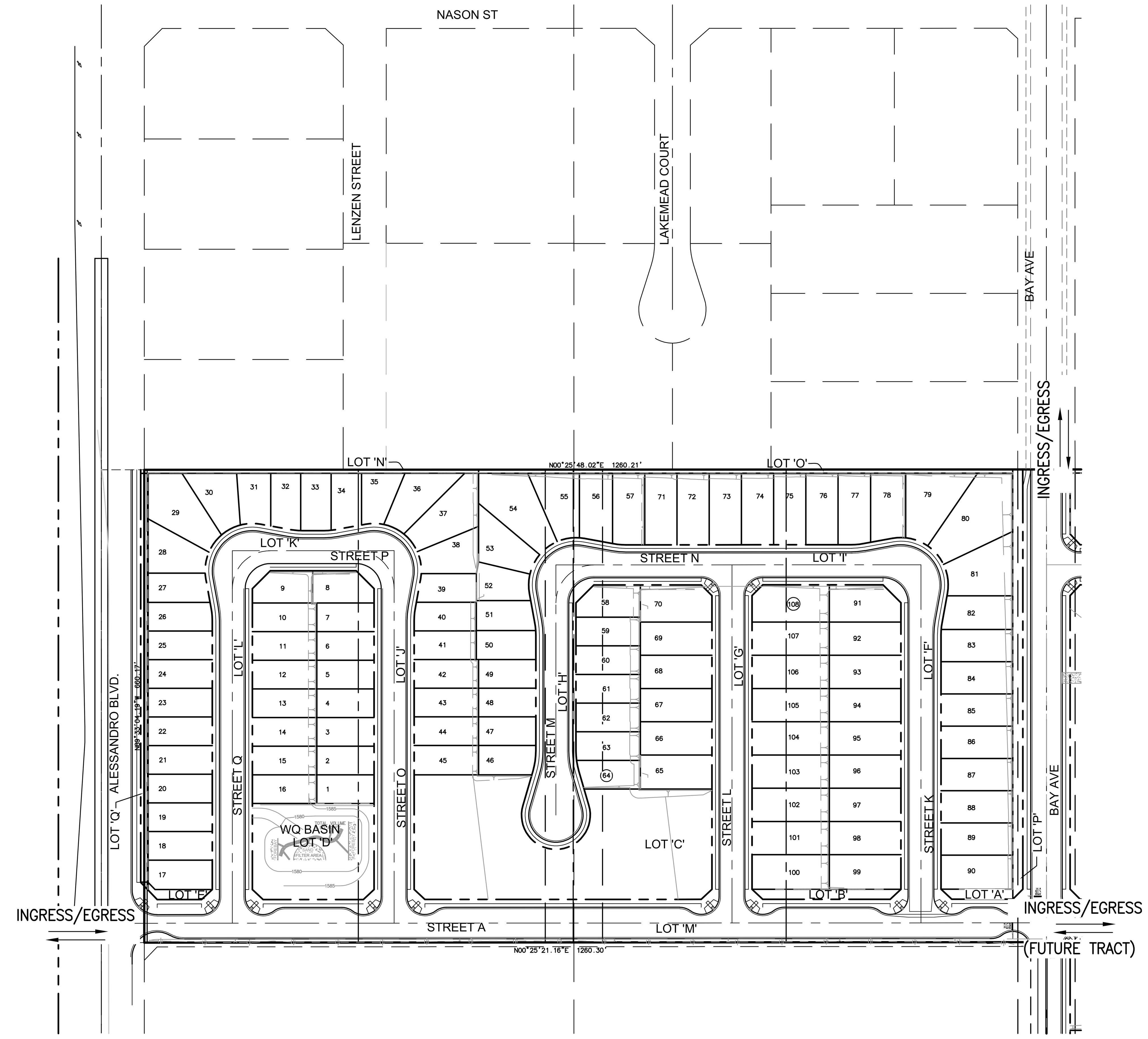
THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA STATE PLANE COORDINATE SYSTEM CS83, ZONE VU BASED LOCALLY ON CONTROL STATIONS "MAT2", "MLFP" & "PPBF" NAD83 (NSRS2011) EPOCH 2010.00, RECORDS OF THE RIVERSIDE COUNTY SURVEYOR. ALL BEARING SHOWN ON THIS MAP ARE GRID. QUOTED BEARINGS AD DISTANCE FROM REFERENCE MAPS OR DEEDS ARE AS SHOWN PER THAT RECORD REFERENCE. ALL DISTANCES SHOWN ARE ROUND DISTANCES UNLESS SPECIFIED OTHERWISE. GRID DISTANCES, MAY BE OBTAINED BY MULTIPLYING THE GROUND DISTANCE BY A COMBINATION FACTOR OF .999946285

