Submitted To:
City of Moreno Valley

PRELIMINARY DRAINAGE REPORT

To Support:
Tract No. 38443

Plan Check No:

3/18/2024

Job No. 10.094

Prepared For:

Highpointe, LLC
560 Technology, Suite 100
Irvine, CA 92618

Prepared By:

PROACTIVE ENGINEERING CONSULTANTS
a different kind of company
200 SOUTH MAIN STREET, SUITE 300
CORONA, CA 92882

Dillon Strand Date

TABLE OF CONTENTS

APPENDICES

PROACTIVE
ENGINEERING CONSULTANTS
WWW.PROACTIVEENGINEERING.NET
200 South Main Street, Corona, CA 92882 Suite 300
951•280•3300

I. INTRODUCTION

A. PURPOSE OF DRAINAGE STUDY

The proposed storm drain improvements are in the City of Moreno Valley County of Riverside, California. See Vicinity Map. 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 east and west, and Bay Avenue to the south. Access to the site is currently provided from Bay Avenue and Cottonwood Avenue.

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

Hydrology calculations for the 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.

A water quality / detention basin is proposed to treat pollutants and mitigate developed flows for Tract No. 38443. The basin ensures the total runoff discharged to Line H remains the same as the Moreno Master Drainage Plan. To document broad regional compliance, Tract No. 38442 to the south of this project has been included in the calculations as reference. A separate drainage report for Tract No. 38442 has been prepared and should be referenced for Tract No. 38442 improvements. Based on information available now, construction of Tract No. 38442 and Tract No. 38443 will overlap and be constructed by the same developer. Therefore, hydrology models presented in this report show the ultimate condition of both tracts being developed.

As requested by the City of Moreno Valley and the Riverside County Flood Control & Water Conservation District, an analysis of the existing Cottonwood Sediment Basin is included in Appendix I. The current approach is to improve the existing sediment/flooding condition that Tract No. 38443 does not contribute to by providing additional culverts, sediment mitigation, and providing A Street as an overflow path.

B. PROJECT OBJECTIVES

The following objectives will be addressed in this drainage study:

- A description of the physical setting of 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. 38443.
- Analyze offsite upstream drainage areas

PROACTIVE
ENGINEERING CONSULTANTS
WWW.PROACTIVEENGINEERING.NET
200 South Main Street, Corona, CA 92882 Suite 300
951•280•3300

C. PROJECT DESCRIPTION

Tract No. 38443 Project drainage boundary encompasses approximately 30 acres. The proposed development will build 135 single family homes, sidewalks, streets, open space areas, a Detention/Extended Detention Basin, and a storm drain network system to convey offsite & onsite runoff.

Tract No. 38442 and Tract No. 38443 will extend Line H in accordance with the Moreno Master Drainage Plan 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. A new Detention / Extended Detention Basin will collect project runoff and mitigate 100 year flows to comply with the Moreno Master Drainage Plan for Line H.

Detention / Extended Detention Basin No. 1 – Tract No 38443
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 No. 1. The Detention / Extended Detention Basin will capture water quality flows and provide runoff treatment for the required Design Capture Volume (DCV). Flows that exceed the DCV will be routed through an outlet structure with 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 – Tract No 38442
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 capture water quality flows and provide runoff treatment for the required Design Capture Volume (DCV). Flows that exceed the DCV will be routed through an outlet structure with 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. Refer to the Tract No. 38442 Drainage Report and Water Quality Management Plan for additional information.

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

Existing Cottonwood Sediment Basin
The existing Cottonwood Sediment Basin located north of the intersection of Cottonwood Avenue & Street A is generally within private property. The City of Moreno Valley has lost maintenance rights/access to this existing basin and is currently in negotiations to re-acquire maintenance/access rights. As a result, this project has been tasked with constructing a new sediment basin if rights to the Cottonwood Sediment Basin are unable to be re-acquired. The new/proposed sediment basin is located at the southwest corner of Cottonwood Avenue and Street A. Runoff from the existing Cottonwood Sediment Basin will be routed to the proposed sediment basin via rerouting of the existing culvert from the existing basin. Based on a review of existing tributary area, the Cottonwood Sediment Basin may receive ~430 cfs of bulked flow in a 100-year event. By re-routing the existing headwall and adding an additional headwall/culverts within City ROW – a total of ~265 cfs will be captured & routed to the proposed sediment basin within Tr. 38443. The remaining ~165 cfs will be bypassed to proposed Street A. Street capacity calculations demonstrate Street A can handle the offsite flow without flooding private property. Additional calculations/study is available in Appendix I.

PROACTIVE
ENGINEERING CONSULTANTS
WWW.PROACTIVEENGINEERING.NET
200 South Main Street, Corona, CA 92882 Suite 300
951•280•3300

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. As part of Tract No. 38442 and Tract No. 38443 improvements, the existing Line H will be extended to Cottonwood Avenue to capture offsite runoff tributary to Line H. A new stub will be provided in Cottonwood Ave located in the northwest corner of the project area. This new stub will collect runoff from an existing CMP culvert. The existing CMP culvert currently takes offsite runoff to the project area. The existing CMP culvert located near Cottonwood Ave & Street A will be re-routed to the proposed Tr. 38443 sediment basin.

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 Studies 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.

PROACTIVE
ENGINEERING CONSULTANTS
WWW.PROACTIVEENGINEERING.NET
200 South Main Street, Corona, CA 92882 Suite 300
951•280•3300

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. 38443. Watershed 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. Rational Method calculations for Tract No. 38442 are provided in this report for reference only.

PROACTIVE
ENGINEERING CONSULTANTS
WWW.PROACTIVEENGINEERING.NET
200 South Main Street, Corona, CA 92882 Suite 300
951•280•3300

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. Unit Hydrograph calculations for Tract No. 38442 are provided in this report for reference only.

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)

- 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. Flood Routing calculations for Tract No. 38442 are provided in this report for reference only to demonstrate compliance with the Moreno Master Drainage Plan.

PROACTIVE
ENGINEERING CONSULTANTS
WWW.PROACTIVEENGINEERING.NET
200 South Main Street, Corona, CA 92882 Suite 300
951•280•3300

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 structures are provided in Appendix G.

B. LINE H

Preliminary hydraulic calculations for Line H 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 and contributes approximately 122.7 cfs. This is within ~2.3% of the allocated flow. Therefore, the proposed development conforms with Moreno Master Drainage Plan.

The hydrology and hydraulic calculations in Appendix I demonstrate the proposed sediment basin and headwalls will intercept offsite flows and mitigate flooding impacts to downstream facilities. Street A has sufficient capacity within ROW for offsite flows that are not able to be captured by the proposed and existing headwalls structures. As runoff travels down A Street, flows will be captured by downstream onsite storm drain systems. Flows exceeding onsite capacity will continue to Alessandro Blvd as they do in the existing condition.

PROACTIVE
ENGINEERING CONSULTANTS
WWW.PROACTIVEENGINEERING.NET
200 South Main Street, Corona, CA 92882 Suite 300
951•280•3300

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	10.9	**
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		122.7	
G*	15.6	43.30	

NOTES

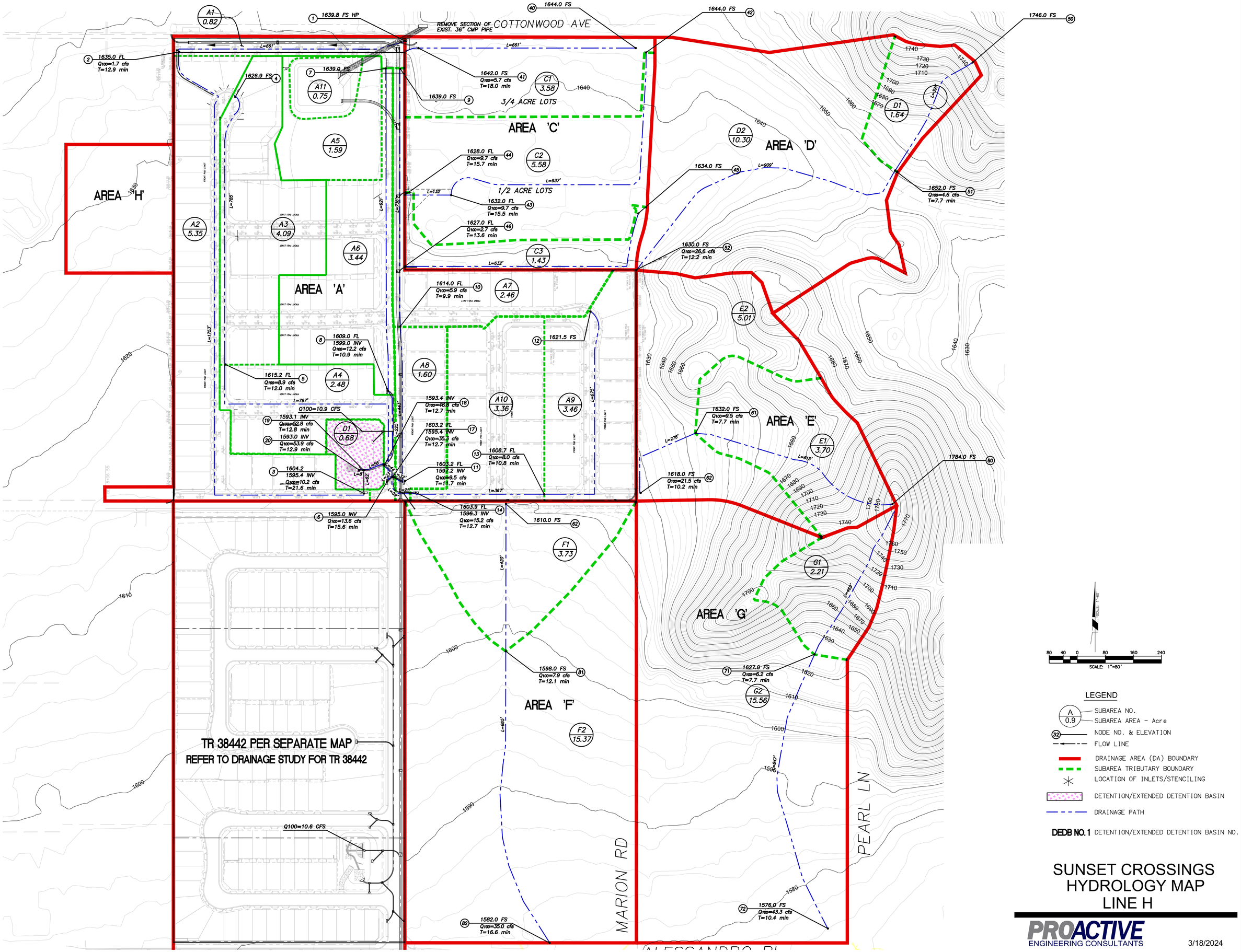
* AREA G EXCLUDED FROM CONTROL FLOW COMPARISON SINCE IT ENTERS LINE H AT A POINT DOWNSTREAM OF THE PROJECT SITE

** 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

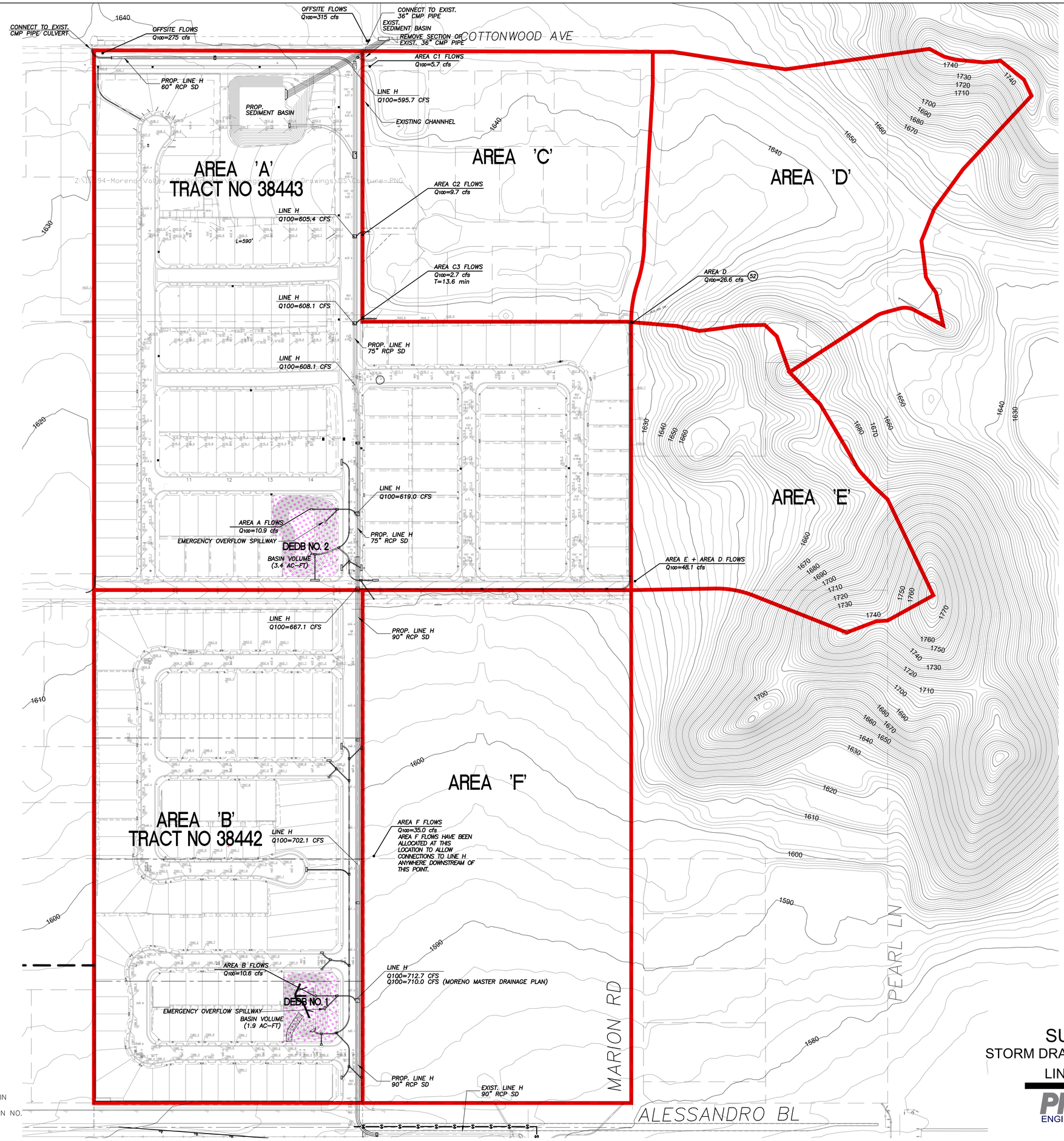


SUNSET CROSSINGS HYDROLOGY MAP LINE H

PROACTIVE ENGINEERING CONSULTANTS

3/18/2024

STORM DRAIN AND PEAK FLOW SUMMARY MAP



LEGEND

- DRAINAGE AREA (DA) BOUNDARY
- DETENTION/EXTENDED DETENTION BASIN
- **DEDB NO. 1** DETENTION/EXTENDED DETENTION BASIN NO.

EXHIBIT B
SUNSET CROSSINGS
STORM DRAIN & PEAK FLOW SUMMARY MAP
LINE H - TRIBUTARY FLOWS

PROACTIVE ENGINEERING CONSULTANTS

3/8/2024

APPENDIX B

RATIONAL METHOD ANALYSIS

```
**************************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
         RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2015 Advanced Engineering Software (aes)
                      (Rational Tabling Version 22.0)
                  Release Date: 07/01/2015  License ID 1673

                            Analysis prepared by:



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

  FILE NAME: TR38443.DAT
  TIME/DATE OF STUDY: 09:05 02/07/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  24.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5001
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   28.0     18.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.125 0.0150
  2   33.0     23.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS CONDOMINIUM
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   921.00
  UPSTREAM ELEVATION(FEET) =   1639.00
  DOWNSTREAM ELEVATION(FEET) =   1609.00
  ELEVATION DIFFERENCE(FEET) =     30.00
  TC = 0.359*[(  921.00**3)/(    30.00)]**.2 =   10.926
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.813
  CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8145
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      7.88
  TOTAL AREA(ACRES) =      3.44   TOTAL RUNOFF(CFS) =      7.88

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.813
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6558
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    1.59   SUBAREA RUNOFF(CFS) =    2.93
  TOTAL AREA(ACRES) =        5.0   TOTAL RUNOFF(CFS) =      10.81
  TC(MIN.) =   10.93

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.813
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6558
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.75   SUBAREA RUNOFF(CFS) =    1.38
  TOTAL AREA(ACRES) =        5.8   TOTAL RUNOFF(CFS) =      12.20
  TC(MIN.) =   10.93

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1599.00  DOWNSTREAM(FEET) =  1593.40
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.90
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.20
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   11.30
```

```
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     18.00 =    1146.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS CONDOMINIUM
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   675.00
  UPSTREAM ELEVATION(FEET) =   1621.50
  DOWNSTREAM ELEVATION(FEET) =   1608.70
  ELEVATION DIFFERENCE(FEET) =     12.80
  TC = 0.359*[(  675.00**3)/(    12.80)]**.2 =   10.752
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.835
  CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8150
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      8.00
  TOTAL AREA(ACRES) =      3.46   TOTAL RUNOFF(CFS) =      8.00

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1608.70  DOWNSTREAM ELEVATION(FEET) = 1603.90
  STREET LENGTH(FEET) =   367.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 33.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  23.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   18.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.60
  STREET FLOW TRAVEL TIME(MIN.) =   1.75   Tc(MIN.) =   12.51
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.629
  CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8102
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    3.36      SUBAREA RUNOFF(CFS) =    7.16
```

```
  TOTAL AREA(ACRES) =        6.8        PEAK FLOW RATE(CFS) =      15.15

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  20.83
  FLOW VELOCITY(FEET/SEC.) =  3.74   DEPTH*VELOCITY(FT*FT/SEC.) =   1.85
  LONGEST FLOWPATH FROM NODE     12.00 TO NODE     14.00 =    1042.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1596.30  DOWNSTREAM(FEET) =  1595.00
  FLOW LENGTH(FEET) =    84.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.77
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.15
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   12.66
  LONGEST FLOWPATH FROM NODE     12.00 TO NODE     17.00 =    1126.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS CONDOMINIUM
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   736.00
  UPSTREAM ELEVATION(FEET) =   1639.00
  DOWNSTREAM ELEVATION(FEET) =   1614.00
  ELEVATION DIFFERENCE(FEET) =     25.00
  TC = 0.359*[(  736.00**3)/(    25.00)]**.2 =    9.905
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.954
  CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8175
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      5.94
  TOTAL AREA(ACRES) =      2.46   TOTAL RUNOFF(CFS) =      5.94

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1614.00  DOWNSTREAM ELEVATION(FEET) = 1603.20
  STREET LENGTH(FEET) =   443.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 33.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  23.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   14.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.83   Tc(MIN.) =   11.74
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.713
  CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8123
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    1.60      SUBAREA RUNOFF(CFS) =    3.53
  TOTAL AREA(ACRES) =        4.1        PEAK FLOW RATE(CFS) =       9.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.26
  FLOW VELOCITY(FEET/SEC.) =  4.21   DEPTH*VELOCITY(FT*FT/SEC.) =   1.66
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     11.00 =    1179.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1597.20  DOWNSTREAM(FEET) =  1595.00
  FLOW LENGTH(FEET) =    32.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.32
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.47
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.78
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     17.00 =    1211.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        9.47    11.78       2.709        4.06
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     17.00 =    1211.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
```

```
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       15.15    12.66       2.612        6.82
 LONGEST FLOWPATH FROM NODE     12.00 TO NODE     17.00 =    1126.00 FEET.

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

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      23.56      11.78        2.709
     2      24.28      12.66        2.612

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      24.28   Tc(MIN.) =   12.66
 TOTAL AREA(ACRES) =       10.9

****************************************************************************
 FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS CONDOMINIUM
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   785.00
 UPSTREAM ELEVATION(FEET) =   1626.90
 DOWNSTREAM ELEVATION(FEET) =   1615.20
 ELEVATION DIFFERENCE(FEET) =     11.70
 TC = 0.359*[(  785.00**3)/(    11.70)]**.2 =   11.985
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.686
 CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8116
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      8.91
 TOTAL AREA(ACRES) =      4.09   TOTAL RUNOFF(CFS) =      8.91

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
```

```
==============================================================================
  UPSTREAM ELEVATION(FEET) = 1615.20  DOWNSTREAM ELEVATION(FEET) = 1603.20
  STREET LENGTH(FEET) =   797.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 33.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  23.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   18.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.63
  STREET FLOW TRAVEL TIME(MIN.) =   3.63   Tc(MIN.) =   15.62
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.352
  CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8029
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    2.48      SUBAREA RUNOFF(CFS) =    4.68
  TOTAL AREA(ACRES) =        6.6        PEAK FLOW RATE(CFS) =      13.60

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  19.39
  FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.81
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =    1582.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1595.40  DOWNSTREAM(FEET) =  1595.00
  FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.92
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.60
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   15.66
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     17.00 =    1605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
```

```
    1       13.60    15.66       2.349        6.57
 LONGEST FLOWPATH FROM NODE      4.00 TO NODE     17.00 =    1605.00 FEET.

 ** MEMORY BANK #  3 CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1       24.28    12.66       2.612       10.88
 LONGEST FLOWPATH FROM NODE      9.00 TO NODE     17.00 =    1211.00 FEET.

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

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1      35.28      12.66        2.612
    2      35.43      15.66        2.349

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      35.28   Tc(MIN.) =   12.66
 TOTAL AREA(ACRES) =       17.4

********************************************************************
 FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
--------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
====================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1595.00  DOWNSTREAM(FEET) =  1593.40
 FLOW LENGTH(FEET) =    44.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.65
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      35.28
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   12.72
 LONGEST FLOWPATH FROM NODE      4.00 TO NODE     18.00 =    1649.00 FEET.

********************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  11
--------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
====================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1       35.28    12.72       2.607       17.45
 LONGEST FLOWPATH FROM NODE      4.00 TO NODE     18.00 =    1649.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1       12.20    11.30       2.765        5.78
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     18.00 =    1146.00 FEET.
```

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      43.56      11.30        2.765
      2      46.78      12.72        2.607

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      46.78   Tc(MIN.) =   12.72
  TOTAL AREA(ACRES) =       23.2

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1593.40  DOWNSTREAM(FEET) =  1593.10
  FLOW LENGTH(FEET) =    56.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  26.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.71
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      46.78
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   12.84
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     19.00 =    1705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS CONDOMINIUM
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   661.00
  UPSTREAM ELEVATION(FEET) =   1639.80
  DOWNSTREAM ELEVATION(FEET) =   1635.00
  ELEVATION DIFFERENCE(FEET) =      4.80
  TC = 0.359*[(  661.00**3)/(     4.80)]**.2 =   12.918
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.587
  CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8092
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      1.72
  TOTAL AREA(ACRES) =      0.82   TOTAL RUNOFF(CFS) =      1.72
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1635.00  DOWNSTREAM ELEVATION(FEET) = 1604.20
  STREET LENGTH(FEET) =  1753.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 33.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  23.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.99
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
  STREET FLOW TRAVEL TIME(MIN.) =   8.68   Tc(MIN.) =   21.60
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.000
  CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7917
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    5.35      SUBAREA RUNOFF(CFS) =    8.47
  TOTAL AREA(ACRES) =        6.2        PEAK FLOW RATE(CFS) =      10.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  16.78
  FLOW VELOCITY(FEET/SEC.) =  3.79   DEPTH*VELOCITY(FT*FT/SEC.) =   1.60
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    2414.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE     19.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1595.40  DOWNSTREAM(FEET) =  1593.10
  FLOW LENGTH(FEET) =    62.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.89
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.19
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   21.70
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     19.00 =    2476.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
```

```
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       10.19    21.70       1.996        6.17
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     19.00 =    2476.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       46.78    12.84       2.595       23.23
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     19.00 =    1705.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      52.81      12.84        2.595
      2      46.17      21.70        1.996

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      52.81   Tc(MIN.) =   12.84
  TOTAL AREA(ACRES) =       29.4

**************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1593.10  DOWNSTREAM(FEET) =  1593.00
  FLOW LENGTH(FEET) =     8.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.74
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.81
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   12.85
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    2484.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.594
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6411
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.68   SUBAREA RUNOFF(CFS) =    1.13
  TOTAL AREA(ACRES) =       30.1   TOTAL RUNOFF(CFS) =      53.94
  TC(MIN.) =   12.85
==========================================================================
```

```
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       30.1  TC(MIN.) =     12.85
  PEAK FLOW RATE(CFS)   =      53.94
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

FOR REFERENCE ONLY
SEE DRAINAGE STUDY FOR
TRACT NO. 38442

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
         RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2015 Advanced Engineering Software (aes)
                      (Rational Tabling Version 22.0)
                  Release Date: 07/01/2015  License ID 1673

                             Analysis prepared by:




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

   FILE NAME: 42100YR.DAT
   TIME/DATE OF STUDY: 13:23 11/15/2023
 --------------------------------------------------------------------------
-
   USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
 --------------------------------------------------------------------------
-
   USER SPECIFIED STORM EVENT(YEAR) =  100.00
   SPECIFIED MINIMUM PIPE SIZE(INCH) =  24.00
   SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
   10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
   10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
   100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
   100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
   SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
   SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
   COMPUTED RAINFALL INTENSITY DATA:
   STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
   SLOPE OF INTENSITY DURATION CURVE = 0.5001
   RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
   NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
         AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
   *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
      HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:
MANNING
      WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
 NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
 ===  =====  =========  =================  ======  ===== ====== =====
=======
   1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
```

```
   GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
     1. Relative Flow-Depth =  0.00 FEET
        as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
     2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
   *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
    OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*


****************************************************************************
   FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
 ----------------------------------------------------------------------------
-
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS CONDOMINIUM
   TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   947.00
   UPSTREAM ELEVATION(FEET) =   1611.50
   DOWNSTREAM ELEVATION(FEET) =   1598.40
   ELEVATION DIFFERENCE(FEET) =     13.10
   TC = 0.359*[(  947.00**3)/(    13.10)]**.2 =   13.113
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.567
   CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8087
   SOIL CLASSIFICATION IS "B"
   SUBAREA RUNOFF(CFS) =      8.16
   TOTAL AREA(ACRES) =      3.93   TOTAL RUNOFF(CFS) =      8.16


****************************************************************************
   FLOW PROCESS FROM NODE      1.20 TO NODE      7.10 IS CODE =  31
 ----------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1587.70  DOWNSTREAM(FEET) =  1587.10
   FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.013
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
   DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.1 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   7.52
   ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       8.16
   PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   13.20
   LONGEST FLOWPATH FROM NODE      1.10 TO NODE      7.10 =     985.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE      7.10 TO NODE      7.10 IS CODE =  10
 ----------------------------------------------------------------------------
-
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

============================================================================
```

```
****************************************************************************
   FLOW PROCESS FROM NODE      2.10 TO NODE      2.20 IS CODE =  21
 ----------------------------------------------------------------------------
-
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS CONDOMINIUM
   TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   372.00
   UPSTREAM ELEVATION(FEET) =   1605.50
   DOWNSTREAM ELEVATION(FEET) =   1598.40
   ELEVATION DIFFERENCE(FEET) =      7.10
   TC = 0.359*[(  372.00**3)/(     7.10)]**.2 =    8.461
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.196
   CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8222
   SOIL CLASSIFICATION IS "B"
   SUBAREA RUNOFF(CFS) =      0.66
   TOTAL AREA(ACRES) =      0.25   TOTAL RUNOFF(CFS) =      0.66


****************************************************************************
   FLOW PROCESS FROM NODE      2.20 TO NODE      7.10 IS CODE =  31
 ----------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1587.70  DOWNSTREAM(FEET) =  1587.10
   FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.013
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
   DEPTH OF FLOW IN  24.0 INCH PIPE IS   2.6 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   3.62
   ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       0.66
   PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    8.64
   LONGEST FLOWPATH FROM NODE      2.10 TO NODE      7.10 =     410.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE      7.10 TO NODE      7.10 IS CODE =  11
 ----------------------------------------------------------------------------
-
   >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

============================================================================

   ** MAIN STREAM CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1        0.66     8.64       3.164        0.25
   LONGEST FLOWPATH FROM NODE      2.10 TO NODE      7.10 =     410.00 FEET.
```

```
   ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM     RUNOFF       Tc       INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1        8.16    13.20        2.559        3.93
   LONGEST FLOWPATH FROM NODE      1.10 TO NODE      7.10 =     985.00 FEET.

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

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc       INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
       1       6.00       8.64        3.164
       2       8.69      13.20        2.559

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =       8.69   Tc(MIN.) =   13.20
   TOTAL AREA(ACRES) =        4.2


****************************************************************************
   FLOW PROCESS FROM NODE      7.10 TO NODE      7.20 IS CODE =  31
 ----------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1587.10  DOWNSTREAM(FEET) =  1586.20
   FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
   DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.2 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   9.13
   ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       8.69
   PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   13.26
   LONGEST FLOWPATH FROM NODE      1.10 TO NODE      7.20 =    1020.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE      7.20 TO NODE      7.20 IS CODE =  10
 ----------------------------------------------------------------------------
-
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  21
 ----------------------------------------------------------------------------
-
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS CONDOMINIUM
   TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   634.00
   UPSTREAM ELEVATION(FEET) =   1604.20
   DOWNSTREAM ELEVATION(FEET) =   1597.00
   ELEVATION DIFFERENCE(FEET) =      7.20
   TC = 0.359*[(  634.00**3)/(     7.20)]**.2 =   11.618
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.728
   CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8126
   SOIL CLASSIFICATION IS "B"
   SUBAREA RUNOFF(CFS) =      3.30
   TOTAL AREA(ACRES) =      1.49   TOTAL RUNOFF(CFS) =      3.30


****************************************************************************
   FLOW PROCESS FROM NODE      3.20 TO NODE      7.30 IS CODE =  31
 ----------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1588.20  DOWNSTREAM(FEET) =  1587.40
   FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
   DEPTH OF FLOW IN  24.0 INCH PIPE IS   4.8 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   7.47
   ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       3.30
   PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   11.67
   LONGEST FLOWPATH FROM NODE      3.10 TO NODE      7.30 =     659.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE      7.30 TO NODE      7.30 IS CODE =  10
 ----------------------------------------------------------------------------
-
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE      4.10 TO NODE      4.20 IS CODE =  21
 ----------------------------------------------------------------------------
-
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS CONDOMINIUM
   TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   396.00
   UPSTREAM ELEVATION(FEET) =   1598.50
```

```
   DOWNSTREAM ELEVATION(FEET) =   1597.00
   ELEVATION DIFFERENCE(FEET) =      1.50
   TC = 0.359*[(  396.00**3)/(     1.50)]**.2 =   11.988
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.685
   CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8116
   SOIL CLASSIFICATION IS "B"
   SUBAREA RUNOFF(CFS) =      2.00
   TOTAL AREA(ACRES) =      0.92   TOTAL RUNOFF(CFS) =      2.00


****************************************************************************
   FLOW PROCESS FROM NODE      4.20 TO NODE      7.30 IS CODE =  31
 ----------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1587.50  DOWNSTREAM(FEET) =  1587.40
   FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
   DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.2 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   3.09
   ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       2.00
   PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   12.12
   LONGEST FLOWPATH FROM NODE      4.10 TO NODE      7.30 =     421.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE      7.30 TO NODE      7.30 IS CODE =  11
 ----------------------------------------------------------------------------
-
   >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<

============================================================================

   ** MAIN STREAM CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1        2.00    12.12       2.670        0.92
   LONGEST FLOWPATH FROM NODE      4.10 TO NODE      7.30 =     421.00 FEET.

   ** MEMORY BANK #  3 CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1        3.30    11.67       2.721        1.49
   LONGEST FLOWPATH FROM NODE      3.10 TO NODE      7.30 =     659.00 FEET.

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

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc      INTENSITY
```

```
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
       1       5.23      11.67        2.721
       2       5.25      12.12        2.670

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =       5.23   Tc(MIN.) =   11.67
   TOTAL AREA(ACRES) =        2.4


****************************************************************************
   FLOW PROCESS FROM NODE      7.30 TO NODE      7.20 IS CODE =  31
 ----------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1587.40  DOWNSTREAM(FEET) =  1586.20
   FLOW LENGTH(FEET) =    46.00   MANNING'S N =  0.013
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
   DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.3 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   7.96
   ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       5.23
   PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   11.77
   LONGEST FLOWPATH FROM NODE      3.10 TO NODE      7.20 =     705.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE      7.20 TO NODE      7.20 IS CODE =  11
 ----------------------------------------------------------------------------
-
   >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<

============================================================================

   ** MAIN STREAM CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1        5.23    11.77       2.710        2.41
   LONGEST FLOWPATH FROM NODE      3.10 TO NODE      7.20 =     705.00 FEET.

   ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1        8.69    13.26       2.553        4.18
   LONGEST FLOWPATH FROM NODE      1.10 TO NODE      7.20 =    1020.00 FEET.

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

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc      INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
```

```
       1      12.95      11.77        2.710
       2      13.62      13.26        2.553

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      13.62   Tc(MIN.) =   13.26
   TOTAL AREA(ACRES) =        6.6


****************************************************************************
   FLOW PROCESS FROM NODE      7.20 TO NODE      7.20 IS CODE =  12
 ----------------------------------------------------------------------------
-
   >>>>>CLEAR MEMORY BANK # 1 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE      7.20 TO NODE      7.20 IS CODE =  12
 ----------------------------------------------------------------------------
-
   >>>>>CLEAR MEMORY BANK # 2 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE      7.20 TO NODE      7.20 IS CODE =  12
 ----------------------------------------------------------------------------
-
   >>>>>CLEAR MEMORY BANK # 3 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE      7.20 TO NODE      7.40 IS CODE =  31
 ----------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1586.20  DOWNSTREAM(FEET) =  1582.20
   FLOW LENGTH(FEET) =   284.00   MANNING'S N =  0.013
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
   DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.5 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   8.24
   ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      13.62
   PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   13.83
   LONGEST FLOWPATH FROM NODE      1.10 TO NODE      7.40 =    1304.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE      7.40 TO NODE      7.40 IS CODE =  10
```

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

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE      5.10 TO NODE      5.20 IS CODE =  21
 ----------------------------------------------------------------------------
-
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
           ASSUMED INITIAL SUBAREA UNIFORM
           DEVELOPMENT IS CONDOMINIUM
   TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   948.00
   UPSTREAM ELEVATION(FEET) =   1606.00
   DOWNSTREAM ELEVATION(FEET) =   1589.50
   ELEVATION DIFFERENCE(FEET) =     16.50
   TC = 0.359*[(  948.00**3)/(    16.50)]**.2 =   12.529
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.626
   CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8102
   SOIL CLASSIFICATION IS "B"
   SUBAREA RUNOFF(CFS) =      8.17
   TOTAL AREA(ACRES) =      3.84   TOTAL RUNOFF(CFS) =      8.17


****************************************************************************
   FLOW PROCESS FROM NODE      5.20 TO NODE      7.40 IS CODE =  31
 ----------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1582.50  DOWNSTREAM(FEET) =  1582.20
   FLOW LENGTH(FEET) =   107.00   MANNING'S N =  0.013
   DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   3.94
   ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       8.17
   PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   12.98
   LONGEST FLOWPATH FROM NODE      5.10 TO NODE      7.40 =    1055.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE      7.40 TO NODE      7.40 IS CODE =  11
 ----------------------------------------------------------------------------
-
   >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

============================================================================

   ** MAIN STREAM CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
```

```
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1        8.17    12.98       2.580        3.84
   LONGEST FLOWPATH FROM NODE      5.10 TO NODE      7.40 =    1055.00 FEET.

   ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1       13.62    13.83       2.499        6.59
   LONGEST FLOWPATH FROM NODE      1.10 TO NODE      7.40 =    1304.00 FEET.

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

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc      INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
       1      20.95      12.98        2.580
       2      21.54      13.83        2.499

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      21.54   Tc(MIN.) =   13.83
   TOTAL AREA(ACRES) =       10.4


****************************************************************************
   FLOW PROCESS FROM NODE      7.40 TO NODE      7.40 IS CODE =  12
 --------------------------------------------------------------------------
-
   >>>>>CLEAR MEMORY BANK # 1 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE      7.40 TO NODE     12.30 IS CODE =  31
 --------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1582.20  DOWNSTREAM(FEET) =  1578.40
   FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
   DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.8 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   9.80
   ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      21.54
   PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   14.22
   LONGEST FLOWPATH FROM NODE      1.10 TO NODE     12.30 =    1529.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE     12.30 TO NODE     12.30 IS CODE =  10
```

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

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE     12.30 TO NODE     12.30 IS CODE =  12
 ----------------------------------------------------------------------------
-
   >>>>>CLEAR MEMORY BANK # 3 <<<<<

============================================================================
   ***MEMORY BANK #  3 IS EMPTY - PROCESS IGNORED.***


****************************************************************************
   FLOW PROCESS FROM NODE      9.10 TO NODE      9.20 IS CODE =  21
 ----------------------------------------------------------------------------
-
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS CONDOMINIUM
   TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   462.00
   UPSTREAM ELEVATION(FEET) =   1592.30
   DOWNSTREAM ELEVATION(FEET) =   1587.60
   ELEVATION DIFFERENCE(FEET) =      4.70
   TC = 0.359*[(  462.00**3)/(     4.70)]**.2 =   10.464
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.874
   CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8159
   SOIL CLASSIFICATION IS "B"
   SUBAREA RUNOFF(CFS) =      3.68
   TOTAL AREA(ACRES) =      1.57   TOTAL RUNOFF(CFS) =      3.68


****************************************************************************
   FLOW PROCESS FROM NODE      9.20 TO NODE      9.20 IS CODE =  81
 ----------------------------------------------------------------------------
-
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

============================================================================
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.874
   UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6596
   SOIL CLASSIFICATION IS "B"
   SUBAREA AREA(ACRES) =    1.38   SUBAREA RUNOFF(CFS) =    2.62
   TOTAL AREA(ACRES) =        3.0   TOTAL RUNOFF(CFS) =       6.30
   TC(MIN.) =   10.46


****************************************************************************
   FLOW PROCESS FROM NODE      9.20 TO NODE      9.30 IS CODE =  31
```

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

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1578.70  DOWNSTREAM(FEET) =  1578.60
   FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
   DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.5 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   4.24
   ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       6.30
   PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   10.56
   LONGEST FLOWPATH FROM NODE      9.10 TO NODE      9.30 =     487.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE      9.30 TO NODE      9.30 IS CODE =  10
 ----------------------------------------------------------------------------
-
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE     10.10 TO NODE     10.20 IS CODE =  21
 ----------------------------------------------------------------------------
-
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS CONDOMINIUM
   TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   422.00
   UPSTREAM ELEVATION(FEET) =   1590.50
   DOWNSTREAM ELEVATION(FEET) =   1587.60
   ELEVATION DIFFERENCE(FEET) =      2.90
   TC = 0.359*[(  422.00**3)/(     2.90)]**.2 =   10.915
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.814
   CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8145
   SOIL CLASSIFICATION IS "B"
   SUBAREA RUNOFF(CFS) =      1.99
   TOTAL AREA(ACRES) =      0.87   TOTAL RUNOFF(CFS) =      1.99


****************************************************************************
   FLOW PROCESS FROM NODE     10.20 TO NODE      9.30 IS CODE =  31
 ----------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1578.70  DOWNSTREAM(FEET) =  1578.60
```

```
   FLOW LENGTH(FEET) =    26.00   MANNING'S N =  0.013
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
   DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.3 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   3.05
   ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       1.99
   PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   11.06
   LONGEST FLOWPATH FROM NODE     10.10 TO NODE      9.30 =     448.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE      9.30 TO NODE      9.30 IS CODE =  11
 ----------------------------------------------------------------------------
-
   >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<

============================================================================

   ** MAIN STREAM CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1        1.99    11.06       2.796        0.87
   LONGEST FLOWPATH FROM NODE     10.10 TO NODE      9.30 =     448.00 FEET.

   ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1        6.30    10.56       2.861        2.95
   LONGEST FLOWPATH FROM NODE      9.10 TO NODE      9.30 =     487.00 FEET.

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

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc      INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
       1       8.20      10.56        2.861
       2       8.15      11.06        2.796

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =       8.20   Tc(MIN.) =   10.56
   TOTAL AREA(ACRES) =        3.8


****************************************************************************
   FLOW PROCESS FROM NODE      9.30 TO NODE     12.30 IS CODE =  31
 ----------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1578.60  DOWNSTREAM(FEET) =  1578.40
   FLOW LENGTH(FEET) =    46.00   MANNING'S N =  0.013
```

```
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
   DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.1 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   4.67
   ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       8.20
   PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   10.73
   LONGEST FLOWPATH FROM NODE      9.10 TO NODE     12.30 =     533.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE     12.30 TO NODE     12.30 IS CODE =  11
 ----------------------------------------------------------------------------
-
   >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

============================================================================

   ** MAIN STREAM CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1        8.20    10.73       2.839        3.82
   LONGEST FLOWPATH FROM NODE      9.10 TO NODE     12.30 =     533.00 FEET.

   ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1       21.54    14.22       2.466       10.43
   LONGEST FLOWPATH FROM NODE      1.10 TO NODE     12.30 =    1529.00 FEET.

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

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc      INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
       1      24.45      10.73        2.839
       2      28.66      14.22        2.466

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      28.66   Tc(MIN.) =   14.22
   TOTAL AREA(ACRES) =       14.2


****************************************************************************
   FLOW PROCESS FROM NODE     12.30 TO NODE     14.20 IS CODE =  31
 ----------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1578.40  DOWNSTREAM(FEET) =  1576.20
   FLOW LENGTH(FEET) =   168.00   MANNING'S N =  0.013
   DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.2 INCHES
```

```
   PIPE-FLOW VELOCITY(FEET/SEC.) =   9.50
   ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      28.66
   PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   14.51
   LONGEST FLOWPATH FROM NODE      1.10 TO NODE     14.20 =    1697.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE     14.20 TO NODE     14.20 IS CODE =  10
 ----------------------------------------------------------------------------
-
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE     14.20 TO NODE     14.20 IS CODE =  12
 ----------------------------------------------------------------------------
-
   >>>>>CLEAR MEMORY BANK # 1 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE     14.20 TO NODE     14.20 IS CODE =  12
 ----------------------------------------------------------------------------
-
   >>>>>CLEAR MEMORY BANK # 2 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE      8.10 TO NODE     11.20 IS CODE =  21
 ----------------------------------------------------------------------------
-
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS CONDOMINIUM
   TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   805.00
   UPSTREAM ELEVATION(FEET) =   1598.20
   DOWNSTREAM ELEVATION(FEET) =   1583.00
   ELEVATION DIFFERENCE(FEET) =     14.20
   TC = 0.359*[(  805.00**3)/(    14.20)]**.2 =   11.546
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.736
   CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8128
   SOIL CLASSIFICATION IS "B"
   SUBAREA RUNOFF(CFS) =      1.29
   TOTAL AREA(ACRES) =      0.58   TOTAL RUNOFF(CFS) =      1.29


****************************************************************************
```

```
   FLOW PROCESS FROM NODE     11.20 TO NODE     13.30 IS CODE =  31
 ----------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1578.30  DOWNSTREAM(FEET) =  1576.40
   FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
   DEPTH OF FLOW IN  24.0 INCH PIPE IS   2.7 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   6.81
   ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       1.29
   PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   11.63
   LONGEST FLOWPATH FROM NODE      8.10 TO NODE     13.30 =     840.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE     13.30 TO NODE     13.30 IS CODE =  10
 ----------------------------------------------------------------------------
-
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE     13.10 TO NODE     13.20 IS CODE =  21
 ----------------------------------------------------------------------------
-
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS CONDOMINIUM
   TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   793.00
   UPSTREAM ELEVATION(FEET) =   1592.30
   DOWNSTREAM ELEVATION(FEET) =   1583.00
   ELEVATION DIFFERENCE(FEET) =      9.30
   TC = 0.359*[(  793.00**3)/(     9.30)]**.2 =   12.624
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.617
   CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8099
   SOIL CLASSIFICATION IS "B"
   SUBAREA RUNOFF(CFS) =      7.18
   TOTAL AREA(ACRES) =      3.39   TOTAL RUNOFF(CFS) =      7.18


****************************************************************************
   FLOW PROCESS FROM NODE     13.20 TO NODE     13.30 IS CODE =  31
 ----------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
```

```
   ELEVATION DATA: UPSTREAM(FEET) =  1576.50  DOWNSTREAM(FEET) =  1576.40
   FLOW LENGTH(FEET) =    28.00   MANNING'S N =  0.013
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
   DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.8 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   4.20
   ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       7.18
   PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   12.74
   LONGEST FLOWPATH FROM NODE     13.10 TO NODE     13.30 =     821.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE     13.30 TO NODE     13.30 IS CODE =  11
 ----------------------------------------------------------------------------
-
   >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

============================================================================

   ** MAIN STREAM CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1        7.18    12.74       2.605        3.39
   LONGEST FLOWPATH FROM NODE     13.10 TO NODE     13.30 =     821.00 FEET.

   ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1        1.29    11.63       2.726        0.58
   LONGEST FLOWPATH FROM NODE      8.10 TO NODE     13.30 =     840.00 FEET.

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

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc      INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
       1       7.85      11.63        2.726
       2       8.42      12.74        2.605

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =       8.42   Tc(MIN.) =   12.74
   TOTAL AREA(ACRES) =        4.0


****************************************************************************
   FLOW PROCESS FROM NODE     13.30 TO NODE     14.20 IS CODE =  31
 ----------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1576.40  DOWNSTREAM(FEET) =  1576.20
```

```
   FLOW LENGTH(FEET) =    94.00   MANNING'S N =  0.013
   DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.0 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   3.54
   ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       8.42
   PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   13.18
   LONGEST FLOWPATH FROM NODE      8.10 TO NODE     14.20 =     934.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE     14.20 TO NODE     14.20 IS CODE =  11
 ----------------------------------------------------------------------------
-
   >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<

============================================================================

   ** MAIN STREAM CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1        8.42    13.18       2.561        3.97
   LONGEST FLOWPATH FROM NODE      8.10 TO NODE     14.20 =     934.00 FEET.

   ** MEMORY BANK #  3 CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1       28.66    14.51       2.440       14.25
   LONGEST FLOWPATH FROM NODE      1.10 TO NODE     14.20 =    1697.00 FEET.

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

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc      INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
       1      34.44      13.18        2.561
       2      36.68      14.51        2.440

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      36.68   Tc(MIN.) =   14.51
   TOTAL AREA(ACRES) =       18.2


****************************************************************************
   FLOW PROCESS FROM NODE     14.20 TO NODE     14.20 IS CODE =  10
 ----------------------------------------------------------------------------
-
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE     14.20 TO NODE     14.20 IS CODE =  12
```

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

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  12
 ----------------------------------------------------------------------------
-
   >>>>>CLEAR MEMORY BANK # 3 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE     14.20 TO NODE     14.10 IS CODE =  31
 ----------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1576.20  DOWNSTREAM(FEET) =  1576.10
   FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
   DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.1 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
   ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      36.68
   PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   14.58
   LONGEST FLOWPATH FROM NODE      1.10 TO NODE     14.10 =    1722.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE     14.10 TO NODE     14.10 IS CODE =  10
 ----------------------------------------------------------------------------
-
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE     14.10 TO NODE     14.10 IS CODE =  12
 ----------------------------------------------------------------------------
-
   >>>>>CLEAR MEMORY BANK # 2 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE     12.10 TO NODE     12.20 IS CODE =  21
 ----------------------------------------------------------------------------
-
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
================================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS CONDOMINIUM
   TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   610.00
   UPSTREAM ELEVATION(FEET) =   1590.50
   DOWNSTREAM ELEVATION(FEET) =   1583.40
   ELEVATION DIFFERENCE(FEET) =      7.10
   TC = 0.359*[(  610.00**3)/(     7.10)]**.2 =   11.384
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.755
   CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8132
   SOIL CLASSIFICATION IS "B"
   SUBAREA RUNOFF(CFS) =      2.85
   TOTAL AREA(ACRES) =      1.27   TOTAL RUNOFF(CFS) =      2.85


****************************************************************************
   FLOW PROCESS FROM NODE     12.20 TO NODE     14.10 IS CODE =  31
 ----------------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

================================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1576.20  DOWNSTREAM(FEET) =  1576.10
   FLOW LENGTH(FEET) =    24.00   MANNING'S N =  0.013
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 24.000
   DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.4 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   3.47
   ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       2.85
   PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   11.50
   LONGEST FLOWPATH FROM NODE     12.10 TO NODE     14.10 =     634.00 FEET.


****************************************************************************
   FLOW PROCESS FROM NODE     14.10 TO NODE     14.10 IS CODE =  11
 ----------------------------------------------------------------------------
-
   >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

================================================================================

   ** MAIN STREAM CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1        2.85    11.50       2.742        1.27
   LONGEST FLOWPATH FROM NODE     12.10 TO NODE     14.10 =     634.00 FEET.

   ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1       36.68    14.58       2.435       18.22
   LONGEST FLOWPATH FROM NODE      1.10 TO NODE     14.10 =    1722.00 FEET.

  ********************************WARNING*********************************
```

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

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc      INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
       1      31.78      11.50        2.742
       2      39.21      14.58        2.435

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      39.21   Tc(MIN.) =   14.58
   TOTAL AREA(ACRES) =       19.5


************************************************************************
   FLOW PROCESS FROM NODE     14.10 TO NODE     14.30 IS CODE =  31
 ----------------------------------------------------------------------
-
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

========================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1576.10  DOWNSTREAM(FEET) =  1576.00
   FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
   DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.3 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   5.66
   ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      39.21
   PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   14.68
   LONGEST FLOWPATH FROM NODE      1.10 TO NODE     14.30 =    1758.00 FEET.


************************************************************************
   FLOW PROCESS FROM NODE     14.30 TO NODE     14.30 IS CODE =  81
 ----------------------------------------------------------------------
-
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

========================================================================
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.426
   UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6286
   SOIL CLASSIFICATION IS "B"
   SUBAREA AREA(ACRES) =    0.52   SUBAREA RUNOFF(CFS) =    0.79
   TOTAL AREA(ACRES) =       20.0   TOTAL RUNOFF(CFS) =      40.00
   TC(MIN.) =   14.68


************************************************************************
   FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =  10
 ----------------------------------------------------------------------
-
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<

========================================================================
```

```
****************************************************************************
   FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  12
 ----------------------------------------------------------------------------
-
   >>>>>CLEAR MEMORY BANK # 1 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =  10
 ----------------------------------------------------------------------------
-
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

============================================================================


****************************************************************************
   FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =  12
 ----------------------------------------------------------------------------
-
   >>>>>CLEAR MEMORY BANK # 3 <<<<<

============================================================================

============================================================================
   END OF STUDY SUMMARY:
   TOTAL AREA(ACRES)     =       20.0  TC(MIN.) =     14.68
   PEAK FLOW RATE(CFS)   =      40.00

============================================================================

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

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.
```

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

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
```

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 02/14/24 File: AREAA1001100.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 1-HR

Drainage Area = 30.10(Ac.) = 0.047 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 30.10(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]
30.10	0.49	14.75

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.10	1.20	36.12

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 %
30.100	57.30	0.580

Total Area Entered = 30.10(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.3	57.3	0.498	0.580	0.238	1.000	0.238
					Sum (F) =	0.238

Area averaged mean soil loss (F) (In/Hr) = 0.238
Minimum soil loss rate ((In/Hr)) = 0.119
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.440

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	7.903
2	0.167	245.934	48.616	14.748
3	0.250	368.902	13.055	3.960
4	0.333	491.869	5.887	1.786
5	0.417	614.836	3.289	0.998
6	0.500	737.803	1.843	0.559
7	0.583	860.771	1.257	0.381
		Sum = 100.000	Sum=	30.335

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	0.238	(0.266)	0.367
2	0.17	4.30	0.619	0.238	(0.272)	0.381
3	0.25	5.00	0.720	0.238	(0.317)	0.482
4	0.33	5.00	0.720	0.238	(0.317)	0.482
5	0.42	5.80	0.835	0.238	(0.367)	0.597
6	0.50	6.50	0.936	0.238	(0.412)	0.698
7	0.58	7.40	1.065	0.238	(0.469)	0.827
8	0.67	8.60	1.238	0.238	(0.545)	1.000
9	0.75	12.30	1.771	0.238	(0.779)	1.533
10	0.83	29.10	4.189	0.238	(1.843)	3.951

```
 11   0.92     6.80      0.979          0.238    (  0.431)        0.741
 12   1.00     5.00      0.720          0.238    (  0.317)        0.482
          (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    11.5
    Flood volume = Effective rainfall      0.96(In)
     times area      30.1(Ac.)/[(In)/(Ft.)] =       2.4(Ac.Ft)
    Total soil loss =      0.24(In)
    Total soil loss =     0.597(Ac.Ft)
    Total rainfall =      1.20(In)
    Flood volume =      105094.5 Cubic Feet
    Total soil loss =       25985.4 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =     73.471(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       0.0200      2.90  VQ        |         |         |         |
   0+10       0.0780      8.43  |V  Q     |         |         |         |
   0+15       0.1530     10.89  | V  Q    |         |         |         |
   0+20       0.2431     13.09  |   V Q   |         |         |         |
   0+25       0.3450     14.79  |    V Q  |         |         |         |
   0+30       0.4668     17.69  |      VQ |         |         |         |
   0+35       0.6108     20.90  |         Q         |         |         |
   0+40       0.7819     24.85  |         | Q       |         |         |
   0+45       1.0054     32.46  |         |     Q   |         |         |
   0+50       1.4222     60.52  |         |         |  V      Q         |
   0+55       1.9282     73.47  |         |         |         |V    Q   |
   1+ 0       2.1684     34.87  |         |      Q  |         |    V    |
   1+ 5       2.3028     19.51  |        Q|         |         |       V |
   1+10       2.3607      8.42  |   Q     |         |         |        V|
   1+15       2.3910      4.40  | Q       |         |         |        V|
   1+20       2.4076      2.40  |Q        |         |         |        V|
   1+25       2.4114      0.55  Q         |         |         |        V|
   1+30       2.4126      0.18  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 02/14/24 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 = 30.10(Ac.) = 0.047 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 30.10(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]
30.10	0.80	24.08

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.10	1.85	55.69

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 %
30.100	57.30	0.580

Total Area Entered = 30.10(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.3	57.3	0.498	0.580	0.238	1.000	0.238
					Sum (F) =	0.238

Area averaged mean soil loss (F) (In/Hr) = 0.238
Minimum soil loss rate ((In/Hr)) = 0.119
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.440

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	7.903
2	0.167	245.934	48.616	14.748
3	0.250	368.902	13.055	3.960
4	0.333	491.869	5.887	1.786
5	0.417	614.836	3.289	0.998
6	0.500	737.803	1.843	0.559
7	0.583	860.771	1.257	0.381
		Sum =	100.000 Sum=	30.335

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	(0.238)		0.127	0.162
2	0.17	1.30	0.289	(0.238)		0.127	0.162
3	0.25	1.10	0.244	(0.238)		0.107	0.137
4	0.33	1.50	0.333	(0.238)		0.147	0.186
5	0.42	1.50	0.333	(0.238)		0.147	0.186
6	0.50	1.80	0.400	(0.238)		0.176	0.224
7	0.58	1.50	0.333	(0.238)		0.147	0.186
8	0.67	1.80	0.400	(0.238)		0.176	0.224
9	0.75	1.80	0.400	(0.238)		0.176	0.224
10	0.83	1.50	0.333	(0.238)		0.147	0.186
11	0.92	1.60	0.355	(0.238)		0.156	0.199
12	1.00	1.80	0.400	(0.238)		0.176	0.224

13	1.08	2.20	0.488	(	0.238)	0.215	0.273
14	1.17	2.20	0.488	(	0.238)	0.215	0.273
15	1.25	2.20	0.488	(	0.238)	0.215	0.273
16	1.33	2.00	0.444	(	0.238)	0.195	0.249
17	1.42	2.60	0.577		0.238	(0.254)	0.339
18	1.50	2.70	0.599		0.238	(0.264)	0.361
19	1.58	2.40	0.533	(	0.238)	0.234	0.298
20	1.67	2.70	0.599		0.238	(0.264)	0.361
21	1.75	3.30	0.733		0.238	(0.322)	0.495
22	1.83	3.10	0.688		0.238	(0.303)	0.450
23	1.92	2.90	0.644		0.238	(0.283)	0.406
24	2.00	3.00	0.666		0.238	(0.293)	0.428
25	2.08	3.10	0.688		0.238	(0.303)	0.450
26	2.17	4.20	0.932		0.238	(0.410)	0.694
27	2.25	5.00	1.110		0.238	(0.488)	0.872
28	2.33	3.50	0.777		0.238	(0.342)	0.539
29	2.42	6.80	1.509		0.238	(0.664)	1.272
30	2.50	7.30	1.620		0.238	(0.713)	1.383
31	2.58	8.20	1.820		0.238	(0.801)	1.582
32	2.67	5.90	1.310		0.238	(0.576)	1.072
33	2.75	2.00	0.444	(	0.238)	0.195	0.249
34	2.83	1.80	0.400	(	0.238)	0.176	0.224
35	2.92	1.80	0.400	(	0.238)	0.176	0.224
36	3.00	0.60	0.133	(	0.238)	0.059	0.075

(Loss Rate Not Used)

Sum = 100.0 Sum = 15.1

Flood volume = Effective rainfall 1.26(In)
times area 30.1(Ac.)/[(In)/(Ft.)] = 3.2(Ac.Ft)
Total soil loss = 0.59(In)
Total soil loss = 1.474(Ac.Ft)
Total rainfall = 1.85(In)
Flood volume = 137880.8 Cubic Feet
Total soil loss = 64229.1 Cubic Feet

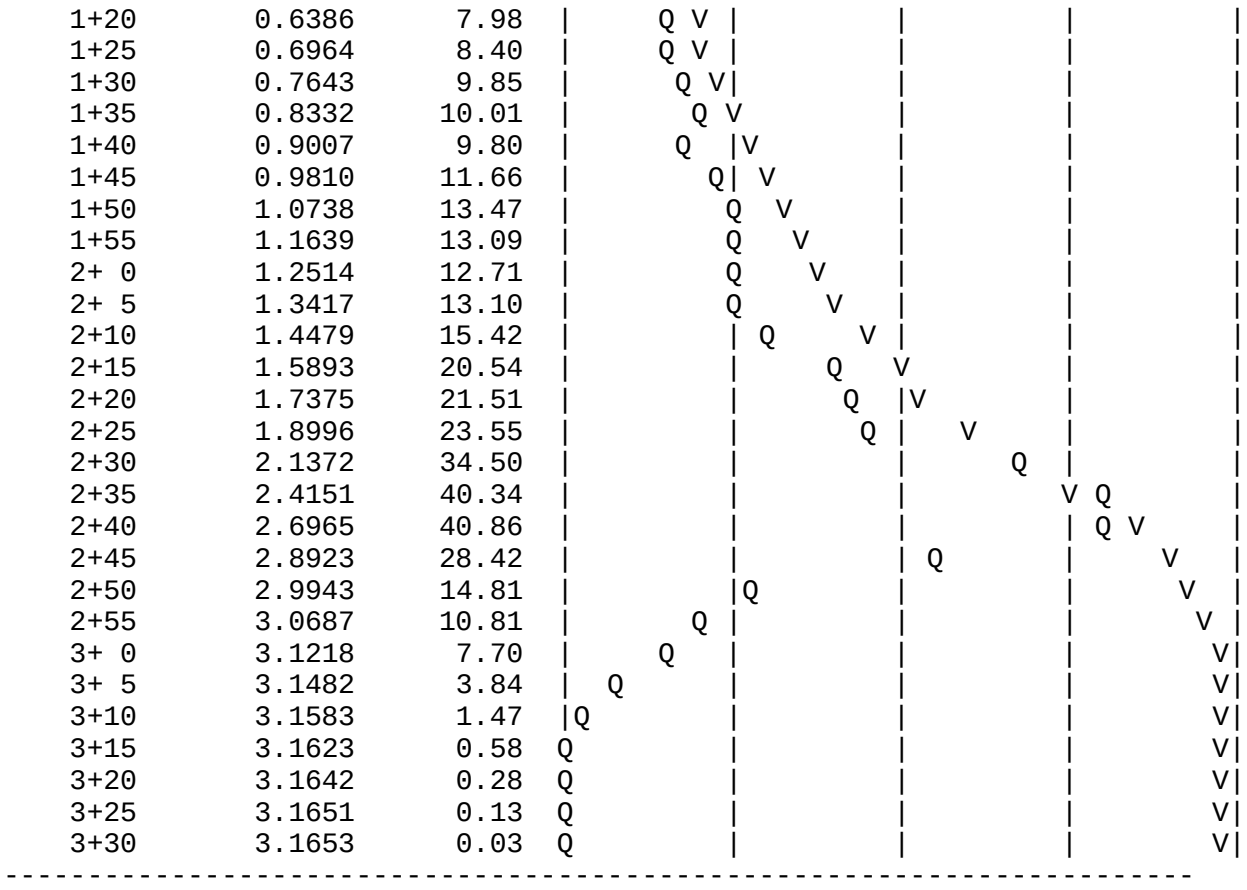
Peak flow rate of this hydrograph = 40.864(CFS)

++

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	0.0088	1.28	VQ				
0+10	0.0340	3.66	V Q				
0+15	0.0623	4.11	V Q				
0+20	0.0927	4.42	|V Q				
0+25	0.1287	5.22	|V Q				
0+30	0.1683	5.76	| V Q				
0+35	0.2106	6.14	| V Q				
0+40	0.2523	6.06	| VQ				
0+45	0.2975	6.55	| V Q				
0+50	0.3415	6.39	| VQ				
0+55	0.3828	5.99	| Q				
1+ 0	0.4259	6.26	| Q				
1+ 5	0.4741	7.00	| Q				
1+10	0.5281	7.84	| Q				
1+15	0.5836	8.07	| QV				



1+20	0.6386	7.98	
1+25	0.6964	8.40	
1+30	0.7643	9.85	
1+35	0.8332	10.01	
1+40	0.9007	9.80	
1+45	0.9810	11.66	
1+50	1.0738	13.47	
1+55	1.1639	13.09	
2+ 0	1.2514	12.71	
2+ 5	1.3417	13.10	
2+10	1.4479	15.42	
2+15	1.5893	20.54	
2+20	1.7375	21.51	
2+25	1.8996	23.55	
2+30	2.1372	34.50	
2+35	2.4151	40.34	
2+40	2.6965	40.86	
2+45	2.8923	28.42	
2+50	2.9943	14.81	
2+55	3.0687	10.81	
3+ 0	3.1218	7.70	
3+ 5	3.1482	3.84	
3+10	3.1583	1.47	
3+15	3.1623	0.58	
3+20	3.1642	0.28	
3+25	3.1651	0.13	
3+30	3.1653	0.03	

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

Study date 02/14/24 File: AREAA1006100.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 6-HR

Drainage Area = 30.10(Ac.) = 0.047 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 30.10(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]
30.10	1.10	33.11

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.10	2.50	75.25

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 %
30.100	57.30	0.580

Total Area Entered = 30.10(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.3	57.3	0.498	0.580	0.238	1.000	0.238
					Sum (F) =	0.238

Area averaged mean soil loss (F) (In/Hr) = 0.238
Minimum soil loss rate ((In/Hr)) = 0.119
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.440

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	7.903
2	0.167	245.934	48.616	14.748
3	0.250	368.902	13.055	3.960
4	0.333	491.869	5.887	1.786
5	0.417	614.836	3.289	0.998
6	0.500	737.803	1.843	0.559
7	0.583	860.771	1.257	0.381
			Sum = 100.000	Sum= 30.335

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	(0.238)		0.066	0.084
2	0.17	0.60	0.180	(0.238)		0.079	0.101
3	0.25	0.60	0.180	(0.238)		0.079	0.101
4	0.33	0.60	0.180	(0.238)		0.079	0.101
5	0.42	0.60	0.180	(0.238)		0.079	0.101
6	0.50	0.70	0.210	(0.238)		0.092	0.118
7	0.58	0.70	0.210	(0.238)		0.092	0.118
8	0.67	0.70	0.210	(0.238)		0.092	0.118
9	0.75	0.70	0.210	(0.238)		0.092	0.118
10	0.83	0.70	0.210	(0.238)		0.092	0.118
11	0.92	0.70	0.210	(0.238)		0.092	0.118
12	1.00	0.80	0.240	(0.238)		0.106	0.134

13	1.08	0.80	0.240	(0.238)	0.106	0.134
14	1.17	0.80	0.240	(0.238)	0.106	0.134
15	1.25	0.80	0.240	(0.238)	0.106	0.134
16	1.33	0.80	0.240	(0.238)	0.106	0.134
17	1.42	0.80	0.240	(0.238)	0.106	0.134
18	1.50	0.80	0.240	(0.238)	0.106	0.134
19	1.58	0.80	0.240	(0.238)	0.106	0.134
20	1.67	0.80	0.240	(0.238)	0.106	0.134
21	1.75	0.80	0.240	(0.238)	0.106	0.134
22	1.83	0.80	0.240	(0.238)	0.106	0.134
23	1.92	0.80	0.240	(0.238)	0.106	0.134
24	2.00	0.90	0.270	(0.238)	0.119	0.151
25	2.08	0.80	0.240	(0.238)	0.106	0.134
26	2.17	0.90	0.270	(0.238)	0.119	0.151
27	2.25	0.90	0.270	(0.238)	0.119	0.151
28	2.33	0.90	0.270	(0.238)	0.119	0.151
29	2.42	0.90	0.270	(0.238)	0.119	0.151
30	2.50	0.90	0.270	(0.238)	0.119	0.151
31	2.58	0.90	0.270	(0.238)	0.119	0.151
32	2.67	0.90	0.270	(0.238)	0.119	0.151
33	2.75	1.00	0.300	(0.238)	0.132	0.168
34	2.83	1.00	0.300	(0.238)	0.132	0.168
35	2.92	1.00	0.300	(0.238)	0.132	0.168
36	3.00	1.00	0.300	(0.238)	0.132	0.168
37	3.08	1.00	0.300	(0.238)	0.132	0.168
38	3.17	1.10	0.330	(0.238)	0.145	0.185
39	3.25	1.10	0.330	(0.238)	0.145	0.185
40	3.33	1.10	0.330	(0.238)	0.145	0.185
41	3.42	1.20	0.360	(0.238)	0.158	0.202
42	3.50	1.30	0.390	(0.238)	0.172	0.218
43	3.58	1.40	0.420	(0.238)	0.185	0.235
44	3.67	1.40	0.420	(0.238)	0.185	0.235
45	3.75	1.50	0.450	(0.238)	0.198	0.252
46	3.83	1.50	0.450	(0.238)	0.198	0.252
47	3.92	1.60	0.480	(0.238)	0.211	0.269
48	4.00	1.60	0.480	(0.238)	0.211	0.269
49	4.08	1.70	0.510	(0.238)	0.224	0.286
50	4.17	1.80	0.540	(0.238)	0.238	0.302
51	4.25	1.90	0.570	0.238	(0.251)	0.332
52	4.33	2.00	0.600	0.238	(0.264)	0.362
53	4.42	2.10	0.630	0.238	(0.277)	0.392
54	4.50	2.10	0.630	0.238	(0.277)	0.392
55	4.58	2.20	0.660	0.238	(0.290)	0.422
56	4.67	2.30	0.690	0.238	(0.304)	0.452
57	4.75	2.40	0.720	0.238	(0.317)	0.482
58	4.83	2.40	0.720	0.238	(0.317)	0.482
59	4.92	2.50	0.750	0.238	(0.330)	0.512
60	5.00	2.60	0.780	0.238	(0.343)	0.542
61	5.08	3.10	0.930	0.238	(0.409)	0.692
62	5.17	3.60	1.080	0.238	(0.475)	0.842
63	5.25	3.90	1.170	0.238	(0.515)	0.932
64	5.33	4.20	1.260	0.238	(0.554)	1.022
65	5.42	4.70	1.410	0.238	(0.620)	1.172
66	5.50	5.60	1.680	0.238	(0.739)	1.442
67	5.58	1.90	0.570	0.238	(0.251)	0.332
68	5.67	0.90	0.270	(0.238)	0.119	0.151
69	5.75	0.60	0.180	(0.238)	0.079	0.101
70	5.83	0.50	0.150	(0.238)	0.066	0.084
71	5.92	0.30	0.090	(0.238)	0.040	0.050
72	6.00	0.20	0.060	(0.238)	0.026	0.034

(Loss Rate Not Used)
Sum = 100.0 Sum = 19.3
Flood volume = Effective rainfall 1.61(In)
times area 30.1(Ac.)/[(In)/(Ft.)] = 4.0(Ac.Ft)
Total soil loss = 0.89(In)
Total soil loss = 2.238(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 175627.3 Cubic Feet
Total soil loss = 97501.9 Cubic Feet

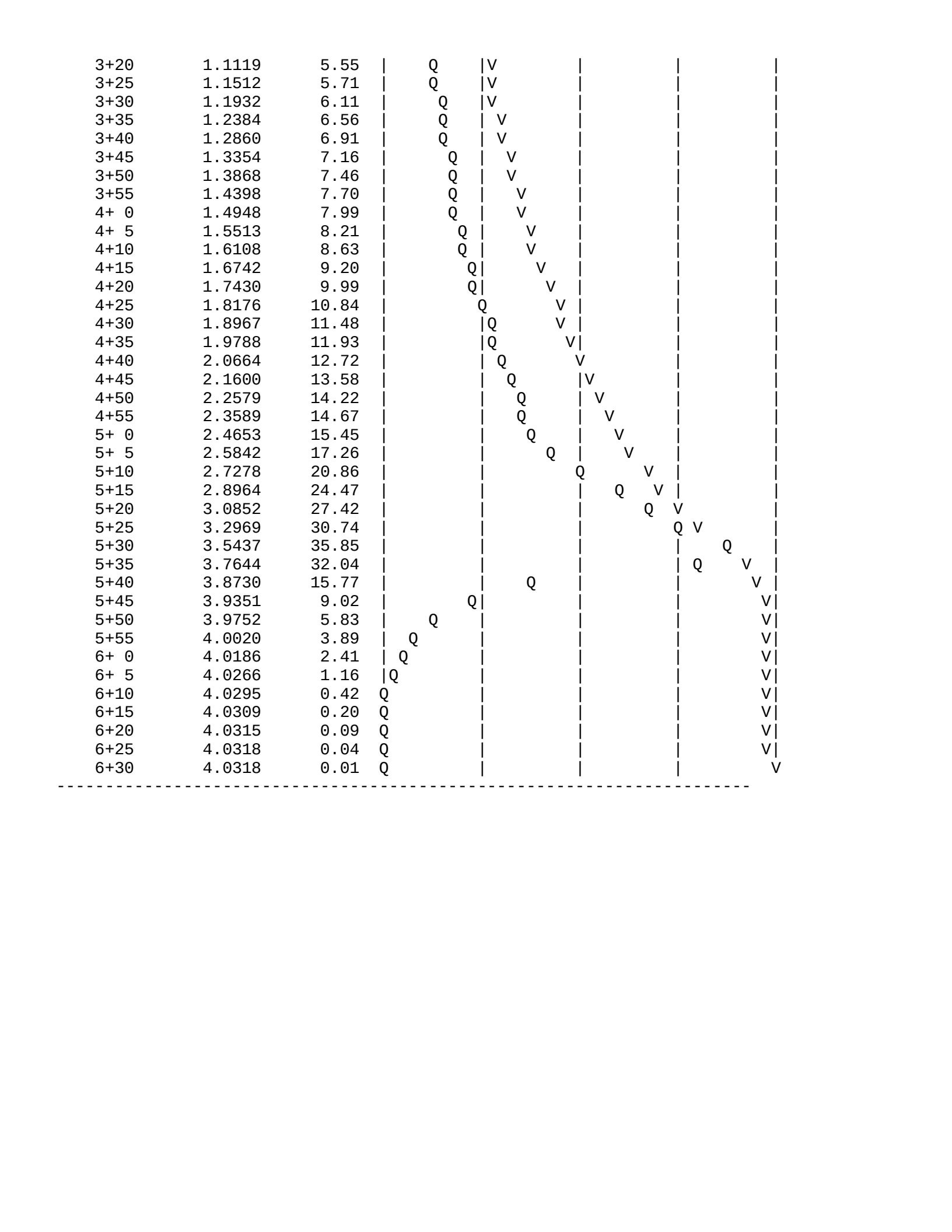
Peak flow rate of this hydrograph = 35.845(CFS)

++

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	0.0046	0.66	Q
0+10	0.0186	2.04	V Q
0+15	0.0366	2.62	V Q
0+20	0.0561	2.83	V Q
0+25	0.0764	2.95	V Q
0+30	0.0981	3.14	V Q
0+35	0.1217	3.43	|V Q
0+40	0.1459	3.51	|V Q
0+45	0.1702	3.54	|V Q
0+50	0.1947	3.55	|V Q
0+55	0.2192	3.56	| VQ
1+ 0	0.2447	3.70	| VQ
1+ 5	0.2719	3.95	| VQ
1+10	0.2996	4.02	| V Q
1+15	0.3275	4.05	| VQ
1+20	0.3554	4.06	| VQ
1+25	0.3835	4.07	| VQ
1+30	0.4116	4.08	| Q
1+35	0.4397	4.08	| Q
1+40	0.4678	4.08	| Q
1+45	0.4959	4.08	| Q
1+50	0.5239	4.08	| QV
1+55	0.5520	4.08	| QV
2+ 0	0.5810	4.21	| QV
2+ 5	0.6108	4.33	| Q V
2+10	0.6403	4.28	| Q V
2+15	0.6712	4.49	| Q V
2+20	0.7025	4.54	| Q V
2+25	0.7339	4.57	| Q V
2+30	0.7655	4.58	| Q V
2+35	0.7970	4.58	| Q V
2+40	0.8286	4.59	| Q V
2+45	0.8612	4.72	| Q V
2+50	0.8954	4.97	| Q V
2+55	0.9301	5.04	| Q V|
3+ 0	0.9650	5.07	| Q V|
3+ 5	1.0000	5.08	| Q V|
3+10	1.0359	5.22	| Q V
3+15	1.0737	5.48	| 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 02/14/24 File: AREAA10024100.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 24-HR

Drainage Area = 30.10(Ac.) = 0.047 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 30.10(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]
30.10	1.70	51.17