LEGAL DESCRIPTION

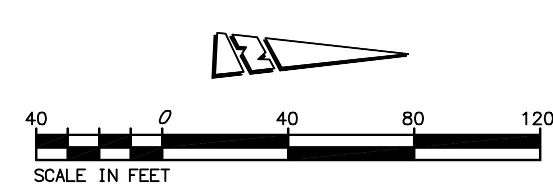
LOTS 3 AND 6, BLOCK 105 OF BEAR VALLEY AND ALESSANDRO DEVELOPMENT COMPANY'S SUBDIVISION, IN THE CITY OF MORENO VALLEY, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 11, PAGE 10 OF MAPS, RECORDS OF SAN BERNARDINO COUNTY

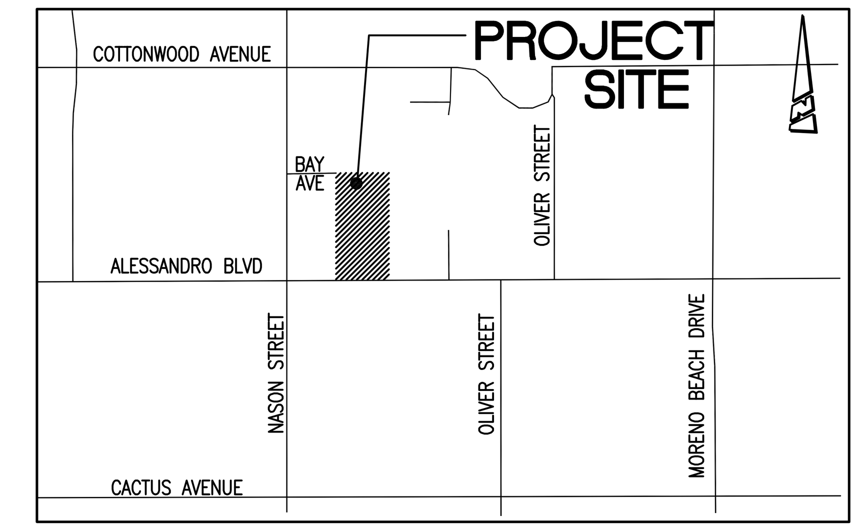
GEOTECHNICAL NOTES

1. THIS SITE IS LOCATED WITHIN A LOW TO MODERATE LIQUEFACTION SUSCEPTIBILITY ZONE.
2. THERE ARE NO FAULT LINES RUNNING THROUGH OR NEAR THIS SITE.
3. THIS SITE IS NOT LOCATED IN A FLOOD HAZARD ZONE.
4. THIS SITE IS LOCATED IN A SUBSIDENCE SUSCEPTIBLE ZONE.
5. SEE GEOTECHNICAL REPORT FOR MORE DETAILS



INDEX MAP





VICINITY MAP
N.T.S.