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.10	4.30	129.43

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 %
30.100	57.30	0.580

Total Area Entered = 30.10(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
57.3	57.3	0.498	0.580	0.238	1.000	0.238
					Sum (F) =	0.238

Area averaged mean soil loss (F) (In/Hr) = 0.238
Minimum soil loss rate ((In/Hr)) = 0.119
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.440

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	7.903
2	0.167	245.934	48.616	14.748
3	0.250	368.902	13.055	3.960
4	0.333	491.869	5.887	1.786
5	0.417	614.836	3.289	0.998
6	0.500	737.803	1.843	0.559
7	0.583	860.771	1.257	0.381
		Sum =	100.000 Sum=	30.335

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	(0.422)		0.015	0.019
2	0.17	0.07	0.034	(0.420)		0.015	0.019
3	0.25	0.07	0.034	(0.418)		0.015	0.019
4	0.33	0.10	0.052	(0.417)		0.023	0.029
5	0.42	0.10	0.052	(0.415)		0.023	0.029
6	0.50	0.10	0.052	(0.413)		0.023	0.029
7	0.58	0.10	0.052	(0.412)		0.023	0.029
8	0.67	0.10	0.052	(0.410)		0.023	0.029
9	0.75	0.10	0.052	(0.409)		0.023	0.029
10	0.83	0.13	0.069	(0.407)		0.030	0.039
11	0.92	0.13	0.069	(0.405)		0.030	0.039
12	1.00	0.13	0.069	(0.404)		0.030	0.039

13	1.08	0.10	0.052	(0.402)	0.023	0.029
14	1.17	0.10	0.052	(0.401)	0.023	0.029
15	1.25	0.10	0.052	(0.399)	0.023	0.029
16	1.33	0.10	0.052	(0.397)	0.023	0.029
17	1.42	0.10	0.052	(0.396)	0.023	0.029
18	1.50	0.10	0.052	(0.394)	0.023	0.029
19	1.58	0.10	0.052	(0.393)	0.023	0.029
20	1.67	0.10	0.052	(0.391)	0.023	0.029
21	1.75	0.10	0.052	(0.390)	0.023	0.029
22	1.83	0.13	0.069	(0.388)	0.030	0.039
23	1.92	0.13	0.069	(0.386)	0.030	0.039
24	2.00	0.13	0.069	(0.385)	0.030	0.039
25	2.08	0.13	0.069	(0.383)	0.030	0.039
26	2.17	0.13	0.069	(0.382)	0.030	0.039
27	2.25	0.13	0.069	(0.380)	0.030	0.039
28	2.33	0.13	0.069	(0.379)	0.030	0.039
29	2.42	0.13	0.069	(0.377)	0.030	0.039
30	2.50	0.13	0.069	(0.376)	0.030	0.039
31	2.58	0.17	0.086	(0.374)	0.038	0.048
32	2.67	0.17	0.086	(0.373)	0.038	0.048
33	2.75	0.17	0.086	(0.371)	0.038	0.048
34	2.83	0.17	0.086	(0.369)	0.038	0.048
35	2.92	0.17	0.086	(0.368)	0.038	0.048
36	3.00	0.17	0.086	(0.366)	0.038	0.048
37	3.08	0.17	0.086	(0.365)	0.038	0.048
38	3.17	0.17	0.086	(0.363)	0.038	0.048
39	3.25	0.17	0.086	(0.362)	0.038	0.048
40	3.33	0.17	0.086	(0.360)	0.038	0.048
41	3.42	0.17	0.086	(0.359)	0.038	0.048
42	3.50	0.17	0.086	(0.357)	0.038	0.048
43	3.58	0.17	0.086	(0.356)	0.038	0.048
44	3.67	0.17	0.086	(0.354)	0.038	0.048
45	3.75	0.17	0.086	(0.353)	0.038	0.048
46	3.83	0.20	0.103	(0.351)	0.045	0.058
47	3.92	0.20	0.103	(0.350)	0.045	0.058
48	4.00	0.20	0.103	(0.348)	0.045	0.058
49	4.08	0.20	0.103	(0.347)	0.045	0.058
50	4.17	0.20	0.103	(0.345)	0.045	0.058
51	4.25	0.20	0.103	(0.344)	0.045	0.058
52	4.33	0.23	0.120	(0.343)	0.053	0.067
53	4.42	0.23	0.120	(0.341)	0.053	0.067
54	4.50	0.23	0.120	(0.340)	0.053	0.067
55	4.58	0.23	0.120	(0.338)	0.053	0.067
56	4.67	0.23	0.120	(0.337)	0.053	0.067
57	4.75	0.23	0.120	(0.335)	0.053	0.067
58	4.83	0.27	0.138	(0.334)	0.061	0.077
59	4.92	0.27	0.138	(0.332)	0.061	0.077
60	5.00	0.27	0.138	(0.331)	0.061	0.077
61	5.08	0.20	0.103	(0.329)	0.045	0.058
62	5.17	0.20	0.103	(0.328)	0.045	0.058
63	5.25	0.20	0.103	(0.327)	0.045	0.058
64	5.33	0.23	0.120	(0.325)	0.053	0.067
65	5.42	0.23	0.120	(0.324)	0.053	0.067
66	5.50	0.23	0.120	(0.322)	0.053	0.067
67	5.58	0.27	0.138	(0.321)	0.061	0.077
68	5.67	0.27	0.138	(0.320)	0.061	0.077
69	5.75	0.27	0.138	(0.318)	0.061	0.077
70	5.83	0.27	0.138	(0.317)	0.061	0.077
71	5.92	0.27	0.138	(0.315)	0.061	0.077
72	6.00	0.27	0.138	(0.314)	0.061	0.077

73	6.08	0.30	0.155	(0.313)	0.068	0.087
74	6.17	0.30	0.155	(0.311)	0.068	0.087
75	6.25	0.30	0.155	(0.310)	0.068	0.087
76	6.33	0.30	0.155	(0.308)	0.068	0.087
77	6.42	0.30	0.155	(0.307)	0.068	0.087
78	6.50	0.30	0.155	(0.306)	0.068	0.087
79	6.58	0.33	0.172	(0.304)	0.076	0.096
80	6.67	0.33	0.172	(0.303)	0.076	0.096
81	6.75	0.33	0.172	(0.302)	0.076	0.096
82	6.83	0.33	0.172	(0.300)	0.076	0.096
83	6.92	0.33	0.172	(0.299)	0.076	0.096
84	7.00	0.33	0.172	(0.297)	0.076	0.096
85	7.08	0.33	0.172	(0.296)	0.076	0.096
86	7.17	0.33	0.172	(0.295)	0.076	0.096
87	7.25	0.33	0.172	(0.293)	0.076	0.096
88	7.33	0.37	0.189	(0.292)	0.083	0.106
89	7.42	0.37	0.189	(0.291)	0.083	0.106
90	7.50	0.37	0.189	(0.289)	0.083	0.106
91	7.58	0.40	0.206	(0.288)	0.091	0.116
92	7.67	0.40	0.206	(0.287)	0.091	0.116
93	7.75	0.40	0.206	(0.285)	0.091	0.116
94	7.83	0.43	0.224	(0.284)	0.098	0.125
95	7.92	0.43	0.224	(0.283)	0.098	0.125
96	8.00	0.43	0.224	(0.281)	0.098	0.125
97	8.08	0.50	0.258	(0.280)	0.114	0.144
98	8.17	0.50	0.258	(0.279)	0.114	0.144
99	8.25	0.50	0.258	(0.278)	0.114	0.144
100	8.33	0.50	0.258	(0.276)	0.114	0.144
101	8.42	0.50	0.258	(0.275)	0.114	0.144
102	8.50	0.50	0.258	(0.274)	0.114	0.144
103	8.58	0.53	0.275	(0.272)	0.121	0.154
104	8.67	0.53	0.275	(0.271)	0.121	0.154
105	8.75	0.53	0.275	(0.270)	0.121	0.154
106	8.83	0.57	0.292	(0.269)	0.129	0.164
107	8.92	0.57	0.292	(0.267)	0.129	0.164
108	9.00	0.57	0.292	(0.266)	0.129	0.164
109	9.08	0.63	0.327	(0.265)	0.144	0.183
110	9.17	0.63	0.327	(0.264)	0.144	0.183
111	9.25	0.63	0.327	(0.262)	0.144	0.183
112	9.33	0.67	0.344	(0.261)	0.151	0.193
113	9.42	0.67	0.344	(0.260)	0.151	0.193
114	9.50	0.67	0.344	(0.259)	0.151	0.193
115	9.58	0.70	0.361	(0.257)	0.159	0.202
116	9.67	0.70	0.361	(0.256)	0.159	0.202
117	9.75	0.70	0.361	(0.255)	0.159	0.202
118	9.83	0.73	0.378	(0.254)	0.166	0.212
119	9.92	0.73	0.378	(0.252)	0.166	0.212
120	10.00	0.73	0.378	(0.251)	0.166	0.212
121	10.08	0.50	0.258	(0.250)	0.114	0.144
122	10.17	0.50	0.258	(0.249)	0.114	0.144
123	10.25	0.50	0.258	(0.248)	0.114	0.144
124	10.33	0.50	0.258	(0.246)	0.114	0.144
125	10.42	0.50	0.258	(0.245)	0.114	0.144
126	10.50	0.50	0.258	(0.244)	0.114	0.144
127	10.58	0.67	0.344	(0.243)	0.151	0.193
128	10.67	0.67	0.344	(0.242)	0.151	0.193
129	10.75	0.67	0.344	(0.240)	0.151	0.193
130	10.83	0.67	0.344	(0.239)	0.151	0.193
131	10.92	0.67	0.344	(0.238)	0.151	0.193
132	11.00	0.67	0.344	(0.237)	0.151	0.193

133	11.08	0.63	0.327	(0.236)	0.144	0.183
134	11.17	0.63	0.327	(0.235)	0.144	0.183
135	11.25	0.63	0.327	(0.233)	0.144	0.183
136	11.33	0.63	0.327	(0.232)	0.144	0.183
137	11.42	0.63	0.327	(0.231)	0.144	0.183
138	11.50	0.63	0.327	(0.230)	0.144	0.183
139	11.58	0.57	0.292	(0.229)	0.129	0.164
140	11.67	0.57	0.292	(0.228)	0.129	0.164
141	11.75	0.57	0.292	(0.226)	0.129	0.164
142	11.83	0.60	0.310	(0.225)	0.136	0.173
143	11.92	0.60	0.310	(0.224)	0.136	0.173
144	12.00	0.60	0.310	(0.223)	0.136	0.173
145	12.08	0.83	0.430	(0.222)	0.189	0.241
146	12.17	0.83	0.430	(0.221)	0.189	0.241
147	12.25	0.83	0.430	(0.220)	0.189	0.241
148	12.33	0.87	0.447	(0.219)	0.197	0.250
149	12.42	0.87	0.447	(0.218)	0.197	0.250
150	12.50	0.87	0.447	(0.216)	0.197	0.250
151	12.58	0.93	0.482	(0.215)	0.212	0.270
152	12.67	0.93	0.482	(0.214)	0.212	0.270
153	12.75	0.93	0.482	(0.213)	0.212	0.270
154	12.83	0.97	0.499	0.212	(0.219)	0.287
155	12.92	0.97	0.499	0.211	(0.219)	0.288
156	13.00	0.97	0.499	0.210	(0.219)	0.289
157	13.08	1.13	0.585	0.209	(0.257)	0.376
158	13.17	1.13	0.585	0.208	(0.257)	0.377
159	13.25	1.13	0.585	0.207	(0.257)	0.378
160	13.33	1.13	0.585	0.206	(0.257)	0.379
161	13.42	1.13	0.585	0.205	(0.257)	0.380
162	13.50	1.13	0.585	0.204	(0.257)	0.381
163	13.58	0.77	0.396	(0.203)	0.174	0.222
164	13.67	0.77	0.396	(0.202)	0.174	0.222
165	13.75	0.77	0.396	(0.201)	0.174	0.222
166	13.83	0.77	0.396	(0.200)	0.174	0.222
167	13.92	0.77	0.396	(0.199)	0.174	0.222
168	14.00	0.77	0.396	(0.198)	0.174	0.222
169	14.08	0.90	0.464	0.197	(0.204)	0.268
170	14.17	0.90	0.464	0.196	(0.204)	0.269
171	14.25	0.90	0.464	0.195	(0.204)	0.270
172	14.33	0.87	0.447	0.194	(0.197)	0.254
173	14.42	0.87	0.447	0.193	(0.197)	0.255
174	14.50	0.87	0.447	0.192	(0.197)	0.256
175	14.58	0.87	0.447	0.191	(0.197)	0.257
176	14.67	0.87	0.447	0.190	(0.197)	0.258
177	14.75	0.87	0.447	0.189	(0.197)	0.259
178	14.83	0.83	0.430	0.188	(0.189)	0.242
179	14.92	0.83	0.430	0.187	(0.189)	0.243
180	15.00	0.83	0.430	0.186	(0.189)	0.244
181	15.08	0.80	0.413	(0.185)	0.182	0.231
182	15.17	0.80	0.413	(0.184)	0.182	0.231
183	15.25	0.80	0.413	(0.183)	0.182	0.231
184	15.33	0.77	0.396	(0.182)	0.174	0.222
185	15.42	0.77	0.396	(0.181)	0.174	0.222
186	15.50	0.77	0.396	(0.180)	0.174	0.222
187	15.58	0.63	0.327	(0.179)	0.144	0.183
188	15.67	0.63	0.327	(0.178)	0.144	0.183
189	15.75	0.63	0.327	(0.177)	0.144	0.183
190	15.83	0.63	0.327	(0.176)	0.144	0.183
191	15.92	0.63	0.327	(0.176)	0.144	0.183
192	16.00	0.63	0.327	(0.175)	0.144	0.183

193	16.08	0.13	0.069	(0.174)	0.030	0.039
194	16.17	0.13	0.069	(0.173)	0.030	0.039
195	16.25	0.13	0.069	(0.172)	0.030	0.039
196	16.33	0.13	0.069	(0.171)	0.030	0.039
197	16.42	0.13	0.069	(0.170)	0.030	0.039
198	16.50	0.13	0.069	(0.169)	0.030	0.039
199	16.58	0.10	0.052	(0.169)	0.023	0.029
200	16.67	0.10	0.052	(0.168)	0.023	0.029
201	16.75	0.10	0.052	(0.167)	0.023	0.029
202	16.83	0.10	0.052	(0.166)	0.023	0.029
203	16.92	0.10	0.052	(0.165)	0.023	0.029
204	17.00	0.10	0.052	(0.164)	0.023	0.029
205	17.08	0.17	0.086	(0.163)	0.038	0.048
206	17.17	0.17	0.086	(0.163)	0.038	0.048
207	17.25	0.17	0.086	(0.162)	0.038	0.048
208	17.33	0.17	0.086	(0.161)	0.038	0.048
209	17.42	0.17	0.086	(0.160)	0.038	0.048
210	17.50	0.17	0.086	(0.159)	0.038	0.048
211	17.58	0.17	0.086	(0.159)	0.038	0.048
212	17.67	0.17	0.086	(0.158)	0.038	0.048
213	17.75	0.17	0.086	(0.157)	0.038	0.048
214	17.83	0.13	0.069	(0.156)	0.030	0.039
215	17.92	0.13	0.069	(0.155)	0.030	0.039
216	18.00	0.13	0.069	(0.155)	0.030	0.039
217	18.08	0.13	0.069	(0.154)	0.030	0.039
218	18.17	0.13	0.069	(0.153)	0.030	0.039
219	18.25	0.13	0.069	(0.152)	0.030	0.039
220	18.33	0.13	0.069	(0.152)	0.030	0.039
221	18.42	0.13	0.069	(0.151)	0.030	0.039
222	18.50	0.13	0.069	(0.150)	0.030	0.039
223	18.58	0.10	0.052	(0.149)	0.023	0.029
224	18.67	0.10	0.052	(0.149)	0.023	0.029
225	18.75	0.10	0.052	(0.148)	0.023	0.029
226	18.83	0.07	0.034	(0.147)	0.015	0.019
227	18.92	0.07	0.034	(0.147)	0.015	0.019
228	19.00	0.07	0.034	(0.146)	0.015	0.019
229	19.08	0.10	0.052	(0.145)	0.023	0.029
230	19.17	0.10	0.052	(0.145)	0.023	0.029
231	19.25	0.10	0.052	(0.144)	0.023	0.029
232	19.33	0.13	0.069	(0.143)	0.030	0.039
233	19.42	0.13	0.069	(0.143)	0.030	0.039
234	19.50	0.13	0.069	(0.142)	0.030	0.039
235	19.58	0.10	0.052	(0.141)	0.023	0.029
236	19.67	0.10	0.052	(0.141)	0.023	0.029
237	19.75	0.10	0.052	(0.140)	0.023	0.029
238	19.83	0.07	0.034	(0.139)	0.015	0.019
239	19.92	0.07	0.034	(0.139)	0.015	0.019
240	20.00	0.07	0.034	(0.138)	0.015	0.019
241	20.08	0.10	0.052	(0.137)	0.023	0.029
242	20.17	0.10	0.052	(0.137)	0.023	0.029
243	20.25	0.10	0.052	(0.136)	0.023	0.029
244	20.33	0.10	0.052	(0.136)	0.023	0.029
245	20.42	0.10	0.052	(0.135)	0.023	0.029
246	20.50	0.10	0.052	(0.135)	0.023	0.029
247	20.58	0.10	0.052	(0.134)	0.023	0.029
248	20.67	0.10	0.052	(0.133)	0.023	0.029
249	20.75	0.10	0.052	(0.133)	0.023	0.029
250	20.83	0.07	0.034	(0.132)	0.015	0.019
251	20.92	0.07	0.034	(0.132)	0.015	0.019
252	21.00	0.07	0.034	(0.131)	0.015	0.019

253	21.08	0.10	0.052	(	0.131)	0.023	0.029
254	21.17	0.10	0.052	(	0.130)	0.023	0.029
255	21.25	0.10	0.052	(	0.130)	0.023	0.029
256	21.33	0.07	0.034	(	0.129)	0.015	0.019
257	21.42	0.07	0.034	(	0.129)	0.015	0.019
258	21.50	0.07	0.034	(	0.128)	0.015	0.019
259	21.58	0.10	0.052	(	0.128)	0.023	0.029
260	21.67	0.10	0.052	(	0.127)	0.023	0.029
261	21.75	0.10	0.052	(	0.127)	0.023	0.029
262	21.83	0.07	0.034	(	0.126)	0.015	0.019
263	21.92	0.07	0.034	(	0.126)	0.015	0.019
264	22.00	0.07	0.034	(	0.126)	0.015	0.019
265	22.08	0.10	0.052	(	0.125)	0.023	0.029
266	22.17	0.10	0.052	(	0.125)	0.023	0.029
267	22.25	0.10	0.052	(	0.124)	0.023	0.029
268	22.33	0.07	0.034	(	0.124)	0.015	0.019
269	22.42	0.07	0.034	(	0.124)	0.015	0.019
270	22.50	0.07	0.034	(	0.123)	0.015	0.019
271	22.58	0.07	0.034	(	0.123)	0.015	0.019
272	22.67	0.07	0.034	(	0.123)	0.015	0.019
273	22.75	0.07	0.034	(	0.122)	0.015	0.019
274	22.83	0.07	0.034	(	0.122)	0.015	0.019
275	22.92	0.07	0.034	(	0.122)	0.015	0.019
276	23.00	0.07	0.034	(	0.121)	0.015	0.019
277	23.08	0.07	0.034	(	0.121)	0.015	0.019
278	23.17	0.07	0.034	(	0.121)	0.015	0.019
279	23.25	0.07	0.034	(	0.120)	0.015	0.019
280	23.33	0.07	0.034	(	0.120)	0.015	0.019
281	23.42	0.07	0.034	(	0.120)	0.015	0.019
282	23.50	0.07	0.034	(	0.120)	0.015	0.019
283	23.58	0.07	0.034	(	0.120)	0.015	0.019
284	23.67	0.07	0.034	(	0.119)	0.015	0.019
285	23.75	0.07	0.034	(	0.119)	0.015	0.019
286	23.83	0.07	0.034	(	0.119)	0.015	0.019
287	23.92	0.07	0.034	(	0.119)	0.015	0.019
288	24.00	0.07	0.034	(	0.119)	0.015	0.019

(Loss Rate Not Used)

Sum = 100.0 Sum = 29.3

Flood volume = Effective rainfall 2.44(In)
times area 30.1(Ac.)/[(In)/(Ft.)] = 6.1(Ac.Ft)
Total soil loss = 1.86(In)
Total soil loss = 4.662(Ac.Ft)
Total rainfall = 4.30(In)
Flood volume = 266721.4 Cubic Feet
Total soil loss = 203081.8 Cubic Feet

Peak flow rate of this hydrograph = 11.494(CFS)

++

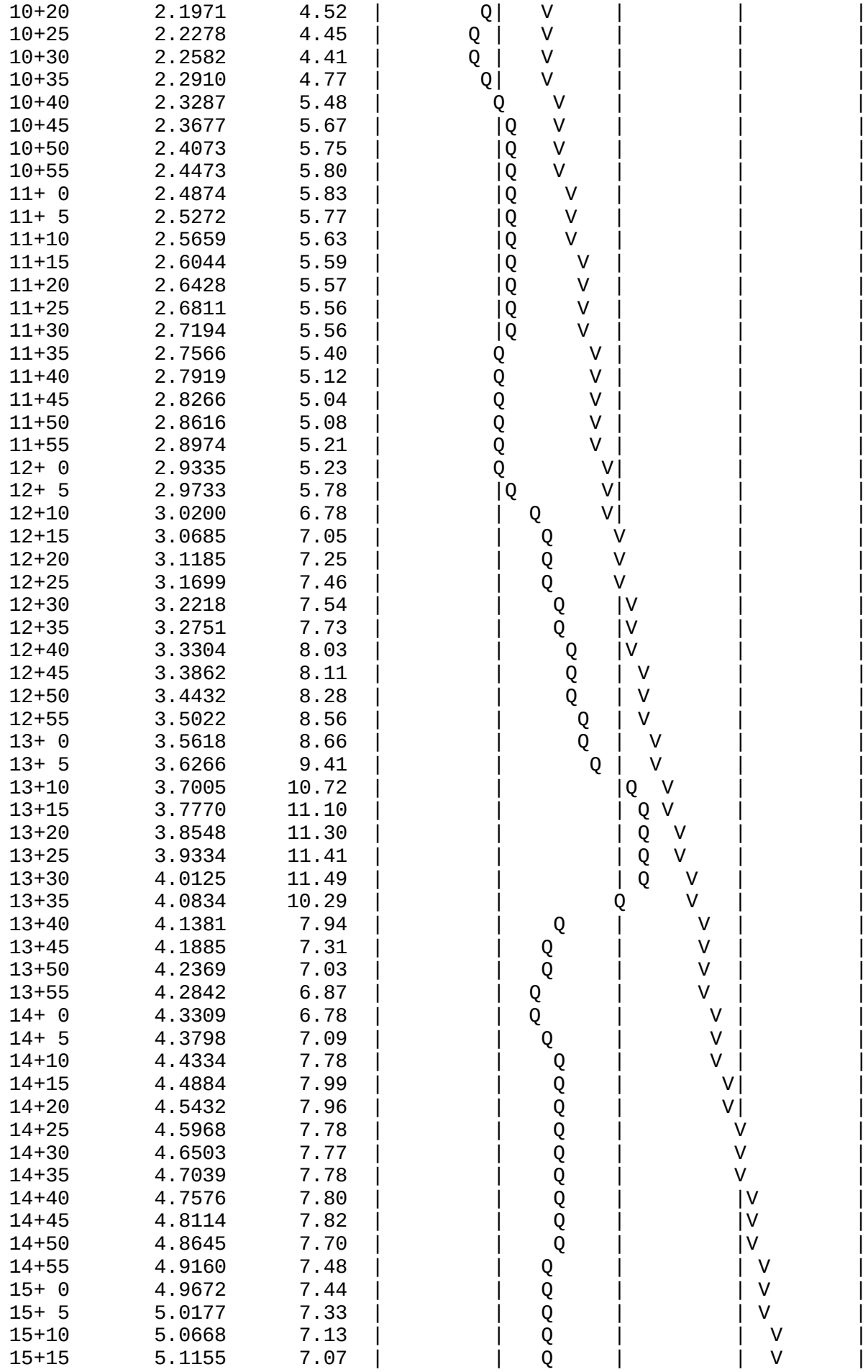
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0010	0.15	Q	|	|	|	|
0+10	0.0041	0.44	Q	|	|	|	|
0+15	0.0076	0.51	VQ	|	|	|	|

```
0+20       0.0119      0.62  VQ       |          |          |          |
0+25       0.0173      0.78  VQ       |          |          |          |
0+30       0.0230      0.83  VQ       |          |          |          |
0+35       0.0289      0.86  VQ       |          |          |          |
0+40       0.0349      0.87  VQ       |          |          |          |
0+45       0.0409      0.87  VQ       |          |          |          |
0+50       0.0475      0.95  VQ       |          |          |          |
0+55       0.0550      1.10  V Q      |          |          |          |
1+ 0       0.0628      1.13  V Q      |          |          |          |
1+ 5       0.0702      1.07  V Q      |          |          |          |
1+10       0.0767      0.94  VQ       |          |          |          |
1+15       0.0830      0.91  VQ       |          |          |          |
1+20       0.0892      0.90  VQ       |          |          |          |
1+25       0.0953      0.89  VQ       |          |          |          |
1+30       0.1013      0.88  VQ       |          |          |          |
1+35       0.1074      0.88  VQ       |          |          |          |
1+40       0.1134      0.88  VQ       |          |          |          |
1+45       0.1194      0.88  VQ       |          |          |          |
1+50       0.1260      0.95  VQ       |          |          |          |
1+55       0.1336      1.10  V Q      |          |          |          |
2+ 0       0.1414      1.13  V Q      |          |          |          |
2+ 5       0.1493      1.15  V Q      |          |          |          |
2+10       0.1573      1.16  |VQ      |          |          |          |
2+15       0.1653      1.17  |VQ      |          |          |          |
2+20       0.1734      1.17  |VQ      |          |          |          |
2+25       0.1814      1.17  |VQ      |          |          |          |
2+30       0.1895      1.17  |VQ      |          |          |          |
2+35       0.1980      1.25  |VQ      |          |          |          |
2+40       0.2076      1.39  |VQ      |          |          |          |
2+45       0.2174      1.43  |VQ      |          |          |          |
2+50       0.2274      1.44  |VQ      |          |          |          |
2+55       0.2374      1.45  |VQ      |          |          |          |
3+ 0       0.2474      1.46  |VQ      |          |          |          |
3+ 5       0.2575      1.46  |VQ      |          |          |          |
3+10       0.2675      1.46  |VQ      |          |          |          |
3+15       0.2776      1.46  |VQ      |          |          |          |
3+20       0.2877      1.46  |VQ      |          |          |          |
3+25       0.2977      1.46  |VQ      |          |          |          |
3+30       0.3078      1.46  | Q      |          |          |          |
3+35       0.3179      1.46  | Q      |          |          |          |
3+40       0.3279      1.46  | Q      |          |          |          |
3+45       0.3380      1.46  | Q      |          |          |          |
3+50       0.3486      1.54  | VQ     |          |          |          |
3+55       0.3602      1.68  | VQ     |          |          |          |
4+ 0       0.3720      1.72  | VQ     |          |          |          |
4+ 5       0.3839      1.74  | VQ     |          |          |          |
4+10       0.3960      1.74  | VQ     |          |          |          |
4+15       0.4080      1.75  | VQ     |          |          |          |
4+20       0.4206      1.83  | VQ     |          |          |          |
4+25       0.4342      1.97  | VQ     |          |          |          |
4+30       0.4480      2.01  | V Q    |          |          |          |
4+35       0.4620      2.03  |  VQ    |          |          |          |
4+40       0.4760      2.04  |  VQ    |          |          |          |
4+45       0.4901      2.04  |  VQ    |          |          |          |
4+50       0.5047      2.12  |  VQ    |          |          |          |
4+55       0.5203      2.26  |  VQ    |          |          |          |
5+ 0       0.5362      2.30  |  VQ    |          |          |          |
5+ 5       0.5511      2.17  |  VQ    |          |          |          |
5+10       0.5641      1.89  |  Q     |          |          |          |
5+15       0.5767      1.82  |  Q     |          |          |          |
```

5+20	0.5895	1.87	Q				
5+25	0.6033	1.99	Q				
5+30	0.6172	2.02	Q				
5+35	0.6316	2.10	Q				
5+40	0.6472	2.26	Q				
5+45	0.6630	2.30	Q				
5+50	0.6790	2.32	Q				
5+55	0.6950	2.33	Q				
6+ 0	0.7111	2.33	Q				
6+ 5	0.7277	2.41	Q				
6+10	0.7453	2.56	VQ				
6+15	0.7632	2.60	VQ				
6+20	0.7812	2.61	Q				
6+25	0.7993	2.62	Q				
6+30	0.8174	2.63	Q				
6+35	0.8360	2.71	Q				
6+40	0.8556	2.85	Q				
6+45	0.8755	2.89	Q				
6+50	0.8955	2.90	Q				
6+55	0.9156	2.91	Q				
7+ 0	0.9357	2.92	QV				
7+ 5	0.9558	2.92	QV				
7+10	0.9760	2.92	QV				
7+15	0.9961	2.92	QV				
7+20	1.0167	3.00	QV				
7+25	1.0384	3.14	Q				
7+30	1.0603	3.18	Q				
7+35	1.0828	3.27	QV				
7+40	1.1064	3.42	QV				
7+45	1.1303	3.47	QV				
7+50	1.1548	3.57	Q				
7+55	1.1804	3.72	Q				
8+ 0	1.2063	3.76	Q				
8+ 5	1.2334	3.93	QV				
8+10	1.2626	4.23	Q				
8+15	1.2922	4.31	Q				
8+20	1.3222	4.35	Q				
8+25	1.3523	4.37	Q				
8+30	1.3824	4.38	QV				
8+35	1.4131	4.46	QV				
8+40	1.4448	4.60	Q				
8+45	1.4768	4.64	Q				
8+50	1.5094	4.73	Q				
8+55	1.5430	4.89	QV				
9+ 0	1.5770	4.93	QV				
9+ 5	1.6121	5.10	Q				
9+10	1.6493	5.40	Q				
9+15	1.6870	5.48	QV				
9+20	1.7256	5.59	Q				
9+25	1.7652	5.75	Q				
9+30	1.8052	5.80	Q				
9+35	1.8458	5.90	QV				
9+40	1.8875	6.06	Q				
9+45	1.9295	6.10	Q				
9+50	1.9722	6.20	Q				
9+55	2.0159	6.35	QV				
10+ 0	2.0599	6.39	QV				
10+ 5	2.1004	5.88	Q V				
10+10	2.1341	4.89	Q V				
10+15	2.1660	4.63	Q V				



```
15+20       5.1634      6.96  |          |  Q       |          |  V       |
15+25       5.2103      6.81  |          |  Q       |          |   V      |
15+30       5.2569      6.76  |          |  Q       |          |   V      |
15+35       5.3012      6.44  |          | Q        |          |   V      |
15+40       5.3416      5.86  |          |Q         |          |   V      |
15+45       5.3809      5.70  |          |Q         |          |    V     |
15+50       5.4196      5.63  |          |Q         |          |    V     |
15+55       5.4581      5.59  |          |Q         |          |    V     |
16+ 0       5.4965      5.57  |          |Q         |          |    V     |
16+ 5       5.5269      4.41  |        Q |          |          |     V    |
16+10       5.5426      2.28  |    Q     |          |          |     V    |
16+15       5.5543      1.71  |   Q      |          |          |     V    |
16+20       5.5643      1.45  | Q        |          |          |     V    |
16+25       5.5733      1.31  | Q        |          |          |     V    |
16+30       5.5817      1.22  | Q        |          |          |     V    |
16+35       5.5893      1.09  | Q        |          |          |     V    |
16+40       5.5958      0.95  |Q         |          |          |     V    |
16+45       5.6021      0.91  |Q         |          |          |     V    |
16+50       5.6083      0.90  |Q         |          |          |     V    |
16+55       5.6144      0.89  |Q         |          |          |     V    |
17+ 0       5.6204      0.88  |Q         |          |          |     V    |
17+ 5       5.6275      1.03  | Q        |          |          |     V    |
17+10       5.6366      1.31  | Q        |          |          |     V    |
17+15       5.6461      1.39  | Q        |          |          |     V    |
17+20       5.6560      1.42  | Q        |          |          |     V    |
17+25       5.6659      1.44  | Q        |          |          |      V   |
17+30       5.6759      1.45  | Q        |          |          |      V   |
17+35       5.6860      1.46  | Q        |          |          |      V   |
17+40       5.6960      1.46  | Q        |          |          |      V   |
17+45       5.7061      1.46  | Q        |          |          |      V   |
17+50       5.7157      1.39  | Q        |          |          |      V   |
17+55       5.7242      1.24  | Q        |          |          |      V   |
18+ 0       5.7325      1.21  | Q        |          |          |      V   |
18+ 5       5.7407      1.19  | Q        |          |          |      V   |
18+10       5.7488      1.18  | Q        |          |          |      V   |
18+15       5.7569      1.17  | Q        |          |          |      V   |
18+20       5.7649      1.17  | Q        |          |          |      V   |
18+25       5.7730      1.17  | Q        |          |          |      V   |
18+30       5.7810      1.17  | Q        |          |          |      V   |
18+35       5.7886      1.09  | Q        |          |          |      V   |
18+40       5.7951      0.95  |Q         |          |          |      V   |
18+45       5.8014      0.91  |Q         |          |          |      V   |
18+50       5.8071      0.82  |Q         |          |          |      V   |
18+55       5.8117      0.67  |Q         |          |          |      V   |
19+ 0       5.8160      0.62  |Q         |          |          |      V   |
19+ 5       5.8206      0.68  |Q         |          |          |       V  |
19+10       5.8262      0.81  |Q         |          |          |       V  |
19+15       5.8320      0.84  |Q         |          |          |       V  |
19+20       5.8385      0.93  |Q         |          |          |       V  |
19+25       5.8460      1.09  | Q        |          |          |       V  |
19+30       5.8537      1.13  | Q        |          |          |       V  |
19+35       5.8611      1.07  | Q        |          |          |       V  |
19+40       5.8676      0.94  |Q         |          |          |       V  |
19+45       5.8739      0.91  |Q         |          |          |       V  |
19+50       5.8795      0.82  |Q         |          |          |       V  |
19+55       5.8841      0.67  |Q         |          |          |       V  |
20+ 0       5.8884      0.62  |Q         |          |          |       V  |
20+ 5       5.8931      0.68  |Q         |          |          |       V  |
20+10       5.8987      0.81  |Q         |          |          |       V  |
20+15       5.9045      0.84  |Q         |          |          |       V  |
```

```
  20+20       5.9104      0.86  |Q        |          |          |        V |
  20+25       5.9164      0.87  |Q        |          |          |        V |
  20+30       5.9224      0.87  |Q        |          |          |        V |
  20+35       5.9285      0.88  |Q        |          |          |        V |
  20+40       5.9345      0.88  |Q        |          |          |        V |
  20+45       5.9405      0.88  |Q        |          |          |        V |
  20+50       5.9461      0.80  |Q        |          |          |        V |
  20+55       5.9506      0.66  |Q        |          |          |        V |
  21+ 0       5.9549      0.62  |Q        |          |          |        V |
  21+ 5       5.9595      0.68  |Q        |          |          |        V |
  21+10       5.9651      0.81  |Q        |          |          |        V |
  21+15       5.9710      0.84  |Q        |          |          |         V|
  21+20       5.9763      0.78  |Q        |          |          |         V|
  21+25       5.9808      0.65  |Q        |          |          |         V|
  21+30       5.9851      0.62  |Q        |          |          |         V|
  21+35       5.9897      0.68  |Q        |          |          |         V|
  21+40       5.9953      0.81  |Q        |          |          |         V|
  21+45       6.0012      0.84  |Q        |          |          |         V|
  21+50       6.0065      0.78  |Q        |          |          |         V|
  21+55       6.0110      0.65  |Q        |          |          |         V|
  22+ 0       6.0153      0.62  |Q        |          |          |         V|
  22+ 5       6.0199      0.68  |Q        |          |          |         V|
  22+10       6.0255      0.81  |Q        |          |          |         V|
  22+15       6.0314      0.84  |Q        |          |          |         V|
  22+20       6.0367      0.78  |Q        |          |          |         V|
  22+25       6.0412      0.65  |Q        |          |          |         V|
  22+30       6.0455      0.62  |Q        |          |          |         V|
  22+35       6.0496      0.60  |Q        |          |          |         V|
  22+40       6.0537      0.59  |Q        |          |          |         V|
  22+45       6.0578      0.59  |Q        |          |          |         V|
  22+50       6.0618      0.58  |Q        |          |          |         V|
  22+55       6.0658      0.58  |Q        |          |          |         V|
  23+ 0       6.0698      0.58  |Q        |          |          |         V|
  23+ 5       6.0739      0.58  |Q        |          |          |         V|
  23+10       6.0779      0.58  |Q        |          |          |         V|
  23+15       6.0819      0.58  |Q        |          |          |         V|
  23+20       6.0859      0.58  |Q        |          |          |         V|
  23+25       6.0900      0.58  |Q        |          |          |         V|
  23+30       6.0940      0.58  |Q        |          |          |         V|
  23+35       6.0980      0.58  |Q        |          |          |         V|
  23+40       6.1021      0.58  |Q        |          |          |         V|
  23+45       6.1061      0.58  |Q        |          |          |         V|
  23+50       6.1101      0.58  |Q        |          |          |         V|
  23+55       6.1141      0.58  |Q        |          |          |         V|
  24+ 0       6.1182      0.58  |Q        |          |          |         V|
  24+ 5       6.1211      0.43  Q         |          |          |         V|
  24+10       6.1222      0.15  Q         |          |          |         V|
  24+15       6.1226      0.07  Q         |          |          |         V|
  24+20       6.1229      0.04  Q         |          |          |         V|
  24+25       6.1230      0.02  Q         |          |          |         V|
  24+30       6.1231      0.01  Q         |          |          |          V
-------------------------------------------------------------------------
```

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

FOR REFERENCE ONLY
SEE DRAINAGE STUDY FOR
TRACT NO. 38442

Study date 08/29/22 File: AREAB1001100.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 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|
------------------------------------------------------------------------
```

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

FOR REFERENCE ONLY
SEE DRAINAGE STUDY FOR
TRACT NO. 38442

Study date 08/29/22 File: AREAB1003100.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 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

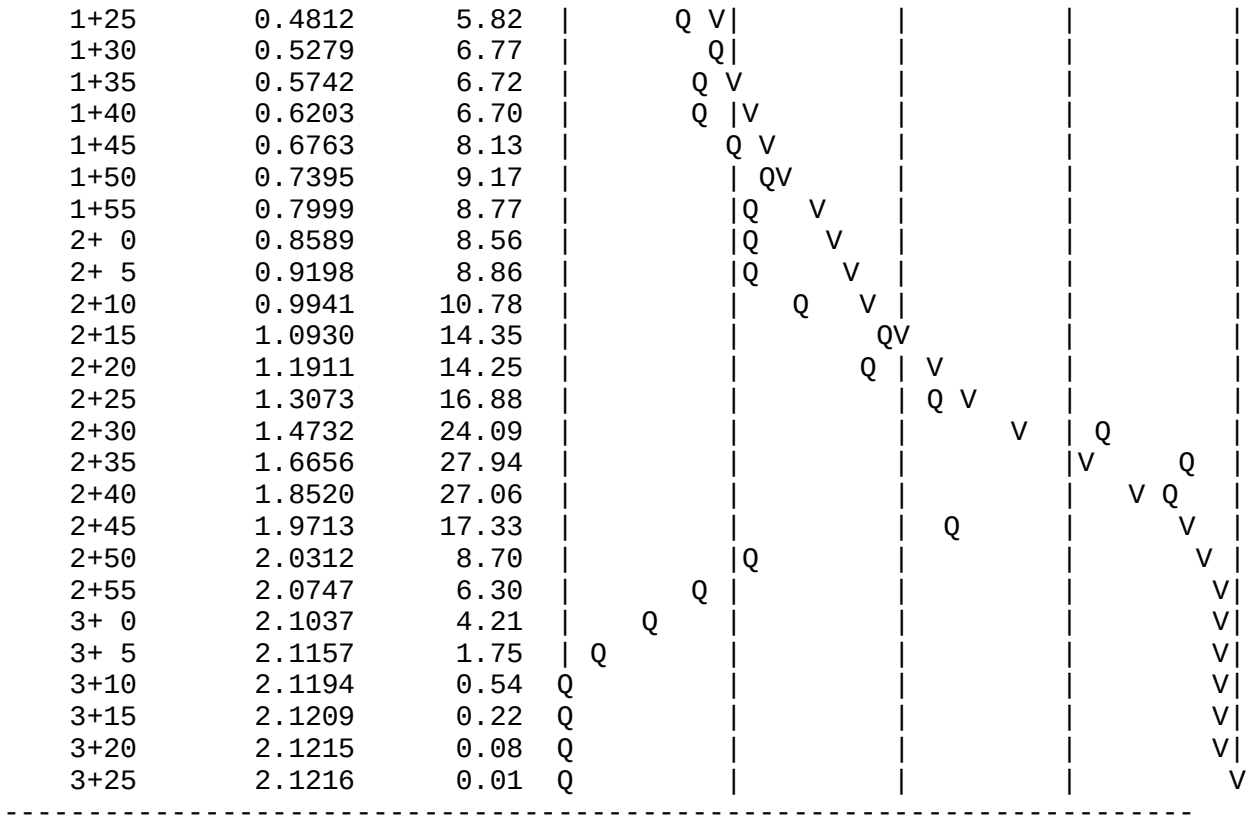
Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	156.374	34.683	6.987
2	0.167	312.748	46.539	9.376
3	0.250	469.122	10.823	2.180
4	0.333	625.496	4.691	0.945
5	0.417	781.870	2.294	0.462
6	0.500	938.244	0.971	0.196
		Sum =	100.000 Sum=	20.146

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		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

```
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 |          |          |          |
```


1+25 0.4812 5.82
1+30 0.5279 6.77
1+35 0.5742 6.72
1+40 0.6203 6.70
1+45 0.6763 8.13
1+50 0.7395 9.17
1+55 0.7999 8.77
2+ 0 0.8589 8.56
2+ 5 0.9198 8.86
2+10 0.9941 10.78
2+15 1.0930 14.35
2+20 1.1911 14.25
2+25 1.3073 16.88
2+30 1.4732 24.09
2+35 1.6656 27.94
2+40 1.8520 27.06
2+45 1.9713 17.33
2+50 2.0312 8.70
2+55 2.0747 6.30
3+ 0 2.1037 4.21
3+ 5 2.1157 1.75
3+10 2.1194 0.54
3+15 2.1209 0.22
3+20 2.1215 0.08
3+25 2.1216 0.01

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

FOR REFERENCE ONLY
SEE DRAINAGE STUDY FOR
TRACT NO. 38442

Study date 08/29/22 File: AREAB1006100.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 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

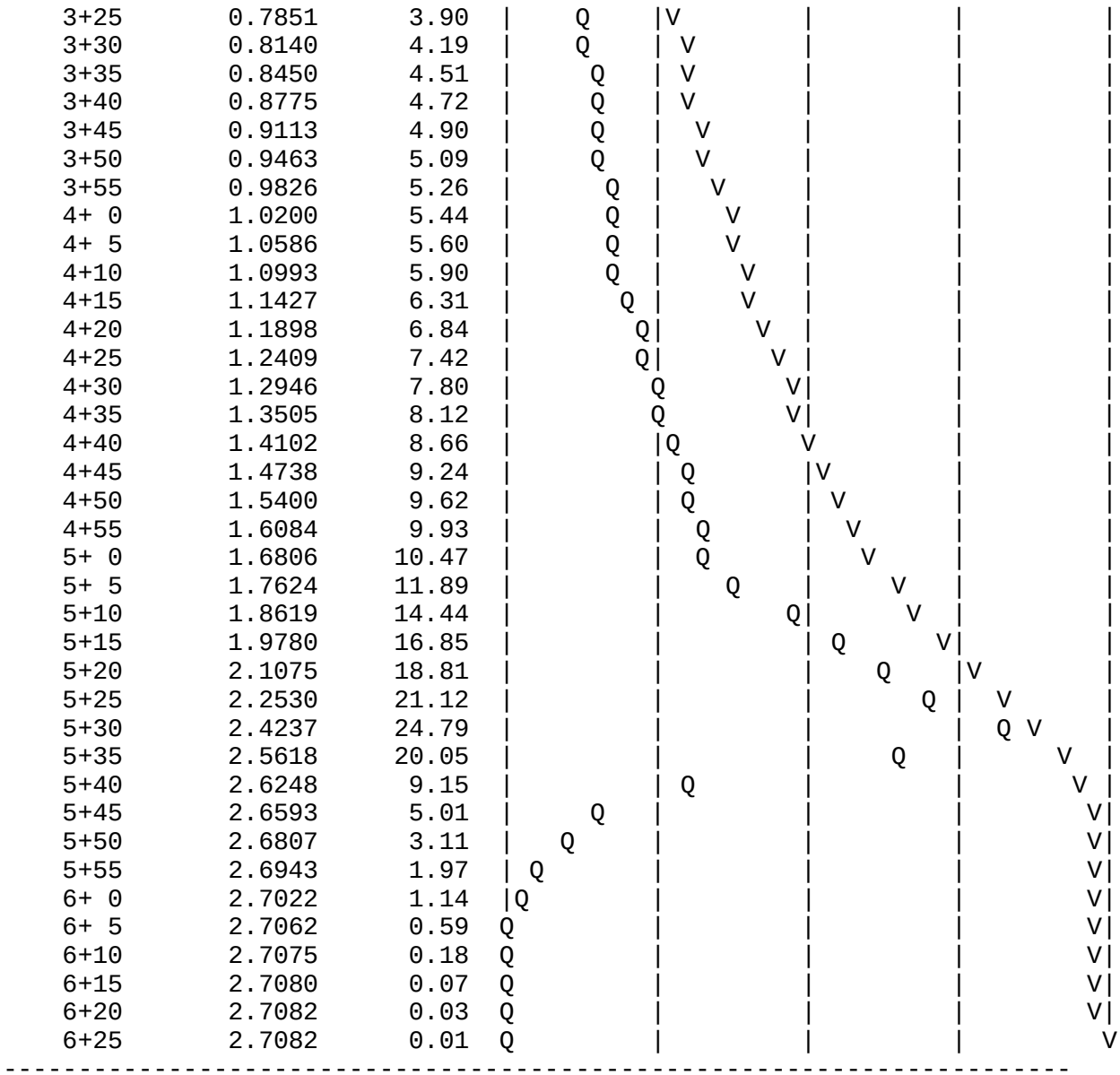
Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max		Low	Effective (In/Hr)
1	0.08	0.50	0.150	(0.234)		0.064	0.085
2	0.17	0.60	0.180	(0.234)		0.077	0.103
3	0.25	0.60	0.180	(0.234)		0.077	0.103
4	0.33	0.60	0.180	(0.234)		0.077	0.103
5	0.42	0.60	0.180	(0.234)		0.077	0.103
6	0.50	0.70	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         |          |          |
```



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

FOR REFERENCE ONLY
SEE DRAINAGE STUDY FOR
TRACT NO. 38442

Study date 08/29/22 File: AREAB10024100.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 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
          (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        |         |         |         |
```

```
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    |         |         |         |
```

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			

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	|	|

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 |