PROPOSED LOT SUMMARY TABLE

3200 SF MIN LOTS				4500 SF MIN LOTS			
LOT#	AREA	LOT#	AREA	LOT#	AREA	LOT#	AREA
1	3200 SF	33	3398 SF	65	4760 SF	97	4640 SF
2	3200 SF	34	3227 SF	66	4640 SF	98	4640 SF
3	3200 SF	35	3253 SF	67	4640 SF	99	4829 SF
4	3200 SF	36	4692 SF	68	4640 SF	100	5221 SF
5	3200 SF	37	6038 SF	69	4640 SF	101	5011 SF
6	3200 SF	38	3988 SF	70	5073 SF	102	5011 SF
7	3200 SF	39	3204 SF	71	4500 SF	103	5011 SF
8	3483 SF	40	3443 SF	72	4500 SF	104	5011 SF
9	3548 SF	41	3472 SF	73	4500 SF	105	5011 SF
10	3600 SF	42	3600 SF	74	4500 SF	106	5011 SF
11	3600 SF	43	3600 SF	75	4500 SF	107	5011 SF
12	3600 SF	44	3600 SF	76	4500 SF	108	5496 SF
13	3600 SF	45	3690 SF	77	4515 SF		
14	3600 SF	46	3216 SF	78	4531 SF		
15	3600 SF	47	3200 SF	79	6437 SF		
16	3600 SF	48	3200 SF	80	9046 SF		
17	3691 SF	49	3200 SF	81	6261 SF		
18	3600 SF	50	3369 SF	82	4250 SF		
19	3600 SF	51	3336 SF	83	4510 SF		
20	3600 SF	52	3381 SF	84	4511 SF		
21	3600 SF	53	4549 SF	85	4511 SF		
22	3600 SF	54	7188 SF	86	4511 SF		
23	3600 SF	55	4812 SF	87	4512 SF		
24	3600 SF	56	4355 SF	88	4512 SF		
25	3600 SF	57	4488 SF	89	4512 SF		
26	3571 SF	58	3740 SF	90	4775 SF		
27	3404 SF	59	3600 SF	91	4881 SF		
28	4375 SF	60	3200 SF	92	4640 SF		
29	6707 SF	61	3200 SF	93	4640 SF		
30	4236 SF	62	3200 SF	94	4640 SF		
31	3204 SF	63	3200 SF	95	4640 SF		
32	3236 SF	64	3200 SF	96	4640 SF		

PARKS/LANDSCAPE AREAS			
LOT#	AREA	OWNERSHIP	PURPOSE
A	0.03 AC	HOA	LANDSCAPE
B	0.06 AC	HOA	LANDSCAPE
C	1.38 AC	HOA	RECREATION
D	0.52 AC	HOA	BASIN
E	0.03 AC	HOA	LANDSCAPE
F	0.31 AC	CITY OF MORENO VALLEY	STREET
G	0.34 AC	CITY OF MORENO VALLEY	STREET
H	0.32 AC	CITY OF MORENO VALLEY	STREET
I	0.63 AC	CITY OF MORENO VALLEY	STREET
J	0.33 AC	CITY OF MORENO VALLEY	STREET
K	0.37 AC	CITY OF MORENO VALLEY	STREET
L	0.33 AC	CITY OF MORENO VALLEY	STREET
M	1.40 AC	CITY OF MORENO VALLEY	STREET
N	0.05 AC	HOA	DRAINAGE
O	0.09 AC	HOA	DRAINAGE
P	0.19 AC	CITY OF MORENO VALLEY	LANDSCAPE
Q	0.13 AC	CITY OF MORENO VALLEY	LANDSCAPE