```
  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|
-------------------------------------------------------------------------
```

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)	
1590.5	0	527	0	0	0.000	0.000	0.00	
1591	0.5	527	527	92	0.002	0.002	0.47	SAND FILTER AREA
1592	1.5	527	527	184	0.004	0.006	1.06	
1593	2.5	5,614	3,071	1,965	0.045	0.051	1.42	
1594	3.5	6,651	6,133	6,133	0.141	0.192	1.80	
1595	4.5	7,743	7,197	7,197	0.165	0.357	2.09	
1596	5.5	8,892	8,318	8,318	0.191	0.548	2.34	
1597	6.5	10,096	9,494	9,494	0.218	0.766	2.57	
1598	7.5	11,355	10,726	10,726	0.246	1.013	2.78	
1599	8.5	12,671	12,013	12,013	0.276	1.288	6.24	
1600	9.5	14,042	13,357	13,357	0.307	1.595	8.15	
1601	10.5	15,470	14,756	14,756	0.339	1.934	9.59	
1602	11.5	16,985	16,228	16,228	0.373	2.306	10.80	
1603	12.5	18,622	17,804	17,804	0.409	2.715	11.88	
1604	13.5	20,311	19,467	19,467	0.447	3.162	12.85	
1605	14.5		10,156	10,156	0.233	3.395	13.75	

NOTES:

TABLE B

DETENTION BASIN OUTLET

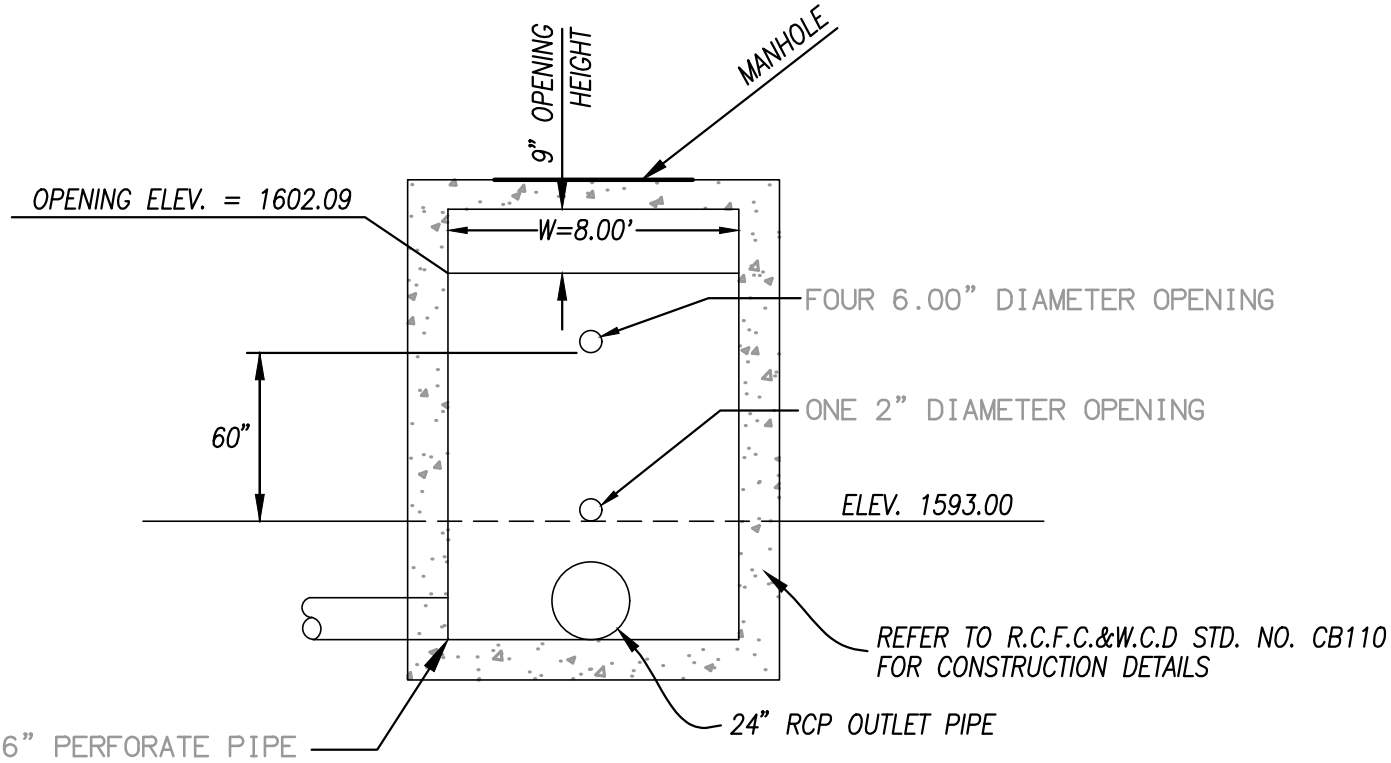
AREA A

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 =	2	in	Hole Diameter =	6	in
H=	4	in	# of holes =	1		# of holes =	1		# of holes =	4	
# of holes =	0										
Elevation =	1595	ft	Elevation =	1590.5	ft	Elevation =	1593	ft	Elevation =	1598	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)
1590.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1591	0.50	0.00	0.50	0.47	0.00	0.00	0.00	0.00	0.47
1592	1.50	0.00	1.50	1.06	0.00	0.00	0.00	0.00	1.06
1593	2.50	0.00	2.50	1.42	0.00	0.00	0.00	0.00	1.42
1594	3.50	0.00	3.50	1.70	1.00	0.10	0.00	0.00	1.80
1595	4.50	0.00	4.50	1.95	2.00	0.15	0.00	0.00	2.09
1596	5.50	0.00	5.50	2.17	3.00	0.18	0.00	0.00	2.34
1597	6.50	0.00	6.50	2.36	4.00	0.21	0.00	0.00	2.57
1598	7.50	0.00	7.50	2.54	5.00	0.23	0.00	0.00	2.78
1599	8.50	0.00	8.50	2.71	6.00	0.26	1.00	3.27	6.24
1600	9.50	0.00	9.50	2.87	7.00	0.28	2.00	5.00	8.15
1601	10.50	0.00	10.50	3.03	8.00	0.30	3.00	6.27	9.59
1602	11.50	0.00	11.50	3.17	9.00	0.31	4.00	7.32	10.80
1603	12.50	0.00	12.50	3.31	10.00	0.33	5.00	8.24	11.88
1604	13.50	0.00	13.50	3.44	11.00	0.35	6.00	9.06	12.85
1605	14.50	0.00	14.50	3.57	12.00	0.36	7.00	9.82	13.75



SECTION VIEW - TRACT NO. 38443 BASIN

INLET STRUCTURE DETAILS

N.T.S.

TABLE A
AREA A
BASIN NO 1
DETENTION BASIN SIZE

FOR REFERENCE ONLY
SEE DRAINAGE STUDY FOR
TRACT NO. 38442

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	
1574	1.5	795	795	417	0.010	0.010	1.06	SAND FILTER AREA
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

FOR REFERENCE ONLY
SEE DRAINAGE STUDY FOR
TRACT NO. 38442

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=	0.01	sq-ft	Area Total=	0.79	sq-ft
W=	4	in	Hole Diameter =	6	in	Hole Diameter =	1.5	in	Hole Diameter =	6	in
H=	4	in	# of holes =	1		# of holes =	1		# of holes =	4	
# of holes =	0										
Elevation =	1572.5	ft	Elevation =	1572.5	ft	Elevation =	1576	ft	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

100-YR 1-HR

FLOOD HYDROGRAPH ROUTING PROGRAM

Study date: 02/14/24

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 = 73.471 (CFS)
Total volume = 2.413 (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 = 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
0.500	0.002	0.470	0.000	0.004
1.500	0.006	1.060	0.002	0.010
2.500	0.051	1.420	0.046	0.056

3.500	0.192	1.800	0.186	0.198
4.500	0.357	2.090	0.350	0.364
5.500	0.548	2.340	0.540	0.556
6.500	0.766	2.570	0.757	0.775
7.500	1.013	2.780	1.003	1.023
8.500	1.288	6.240	1.267	1.309
9.500	1.595	8.150	1.567	1.623
10.500	1.934	9.590	1.901	1.967
11.500	2.306	10.800	2.269	2.343
12.500	2.715	11.880	2.674	2.756
13.500	3.162	12.850	3.118	3.206

Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 18.4 36.74 55.10 73.47	Depth (Ft.)
0.083	2.90	1.06	0.006	OI | | | |	1.51
0.167	8.43	1.31	0.037	O I | | | |	2.19
0.250	10.89	1.54	0.094	O I | | | |	2.80
0.333	13.09	1.73	0.165	O I | | | |	3.31
0.417	14.79	1.90	0.249	O I | | | |	3.84
0.500	17.69	2.07	0.347	O I| | | |	4.44
0.583	20.90	2.23	0.465	O |I | | |	5.07
0.667	24.85	2.40	0.607	|O | I | | |	5.77
0.750	32.46	2.59	0.787	|O | I | | |	6.58
0.833	60.52	3.69	1.085	|O | | | I |	7.76
0.917	73.47	7.61	1.508	| O | | | I	9.22
1.000	34.87	9.12	1.823	| O | | I| |	10.17
1.083	19.51	9.63	1.946	| O I | | |	10.53
1.167	8.42	9.72	1.975	| IO | | | |	10.61
1.250	4.40	9.65	1.953	|I O | | | |	10.55
1.333	2.40	9.49	1.910	|I O | | | |	10.43
1.417	0.55	9.26	1.856	I O | | | |	10.27
1.500	0.18	9.00	1.796	I O | | | |	10.09
1.583	0.00	8.75	1.735	I O | | | |	9.91
1.667	0.00	8.49	1.676	I O | | | |	9.74
1.750	0.00	8.25	1.618	I O | | | |	9.57
1.833	0.00	7.95	1.562	I O | | | |	9.39
1.917	0.00	7.61	1.509	I O | | | |	9.22
2.000	0.00	7.29	1.457	I O | | | |	9.05
2.083	0.00	6.99	1.408	I O | | | |	8.89
2.167	0.00	6.70	1.361	I O | | | |	8.74
2.250	0.00	6.41	1.316	I O | | | |	8.59
2.333	0.00	6.05	1.273	I O | | | |	8.45
2.417	0.00	5.55	1.233	I O | | | |	8.30
2.500	0.00	5.09	1.196	I O | | | |	8.17
2.583	0.00	4.67	1.163	I O | | | |	8.05
2.667	0.00	4.28	1.132	IO | | | |	7.93
2.750	0.00	3.92	1.104	IO | | | |	7.83
2.833	0.00	3.60	1.078	IO | | | |	7.74
2.917	0.00	3.30	1.054	IO | | | |	7.65
3.000	0.00	3.02	1.032	IO | | | |	7.57
3.083	0.00	2.78	1.012	IO | | | |	7.50
3.167	0.00	2.76	0.993	IO | | | |	7.42
3.250	0.00	2.75	0.974	IO | | | |	7.34
3.333	0.00	2.73	0.956	IO | | | |	7.27
3.417	0.00	2.72	0.937	IO | | | |	7.19

3.500	0.00	2.70	0.918	IO				7.12
3.583	0.00	2.68	0.900	IO				7.04
3.667	0.00	2.67	0.881	IO				6.97
3.750	0.00	2.65	0.863	IO				6.89
3.833	0.00	2.64	0.845	IO				6.82
3.917	0.00	2.62	0.827	IO				6.75
4.000	0.00	2.61	0.809	IO				6.67
4.083	0.00	2.59	0.791	IO				6.60
4.167	0.00	2.58	0.773	IO				6.53
4.250	0.00	2.56	0.755	IO				6.45
4.333	0.00	2.54	0.738	IO				6.37
4.417	0.00	2.52	0.720	IO				6.29
4.500	0.00	2.50	0.703	IO				6.21
4.583	0.00	2.49	0.686	IO				6.13
4.667	0.00	2.47	0.669	IO				6.05
4.750	0.00	2.45	0.652	IO				5.98
4.833	0.00	2.43	0.635	IO				5.90
4.917	0.00	2.41	0.618	IO				5.82
5.000	0.00	2.40	0.602	IO				5.75
5.083	0.00	2.38	0.585	IO				5.67
5.167	0.00	2.36	0.569	IO				5.60
5.250	0.00	2.34	0.553	IO				5.52
5.333	0.00	2.33	0.537	IO				5.44
5.417	0.00	2.30	0.521	IO				5.36
5.500	0.00	2.28	0.505	O				5.27
5.583	0.00	2.26	0.489	O				5.19
5.667	0.00	2.24	0.474	O				5.11
5.750	0.00	2.22	0.458	O				5.03
5.833	0.00	2.20	0.443	O				4.95
5.917	0.00	2.18	0.428	O				4.87
6.000	0.00	2.16	0.413	O				4.79
6.083	0.00	2.14	0.398	O				4.72
6.167	0.00	2.12	0.383	O				4.64
6.250	0.00	2.11	0.369	O				4.56
6.333	0.00	2.09	0.354	O				4.48
6.417	0.00	2.06	0.340	O				4.40
6.500	0.00	2.04	0.326	O				4.31
6.583	0.00	2.01	0.312	O				4.23
6.667	0.00	1.99	0.298	O				4.14
6.750	0.00	1.96	0.285	O				4.06
6.833	0.00	1.94	0.271	O				3.98
6.917	0.00	1.92	0.258	O				3.90
7.000	0.00	1.89	0.245	O				3.82
7.083	0.00	1.87	0.232	O				3.74
7.167	0.00	1.85	0.219	O				3.66
7.250	0.00	1.83	0.207	O				3.59
7.333	0.00	1.80	0.194	O				3.51
7.417	0.00	1.77	0.182	O				3.43
7.500	0.00	1.74	0.170	O				3.34
7.583	0.00	1.71	0.158	O				3.26
7.667	0.00	1.68	0.146	O				3.17
7.750	0.00	1.65	0.135	O				3.09
7.833	0.00	1.62	0.123	O				3.01
7.917	0.00	1.59	0.112	O				2.94
8.000	0.00	1.56	0.102	O				2.86
8.083	0.00	1.53	0.091	O				2.78
8.167	0.00	1.50	0.081	O				2.71
8.250	0.00	1.47	0.070	O				2.64
8.333	0.00	1.44	0.060	O				2.57
8.417	0.00	1.42	0.050	O				2.49

8.500	0.00	1.34	0.041	O	|	|	|	2.28
8.583	0.00	1.27	0.032	O	|	|	|	2.08
8.667	0.00	1.20	0.023	O	|	|	|	1.89
8.750	0.00	1.14	0.015	O	|	|	|	1.71
8.833	0.00	1.07	0.008	O	|	|	|	1.54
8.917	0.00	0.52	0.002	O	|	|	|	0.58
9.000	0.00	0.07	0.000	O	|	|	|	0.07
9.083	0.00	0.01	0.000	O	|	|	|	0.01
9.167	0.00	0.00	0.000	O	|	|	|	0.00

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

Number of intervals = 110
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 9.725 (CFS)
Total volume = 2.413 (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

****

100-YR 3-HR

FLOOD HYDROGRAPH ROUTING PROGRAM

Study date: 02/14/24

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 = 40.864 (CFS)
Total volume = 3.165 (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 (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.002	0.470	0.000	0.004
1.500	0.006	1.060	0.002	0.010
2.500	0.051	1.420	0.046	0.056

3.500	0.192	1.800	0.186	0.198
4.500	0.357	2.090	0.350	0.364
5.500	0.548	2.340	0.540	0.556
6.500	0.766	2.570	0.757	0.775
7.500	1.013	2.780	1.003	1.023
8.500	1.288	6.240	1.267	1.309
9.500	1.595	8.150	1.567	1.623
10.500	1.934	9.590	1.901	1.967
11.500	2.306	10.800	2.269	2.343
12.500	2.715	11.880	2.674	2.756
13.500	3.162	12.850	3.118	3.206

Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 10.2 20.43 30.65 40.86	Depth (Ft.)
0.083	1.28	0.55	0.003	OI | | | |	0.63
0.167	3.66	1.12	0.014	O I | | | |	1.67
0.250	4.11	1.27	0.032	O I | | | |	2.08
0.333	4.42	1.42	0.052	|O I | | | |	2.51
0.417	5.22	1.49	0.076	|O I | | | |	2.67
0.500	5.76	1.56	0.103	|O I | | | |	2.87
0.583	6.14	1.64	0.133	|O I | | | |	3.08
0.667	6.06	1.72	0.163	|O I | | | |	3.30
0.750	6.55	1.80	0.195	|O I | | | |	3.52
0.833	6.39	1.86	0.226	|O I | | | |	3.71
0.917	5.99	1.91	0.256	|O I | | | |	3.89
1.000	6.26	1.96	0.285	|O I | | | |	4.06
1.083	7.00	2.02	0.317	|O I | | | |	4.26
1.167	7.84	2.08	0.354	|O I | | | |	4.48
1.250	8.07	2.14	0.394	|O I | | | |	4.69
1.333	7.98	2.19	0.434	|O I | | | |	4.91
1.417	8.40	2.25	0.476	|O I | | | |	5.12
1.500	9.85	2.31	0.523	|O I| | | |	5.37
1.583	10.01	2.37	0.575	|O I| | | |	5.62
1.667	9.80	2.42	0.627	|O I| | | |	5.86
1.750	11.66	2.48	0.684	|O |I | | |	6.12
1.833	13.47	2.56	0.753	| O | I | | |	6.44
1.917	13.09	2.62	0.827	| O | I | | |	6.75
2.000	12.71	2.68	0.897	| O |I | | |	7.03
2.083	13.10	2.74	0.967	| O | I | | |	7.32
2.167	15.42	3.18	1.045	| O | I | |	7.62
2.250	20.54	4.41	1.143	| O | I | |	7.97
2.333	21.51	5.79	1.252	| O | I | |	8.37
2.417	23.55	6.72	1.365	| O | | I | |	8.75
2.500	34.50	7.65	1.515	| O | | | I |	9.24
2.583	40.34	8.67	1.716	| O | | | I|	9.86
2.667	40.86	9.59	1.933	| O| | | I	10.50
2.750	28.42	10.14	2.104	| O| | I | |	10.96
2.833	14.81	10.40	2.182	| O I | | |	11.17
2.917	10.81	10.45	2.198	| O | | |	11.21
3.000	7.70	10.42	2.190	| I O | | |	11.19
3.083	3.84	10.32	2.159	| I O | | |	11.10
3.167	1.47	10.15	2.106	|I O| | |	10.96
3.250	0.58	9.95	2.044	I O| | |	10.80
3.333	0.28	9.74	1.979	I O| | |	10.62
3.417	0.13	9.51	1.915	I O| | |	10.44

3.500	0.03	9.24	1.851	I O	|	|	|	10.25
3.583	0.00	8.97	1.788	I O	|	|	|	10.07
3.667	0.00	8.71	1.727	I O	|	|	|	9.89
3.750	0.00	8.46	1.668	I O	|	|	|	9.72
3.833	0.00	8.22	1.611	I O	|	|	|	9.55
3.917	0.00	7.90	1.555	I O	|	|	|	9.37
4.000	0.00	7.57	1.502	I O	|	|	|	9.20
4.083	0.00	7.25	1.451	I O	|	|	|	9.03
4.167	0.00	6.95	1.402	I O	|	|	|	8.87
4.250	0.00	6.66	1.355	I O	|	|	|	8.72
4.333	0.00	6.38	1.310	I O	|	|	|	8.57
4.417	0.00	5.98	1.268	I O	|	|	|	8.43
4.500	0.00	5.49	1.228	I O	|	|	|	8.28
4.583	0.00	5.03	1.192	I O	|	|	|	8.15
4.667	0.00	4.61	1.159	I O	|	|	|	8.03
4.750	0.00	4.23	1.128	I O	|	|	|	7.92
4.833	0.00	3.88	1.100	I O	|	|	|	7.82
4.917	0.00	3.56	1.075	I O	|	|	|	7.72
5.000	0.00	3.26	1.051	I O	|	|	|	7.64
5.083	0.00	2.99	1.030	I O	|	|	|	7.56
5.167	0.00	2.78	1.010	I O	|	|	|	7.49
5.250	0.00	2.76	0.991	I O	|	|	|	7.41
5.333	0.00	2.74	0.972	I O	|	|	|	7.33
5.417	0.00	2.73	0.953	I O	|	|	|	7.26
5.500	0.00	2.71	0.934	I O	|	|	|	7.18
5.583	0.00	2.70	0.916	I O	|	|	|	7.11
5.667	0.00	2.68	0.897	I O	|	|	|	7.03
5.750	0.00	2.67	0.879	I O	|	|	|	6.96
5.833	0.00	2.65	0.860	I O	|	|	|	6.88
5.917	0.00	2.63	0.842	I O	|	|	|	6.81
6.000	0.00	2.62	0.824	I O	|	|	|	6.73
6.083	0.00	2.60	0.806	I O	|	|	|	6.66
6.167	0.00	2.59	0.788	I O	|	|	|	6.59
6.250	0.00	2.57	0.770	I O	|	|	|	6.52
6.333	0.00	2.56	0.753	I O	|	|	|	6.44
6.417	0.00	2.54	0.735	IO	|	|	|	6.36
6.500	0.00	2.52	0.718	IO	|	|	|	6.28
6.583	0.00	2.50	0.700	IO	|	|	|	6.20
6.667	0.00	2.48	0.683	IO	|	|	|	6.12
6.750	0.00	2.46	0.666	IO	|	|	|	6.04
6.833	0.00	2.45	0.649	IO	|	|	|	5.97
6.917	0.00	2.43	0.633	IO	|	|	|	5.89
7.000	0.00	2.41	0.616	IO	|	|	|	5.81
7.083	0.00	2.39	0.599	IO	|	|	|	5.74
7.167	0.00	2.38	0.583	IO	|	|	|	5.66
7.250	0.00	2.36	0.567	IO	|	|	|	5.59
7.333	0.00	2.34	0.550	IO	|	|	|	5.51
7.417	0.00	2.32	0.534	IO	|	|	|	5.43
7.500	0.00	2.30	0.518	IO	|	|	|	5.35
7.583	0.00	2.28	0.503	IO	|	|	|	5.26
7.667	0.00	2.26	0.487	IO	|	|	|	5.18
7.750	0.00	2.24	0.472	IO	|	|	|	5.10
7.833	0.00	2.22	0.456	IO	|	|	|	5.02
7.917	0.00	2.20	0.441	IO	|	|	|	4.94
8.000	0.00	2.18	0.426	IO	|	|	|	4.86
8.083	0.00	2.16	0.411	IO	|	|	|	4.78
8.167	0.00	2.14	0.396	IO	|	|	|	4.70
8.250	0.00	2.12	0.381	IO	|	|	|	4.63
8.333	0.00	2.10	0.367	IO	|	|	|	4.55
8.417	0.00	2.08	0.352	IO	|	|	|	4.47

8.500	0.00	2.06	0.338	IO	|	|	|	4.39
8.583	0.00	2.03	0.324	IO	|	|	|	4.30
8.667	0.00	2.01	0.310	IO	|	|	|	4.22
8.750	0.00	1.98	0.296	IO	|	|	|	4.13
8.833	0.00	1.96	0.283	IO	|	|	|	4.05
8.917	0.00	1.94	0.269	IO	|	|	|	3.97
9.000	0.00	1.91	0.256	IO	|	|	|	3.89
9.083	0.00	1.89	0.243	IO	|	|	|	3.81
9.167	0.00	1.87	0.230	IO	|	|	|	3.73
9.250	0.00	1.84	0.217	IO	|	|	|	3.65
9.333	0.00	1.82	0.205	IO	|	|	|	3.58
9.417	0.00	1.80	0.192	IO	|	|	|	3.50
9.500	0.00	1.77	0.180	IO	|	|	|	3.42
9.583	0.00	1.74	0.168	IO	|	|	|	3.33
9.667	0.00	1.70	0.156	IO	|	|	|	3.25
9.750	0.00	1.67	0.145	IO	|	|	|	3.16
9.833	0.00	1.64	0.133	IO	|	|	|	3.08
9.917	0.00	1.61	0.122	IO	|	|	|	3.00
10.000	0.00	1.58	0.111	IO	|	|	|	2.92
10.083	0.00	1.55	0.100	IO	|	|	|	2.85
10.167	0.00	1.52	0.090	IO	|	|	|	2.77
10.250	0.00	1.50	0.079	IO	|	|	|	2.70
10.333	0.00	1.47	0.069	IO	|	|	|	2.63
10.417	0.00	1.44	0.059	IO	|	|	|	2.56
10.500	0.00	1.40	0.049	IO	|	|	|	2.46
10.583	0.00	1.33	0.040	IO	|	|	|	2.25
10.667	0.00	1.26	0.031	O	|	|	|	2.05
10.750	0.00	1.19	0.022	O	|	|	|	1.86
10.833	0.00	1.13	0.014	O	|	|	|	1.69
10.917	0.00	1.07	0.007	O	|	|	|	1.52
11.000	0.00	0.41	0.002	O	|	|	|	0.43
11.083	0.00	0.04	0.000	O	|	|	|	0.05
11.167	0.00	0.00	0.000	O	|	|	|	0.00
11.250	0.00	0.00	0.000	O	|	|	|	0.00

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

Number of intervals = 135
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 10.450 (CFS)
Total volume = 3.165 (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

****

100-YR 6-HR

FLOOD HYDROGRAPH ROUTING PROGRAM

Study date: 02/14/24

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 = 35.845 (CFS)
Total volume = 4.032 (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 = 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
0.500	0.002	0.470	0.000	0.004
1.500	0.006	1.060	0.002	0.010
2.500	0.051	1.420	0.046	0.056

3.500	0.192	1.800	0.186	0.198
4.500	0.357	2.090	0.350	0.364
5.500	0.548	2.340	0.540	0.556
6.500	0.766	2.570	0.757	0.775
7.500	1.013	2.780	1.003	1.023
8.500	1.288	6.240	1.267	1.309
9.500	1.595	8.150	1.567	1.623
10.500	1.934	9.590	1.901	1.967
11.500	2.306	10.800	2.269	2.343
12.500	2.715	11.880	2.674	2.756
13.500	3.162	12.850	3.118	3.206

Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 9.0 17.92 26.88 35.85	Depth (Ft.)
0.083	0.66	0.30	0.001	O | | | |	0.32
0.167	2.04	1.05	0.006	OI | | | |	1.48
0.250	2.62	1.13	0.014	|OI | | | |	1.69
0.333	2.83	1.21	0.025	|OI | | | |	1.93
0.417	2.95	1.30	0.036	|OI | | | |	2.18
0.500	3.14	1.40	0.048	|OI | | | |	2.44
0.583	3.43	1.45	0.061	|O I | | | |	2.57
0.667	3.51	1.48	0.075	|O I | | | |	2.67
0.750	3.54	1.52	0.089	|O I | | | |	2.77
0.833	3.55	1.56	0.102	|O I | | | |	2.86
0.917	3.56	1.60	0.116	|O I | | | |	2.96
1.000	3.70	1.63	0.130	|O I | | | |	3.06
1.083	3.95	1.67	0.145	|O I | | | |	3.17
1.167	4.02	1.72	0.161	|O I | | | |	3.28
1.250	4.05	1.76	0.177	|O I | | | |	3.39
1.333	4.06	1.80	0.192	|O I | | | |	3.50
1.417	4.07	1.83	0.208	|O I | | | |	3.60
1.500	4.08	1.85	0.223	|O I | | | |	3.69
1.583	4.08	1.88	0.238	|O I | | | |	3.78
1.667	4.08	1.91	0.253	|O I | | | |	3.87
1.750	4.08	1.93	0.268	|O I | | | |	3.96
1.833	4.08	1.96	0.283	|O I | | | |	4.05
1.917	4.08	1.99	0.297	|O I | | | |	4.14
2.000	4.21	2.01	0.312	|O I | | | |	4.23
2.083	4.33	2.04	0.328	|O I | | | |	4.32
2.167	4.28	2.07	0.343	|O I | | | |	4.42
2.250	4.49	2.09	0.359	|O I | | | |	4.51
2.333	4.54	2.11	0.376	|O I | | | |	4.60
2.417	4.57	2.14	0.392	|O I | | | |	4.69
2.500	4.58	2.16	0.409	|O I | | | |	4.77
2.583	4.58	2.18	0.426	|O I | | | |	4.86
2.667	4.59	2.20	0.442	|O I | | | |	4.95
2.750	4.72	2.22	0.459	|O I | | | |	5.03
2.833	4.97	2.25	0.477	| O I | | | |	5.13
2.917	5.04	2.27	0.496	| O I | | | |	5.23
3.000	5.07	2.30	0.515	| O I | | | |	5.33
3.083	5.08	2.32	0.534	| O I | | | |	5.43
3.167	5.22	2.35	0.553	| O I | | | |	5.52
3.250	5.48	2.37	0.574	| O I | | | |	5.62
3.333	5.55	2.39	0.596	| O I | | | |	5.72
3.417	5.71	2.41	0.618	| O I | | | |	5.82

3.500	6.11	2.44	0.642	O I				5.93
3.583	6.56	2.47	0.669	O I				6.05
3.667	6.91	2.50	0.698	O I				6.19
3.750	7.16	2.53	0.729	O I				6.33
3.833	7.46	2.57	0.762	O I				6.48
3.917	7.70	2.60	0.796	O I				6.62
4.000	7.99	2.63	0.832	O I				6.77
4.083	8.21	2.66	0.870	O I				6.92
4.167	8.63	2.69	0.909	O I				7.08
4.250	9.20	2.73	0.952	O I				7.25
4.333	9.99	2.77	0.999	O I				7.44
4.417	10.84	3.25	1.050	O I				7.64
4.500	11.48	3.91	1.103	O I				7.83
4.583	11.93	4.55	1.154	O I				8.01
4.667	12.72	5.20	1.205	O I				8.20
4.750	13.58	5.86	1.258	O I				8.39
4.833	14.22	6.39	1.311	O I				8.58
4.917	14.67	6.72	1.366	O I				8.75
5.000	15.45	7.07	1.422	O I				8.94
5.083	17.26	7.46	1.484	O I				9.14
5.167	20.86	7.95	1.563	O I				9.39
5.250	24.47	8.44	1.662	O I				9.70
5.333	27.42	8.94	1.781	O I				10.05
5.417	30.74	9.52	1.918	O I				10.45
5.500	35.85	10.06	2.080	O I				10.89
5.583	32.04	10.59	2.242	O I				11.33
5.667	15.77	10.87	2.333	O I				11.57
5.750	9.02	10.90	2.343	O I				11.59
5.833	5.83	10.84	2.320	O I				11.53
5.917	3.89	10.71	2.279	O I				11.43
6.000	2.41	10.54	2.227	O I				11.29
6.083	1.16	10.35	2.168	O I				11.13
6.167	0.42	10.14	2.103	O I				10.95
6.250	0.20	9.92	2.036	O I				10.77
6.333	0.09	9.70	1.969	O I				10.59
6.417	0.04	9.46	1.904	O I				10.41
6.500	0.01	9.19	1.840	O I				10.22
6.583	0.00	8.92	1.777	O I				10.04
6.667	0.00	8.67	1.717	O I				9.86
6.750	0.00	8.42	1.658	O I				9.69
6.833	0.00	8.17	1.601	O I				9.52
6.917	0.00	7.84	1.546	O I				9.34
7.000	0.00	7.51	1.493	O I				9.17
7.083	0.00	7.20	1.442	O I				9.00
7.167	0.00	6.90	1.393	O I				8.84
7.250	0.00	6.61	1.347	O I				8.69
7.333	0.00	6.33	1.302	O I				8.55
7.417	0.00	5.89	1.260	O I				8.40
7.500	0.00	5.40	1.221	O I				8.26
7.583	0.00	4.95	1.186	O I				8.13
7.667	0.00	4.54	1.153	O I				8.01
7.750	0.00	4.17	1.123	O I				7.90
7.833	0.00	3.82	1.096	O I				7.80
7.917	0.00	3.50	1.070	O I				7.71
8.000	0.00	3.21	1.047	O I				7.62
8.083	0.00	2.94	1.026	O I				7.55
8.167	0.00	2.77	1.006	O I				7.47
8.250	0.00	2.76	0.987	O I				7.40
8.333	0.00	2.74	0.968	O I				7.32
8.417	0.00	2.73	0.950	O I				7.24

MAX FLOW DEPTH WITHIN BASIN, BASIN DEPTH IS 13.50'

8.500	0.00	2.71	0.931	I O	|	|	|	7.17
8.583	0.00	2.69	0.912	I O	|	|	|	7.09
8.667	0.00	2.68	0.894	I O	|	|	|	7.02
8.750	0.00	2.66	0.875	I O	|	|	|	6.94
8.833	0.00	2.65	0.857	I O	|	|	|	6.87
8.917	0.00	2.63	0.839	I O	|	|	|	6.79
9.000	0.00	2.62	0.821	I O	|	|	|	6.72
9.083	0.00	2.60	0.803	I O	|	|	|	6.65
9.167	0.00	2.59	0.785	I O	|	|	|	6.58
9.250	0.00	2.57	0.767	I O	|	|	|	6.50
9.333	0.00	2.55	0.750	I O	|	|	|	6.42
9.417	0.00	2.53	0.732	I O	|	|	|	6.34
9.500	0.00	2.52	0.715	I O	|	|	|	6.26
9.583	0.00	2.50	0.697	I O	|	|	|	6.19
9.667	0.00	2.48	0.680	I O	|	|	|	6.11
9.750	0.00	2.46	0.663	I O	|	|	|	6.03
9.833	0.00	2.44	0.646	I O	|	|	|	5.95
9.917	0.00	2.43	0.630	I O	|	|	|	5.87
10.000	0.00	2.41	0.613	I O	|	|	|	5.80
10.083	0.00	2.39	0.596	I O	|	|	|	5.72
10.167	0.00	2.37	0.580	I O	|	|	|	5.65
10.250	0.00	2.36	0.564	I O	|	|	|	5.57
10.333	0.00	2.34	0.548	I O	|	|	|	5.50
10.417	0.00	2.32	0.531	I O	|	|	|	5.41
10.500	0.00	2.30	0.516	I O	|	|	|	5.33
10.583	0.00	2.28	0.500	I O	|	|	|	5.25
10.667	0.00	2.26	0.484	I O	|	|	|	5.17
10.750	0.00	2.24	0.469	IO	|	|	|	5.09
10.833	0.00	2.22	0.453	IO	|	|	|	5.00
10.917	0.00	2.20	0.438	IO	|	|	|	4.93
11.000	0.00	2.18	0.423	IO	|	|	|	4.85
11.083	0.00	2.16	0.408	IO	|	|	|	4.77
11.167	0.00	2.14	0.393	IO	|	|	|	4.69
11.250	0.00	2.12	0.379	IO	|	|	|	4.61
11.333	0.00	2.10	0.364	IO	|	|	|	4.54
11.417	0.00	2.08	0.350	IO	|	|	|	4.46
11.500	0.00	2.05	0.336	IO	|	|	|	4.37
11.583	0.00	2.03	0.322	IO	|	|	|	4.29
11.667	0.00	2.00	0.308	IO	|	|	|	4.20
11.750	0.00	1.98	0.294	IO	|	|	|	4.12
11.833	0.00	1.96	0.280	IO	|	|	|	4.04
11.917	0.00	1.93	0.267	IO	|	|	|	3.96
12.000	0.00	1.91	0.254	IO	|	|	|	3.87
12.083	0.00	1.89	0.241	IO	|	|	|	3.80
12.167	0.00	1.86	0.228	IO	|	|	|	3.72
12.250	0.00	1.84	0.215	IO	|	|	|	3.64
12.333	0.00	1.82	0.203	IO	|	|	|	3.56
12.417	0.00	1.79	0.190	IO	|	|	|	3.49
12.500	0.00	1.76	0.178	IO	|	|	|	3.40
12.583	0.00	1.73	0.166	IO	|	|	|	3.31
12.667	0.00	1.70	0.154	IO	|	|	|	3.23
12.750	0.00	1.67	0.142	IO	|	|	|	3.15
12.833	0.00	1.64	0.131	IO	|	|	|	3.07
12.917	0.00	1.61	0.120	IO	|	|	|	2.99
13.000	0.00	1.58	0.109	IO	|	|	|	2.91
13.083	0.00	1.55	0.098	IO	|	|	|	2.83
13.167	0.00	1.52	0.088	IO	|	|	|	2.76
13.250	0.00	1.49	0.077	IO	|	|	|	2.69
13.333	0.00	1.46	0.067	IO	|	|	|	2.61
13.417	0.00	1.44	0.057	IO	|	|	|	2.54

13.500	0.00	1.39	0.047	IO	|	|	|	2.42
13.583	0.00	1.32	0.038	IO	|	|	|	2.21
13.667	0.00	1.25	0.029	IO	|	|	|	2.02
13.750	0.00	1.18	0.021	IO	|	|	|	1.83
13.833	0.00	1.12	0.013	O	|	|	|	1.66
13.917	0.00	1.01	0.006	O	|	|	|	1.41
14.000	0.00	0.28	0.001	O	|	|	|	0.30
14.083	0.00	0.03	0.000	O	|	|	|	0.03
14.167	0.00	0.00	0.000	O	|	|	|	0.00
14.250	0.00	0.00	0.000	O	|	|	|	0.00

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

Number of intervals = 171
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 10.899 (CFS)
Total volume = 4.032 (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

****

100-YR 24-HR

FLOOD HYDROGRAPH ROUTING PROGRAM

Study date: 02/14/24

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 = 11.494 (CFS)
Total volume = 6.123 (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 = 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
0.500	0.002	0.470	0.000	0.004
1.500	0.006	1.060	0.002	0.010
2.500	0.051	1.420	0.046	0.056

3.500	0.192	1.800	0.186	0.198
4.500	0.357	2.090	0.350	0.364
5.500	0.548	2.340	0.540	0.556
6.500	0.766	2.570	0.757	0.775
7.500	1.013	2.780	1.003	1.023
8.500	1.288	6.240	1.267	1.309
9.500	1.595	8.150	1.567	1.623
10.500	1.934	9.590	1.901	1.967
11.500	2.306	10.800	2.269	2.343
12.500	2.715	11.880	2.674	2.756
13.500	3.162	12.850	3.118	3.206

Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 2.9 5.75 8.62 11.49	Depth (Ft.)
0.083	0.15	0.07	0.000	O | | | |	0.07
0.167	0.44	0.27	0.001	OI | | | |	0.29
0.250	0.51	0.45	0.002	|O | | | |	0.48
0.333	0.62	0.53	0.002	|O | | | |	0.61
0.417	0.78	0.65	0.003	|OI | | | |	0.80
0.500	0.83	0.76	0.004	| O | | | |	0.99
0.583	0.86	0.82	0.004	| O | | | |	1.09
0.667	0.87	0.85	0.005	| O | | | |	1.14
0.750	0.87	0.86	0.005	| O | | | |	1.17
0.833	0.95	0.90	0.005	| O | | | |	1.22
0.917	1.10	0.98	0.005	| OI | | | |	1.37
1.000	1.13	1.06	0.006	| OI | | | |	1.50
1.083	1.07	1.06	0.006	| O | | | |	1.51
1.167	0.94	1.06	0.006	| O | | | |	1.50
1.250	0.91	0.97	0.005	| O | | | |	1.35
1.333	0.90	0.93	0.005	| O | | | |	1.27
1.417	0.89	0.90	0.005	| O | | | |	1.23
1.500	0.88	0.89	0.005	| O | | | |	1.21
1.583	0.88	0.88	0.005	| O | | | |	1.20
1.667	0.88	0.88	0.005	| O | | | |	1.19
1.750	0.88	0.88	0.005	| O | | | |	1.19
1.833	0.95	0.90	0.005	| O | | | |	1.23
1.917	1.10	0.98	0.005	| OI | | | |	1.37
2.000	1.13	1.06	0.006	| OI | | | |	1.50
2.083	1.15	1.07	0.007	| OI | | | |	1.51
2.167	1.16	1.07	0.007	| OI | | | |	1.53
2.250	1.17	1.08	0.008	| OI | | | |	1.54
2.333	1.17	1.08	0.009	| O | | | |	1.56
2.417	1.17	1.08	0.009	| O | | | |	1.57
2.500	1.17	1.09	0.010	| O | | | |	1.58
2.583	1.25	1.10	0.010	| O | | | |	1.60
2.667	1.39	1.11	0.012	| O | | | |	1.63
2.750	1.43	1.12	0.014	| O | | | |	1.68
2.833	1.44	1.14	0.016	| OI | | | |	1.72
2.917	1.45	1.16	0.018	| OI | | | |	1.77
3.000	1.46	1.17	0.020	| OI | | | |	1.81
3.083	1.46	1.19	0.022	| OI | | | |	1.86
3.167	1.46	1.20	0.024	| OI | | | |	1.90
3.250	1.46	1.22	0.026	| OI | | | |	1.94
3.333	1.46	1.23	0.027	| OI | | | |	1.97
3.417	1.46	1.24	0.029	| OI | | | |	2.01

3.500	1.46	1.25	0.030	OI					2.04
3.583	1.46	1.27	0.032	OI					2.07
3.667	1.46	1.28	0.033	OI					2.10
3.750	1.46	1.29	0.034	OI					2.13
3.833	1.54	1.30	0.036	OI					2.16
3.917	1.68	1.31	0.038	OI					2.21
4.000	1.72	1.33	0.040	OI					2.26
4.083	1.74	1.36	0.043	OI					2.32
4.167	1.74	1.38	0.046	OI					2.38
4.250	1.75	1.40	0.048	OI					2.43
4.333	1.83	1.42	0.051	O I					2.49
4.417	1.97	1.43	0.054	O I					2.52
4.500	2.01	1.44	0.058	OI					2.55
4.583	2.03	1.45	0.062	OI					2.58
4.667	2.04	1.46	0.066	OI					2.60
4.750	2.04	1.47	0.070	OI					2.63
4.833	2.12	1.48	0.074	OI					2.66
4.917	2.26	1.49	0.079	O I					2.70
5.000	2.30	1.51	0.084	O I					2.73
5.083	2.17	1.52	0.089	O I					2.77
5.167	1.89	1.53	0.093	OI					2.79
5.250	1.82	1.54	0.095	OI					2.81
5.333	1.87	1.54	0.097	OI					2.83
5.417	1.99	1.55	0.099	OI					2.84
5.500	2.02	1.56	0.103	OI					2.87
5.583	2.10	1.57	0.106	OI					2.89
5.667	2.26	1.58	0.110	O I					2.92
5.750	2.30	1.59	0.115	O I					2.95
5.833	2.32	1.61	0.120	O I					2.99
5.917	2.33	1.62	0.125	O I					3.02
6.000	2.33	1.63	0.130	O I					3.06
6.083	2.41	1.65	0.135	O I					3.09
6.167	2.56	1.66	0.140	O I					3.13
6.250	2.60	1.68	0.147	O I					3.18
6.333	2.61	1.69	0.153	O I					3.22
6.417	2.62	1.71	0.159	O I					3.27
6.500	2.63	1.73	0.165	O I					3.31
6.583	2.71	1.75	0.172	O I					3.36
6.667	2.85	1.76	0.179	O I					3.41
6.750	2.89	1.79	0.186	O I					3.46
6.833	2.90	1.80	0.194	O I					3.51
6.917	2.91	1.82	0.202	O I					3.56
7.000	2.92	1.83	0.209	O I					3.60
7.083	2.92	1.84	0.217	O I					3.65
7.167	2.92	1.86	0.224	O I					3.69
7.250	2.92	1.87	0.231	O I					3.74
7.333	3.00	1.88	0.239	O I					3.78
7.417	3.14	1.90	0.247	O I					3.83
7.500	3.18	1.91	0.256	O I					3.89
7.583	3.27	1.93	0.265	O	I				3.94
7.667	3.42	1.94	0.274	O	I				4.00
7.750	3.47	1.96	0.285	O	I				4.06
7.833	3.57	1.98	0.295	O	I				4.13
7.917	3.72	2.00	0.307	O	I				4.19
8.000	3.76	2.02	0.318	O	I				4.27
8.083	3.93	2.04	0.331	O	I				4.34
8.167	4.23	2.07	0.345	O	I				4.43
8.250	4.31	2.09	0.360	O	I				4.52
8.333	4.35	2.11	0.375	O	I				4.60
8.417	4.37	2.13	0.391	O	I				4.68

8.500	4.38	2.15	0.406	O	I			4.76
8.583	4.46	2.17	0.422	O	I			4.84
8.667	4.60	2.20	0.438	O	I			4.92
8.750	4.64	2.22	0.454	O	I			5.01
8.833	4.73	2.24	0.471	O	I			5.10
8.917	4.89	2.26	0.489	O	I			5.19
9.000	4.93	2.29	0.507	O	I			5.29
9.083	5.10	2.31	0.526	O	I			5.38
9.167	5.40	2.34	0.546	O	I			5.49
9.250	5.48	2.36	0.567	O	I			5.59
9.333	5.59	2.38	0.589	O	I			5.69
9.417	5.75	2.41	0.612	O	I			5.79
9.500	5.80	2.43	0.635	O	I			5.90
9.583	5.90	2.46	0.658	O	I			6.01
9.667	6.06	2.48	0.682	O	I			6.12
9.750	6.10	2.51	0.707	O	I			6.23
9.833	6.20	2.53	0.732	O	I			6.34
9.917	6.35	2.56	0.758	O	I			6.46
10.000	6.39	2.59	0.784	O	I			6.57
10.083	5.88	2.61	0.808	O	I			6.67
10.167	4.89	2.62	0.827	O	I			6.75
10.250	4.63	2.63	0.842	O	I			6.81
10.333	4.52	2.65	0.855	O	I			6.86
10.417	4.45	2.66	0.868	O	I			6.91
10.500	4.41	2.67	0.880	O	I			6.96
10.583	4.77	2.68	0.893	O	I			7.02
10.667	5.48	2.69	0.910	O	I			7.08
10.750	5.67	2.71	0.930	O	I			7.16
10.833	5.75	2.73	0.950	O	I			7.25
10.917	5.80	2.74	0.971	O	I			7.33
11.000	5.83	2.76	0.992	O	I			7.42
11.083	5.77	2.78	1.013	O	I			7.50
11.167	5.63	3.03	1.033	O	I			7.57
11.250	5.59	3.24	1.050	O	I			7.63
11.333	5.57	3.43	1.065	O	I			7.69
11.417	5.56	3.61	1.079	O	I			7.74
11.500	5.56	3.77	1.092	O	I			7.79
11.583	5.40	3.92	1.103	O	I			7.83
11.667	5.12	4.03	1.112	O	I			7.86
11.750	5.04	4.11	1.119	O	I			7.89
11.833	5.08	4.19	1.125	O	I			7.91
11.917	5.21	4.27	1.132	O	I			7.93
12.000	5.23	4.35	1.138	O	I			7.95
12.083	5.78	4.45	1.145	O	I			7.98
12.167	6.78	4.60	1.158	O	I			8.03
12.250	7.05	4.79	1.173	O	I			8.08
12.333	7.25	4.99	1.188	O	I			8.14
12.417	7.46	5.18	1.204	O	I			8.19
12.500	7.54	5.38	1.219	O	I			8.25
12.583	7.73	5.56	1.234	O	I			8.30
12.667	8.03	5.76	1.250	O	I			8.36
12.750	8.11	5.95	1.265	O	I			8.42
12.833	8.28	6.14	1.280	O	I			8.47
12.917	8.56	6.28	1.295	O	I			8.52
13.000	8.66	6.38	1.311	O	I			8.57
13.083	9.41	6.49	1.329	O	I			8.63
13.167	10.72	6.64	1.353	O	I			8.71
13.250	11.10	6.82	1.381	O	I			8.80
13.333	11.30	7.00	1.411	O	I			8.90
13.417	11.41	7.19	1.440	O	I			9.00

13.500	11.49	7.37	1.469	|	|	| O	|	I 9.09
13.583	10.29	7.51	1.493	|	|	| O	I |	9.17
13.667	7.94	7.58	1.504	|	|	| OI	|	9.20
13.750	7.31	7.58	1.504	|	|	| IO	|	9.20
13.833	7.03	7.57	1.501	|	|	| I O	|	9.19
13.917	6.87	7.54	1.497	|	|	| IO	|	9.18
14.000	6.78	7.51	1.492	|	|	| I O	|	9.17
14.083	7.09	7.49	1.488	|	|	| IO	|	9.15
14.167	7.78	7.48	1.488	|	|	| OI	|	9.15
14.250	7.99	7.50	1.491	|	|	| O I	|	9.16
14.333	7.96	7.52	1.494	|	|	| O I	|	9.17
14.417	7.78	7.54	1.496	|	|	| OI	|	9.18
14.500	7.77	7.55	1.498	|	|	| O	|	9.18
14.583	7.78	7.56	1.499	|	|	| O	|	9.19
14.667	7.80	7.57	1.501	|	|	| O	|	9.19
14.750	7.82	7.58	1.503	|	|	| O	|	9.20
14.833	7.70	7.58	1.504	|	|	| O	|	9.20
14.917	7.48	7.58	1.504	|	|	| IO	|	9.20
15.000	7.44	7.58	1.503	|	|	| IO	|	9.20
15.083	7.33	7.57	1.502	|	|	| IO	|	9.20
15.167	7.13	7.56	1.499	|	|	| I O	|	9.19
15.250	7.07	7.54	1.496	|	|	| IO	|	9.18
15.333	6.96	7.51	1.493	|	|	| IO	|	9.17
15.417	6.81	7.49	1.489	|	|	| I O	|	9.15
15.500	6.76	7.46	1.484	|	|	| I O	|	9.14
15.583	6.44	7.42	1.478	|	|	|I O	|	9.12
15.667	5.86	7.37	1.470	|	|	I O	|	9.09
15.750	5.70	7.30	1.459	|	|	I| O	|	9.06
15.833	5.63	7.23	1.448	|	|	I| O	|	9.02
15.917	5.59	7.17	1.437	|	|	I| O	|	8.98
16.000	5.57	7.10	1.426	|	|	I| O	|	8.95
16.083	4.41	7.01	1.412	|	I	| O	|	8.90
16.167	2.28	6.86	1.387	| I	|	| O	|	8.82
16.250	1.71	6.65	1.354	| I	|	| O	|	8.72
16.333	1.45	6.44	1.320	| I	|	|O	|	8.60
16.417	1.31	6.22	1.286	| I	|	|O	|	8.49
16.500	1.22	5.80	1.253	| I	|	O	|	8.37
16.583	1.09	5.42	1.223	| I	|	O|	|	8.26
16.667	0.95	5.05	1.194	| I	|	O |	|	8.16
16.750	0.91	4.71	1.167	| I	|	O |	|	8.06
16.833	0.90	4.40	1.141	| I	|	O |	|	7.97
16.917	0.89	4.10	1.118	| I	|	O |	|	7.88
17.000	0.88	3.84	1.097	| I	| O	|	|	7.81
17.083	1.03	3.60	1.078	| I	| O	|	|	7.74
17.167	1.31	3.40	1.062	| I	|O	|	|	7.68
17.250	1.39	3.23	1.048	| I	O |	|	|	7.63
17.333	1.42	3.08	1.036	| I	O |	|	|	7.59
17.417	1.44	2.94	1.026	| I	O |	|	|	7.55
17.500	1.45	2.81	1.016	| I	O|	|	|	7.51
17.583	1.46	2.77	1.007	| I	O|	|	|	7.47
17.667	1.46	2.77	0.998	| I	O|	|	|	7.44
17.750	1.46	2.76	0.989	| I	O|	|	|	7.40
17.833	1.39	2.75	0.979	| I	O|	|	|	7.36
17.917	1.24	2.74	0.970	| I	O|	|	|	7.32
18.000	1.21	2.73	0.959	| I	O|	|	|	7.28
18.083	1.19	2.73	0.949	| I	O|	|	|	7.24
18.167	1.18	2.72	0.938	| I	O|	|	|	7.20
18.250	1.17	2.71	0.927	| I	O|	|	|	7.15
18.333	1.17	2.70	0.917	| I	O|	|	|	7.11
18.417	1.17	2.69	0.906	| I	O|	|	|	7.07

18.500	1.17	2.68	0.896	| I O|	|	|	|	7.03
18.583	1.09	2.67	0.885	| I O|	|	|	|	6.98
18.667	0.95	2.66	0.874	| I O|	|	|	|	6.94
18.750	0.91	2.65	0.862	| I O|	|	|	|	6.89
18.833	0.82	2.64	0.850	| I O|	|	|	|	6.84
18.917	0.67	2.63	0.837	|I O|	|	|	|	6.79
19.000	0.62	2.62	0.823	|I O|	|	|	|	6.73
19.083	0.68	2.61	0.810	|I O|	|	|	|	6.68
19.167	0.81	2.60	0.797	| I O|	|	|	|	6.62
19.250	0.84	2.59	0.785	| I O|	|	|	|	6.58
19.333	0.93	2.58	0.773	| I O|	|	|	|	6.53
19.417	1.09	2.57	0.762	| I O|	|	|	|	6.48
19.500	1.13	2.56	0.752	| I O|	|	|	|	6.44
19.583	1.07	2.55	0.742	| I O|	|	|	|	6.39
19.667	0.94	2.53	0.732	| I O|	|	|	|	6.34
19.750	0.91	2.52	0.721	| I O|	|	|	|	6.29
19.833	0.82	2.51	0.709	| I O |	|	|	|	6.24
19.917	0.67	2.50	0.697	|I O |	|	|	|	6.18
20.000	0.62	2.48	0.685	|I O |	|	|	|	6.13
20.083	0.68	2.47	0.672	|I O |	|	|	|	6.07
20.167	0.81	2.46	0.660	| I O |	|	|	|	6.01
20.250	0.84	2.45	0.649	| I O |	|	|	|	5.96
20.333	0.86	2.43	0.638	| I O |	|	|	|	5.91
20.417	0.87	2.42	0.627	| I O |	|	|	|	5.86
20.500	0.87	2.41	0.617	| I O |	|	|	|	5.81
20.583	0.88	2.40	0.606	| I O |	|	|	|	5.77
20.667	0.88	2.39	0.596	| I O |	|	|	|	5.72
20.750	0.88	2.38	0.585	| I O |	|	|	|	5.67
20.833	0.80	2.37	0.575	| I O |	|	|	|	5.62
20.917	0.66	2.36	0.563	|I O |	|	|	|	5.57
21.000	0.62	2.34	0.552	|I O |	|	|	|	5.52
21.083	0.68	2.33	0.540	|I O |	|	|	|	5.46
21.167	0.81	2.32	0.529	| I O |	|	|	|	5.40
21.250	0.84	2.30	0.519	| I O |	|	|	|	5.35
21.333	0.78	2.29	0.509	| I O |	|	|	|	5.29
21.417	0.65	2.27	0.498	|I O |	|	|	|	5.24
21.500	0.62	2.26	0.487	|I O |	|	|	|	5.18
21.583	0.68	2.25	0.476	|I O |	|	|	|	5.12
21.667	0.81	2.23	0.465	| I O |	|	|	|	5.07
21.750	0.84	2.22	0.456	| I O |	|	|	|	5.02
21.833	0.78	2.21	0.446	| I O |	|	|	|	4.97
21.917	0.65	2.19	0.436	|I O |	|	|	|	4.91
22.000	0.62	2.18	0.425	|I O |	|	|	|	4.86
22.083	0.68	2.17	0.415	|I O |	|	|	|	4.80
22.167	0.81	2.15	0.405	| I O |	|	|	|	4.75
22.250	0.84	2.14	0.396	| I O |	|	|	|	4.70
22.333	0.78	2.13	0.387	| I O |	|	|	|	4.66
22.417	0.65	2.12	0.377	|I O |	|	|	|	4.61
22.500	0.62	2.10	0.367	|I O |	|	|	|	4.55
22.583	0.60	2.09	0.357	|I O |	|	|	|	4.50
22.667	0.59	2.07	0.346	|I O |	|	|	|	4.44
22.750	0.59	2.05	0.336	|I O |	|	|	|	4.37
22.833	0.58	2.04	0.326	|I O |	|	|	|	4.31
22.917	0.58	2.02	0.316	|I O |	|	|	|	4.25
23.000	0.58	2.00	0.307	|I O |	|	|	|	4.19
23.083	0.58	1.98	0.297	|I O |	|	|	|	4.14
23.167	0.58	1.97	0.287	|I O |	|	|	|	4.08
23.250	0.58	1.95	0.278	|I O |	|	|	|	4.02
23.333	0.58	1.93	0.268	|I O |	|	|	|	3.96
23.417	0.58	1.92	0.259	|I O |	|	|	|	3.91

23.500	0.58	1.90	0.250	I O	|	|	|	3.85
23.583	0.58	1.89	0.241	I O	|	|	|	3.80
23.667	0.58	1.87	0.232	I O	|	|	|	3.74
23.750	0.58	1.86	0.223	I O	|	|	|	3.69
23.833	0.58	1.84	0.215	I O	|	|	|	3.64
23.917	0.58	1.82	0.206	I O	|	|	|	3.59
24.000	0.58	1.81	0.198	I O	|	|	|	3.53
24.083	0.43	1.79	0.189	I O	|	|	|	3.48
24.167	0.15	1.76	0.178	I O	|	|	|	3.40
24.250	0.07	1.73	0.167	I O	|	|	|	3.32
24.333	0.04	1.70	0.156	I O	|	|	|	3.24
24.417	0.02	1.67	0.144	I O	|	|	|	3.16
24.500	0.01	1.64	0.133	I O	|	|	|	3.08
24.583	0.00	1.61	0.122	I O	|	|	|	3.00
24.667	0.00	1.58	0.111	I O	|	|	|	2.92
24.750	0.00	1.55	0.100	I O	|	|	|	2.85
24.833	0.00	1.52	0.089	I O	|	|	|	2.77
24.917	0.00	1.50	0.079	I O	|	|	|	2.70
25.000	0.00	1.47	0.069	I O	|	|	|	2.63
25.083	0.00	1.44	0.059	I O	|	|	|	2.56
25.167	0.00	1.40	0.049	I O	|	|	|	2.46
25.250	0.00	1.33	0.040	I O	|	|	|	2.25
25.333	0.00	1.26	0.031	I O	|	|	|	2.05
25.417	0.00	1.19	0.022	I O	|	|	|	1.86
25.500	0.00	1.13	0.014	I O	|	|	|	1.68
25.583	0.00	1.07	0.007	I O	|	|	|	1.52
25.667	0.00	0.40	0.002	IO	|	|	|	0.42
25.750	0.00	0.04	0.000	O	|	|	|	0.04
25.833	0.00	0.00	0.000	O	|	|	|	0.00
25.917	0.00	0.00	0.000	O	|	|	|	0.00

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

Number of intervals = 311
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 7.583 (CFS)
Total volume = 6.123 (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 PR