EASEMENT LIST	DISPOSITION
3 THE FOLLOWING MATTERS SHOWN OR DISCLOSED BY THE FILED OR RECORDED MAP REFERRED TO IN TE LEGAL DESCRIPTION: A STRIP OF LAND 80 FEET WIDE RUNNING THROUGH THE CENTER OF BLOCKS 99,100,101,102,103,104,105,106,107,108,109,110,111 112, 239, AND 240 IS RESERVED FOR RAIL ROAD PURPOSES	QUITCLAIM
4 PUBLIC UTILITES AND INCIDENTAL PURPOSES (NON-PLOTTABLE) , BOOK 277, PAGE 343 IN FAVOR OF: MORENO WATER COMPANY	QUITCLAIM
5 UTILITIES AND INCIDENTAL PURPOSES BOOK 854, PAGE 212 IN FAVOR OF: SOUTHERN SIERRAS POWER COMPANY, A CORPORATION	QUITCLAIM
6 UTILITIES AND INCIDENTAL PURPOSES INSTRUMENT NO. 19492346 IN FAVOR OF: CALIFORNIA ELECTRIC POWER COMPANY	QUITCLAIM
7 UTILITIES AND INCIDENTAL PURPOSES INSTRUMENT NO. 1956-81375 IN FAVOR OF: CALIFORNIA ELECTRIC POWER COMPANY	QUITCLAIM
8. PIPELINES AND APPUTRENANCES INSTRUMENT NO. 1969-115832 IN FAVOR OF: EASTERN MUNICIPAL WATER DISTRICT LOCATION OF THE EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.	QUITCLAIM
9 DRAINAGE DITCH AND INCIDENTAL PURPOSES INSTRUMENT NO. 1978-15781 IN FAVOR OF: COUNTY OF RIVERSIDE LOCATION OF THE EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.	QUITCLAIM

LEGEND

DOMESTIC WATER LINE (PROP)	DW	PAD LINE	
RECLAIMED WATER LINE (PROP)	RW	CURB & GUTTER (PROP)	
SANITARY SEWER LINE (PROP)	S	TRACT BOUNDARY	
STORM DRAIN LINE (PROP)	SD	EXISTING CONTOUR	205
DOMESTIC WATER LINE (EXIST)	DW	PROPOSED STREET GRADE	2.0%
RECLAIMED WATER LINE (EXIST)	RW	PROPOSED LOT No./LETTERED	LOT 1 or LOT A
SANITARY SEWER LINE (EXIST)	S	EXISTING LOT LINE	
STORM DRAIN LINE (EXIST)	SD	RETAINING WALL (PROP)	
STREET CENTER LINE		COMMUNITY WALL	
LOT LINE (PROP)		UNIT NUMBER	52
FIRE HYDRANT	FH	PRODUCT TYPE	PT-A
CATCH BASIN (PROP)		PLAN TYPE	PL-1
CATCH BASIN (EXIST)		PUBLIC UTILITY EASEMENT	P.U.E.
STREET LIGHT		RESTRICTED USE AREA	LINE OF SIGHT
EASEMENT			
PARKING SPACE			

PEN22-0131

REVISION	DATE	DESCRIPTION

PREPARED BY:
PROACTIVE ENGINEERING CONSULTANTS
200 South Main Street, Suite 300
Corona, CA 92882 (951) 280-3300
DILLON M. STRAND RCE #91273 DATE

ENGINEER SEAL:
REGISTERED PROFESSIONAL ENGINEER DILLON M. STRAND No. 91273 CIVIL STATE OF CALIFORNIA

TENTATIVE TRACT MAP 38442
TITLE SHEET
MAY 2022

SHEET 1 OF 3

TENTATIVE TRACT MAP NO. 38442

IN THE CITY OF MORENO VALLEY, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

PRELIMINARY GRADING AND UTILITY PLAN

REVISION	DATE	DESCRIPTION

PREPARED BY:
PROACTIVE ENGINEERING CONSULTANTS
200 South Main Street, Suite 300
Corona, CA 92882 (951) 280-3300
DILLON M. STRAND RCE #91273 DATE

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REGISTERED PROFESSIONAL ENGINEER
DILLON M. STRAND
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CIVIL
STATE OF CALIFORNIA

TENTATIVE TRACT MAP
38442
PRELIMINARY GRADING AND UTILITY PLAN
MAY 2022

SHEET 3 OF 3