Copyright (c) CIVILCADD/CIVILDESIGN,
Study date: 08/29/22

FOR REFERENCE ONLY
SEE DRAINAGE STUDY FOR
TRACT NO. 38442

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

****

++
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

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 (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 11.8 23.57 35.36 47.14	Depth (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

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

****

FLOOD HYDROGRAPH ROUTING PR
Copyright (c) CIVILCADD/CIVILDESIGN,
Study date: 08/29/22

FOR REFERENCE ONLY
SEE DRAINAGE STUDY FOR
TRACT NO. 38442

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 (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 7.0 13.97 20.95 27.94	Depth (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

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	I	O			3.19
7.917	0.00	1.54	0.034	I	O			2.93
8.000	0.00	1.43	0.024	I	O			2.69
8.083	0.00	1.19	0.015	I	O			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

****

FLOOD HYDROGRAPH ROUTING PR
Copyright (c) CIVILCADD/CIVILDESIGN,
Study date: 08/29/22

FOR REFERENCE ONLY
SEE DRAINAGE STUDY FOR
TRACT NO. 38442

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

****

++
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

Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 6.2 12.40 18.59 24.79	Depth (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

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 |	|	|	I|	9.52
5.583	20.05	9.76	1.360	| | O | | I |	|	|I	|	9.83
5.667	9.15	10.62	1.390	| | I O | | I |	|	|	|	9.93
5.750	5.01	9.99	1.368	| I | O | | I |	|	|	|	9.86
5.833	3.11	8.94	1.331	| I | O | | I |	|	|	|	9.74
5.917	1.97	7.80	1.291	| I | O | | I |	|	|	|	9.61
6.000	1.14	6.84	1.251	|I O | | I |	|	|	|	9.47
6.083	0.59	6.64	1.211	I O | | I |	|	|	|	9.33
6.167	0.18	6.43	1.168	I O | | I |	|	|	|	9.17
6.250	0.07	6.22	1.126	I O | | I |	|	|	|	9.01
6.333	0.03	6.02	1.084	I O| | I |	|	|	|	8.86
6.417	0.01	5.82	1.043	I O| | I |	|	|	|	8.71
6.500	0.00	5.63	1.004	I O| | I |	|	|	|	8.57
6.583	0.00	5.34	0.966	I O | | I |	|	|	|	8.42
6.667	0.00	4.97	0.930	I O | | I |	|	|	|	8.27
6.750	0.00	4.62	0.897	I O | | I |	|	|	|	8.14
6.833	0.00	4.30	0.867	I O | | I |	|	|	|	8.01
6.917	0.00	4.00	0.838	I O | | I |	|	|	|	7.89
7.000	0.00	3.73	0.811	I O | | I |	|	|	|	7.78
7.083	0.00	3.47	0.787	I O | | I |	|	|	|	7.68
7.167	0.00	3.23	0.764	I O | | I |	|	|	|	7.59
7.250	0.00	3.01	0.742	I O | | I |	|	|	|	7.50
7.333	0.00	2.98	0.721	I O | | I |	|	|	|	7.40
7.417	0.00	2.96	0.701	I O | | I |	|	|	|	7.30
7.500	0.00	2.94	0.681	I O | | I |	|	|	|	7.21
7.583	0.00	2.91	0.661	I O | | I |	|	|	|	7.11
7.667	0.00	2.89	0.641	I O | | I |	|	|	|	7.02
7.750	0.00	2.87	0.621	I O | | I |	|	|	|	6.92
7.833	0.00	2.84	0.601	I O | | I |	|	|	|	6.83
7.917	0.00	2.82	0.582	I O | | I |	|	|	|	6.74
8.000	0.00	2.80	0.562	I O | | I |	|	|	|	6.65
8.083	0.00	2.77	0.543	I O | | I |	|	|	|	6.56
8.167	0.00	2.75	0.524	I O | | I |	|	|	|	6.46
8.250	0.00	2.72	0.505	I O | | I |	|	|	|	6.36
8.333	0.00	2.69	0.487	I O | | I |	|	|	|	6.26
8.417	0.00	2.66	0.468	I O | | I |	|	|	|	6.16
8.500	0.00	2.64	0.450	I O | | I |	|	|	|	6.06
8.583	0.00	2.61	0.432	I O | | I |	|	|	|	5.96
8.667	0.00	2.58	0.414	I O | | I |	|	|	|	5.86

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

****

FLOOD HYDROGRAPH ROUTING PR
Copyright (c) CIVILCADD/CIVILDESIGN,
Study date: 08/29/22

FOR REFERENCE ONLY
SEE DRAINAGE STUDY FOR
TRACT NO. 38442

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

****

++
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

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 (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 1.9 3.87 5.80 7.73	Depth (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

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

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

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	|	|	|	|	|	8.23
15.167	4.79	4.85	0.919	|	|	|	|	|	8.23
15.250	4.76	4.85	0.919	|	|	|	|	|	8.23
15.333	4.68	4.84	0.918	|	|	|	|	|	8.22
15.417	4.58	4.82	0.916	|	|	|	|	|	8.22
15.500	4.56	4.81	0.915	|	|	|	|	|	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

MAX FLOW DEPTH WITHIN BASIN, BASIN DEPTH IS 11.50'

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

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

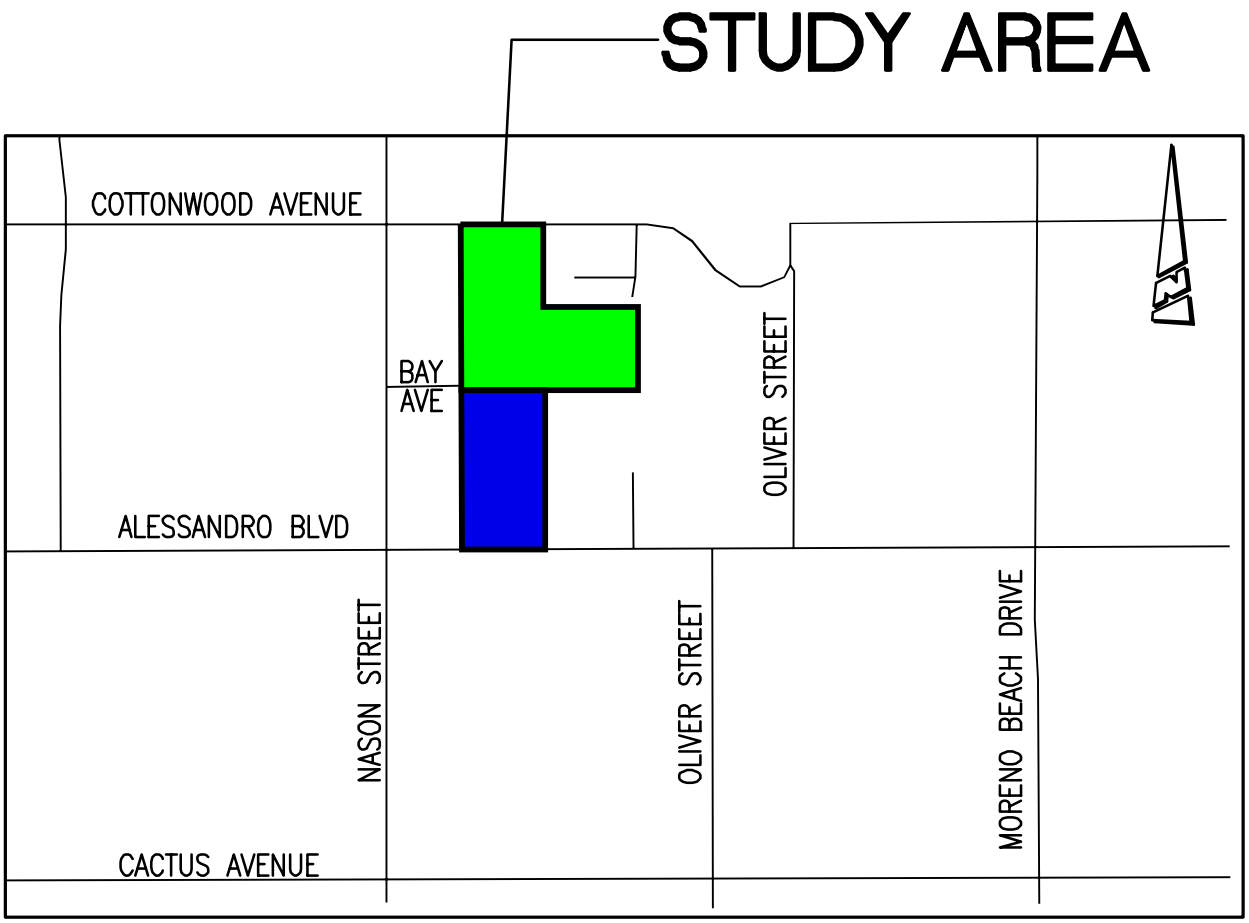
****

APPENDIX E

SITE PLAN

APPENDIX F

VICINITY MAP



VICINITY MAP

N.T.S.

LEGEND

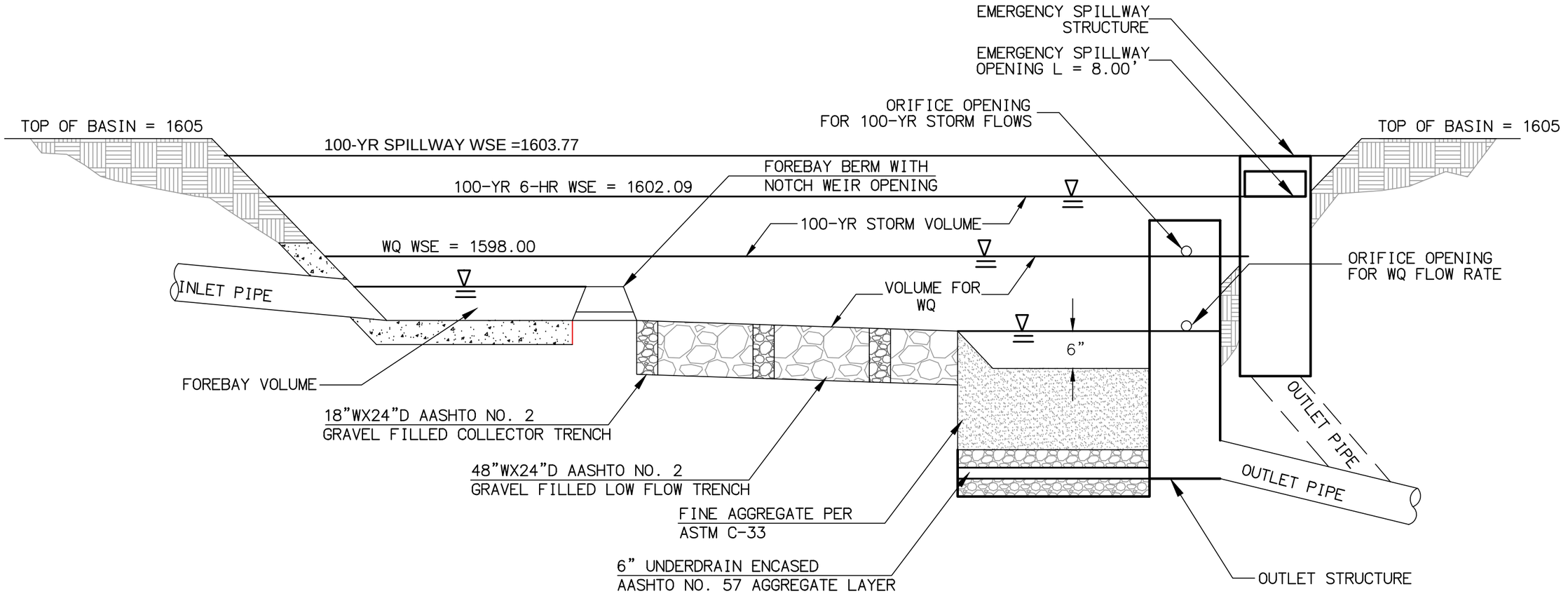
TRACT NO. 38443

TRACT NO. 38442

APPENDIX G

HYDRAULIC CALCULATIONS

EMERGENCY SPILLWAY CALCULATIONS



DETENTION / EXTENDED BASIN NO. 1 DETAIL

NTS

PROACTIVE ENGINEERING CONSULTANTS

Worksheet for BASIN NO 1 - EMERGENCY SPILLWAY

Project Description

Solve For	Headwater Elevation

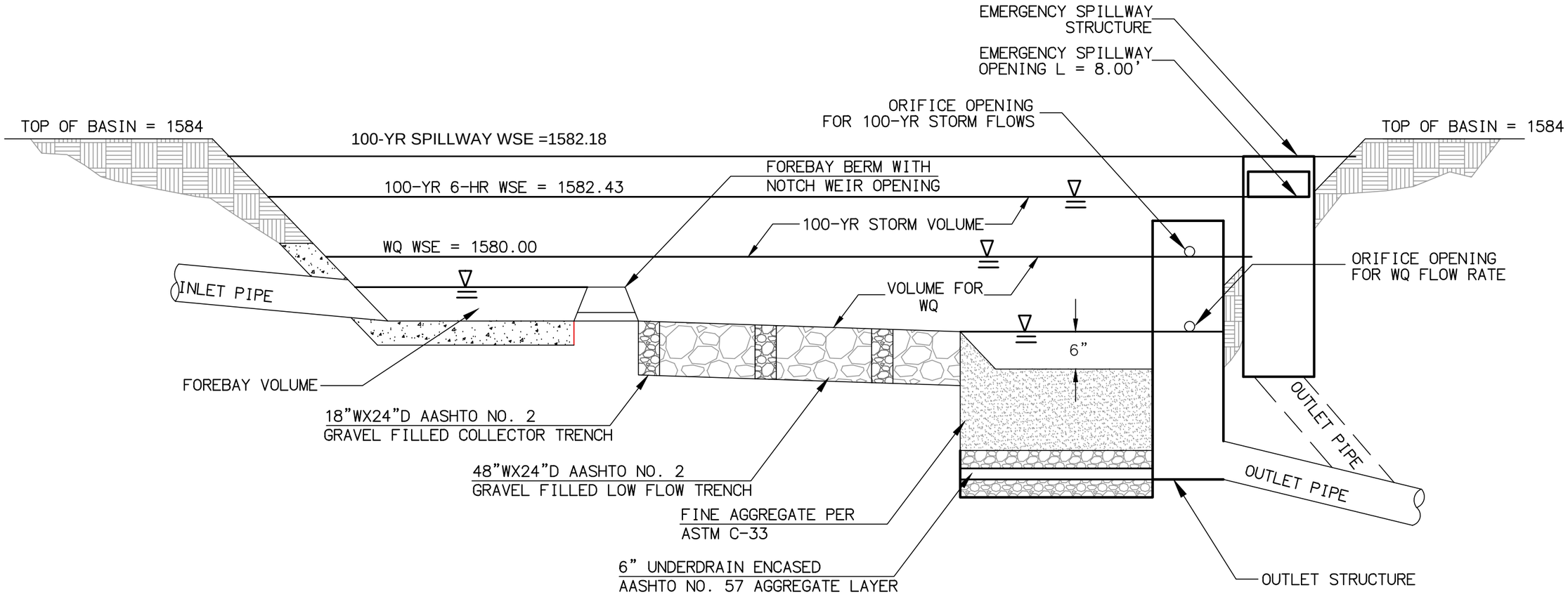
Input Data

Discharge		53.90	ft³/s
Crest Elevation		0.00	ft
Tailwater Elevation		0.00	ft
Crest Surface Type	Paved		
Crest Breadth		1.00	ft
Crest Length		8.00	ft

Results

Headwater Elevation	1.68	ft
Headwater Height Above Crest	1.68	ft
Tailwater Height Above Crest	0.00	ft
Weir Coefficient	3.09	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	3.09	US
Flow Area	13.46	ft²
Velocity	4.00	ft/s
Wetted Perimeter	11.37	ft
Top Width	8.00	ft

FOR REFERENCE ONLY
SEE DRAINAGE STUDY FOR
TRACT NO. 38442



DETENTION / EXTENDED BASIN NO. 2 DETAIL

NTS

PROACTIVE
ENGINEERING CONSULTANTS

Worksheet for BASIN NO 2 - EMERGENCY SPILLWAY

Project Description

FOR REFERENCE ONLY
SEE DRAINAGE STUDY FOR
TRACT NO. 38443

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

LINE H

PRELIMINARY HYDRAULIC CALCULATIONS

Worksheet for 75" RCP SECTION

Project Description

Friction Method	Manning Formula
Solve For	Channel Slope

Input Data

Roughness Coefficient	0.013	
Normal Depth	6.25	ft
Diameter	6.25	ft
Discharge	608.10	ft³/s

MAX FLOW WITHIN 75" RCP SECTION

Results

Channel Slope	0.01659	ft/ft
Flow Area	30.68	ft²
Wetted Perimeter	19.63	ft
Hydraulic Radius	1.56	ft
Top Width	0.00	ft
Critical Depth	6.01	ft
Percent Full	100.0	%
Critical Slope	0.01446	ft/ft
Velocity	19.82	ft/s
Velocity Head	6.11	ft
Specific Energy	12.36	ft
Froude Number	0.00	
Maximum Discharge	654.14	ft³/s
Discharge Full	608.10	ft³/s
Slope Full	0.01659	ft/ft
Flow Type	SubCritical	

MIN. PIPE SLOPE TO BE PROVIDED

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for 75" RCP SECTION

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	6.25	ft
Critical Depth	6.01	ft
Channel Slope	0.01659	ft/ft
Critical Slope	0.01446	ft/ft

Worksheet for 90" RCP SECTION

Project Description

Friction Method	Manning Formula
Solve For	Channel Slope

Input Data

Roughness Coefficient	0.013	
Normal Depth	7.50	ft
Diameter	7.50	ft
Discharge	710.40	ft³/s

MAX FLOW WITHIN 90" RCP SECTION

Results

Channel Slope	0.00856	ft/ft
Flow Area	44.18	ft²
Wetted Perimeter	23.56	ft
Hydraulic Radius	1.88	ft
Top Width	0.00	ft
Critical Depth	6.71	ft
Percent Full	100.0	%
Critical Slope	0.00758	ft/ft
Velocity	16.08	ft/s
Velocity Head	4.02	ft
Specific Energy	11.52	ft
Froude Number	0.00	
Maximum Discharge	764.18	ft³/s
Discharge Full	710.40	ft³/s
Slope Full	0.00856	ft/ft
Flow Type	SubCritical	

MIN. PIPE SLOPE TO BE PROVIDED

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

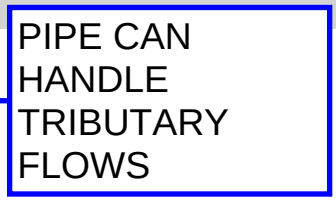
GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for 90" RCP SECTION

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	7.50	ft
Critical Depth	6.71	ft
Channel Slope	0.00856	ft/ft
Critical Slope	0.00758	ft/ft



Worksheet for 60" RCP SECTION

Project Description

Friction Method	Manning Formula
Solve For	Channel Slope

Input Data

Roughness Coefficient	0.013	
Normal Depth	5.00	ft
Diameter	5.00	ft
Discharge	275.00	ft³/s

MAX FLOW WITHIN 90" RCP SECTION

Results

Channel Slope	0.01115	ft/ft
Flow Area	19.63	ft²
Wetted Perimeter	15.71	ft
Hydraulic Radius	1.25	ft
Top Width	0.00	ft
Critical Depth	4.56	ft
Percent Full	100.0	%
Critical Slope	0.00972	ft/ft
Velocity	14.01	ft/s
Velocity Head	3.05	ft
Specific Energy	8.05	ft
Froude Number	0.00	
Maximum Discharge	295.82	ft³/s
Discharge Full	275.00	ft³/s
Slope Full	0.01115	ft/ft
Flow Type	SubCritical	

MIN. PIPE SLOPE TO BE PROVIDED

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

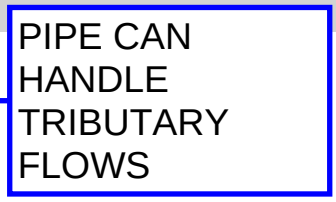
GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for 60" RCP SECTION

GVF Output Data

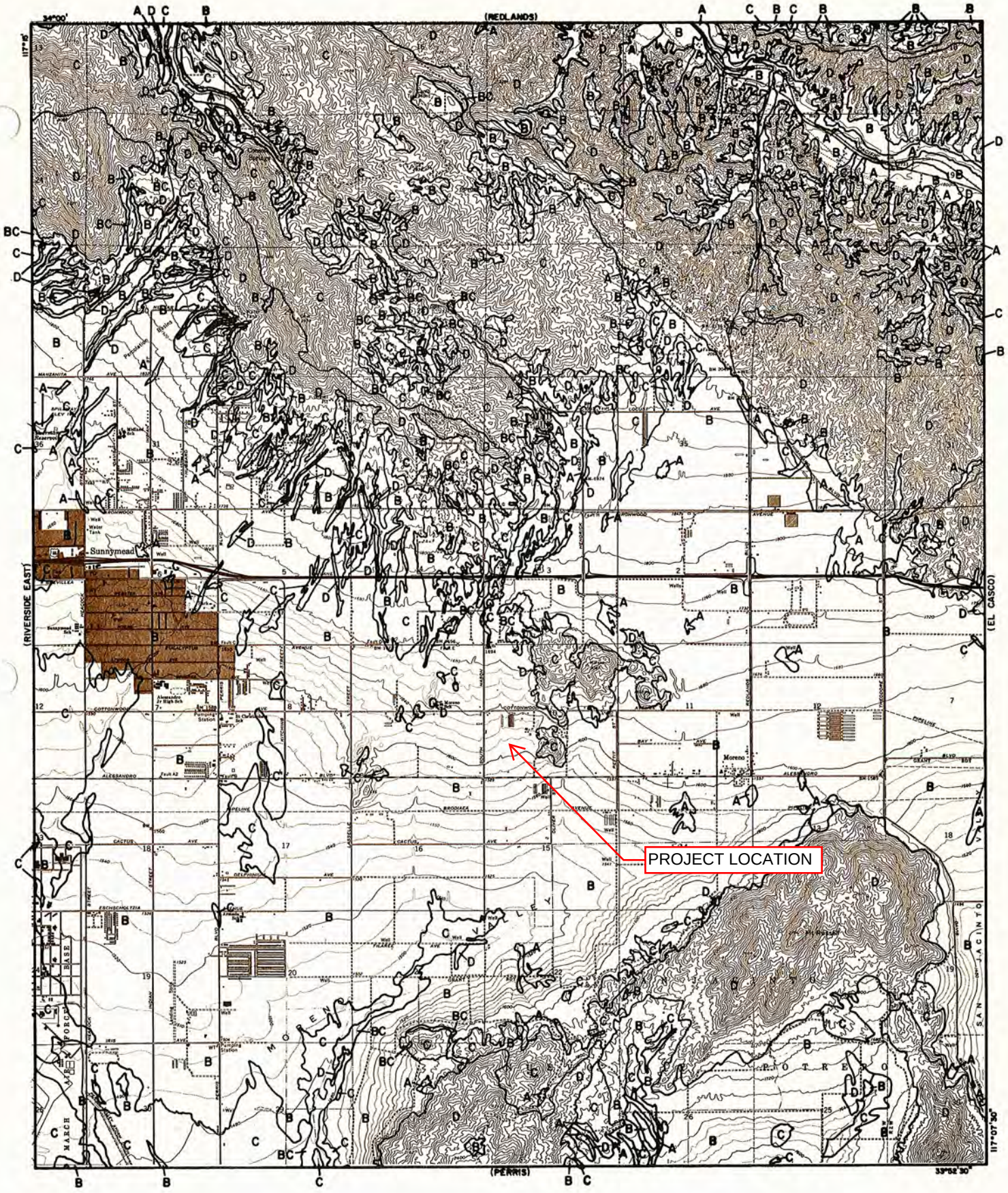
Upstream Velocity	Infinity	ft/s
Normal Depth	5.00	ft
Critical Depth	4.56	ft
Channel Slope	0.01115	ft/ft
Critical Slope	0.00972	ft/ft



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:

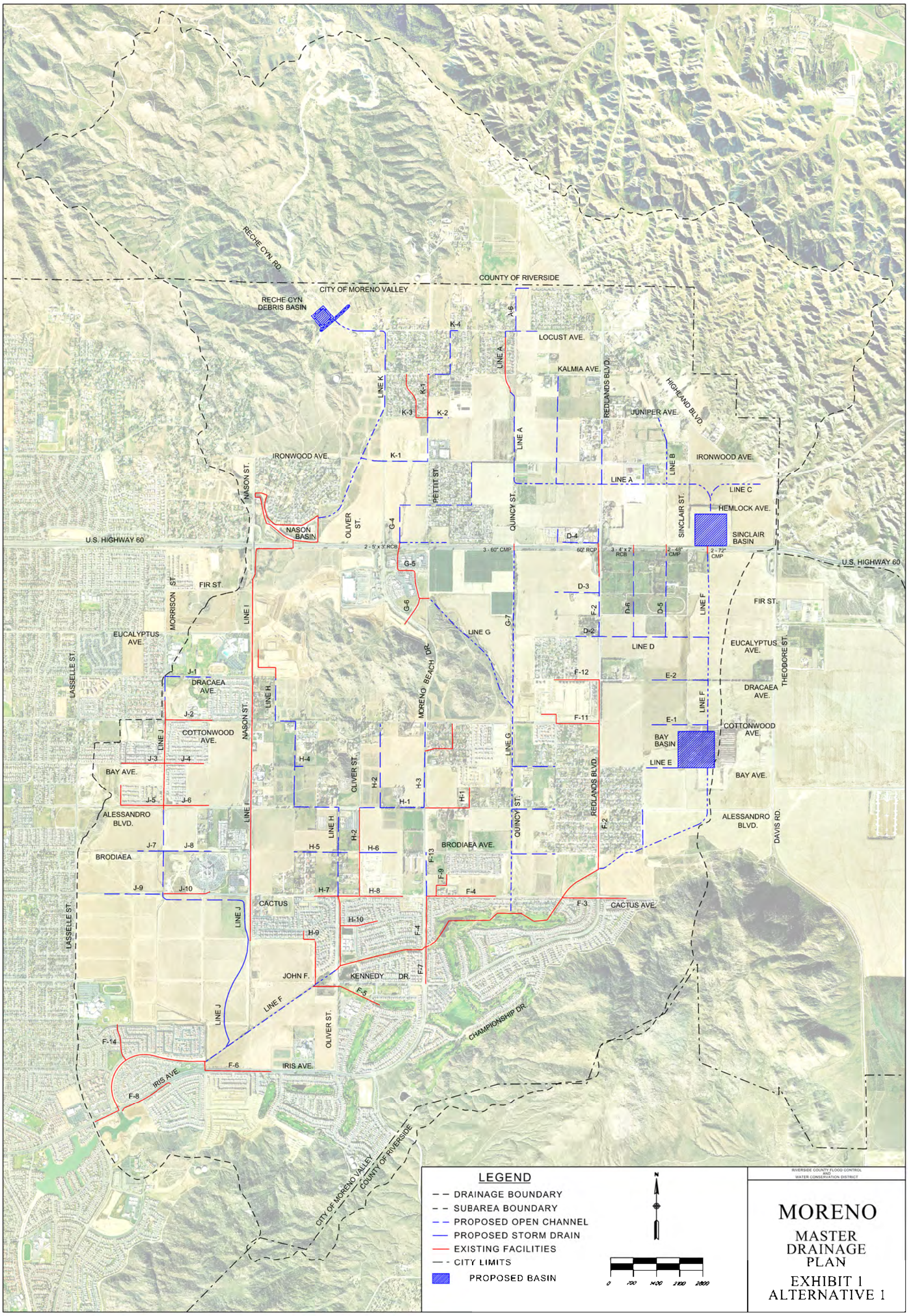
- Detention basins were assumed to require routine maintenance for mowing/weed abatement and erosion control.
- Debris basins were assumed to require routine maintenance for sediment removal from the basins themselves while reducing the amount of sediment deposited in underground facilities.
- Earthen 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.

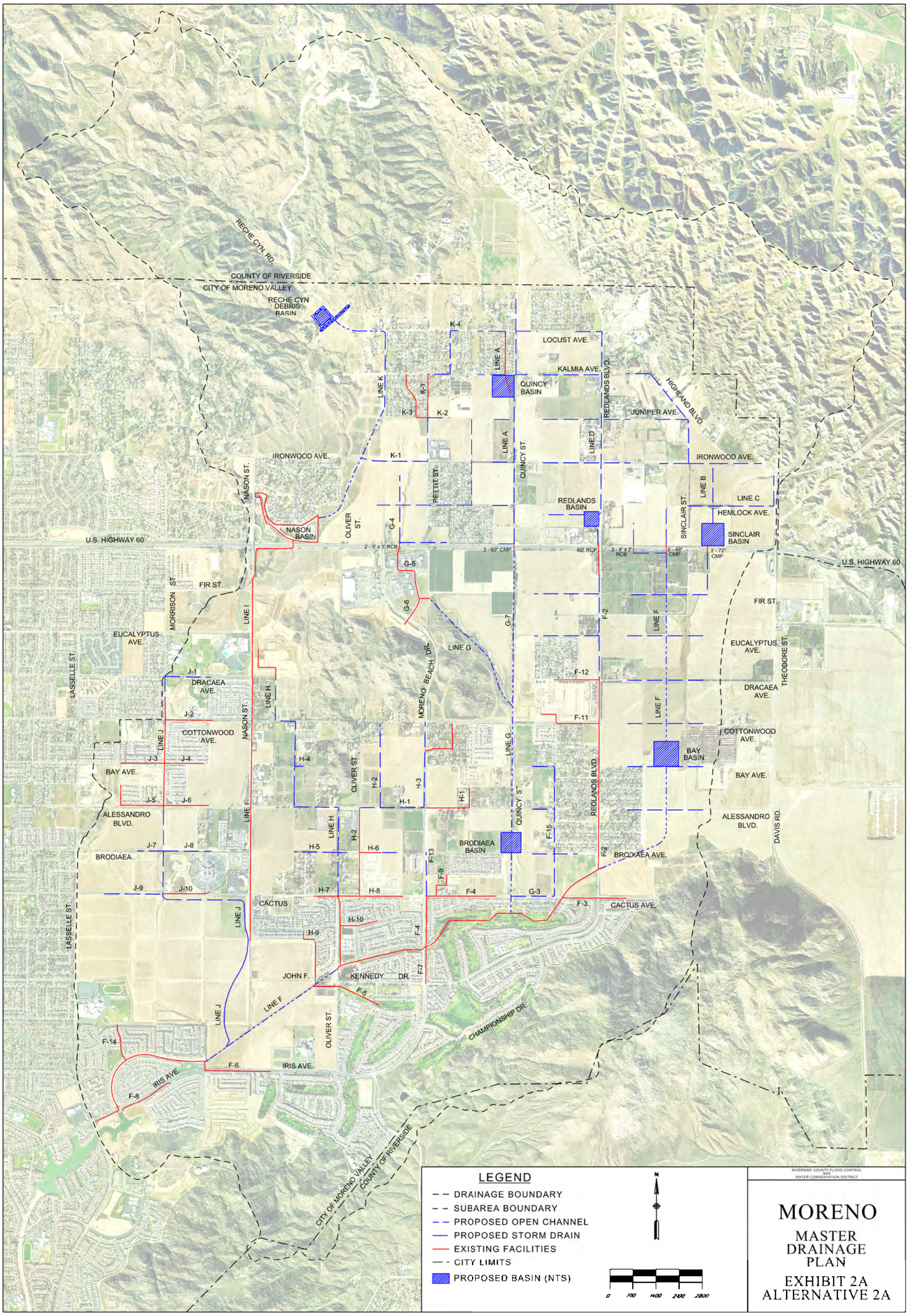
- Alternatives 2a and 2b received scores of 1 for proposing the largest number of basins. Alterative 2a proposes 5 detention basins and 1 debris basin and Alternative 2b proposes 4 detention basins and 1 debris basin.

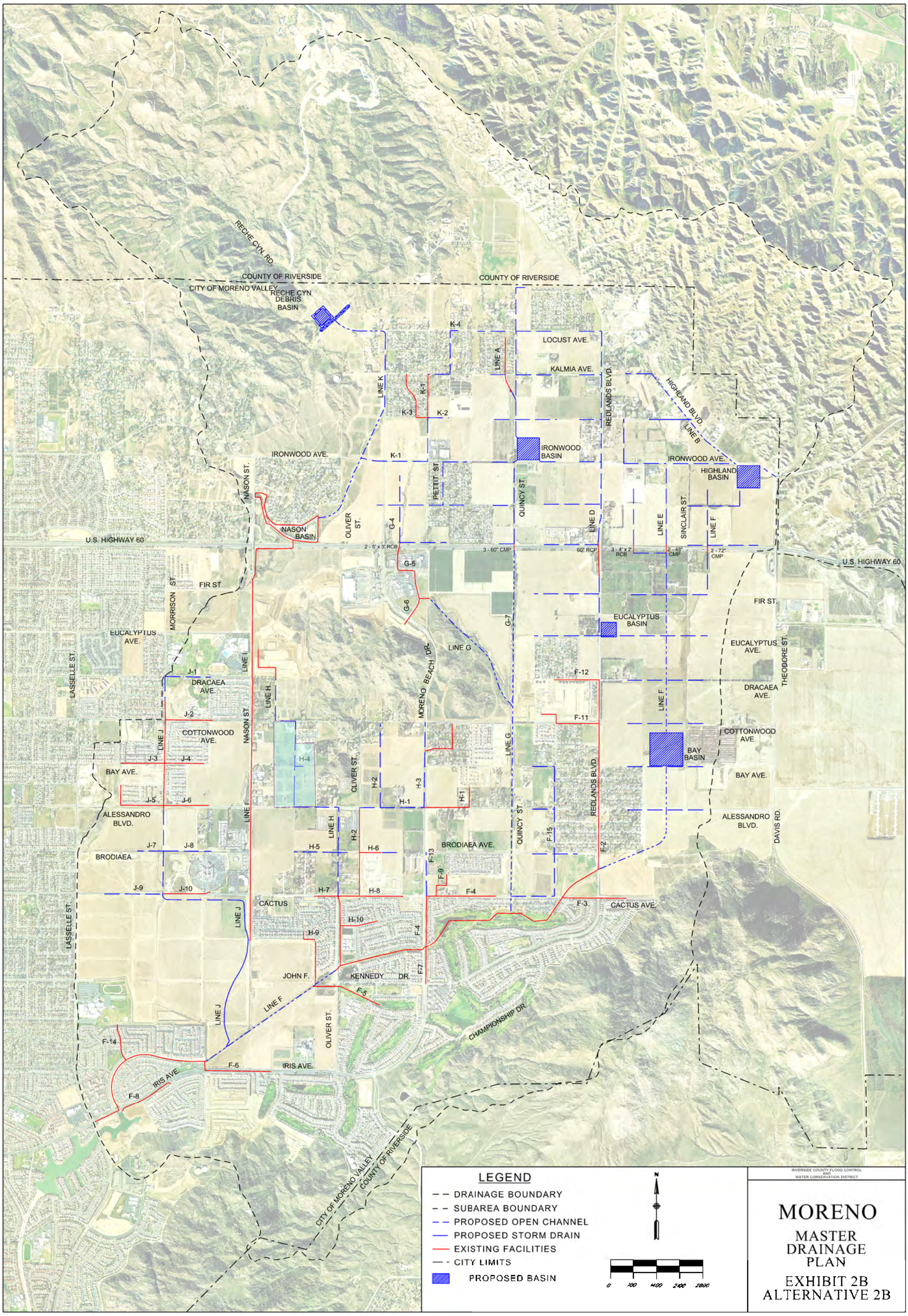
Preferred Alternative

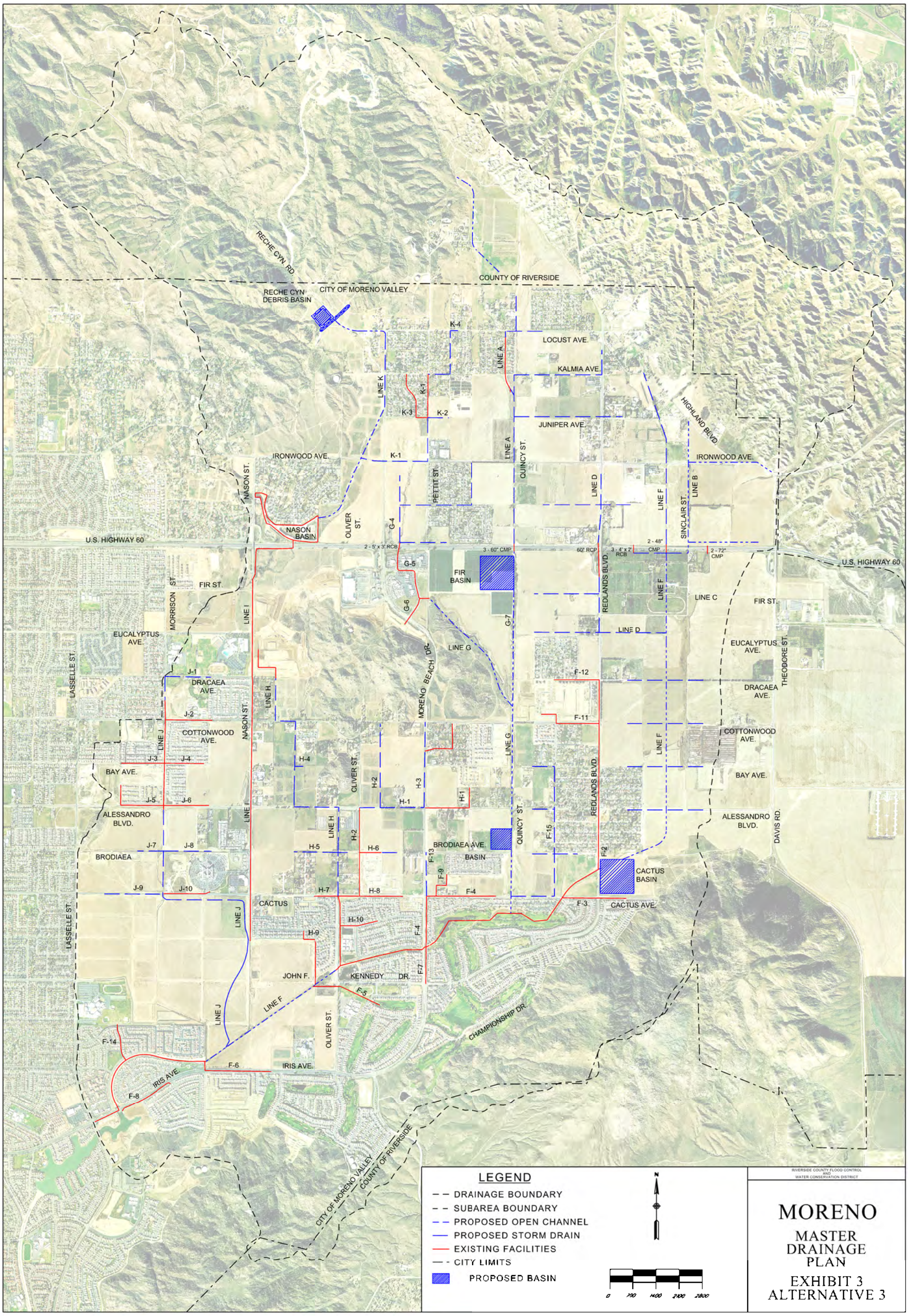
Table 5 shows the completed matrix with the total scores for each alternative. Based upon the evaluation, and as highlighted by the matrix, Alternative 4 best fits the objectives set forth for the project and was selected as the Preferred Alternative. Although the anticipated project footprint for Alternative 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.

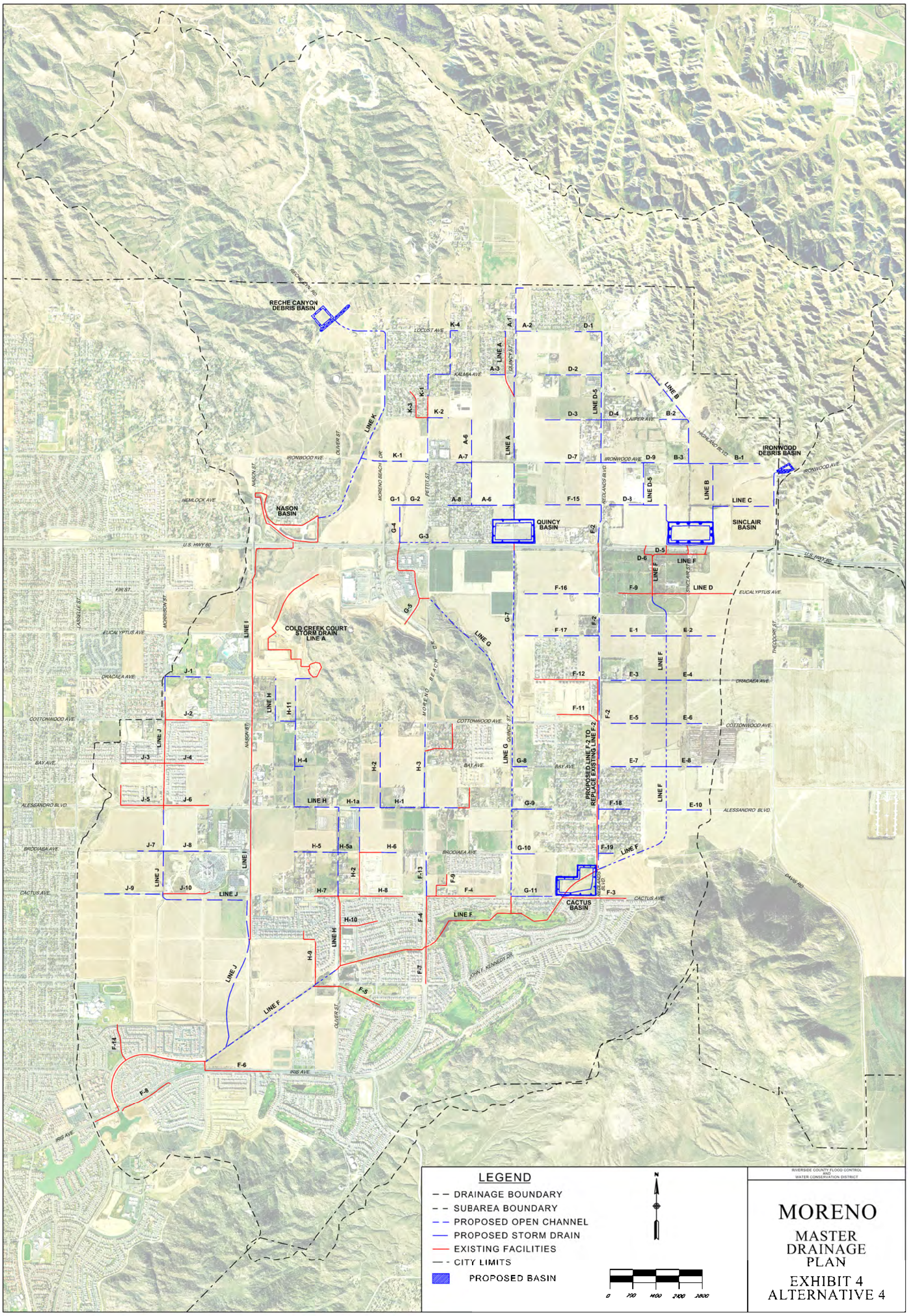
APPENDIX B

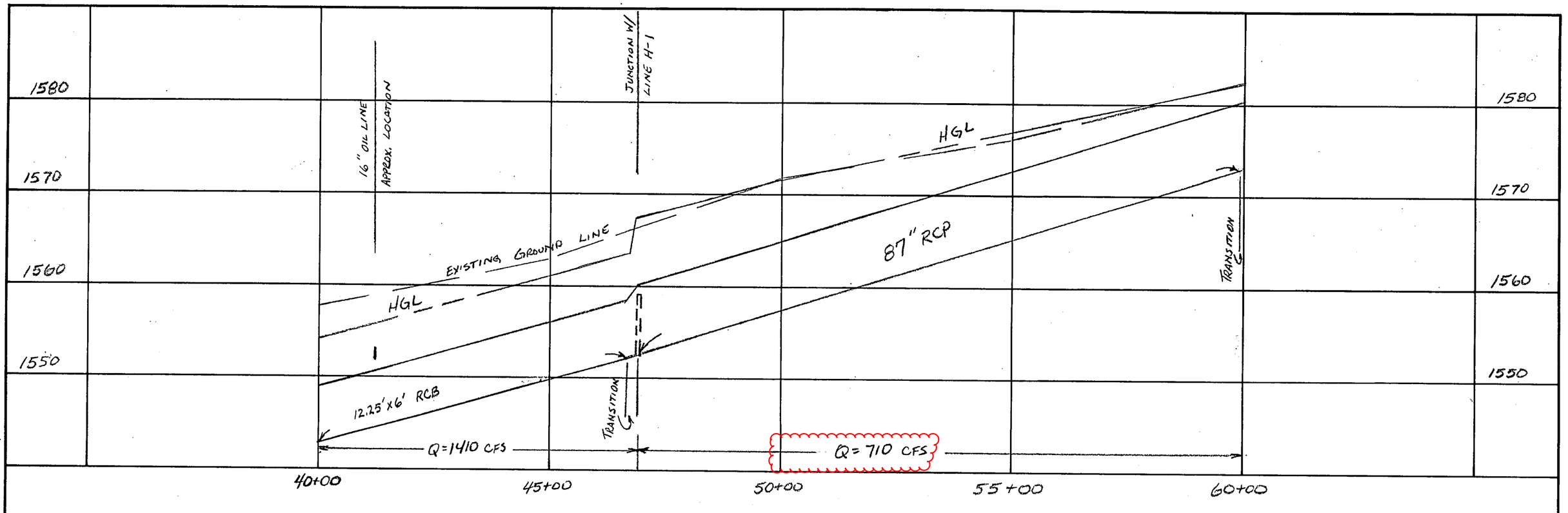

RECHE CYN. RD.
COUNTY OF RIVERSIDE
CITY OF MORENO VALLEY
RECHE CYN DEBRIS BASIN
K-4
A-6
LOCUST AVE.
LINE A
KALMIA AVE.
REDLANDS BLVD.
HIGHLAND BLVD.
LINE K
K-1
K-3
K-2
JUNIPER AVE.
LINE A
IRONWOOD AVE.
K-1
NASON ST.
PETTIT ST.
QUINCY ST.
LINE B
IRONWOOD AVE.
LINE A
LINE C
HEMLOCK AVE.
SINCLAIR ST.
SINCLAIR BASIN
NASON BASIN
OLIVER ST.
G-4
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
U.S. HIGHWAY 60
G-5
D-4
D-3
F-2
D-6
D-5
LINE F
FIR ST.
MORRISON ST.
FIR ST.
G-6
G-7
LINE I
LINE G
D-2
LINE D
EUCALYPTUS AVE.
THEODORE ST.
EUCALYPTUS AVE.
LASSELLE ST.
J-1
DRACAEA AVE.
MORENO BEACH DR.
F-12
E-2
DRACAEA AVE.
LINE H
J-2
NASON ST.
F-11
E-1
LINE F
COTTONWOOD AVE.
LINE J
COTTONWOOD AVE.
J-3
J-4
H-4
OLIVER ST.
H-2
H-3
BAY BASIN
LINE G
LINE E
BAY AVE.
BAY AVE.
J-5
J-6
H-1
H-1
ALESSANDRO BLVD.
LINE I
LINE H
H-2
QUINCY ST.
REDLANDS BLVD.
F-2
ALESSANDRO BLVD.
DAVIS RD.
J-7
J-8
H-5
H-6
BRODIAEA AVE.
BRODIAEA
F-13
F-9
J-9
J-10
H-7
H-8
F-4
F-3
CACTUS AVE.
CACTUS
LINE J
H-10
H-9
F-4
JOHN F.
KENNEDY
DR.
F-7
F-5
LINE J
LINE F
OLIVER ST.
CHAMPIONSHIP DR.
F-14
F-6
IRIS AVE.
IRIS AVE.
F-8
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 1
ALTERNATIVE 1

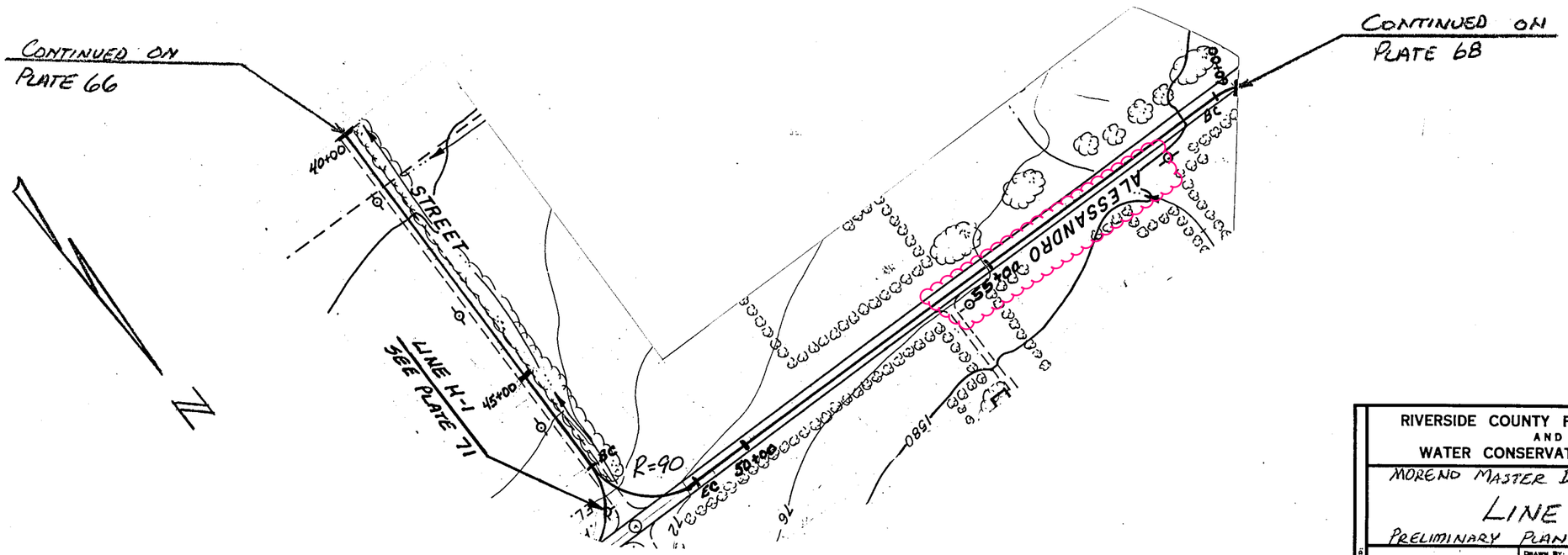

RECHE CYN. RD.
COUNTY OF RIVERSIDE
CITY OF MORENO VALLEY
RECHE CYN DEBRIS BASIN
K-4
LOCUST AVE.
LINE A
KALMIA AVE.
QUINCY BASIN
LINE K
K-1
K-3
K-2
REDLANDS BLVD.
HIGHLAND BLVD.
JUNIPER AVE.
IRONWOOD AVE.
NASON ST.
NASON BASIN
OLIVER ST.
PETTIT ST.
QUINCY ST.
LINE D
REDLANDS BASIN
SINCLAIR ST.
LINE B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


RECHE CYN. RD.
COUNTY OF RIVERSIDE
CITY OF MORENO VALLEY
COUNTY OF RIVERSIDE
RECHE CYN DEBRIS BASIN
K-4
LINE A
LOCUST AVE.
KALMIA AVE.
REDLANDS BLVD.
HIGHLAND BLVD.
LINE B
LINE K
K-1
K-3
K-2
IRONWOOD AVE.
IRONWOOD BASIN
HIGHLAND BASIN
NASON ST.
PETTIT ST.
QUINCY ST.
LINE D
LINE E
SINCLAIR ST.
LINE F
NASON BASIN
OLIVER ST.
G-4
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
G-5
G-6
G-7
FIR ST.
MORRISON ST.
EUCALYPTUS AVE.
EUCALYPTUS BASIN
LASSELLE ST.
LINE I
J-1
DRACAEA AVE.
LINE H
LINE G
MORENO BEACH DR.
F-12
THEODORE ST.
J-2
NASON ST.
LINE J
COTTONWOOD AVE.
J-3
J-4
H-4
OLIVER ST.
H-2
H-3
F-11
BAY BASIN
BAY AVE.
J-5
J-6
H-1
ALESSANDRO BLVD.
DAVIS RD.
J-7
J-8
BRODIAEA
BRODIAEA AVE.
H-5
H-6
F-13
F-9
F-15
F-2
J-9
J-10
H-7
H-8
F-4
CACTUS
CACTUS AVE.
F-3
H-10
H-9
JOHN F.
KENNEDY
DR.
F-7
F-5
CHAMPIONSHIP DR.
F-14
F-6
IRIS AVE.
F-8
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 2B
ALTERNATIVE 2B


RECHE CYN. RD.
RECHE CYN DEBRIS BASIN
CITY OF MORENO VALLEY
COUNTY OF RIVERSIDE
LINE K
K-1
K-2
K-3
K-4
LINE A
LOCUST AVE.
KALMIA AVE.
JUNIPER AVE.
HIGHLAND BLVD.
IRONWOOD AVE.
NASON ST.
NASON BASIN
OLIVER ST.
PETTIT ST.
QUINCY ST.
LINE D
LINE F
SINCLAIR ST.
LINE B
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
G-4
G-5
G-6
G-7
FIR BASIN
REDLANDS BLVD.
LINE C
FIR ST.
MORRISON ST
LINE I
EUCALYPTUS AVE.
LASSELLE ST.
J-1
DRACAEA AVE.
J-2
LINE H
LINE J
COTTONWOOD AVE.
J-3
J-4
BAY AVE.
J-5
J-6
ALESSANDRO BLVD.
J-7
J-8
BRODIAEA
J-9
J-10
LINE G
MORENO BEACH DR.
F-12
F-11
THEODORE ST.
DAVIS RD.
H-4
H-2
H-3
H-1
H-5
H-6
H-7
H-8
H-10
H-9
BRODIAEA AVE. BASIN
F-13
F-9
F-15
F-2
F-4
F-3
CACTUS BASIN
CACTUS AVE.
CACTUS
JOHN F. KENNEDY DR.
F-7
F-5
LINE J
LINE F
OLIVER ST.
CHAMPIONSHIP DR.
F-14
F-6
IRIS AVE.
F-8
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


RECHE CANYON DEBRIS BASIN
RECHE CYN. RD
LOCUST AVE.
K-4
A-1
A-2
D-1
LINE A
QUINCY ST.
A-3
D-2
KALMIA AVE.
K-3
K-1
K-2
D-3
LINE D-5
D-4
JUNIPER AVE.
B-2
LINE B
LINE K
OLIVER ST.
A-6
LINE A
IRONWOOD AVE.
K-1
A-7
D-7
D-9
B-3
B-1
IRONWOOD DEBRIS BASIN
HIGHLAND BLVD.
MORENO BEACH DR.
PETTIT ST.
REDLANDS BLVD.
NASON ST.
HEMLOCK AVE.
G-1
G-2
A-8
A-6
F-15
D-8
LINE D-5
LINE B
LINE C
NASON BASIN
QUINCY BASIN
SINCLAIR BASIN
G-4
G-3
F-2
U.S. HWY 60
D-5
D-6
LINE F
LINE F
SINCLAIR ST.
FIR ST.
F-16
F-9
LINE D
EUCALYPTUS AVE.
LASSELLE ST.
MORRISON ST.
LINE I
G-5
G-7
COLD CREEK COURT STORM DRAIN LINE A
LINE G
F-17
F-2
E-1
E-2
THEODORE ST.
EUCALYPTUS AVE.
J-1
F-12
E-3
E-4
LINE F
DRACAEA AVE.
LINE H
H-11
MORENO BEACH DR.
J-2
F-11
E-5
E-6
COTTONWOOD AVE.
COTTONWOOD AVE.
LINE J
NASON ST.
QUINCY ST.
LINE G
PROPOSED LINE F-2 TO REPLACE EXISTING LINE F-2
J-3
J-4
H-4
H-2
H-3
BAY AVE.
G-8
BAY AVE.
E-7
E-8
J-5
J-6
LINE H
H-1a
H-1
G-9
F-18
E-10
ALESSANDRO BLVD.
ALESSANDRO BLVD.
J-7
J-8
H-5
H-5a
H-6
G-10
F-19
LINE F
BRODIAEA AVE.
BRODIAEA AVE.
LINE I
H-2
F-13
F-9
REDLANDS BLVD.
DAVIS RD.
J-9
J-10
LINE J
H-7
H-8
F-4
G-11
F-3
CACTUS AVE.
CACTUS AVE.
CACTUS BASIN
H-10
F-4
LINE F
LINE H
H-9
JOHN F. KENNEDY DR.
F-7
LINE J
F-5
LINE F
OLIVER ST.
F-14
F-6
IRIS AVE.
F-8
IRIS AVE.
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 4
ALTERNATIVE 4





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

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

1600
1590
1580
1570
1620
1610
1600
1590
EXISTING GROUND LINE
HGL
75" RCP
IDENTICAL POINT
EXISTING GROUND LINE
HGL
75" RCP
TRANSITION
Q=710 CFS
Q=650 CFS
E BAY AVE JUNCTION W/ LINE H-4
Q=590 CFS
60+00
65+00
70+00
75+00
80+00

PROJECT LOCATION

CONTINUED ON PLATE 67

60+00
CL
R=90
65+00
70+00
LINE H-4 see PLATE 78
75+00
80+00

CONTINUED ON PLATE 69

60 CFS - ALLOCATED TO OUR PROJECT

60 CFS - ALLOCATED TO OUR PROJECT

TOTAL STUDY AREA FLOWS ALLOCATED FOR THIS PROJECT = 120 CFS

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

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:

CHECKED BY:

DATE DRAWN:

SHEET NO. PLATE

DR. NO. 68

1650
1640
1630
1620

EXISTING GROUND LINE
HGL
HGL
WATER SURFACE
48" RCP
8.5'x5' RCB
72" RCP
75" RCP
TRANSITION
TRANSITION
APPROX. LOCATION 30" H.P. GAS LINE
Q=590CFS
Q=275 CFS
Q=165 CFS
80+00
85+00
90+00
95+00
100+00

CONTINUED ON PLATE 68

CHICKEN COOPS
CHICKEN COOPS
R=90
R=90
BC
EC
90+00
95+00
100+00
1640
44
48
52
56
80+00
85+00
TRANSITION

CONTINUED ON PLATE 70

315 CFS FLOWS ENTERING LINE

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

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
DATE:
DRAWN BY: WB
CHECKED BY:
DATE DRAWN:
SHEET NO. PLATE
DR. NO. 69
REVISED:

FIRM MAP

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

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.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later.

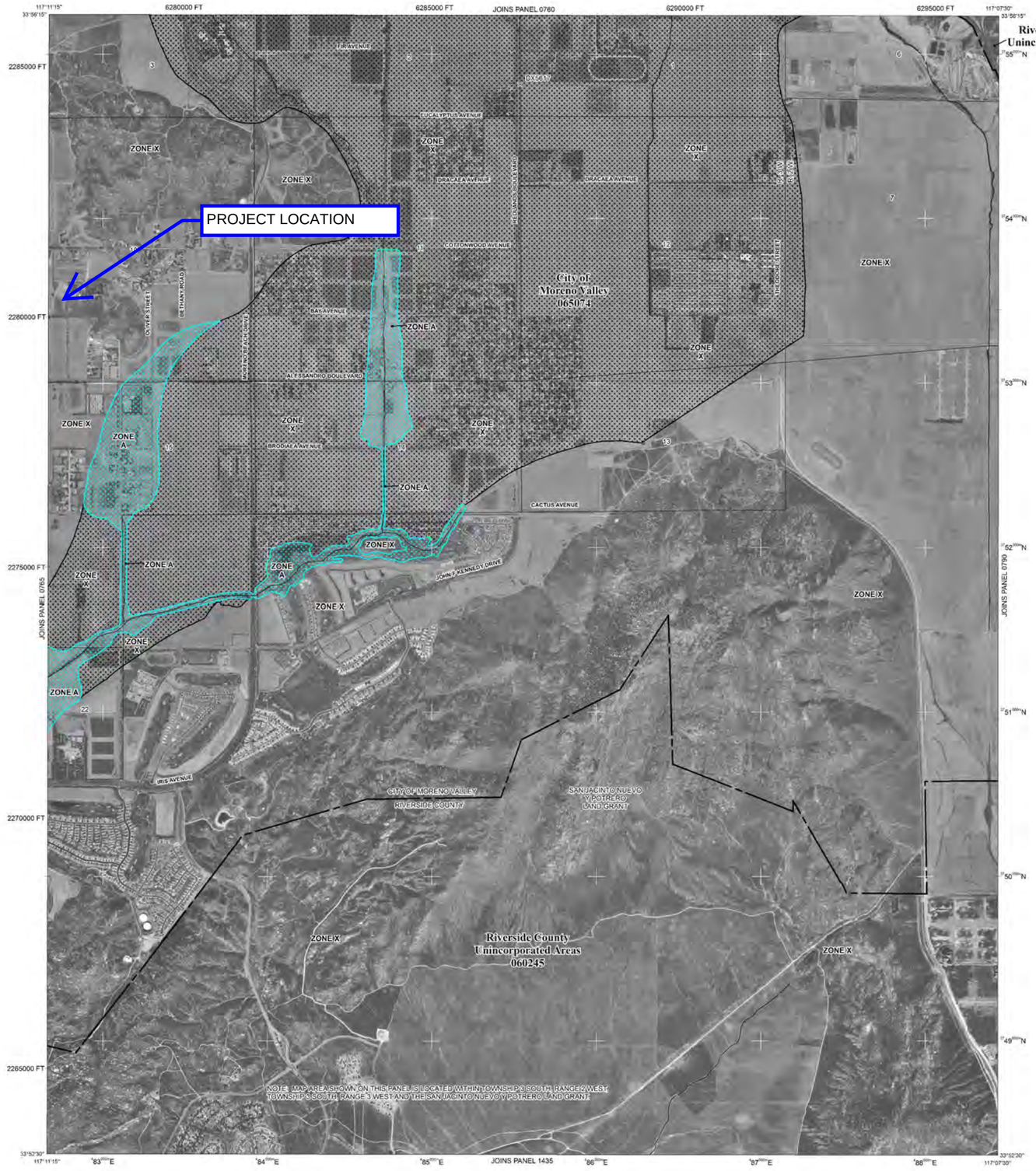
This map may reflect more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

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.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



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 equalled 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
4376000mN	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

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0770G

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

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

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.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later.

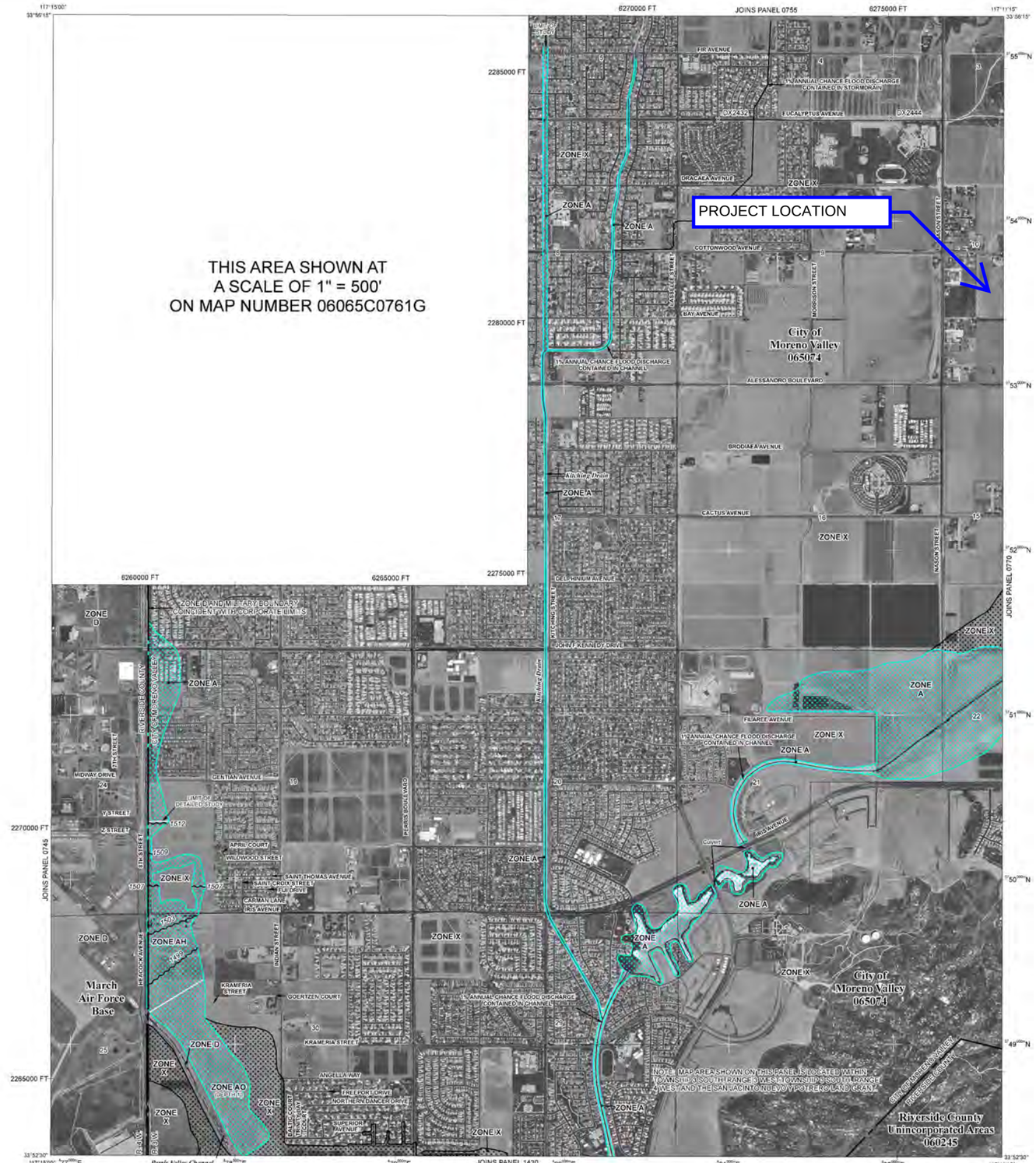
This map may reflect more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

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.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



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
- 3776000mN — 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

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
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

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
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 PG,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

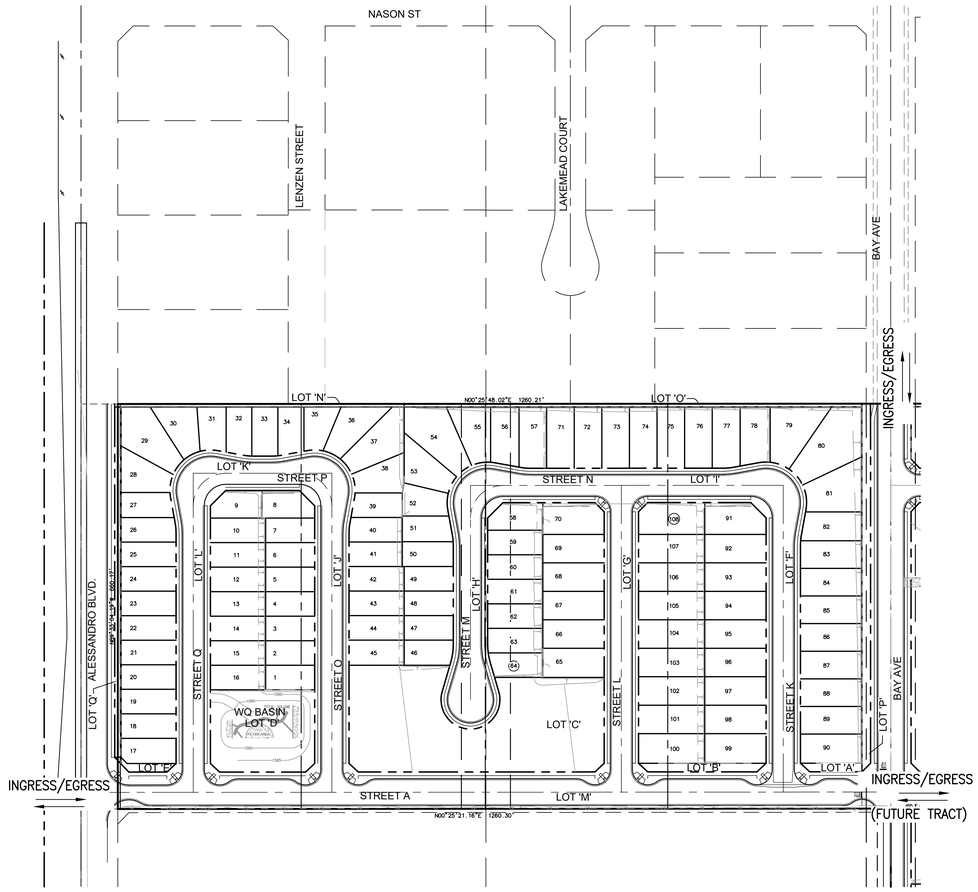
THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA STATE PLANE COORDINATE SYSTEM CS83, ZONE VU BASED LOCALLY ON CONTROL STATIONS "MAT2", "MLFP" & "PPBE" NAD83 (NSRS2011) EPOCH 2010.00, RECORDS OF THE RIVERSIDE COUNTY SURVEYOR. ALL BEARING SHOWN ON THIS MAP ARE GRID. QUOTED BEARINGS AD DISTANCE FROM 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

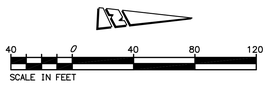
LOTS 3 AND 6, BLOCK 105 OF BEAR VALLEY AND ALESSANDRO DEVELOPMENT COMPANY'S SUBDIVISION, IN THE CITY OF MORENO VALLEY, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 11, PAGE 10 OF MAPS, RECORDS OF SAN BERNARDINO COUNTY

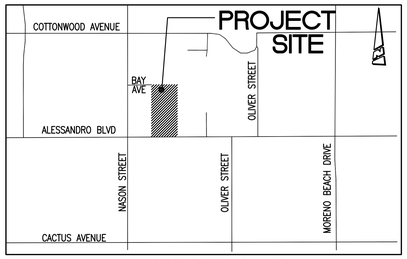
GEOTECHNICAL NOTES

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

LEGEND

DOMESTIC WATER LINE (PROP) — DW
RECLAIMED WATER LINE (PROP) — RW
SANITARY SEWER LINE (PROP) — S
STORM DRAIN LINE (PROP) — SD
DOMESTIC WATER LINE (EXIST) — DW
RECLAIMED WATER LINE (EXIST) — RW
SANITARY SEWER LINE (EXIST) — S
STORM DRAIN LINE (EXIST) — SD
STREET CENTER LINE
LOT LINE (PROP)
FIRE HYDRANT — FH
CATCH BASIN (PROP)
CATCH BASIN (EXIST)
STREET LIGHT
EASEMENT
PARKING SPACE

PAD LINE
CURB & GUTTER (PROP)
TRACT BOUNDARY
EXISTING CONTOUR — 205
PROPOSED STREET GRADE — 2.0%
PROPOSED LOT No./LETTERED — LOT 1 or LOT A
EXISTING LOT LINE
RETAINING WALL (PROP)
COMMUNITY WALL
UNIT NUMBER — 52
PRODUCT TYPE — PT-A
PLAN TYPE — PL-1
PUBLIC UTILITY EASEMENT — P.U.E.
RESTRICTED USE AREA — LINE OF SIGHT

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

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

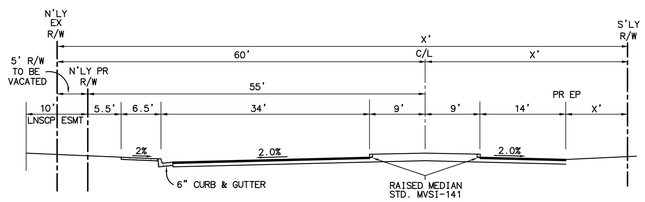
TENTATIVE TRACT MAP
38442
TITLE SHEET
MAY 2022

SHEET 1 OF 3

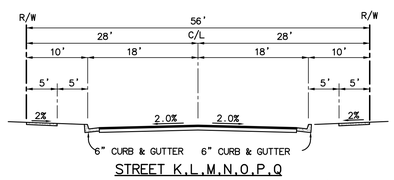
TENTATIVE TRACT MAP NO. 38442

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

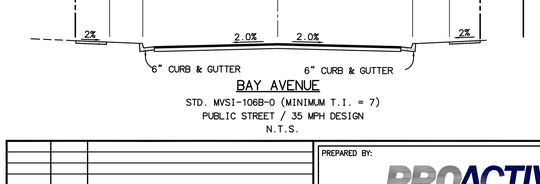
NASON ST
CONNECT TO EXISTING 10" SEWER
BEGIN TRANSITION OF 2 LANES TO 1 LANE
EX 8" DW
CONNECT TO EX 8" DW
EX R/W
PR UNDER SIDEWALK DRAIN
PR R/W
POWER POLE
488-210-019
EXISTING RESIDENTIAL
488-210-031
SOUTHWEST BIBLE COLLEGE
TRACT BOUNDARY
488-210-012
EXISTING RESIDENTIAL
488-210-010
EXISTING RESIDENTIAL
488-210-005
IN MORENO VALLEY CHURCH
LOT 'N'
LOT 'O'
N00°25'48.02"E 1260.21'
CONNECT TO EX 18" SD
CONNECT TO EX 8" DW
14' LANDSCAPE LOT
7' R/W VACATION
5' R/W VACATION
COMMUNITY WALL
1.5' RETAINING WALL
LOT 'K'
STREET P
N00°25'48.02"E 226.00'
STREET N
N00°25'47.76"E 510.00'
LOT 'I'
COMMUNITY WALL & PL
POWER POLE
PR MEDIAN
PR EP, 1' HORIZONTAL FOR EVERY 50' VERTICAL
ALESSANDRO BLVD.
N89°33'04.19"W 660.17'
N89°33'04.19"W 520.16'
LOT 'L'
LOT 'J'
LOT 'H'
LOT 'G'
LOT 'F'
STREET Q
STREET O
STREET M
STREET L
STREET K
BAY AVE
LOT 'P'
LOT 'Q'
EX RW
WQ BASIN
LOT 'D'
TOTAL VOLUME
FOREBAY
SAND FILTER AREA
RAIL ROAD ESMT
LOT 'C'
20' CITY ESMT
47' PR EMWD ESMT
LINE OF SIGHT (TYP)
PR CURB
PR R/W
LOT 'E'
LOT 'B'
LOT 'A'
STREET A
LOT 'M'
N00°25'21.16"E 1320.30'
N00°25'21.16"E 1260.30'
CONNECT TO IMPROVEMENTS PER TR 38236
FUTURE OFFSITE R/W DEDICATION
EX PL
6' FUTURE PKWY DEDICATION
488-210-021
HSUN DA YANG
488-210-007
HSUN DA YANG
PR 8" SS
PR 8" DW
PR RCFCD SD
EX RW
PR EP
FUTURE CURB
FUTURE IMPROVEMENTS PER TRACT 38443
SCALE IN FEET



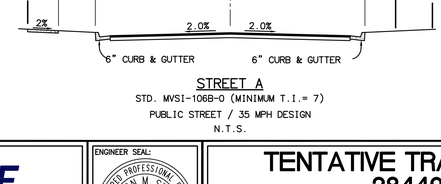
ALESSANDRO BLVD
STD. MVSI-103A-O (MINIMUM T.I. = 10)
PUBLIC STREET
N.T.S.



STREET K,L,M,N,O,P,Q
STD. MVSI-107A-O (MODIFIED) (MINIMUM T.I. = 6)
PUBLIC STREET / 30 MPH DESIGN
N.T.S.



BAY AVENUE
STD. MVSI-106B-O (MINIMUM T.I. = 7)
PUBLIC STREET / 35 MPH DESIGN
N.T.S.



STREET A
STD. MVSI-106B-O (MINIMUM T.I.= 7)
PUBLIC STREET / 35 MPH DESIGN
N.T.S.

PEN22-0131

REVISION	DATE	DESCRIPTION

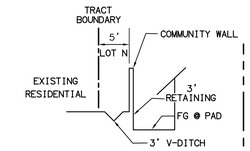
PREPARED BY:
PROACTIVE ENGINEERING CONSULTANTS
200 South Main Street, Suite 300
Corona, CA 92882 (951) 280-3300
DILLON M. STRAND RCE #91273 DATE

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

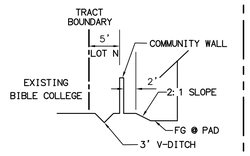
TENTATIVE TRACT MAP
38442
TENTATIVE MAP
MAY 2022

SHEET 2 OF 3

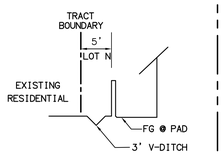
PRELIMINARY GRADING AND UTILITY PLAN



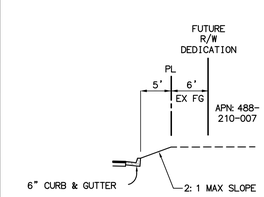
SECTION A-A
N.T.S.



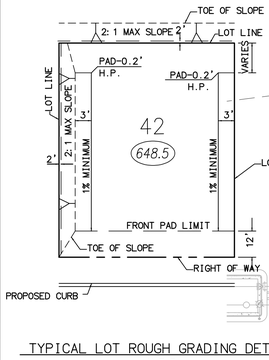
SECTION B-B
N.T.S.



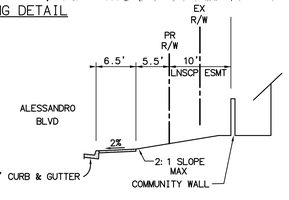
SECTION C-C
N.T.S.



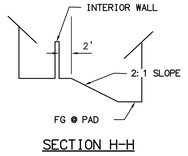
SECTION E-E
N.T.S.



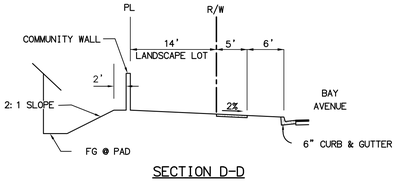
TYPICAL LOT ROUGH GRADING DETAIL
N.T.S.



SECTION G-G
N.T.S.



SECTION H-H
N.T.S.



SECTION D-D
N.T.S.

60 0 60 120 180
SCALE IN FEET

REVISION	DATE	DESCRIPTION

PREPARED BY:
PROACTIVE
ENGINEERING CONSULTANTS
200 South Main Street, Suite 300
Corona, CA 92882 (951) 280-3300

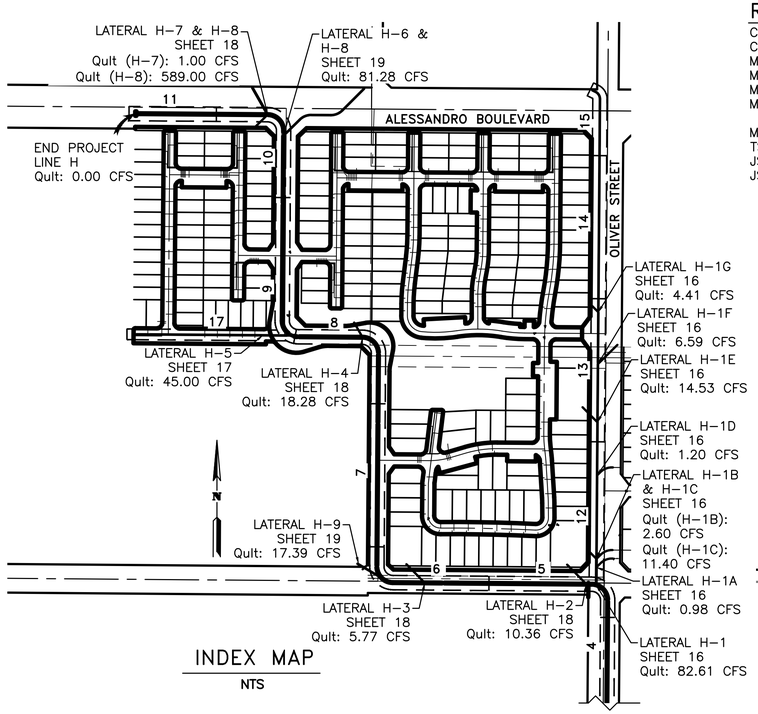
DILLON M. STRAND RCE #91273 DATE

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

TENTATIVE TRACT MAP
38442
PRELIMINARY GRADING AND UTILITY PLAN
MAY 2022

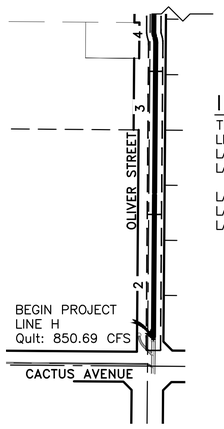
SHEET 3 OF 3

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT



INDEX MAP

NTS



R.C.F.C. & W.C.D. STANDARD DRAWINGS

CB100	CATCH BASIN NO. 1	SHEET NO. 13
CB110	CONCRETE DROP INLET	SHEET NO. 8, 10, 12–16, 18
M803	CONCRETE COLLAR	SHEET NO. 5, 9, 15–18
M816	CONCRETE BULKHEAD	SHEET NO. 11, 12, 16–18
MH251	MANHOLE NO. 1	SHEET NO. 12–14, 16, 18
MH252	MANHOLE NO. 2	SHEET NO. 3–9, 11, 13–15, 17
MH254	MANHOLE NO. 4	SHEET NO. 10, 13, 14
TS303	TRANSITION STRUCTURE NO. 3	SHEET NO. 12
JS227	JUNCTION STRUCTURE NO. 2	SHEET NO. 5, 9, 12, 17
JS229	JUNCTION STRUCTURE NO. 4	SHEET NO. 5, 6, 8, 10, 12–14, 16, 18

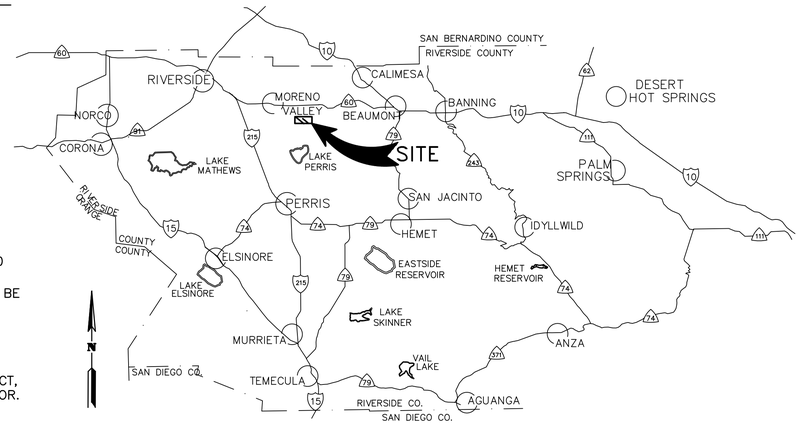
INDEX

GENERAL NOTES

1. THE CONTRACTOR SHALL CONSTRUCT THE FLOOD CONTROL IMPROVEMENTS SHOWN ON THE DRAWINGS IN CONFORMANCE WITH THE REQUIREMENTS OF THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT'S (DISTRICT) M.O.U. STANDARD SPECIFICATIONS DATED MARCH 2020, AND DISTRICT STANDARD DRAWINGS. FOR THE LATEST STANDARD DRAWINGS, PLEASE REFER TO THE "ENGINEERING TOOLS" PAGE FOUND ON "BUSINESS" SECTION OF THE DISTRICT'S WEBSITE.
2. CONTACT THE ENCROACHMENT PERMIT ENGINEER AT 951.955.1266 IF AN ENCROACHMENT PERMIT IS REQUIRED FROM THE DISTRICT. AFTER THE PERMIT IS ISSUED THE DISTRICT MUST BE NOTIFIED ONE WEEK PRIOR TO CONSTRUCTION.
3. CONTACT CONSTRUCTION MANAGEMENT AT 951.955.1288 IF CONSTRUCTION INSPECTION WILL BE PERFORMED BY THE DISTRICT. THE DISTRICT MUST BE NOTIFIED TWENTY DAYS (20) PRIOR TO CONSTRUCTION.
4. ALL STATIONING REFERS TO CENTERLINE OF CONSTRUCTION UNLESS OTHERWISE NOTED.
5. STATIONING FOR LATERALS AND CONNECTOR PIPES REFER TO THE CENTERLINE INTERSECTION STATIONS.
6. FORTY–EIGHT (48) HOURS BEFORE EXCAVATION, CALL UNDERGROUND SERVICE ALERT 1.800.227.2600.
7. ALL ELEVATIONS SHOWN ARE IN FEET AND DECIMALS THEREOF BASED ON THE NORTH AMERICAN VERTICAL DATUM (NAVD 88).
8. ALL COORDINATES ARE SHOWN IN FEET AND DECIMALS THEREOF BASED ON THE NORTH AMERICAN DATUM NAD83 (NSRS2011), CALIFORNIA COORDINATE SYSTEM (CCS), ZONE 6 AND EPOCH 2010.00
9. ALL CROSS SECTIONS ARE TAKEN LOOKING DOWNSTREAM.
10. ELEVATIONS OF UTILITIES ARE APPROXIMATE UNLESS OTHERWISE NOTED.
11. UNLESS OTHERWISE SPECIFIED, MINIMUM STREET RECONSTRUCTION SHALL BE 4" TYPE "A" HOT MIX ASPHALT OVER 6" CLASS 2 AGGREGATE BASE OR AS SPECIFIED BY THE ENGINEER.
12. OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OR SIMILAR STRUCTURES TO BE ABANDONED SHALL BE SEALED WITH 6" OF CLASS "B" CONCRETE.
13. PIPE CONNECTED TO THE MAINLINE PIPE SHALL CONFORM TO JUNCTION STRUCTURE NO. 4 (JS 229) UNLESS OTHERWISE NOTED.
14. PIPE BEDDING SHALL CONFORM TO THE DISTRICTS STANDARD DRAWING NO. M815
15. B–# INDICATES SOIL BORING LOCATIONS BASED ON THE SOILS REPORT DATED JULY 20, 2020. LOCATIONS SHOWN ARE APPROXIMATE.
16. "V" IS THE DEPTH OF CATCH BASINS MEASURED FORM THE TOP OR CURB TO INVERT OF CONNECTOR PIPE.
17. CATCH BASINS SHALL BE LOCATED SO THAT LOCAL DEPRESSION SHALL BEGIN AT EXISTING CURB RETURN JOINT, UNLESS OTHERWISE SPECIFIED.
18. ALL CURBS, GUTTERS, SIDEWALKS, DRIVEWAYS AND OTHER EXISTING IMPROVEMENTS TO BE RECONSTRUCTED IN KIND AND AT THE SAME ELEVATION AND LOCATION AS THE EXISTING IMPROVEMENTS UNLESS OTHERWISE NOTED.
19. STANDARD DRAWINGS CALLED FOR ON THE PLAN AND PROFILE SHALL CONFORM TO DISTRICT STANDARD DRAWINGS UNLESS NOTED OTHERWISE.
20. THE CONTRACTOR IS REQUIRED TO CALL ALL UTILITY AGENCIES REGARDING TEMPORARY SHORING AND SUPPORT REQUIREMENTS FOR THE VARIOUS UTILITY LINES SHOWN ON THESE PLANS.
21. DURING ROUGH GRADING OPERATIONS AND PRIOR TO CONSTRUCTION OF PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE CONTROL SHOULD BE PROVIDED TO PREVENT PONDING WATER AND DAMAGE TO ADJACENT PROPERTIES.
22. APPROVAL OF THESE PLANS BY THE DISTRICT DOES NOT RELIEVE THE DEVELOPER'S ENGINEER OF RESPONSIBILITY FOR THE ENGINEERING DESIGN. IF FIELD CHANGES ARE REQUIRED, IT WILL BE THE RESPONSIBILITY OF THE DESIGN ENGINEER TO MAKE THE NECESSARY CORRECTIONS.
23. THE CONTRACTOR OR DEVELOPER SHALL SECURE ALL REQUIRED ENCROACHMENT AND/OR STATE AND FEDERAL REGULATORY PERMITS PRIOR TO THE COMMENCEMENT OF ANY WORK.
24. THE CONCRETE COATING ON THE INSIDE OF ALL REINFORCED CONCRETE PIPES MUST BE INCREASED TO PROVIDE A MINIMUM OF 1–1/2 INCHES OVER THE REINFORCING AND INCREASED TO A MINIMUM OF 3–1/2 INCHES OVER REINFORCING FOR BOX CULVERT, WHEN DESIGN VELOCITIES EXCEED 20 FEET PER SECOND. THE CONCRETE DESIGN STRENGTH IN THESE REACHES SHALL BE F'C=5,000 PSI FOR VELOCITIES EXCEEDING 20 FEET PER SECOND AND F'C=6,000 PSI FOR VELOCITIES EXCEEDING 30 FEET PER SECOND.
25. CONSTRUCTION JOINTS FOR CALTRANS STANDARDS REINFORCED CONCRETE BOX SHALL BE PLACED ACCORDING TO THE DISTRICT STANDARD DRAWING NO. BOX 401.
26. ROCK FOR ACCESS ROADS, TURN AROUNDS AND OTHER AREAS WITHIN DISTRICT RIGHT OF WAY AS SHOWN ON THE PROJECT DRAWINGS AND AS DIRECTED BY THE ENGINEER SHALL MEET THE REQUIREMENT FOR 1" x NO. 4 COARSE AGGREGATE AS PER SECTION 90*–1.02C(4)(b) OF THE CALTRANS SPECIFICATIONS. X VALUES FOR ROCK GRADATION SHALL BE 75 AND 15 FOR $\frac{3}{4}$" AND $\frac{3}{8}$" RESPECTIVELY. ROCK SHALL ADDITIONALLY MEET THE SPREADING AND COMPACTION REQUIRMENTS OF SECTION 26–1.03D AND 26–1.03E OF THE CALTRANS SPECIFICATIONS FURTHERMORE, ROCK DEPTH SHALL NOT EXEED 3" AND SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER. ROCK SHALL NOT CONTAIN RECYCLED CONCRETE PRODUCTS.

ADDITIONAL NOTES FOR CIPP PIPE CONSTRUCTION

1. CONCRETE MIX DESIGNS SHALL BE SUBMITTED BY CONTRACTOR FOR APPROVAL PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL ALLOW INSPECTOR INTO PIPE WHILE UNDER CONSTRUCTION AND ROD FOR WALL THICKNESS AT A MINIMUM OF 25 C.Y. OF THE POUR.
3. A MINIMUM 6 SACK PER CUBIC YARD DESIGN MIX SHALL BE USED, THE COMPRESSIVE STRENGTH OF THE CONCRETE (FC) AT 28 DAYS SHALL BE AT LEAST 4,000 PSI, AND THE MODULUS OF RUPTURE SHALL BE AT LEAST 550 PSI. FOR VELOCITIES GREATER THAN 10 FT./SEC. BUT NOT GREATER THAN 20 FT./SEC., THE COMPRESSIVE STRENGTH SHALL BE 5,000 PSI. COMPRESSIVE STRENGTHS SHALL BE NOTED ON THE DRAWINGS.
4. PIPE THICKNESS FOR FLOWS HAVING VELOCITIES EQUAL TO OR LESS THAN 10 FT./SEC. SHALL COMPLY WITH THE REQUIREMENTS AS SET FORTH IN THE CAST–IN–PLACE PIPE DESIGN STANDARDS. FOR VELOCITIES GREATER THAN 10 FT./SEC. BUT NOT MORE THAN 20 FT./SEC., A 140 DEGREE SEGMENT OF INVERT SHALL BE THICKENED 2 INCHES IN WALL THICKNESS AS "SACRIFICIAL CONCRETE." INCREASES IN STANDARD WALL THICKNESS SHALL BE NOTED ON THE DRAWINGS.
5. DESIGN FLOW VELOCITIES GREATER THAN 20 FT./SEC. WILL NOT BE ALLOWED UNLESS AN EXCEPTION IS GRANTED BY THE ENGINEER.
6. CAST–IN–PLACE CONCRETE PIPE, WHICH IS TO BE MAINTAINED BY THE COUNTY OR DISTRICT, SHALL NOT BE PLACED EXCEPT IN THE PRESENCE OF THE APPROPRIATE AGENCY INSPECTOR.
7. WHEN CAST–IN–PLACE PIPE IS SPECIFIED AS AN ALTERNATIVE TO REINFORCED CONCRETE PIPE, TRANSITION STRUCTURE NO. 3 SHALL REPLACE JUNCTION STRUCTURE NO. 2. NO CHANGES NEED TO BE MADE FOR JUNCTION STRUCTURE NO. 4.
8. AT THE END OF ALL POURS AND AT THE END OF EACH WORKING DAY, THE CONTRACTOR SHALL INSTALL #4 DOWELS 24" LONG 12" INTO THE LAST POUR AT 12" AROUND THE CIRCUMFERENCE OF CAST–IN–PLACE PIPE.



VICINITY MAP

NTS

T3SR3W SEC15 NE

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER
MICHAEL R. BRENDECKE
NO. 83363
CIVIL
STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering·Surveying·Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241·Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52

BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993"
ELEV. 1603.71 (NAVD88)

REF	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CC
DRAWN BY: CC
CHECKED BY: MB
P8 NO.: _____

RECOMMENDED FOR APPROVAL: _____ CHIEF, DEVELOPER SERVICES DATE:_____

APPROVED BY: _____ GENERAL MANAGER–CHIEF ENGINEER DATE:_____

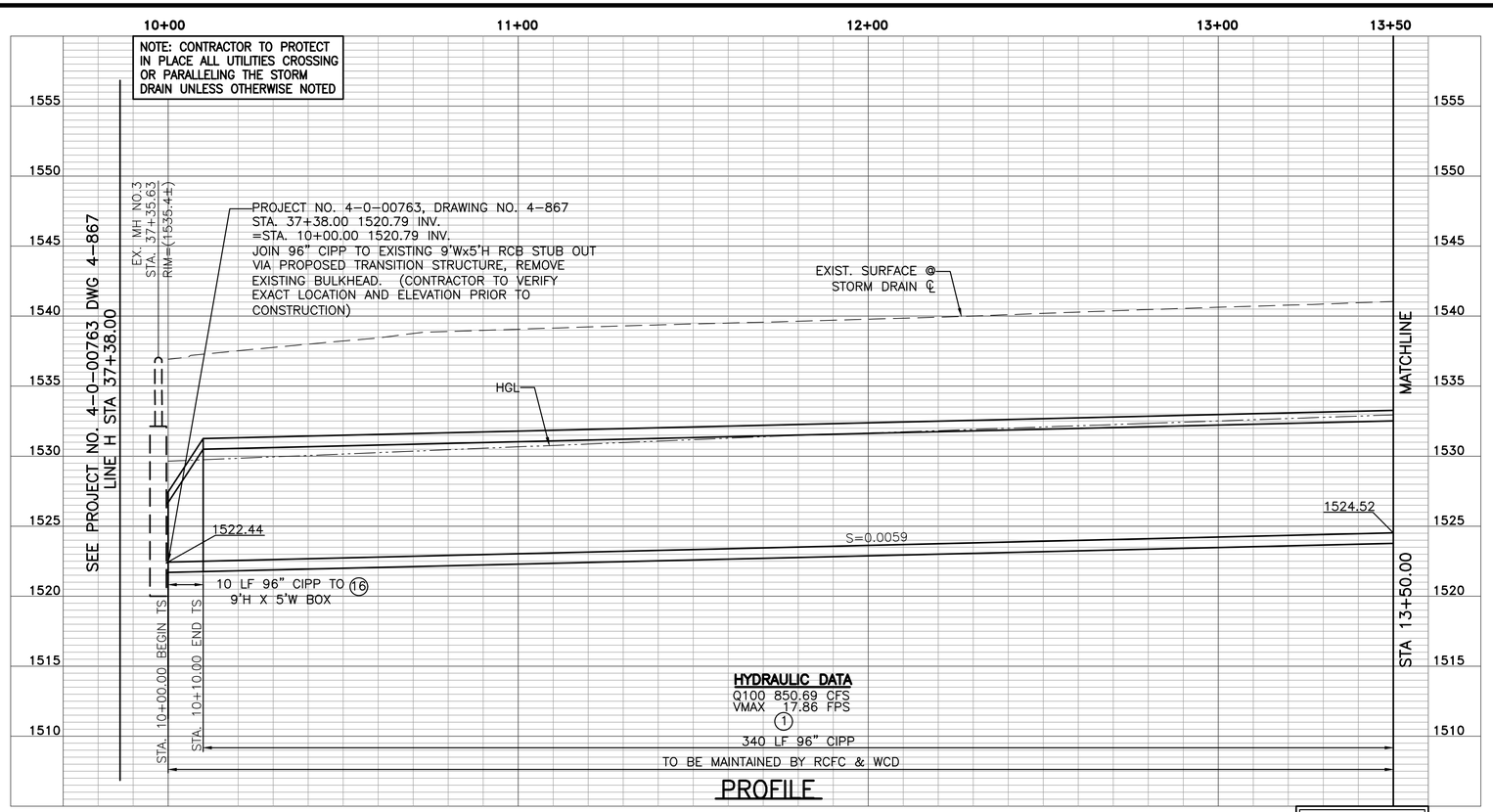
TRACT 38236 PEN21–0184

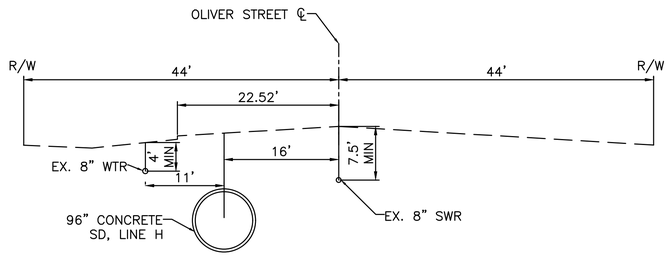
MORENO VALLEY
MDP LINE H
TITLE SHEET

CITY ID: LC022–0019
PROJECT NO. X–X–XXXXX
DRAWING NO. X–XXXX
SHEET NO. 1 OF 19

PLOT DATE: 11/1/2022 1:48 PM

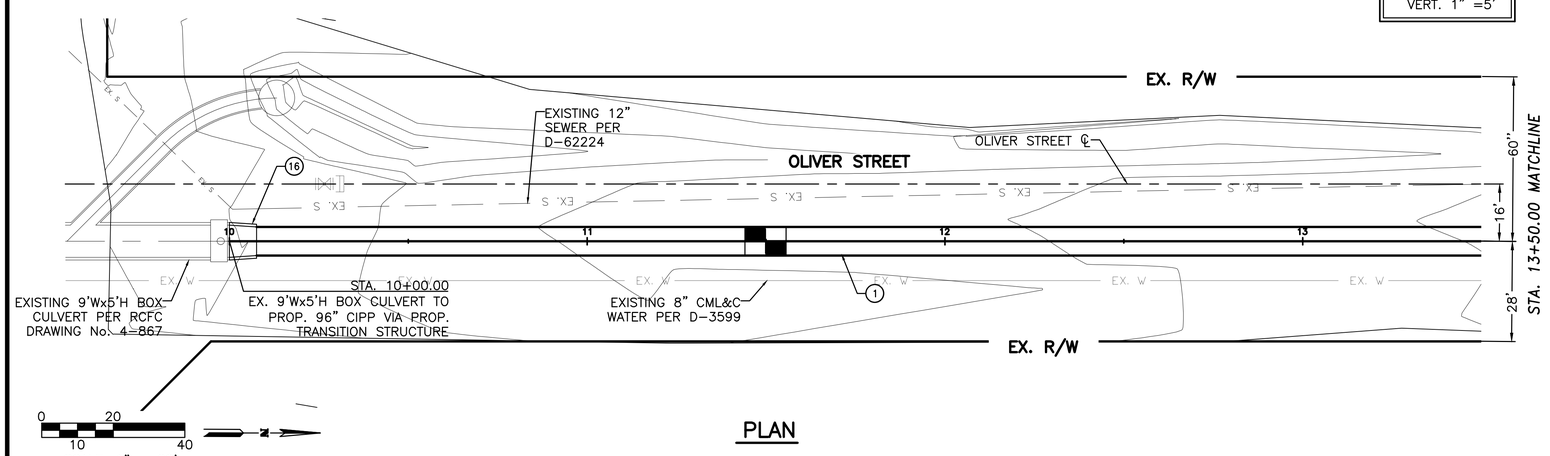
U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_01.DWG





SECTION AT STA. 11+50.00
TYPICAL FROM STA. 10+00.00 TO 13+50.00

SCALE: 1" = 10'



SCALE: 1" = 20'

PLAN

CONSTRUCTION NOTES

(1) INSTALL 96" CIPP PER PLAN

(16) CONSTRUCT TRANSITION STRUCTURE NO. 1 PER RCFC & WCD STANDARD DWG. NO. TS301

*FOR CIPP–WHERE PIPE VELOCITIES ARE GREATER THAN 10 FPS BUT NOT MORE THAN 20 FPS, A 140 DEGREE SEGMENT OF INVERT SHALL BE THICKENED 2 INCHES IN WALL THICKNESS AS A "SACRIFICIAL CONCRETE"

NOTE: ANY FUTURE PARALLEL TRENCHING ADJACENT TO CIPP SHALL REQUIRE A CITY ENCROACHMENT PERMIT. IF LATERAL SUPPORT ADJACENT TO CIPP IS COMPROMISED, THE FILL OVER THE CIPP WILL NEED TO BE REMOVED PRIOR TO TRENCHING.

TRACT 38236 PEN21-0184

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER MICHAEL R. BRENDECKE NO. 83363 CIVIL STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering·Surveying·Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 · Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993"
ELEV. 1603.71 (NAVD88)

REF	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

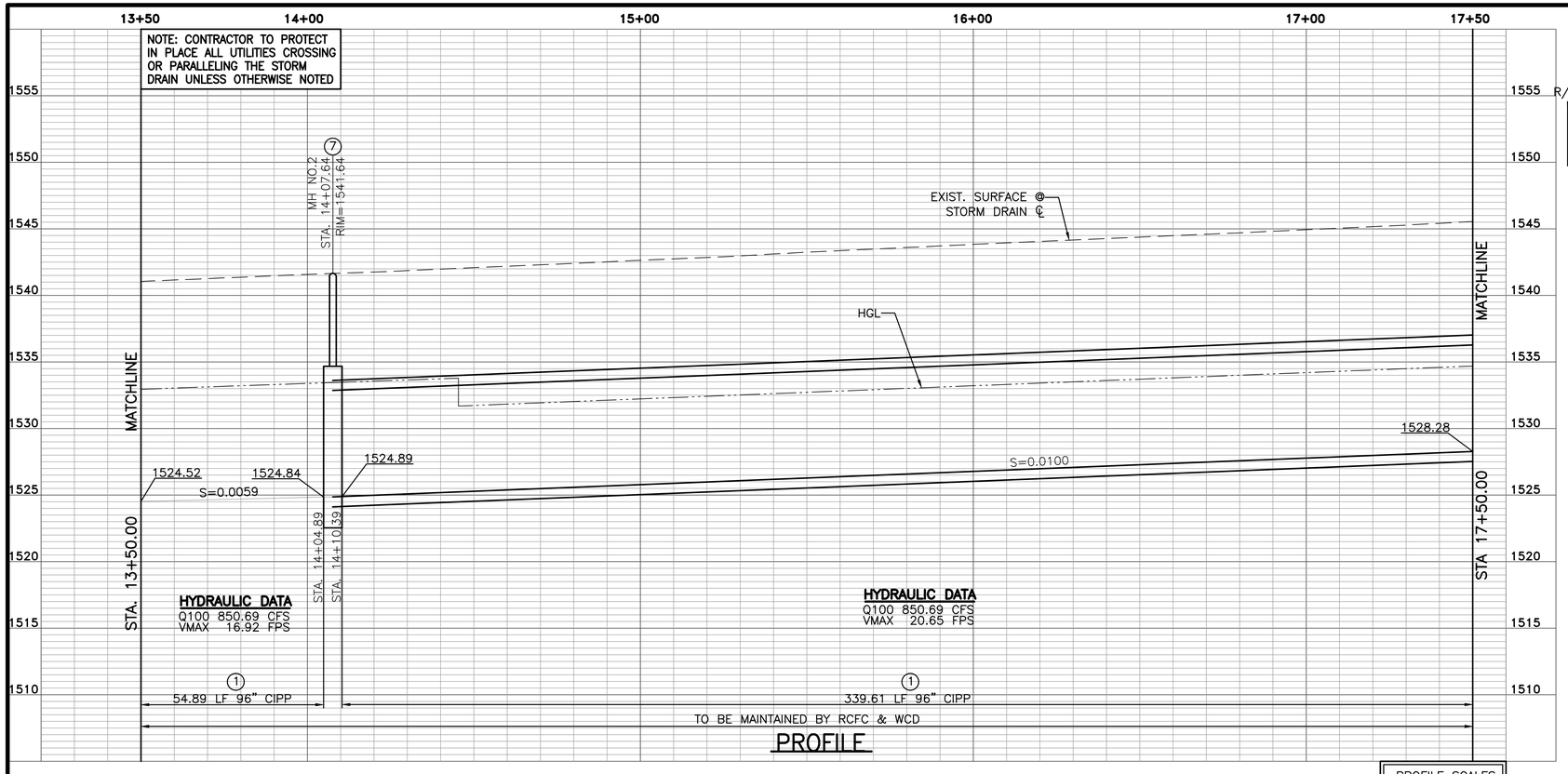
DESIGNED BY: CC	RECOMMENDED FOR APPROVAL:	APPROVED BY:	
DRAWN BY: CC	CHIEF, DEVELOPER SERVICES	GENERAL MANAGER–CHIEF ENGINEER	
CHECKED BY: MB	DATE:_____	DATE:_____	
P8 NO.: _____			

MORENO VALLEY
MDP LINE H
STA. 10+00.00–13+50.00

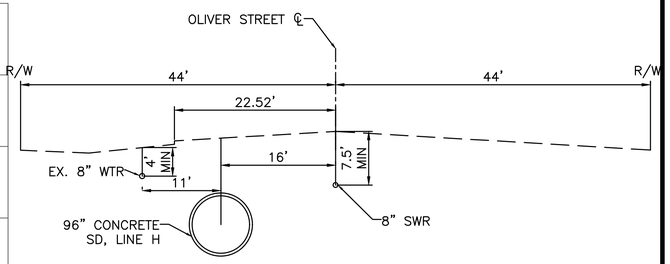
CITY ID: LC022-0019
PROJECT NO. X-X-XXXXX
DRAWING NO. X-XXXX
SHEET NO. 2 OF 19

PLOT DATE: 11/1/2022 1:50 PM

U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_02.DWG

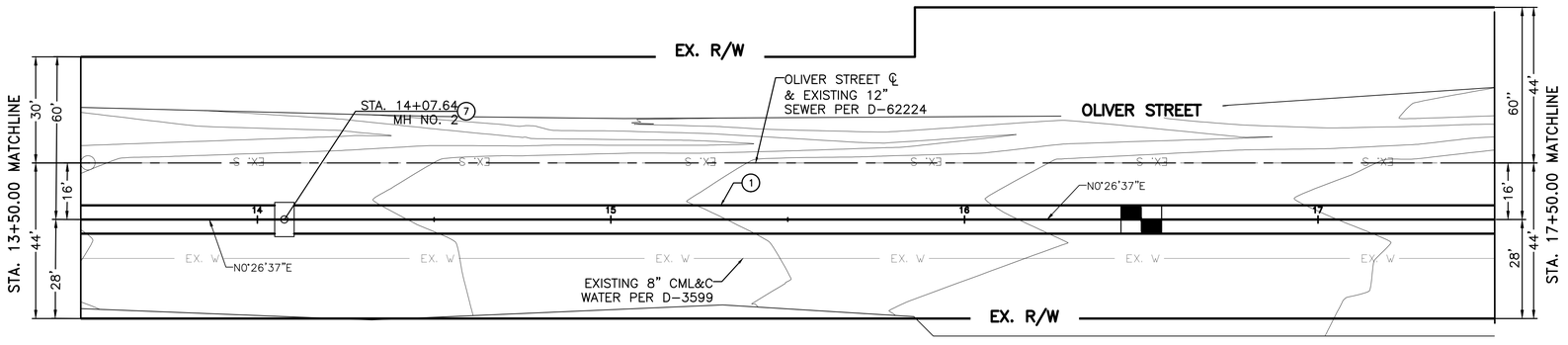


PROFILE SCALES
HORIZ. 1"= 20'
VERT. 1" =5'



SECTION AT STA. 16+50.00
TYPICAL FROM STA. 13+50.00 TO 17+50.00

10
0 5 20
SCALE: 1" = 10'



0 20
10 40
SCALE: 1" = 20'

PLAN

CONSTRUCTION NOTES

1. INSTALL 96" CIPP PER PLAN
7. CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STANDARD DWG. NO. MH252

*FOR CIPP–WHERE PIPE VELOCITIES ARE GREATER THAN 10 FPS BUT NOT MORE THAN 20 FPS, A 140 DEGREE SEGMENT OF INVERT SHALL BE THICKENED 2 INCHES IN WALL THICKNESS AS A "SACRIFICIAL CONCRETE"

NOTE: ANY FUTURE PARALLEL TRENCHING ADJACENT TO CIPP SHALL REQUIRE A CITY ENCROACHMENT PERMIT. IF LATERAL SUPPORT ADJACENT TO CIPP IS COMPROMISED, THE FILL OVER THE CIPP WILL NEED TO BE REMOVED PRIOR TO TRENCHING.

TRACT 38236 PEN21–0184

CITY ID: LC022–0019

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER
MICHAEL R. BRENDECKE
NO. 83363
CIVIL
STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering·Surveying·Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241·Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993"
ELEV. 1603.71 (NAVD88)

REF	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

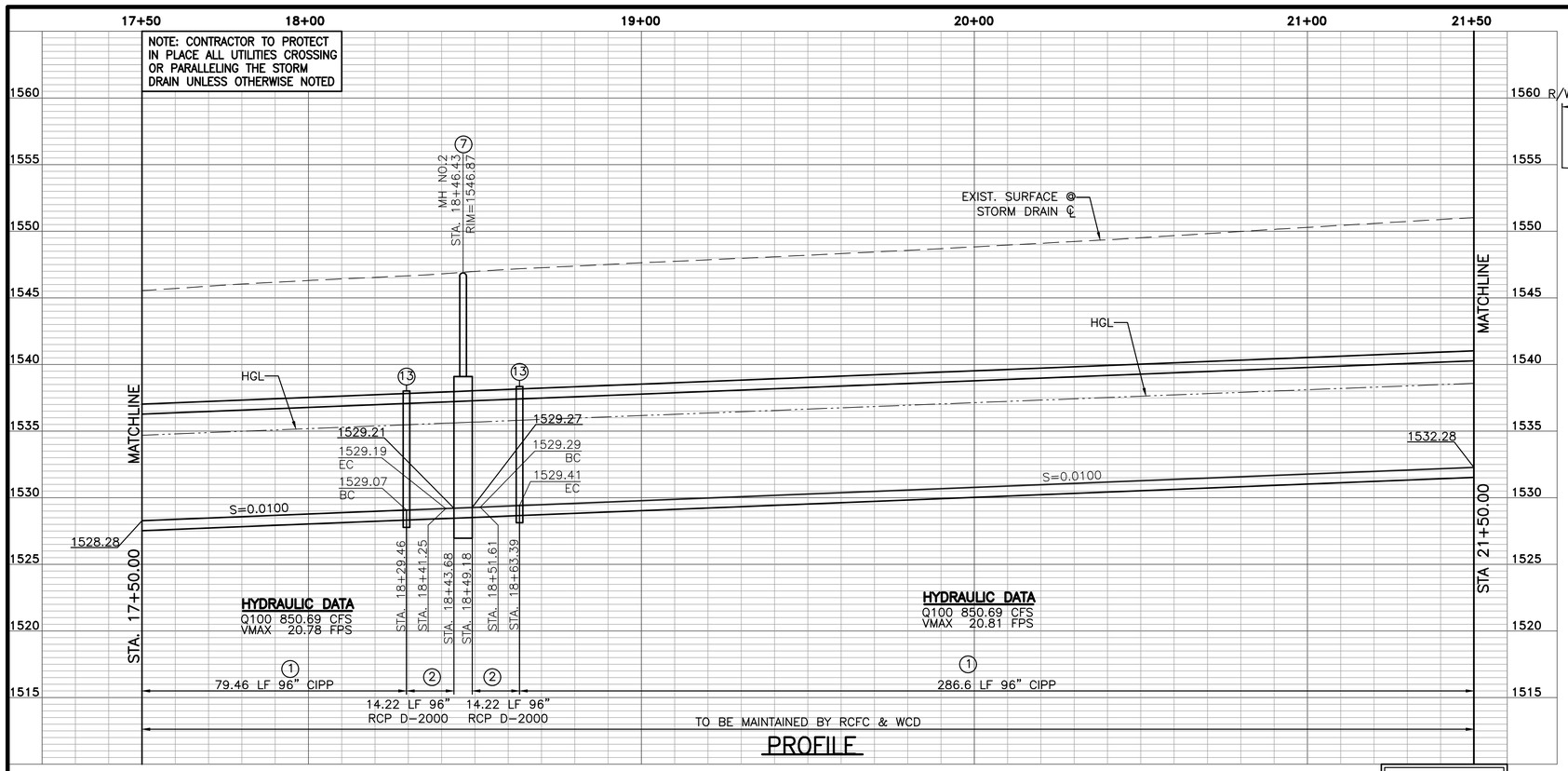
DESIGNED BY: CC	RECOMMENDED FOR APPROVAL BY:	APPROVED BY:
DRAWN BY: CC	CHIEF, DEVELOPER SERVICES	GENERAL MANAGER–CHIEF ENGINEER
CHECKED BY: MB	DATE:	DATE:
P8 NO.:		

MORENO VALLEY
MDP LINE H
STA. 13+50.00–17+50.00

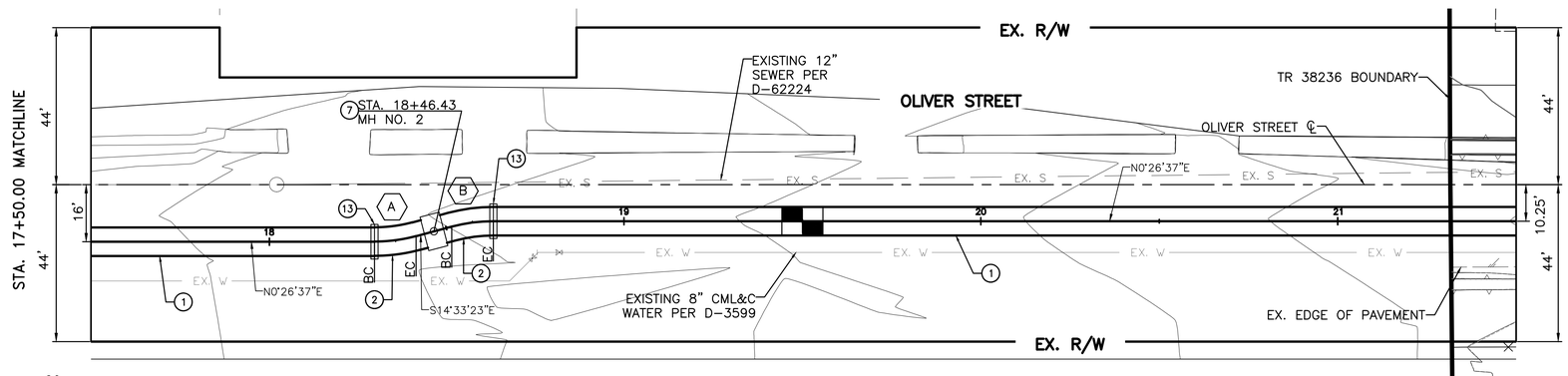
PROJECT NO. X–X–XXXXX
DRAWING NO. X–XXXX
SHEET NO. 3 OF 19

PLOT DATE: 11/1/2022 1:51 PM

U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_03.DWG

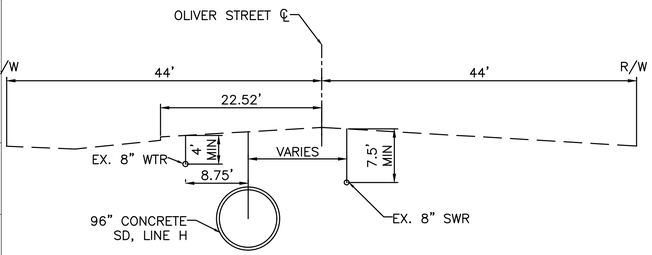


PROFILE SCALES
HORIZ. 1"= 20'
VERT. 1" =5'



0 20
10 40
SCALE: 1" = 20'

PLAN



SECTION AT STA. 19+50.00
TYPICAL FROM STA. 18+63.39 TO 21+50.00

0 5 10 20
SCALE: 1" = 10'

A ℄ CURVE DATA
△=15°00'00"
R=45.00'
T=5.92'
L=11.78'
BC=18+29.46
EC=18+41.25
PI= N:2276967.309
E:6278663.255

B ℄ CURVE DATA
△=15°00'00"
R=45.00'
T=5.92'
L=11.78'
BC=18+51.61
EC=18+63.39
PI= N:2276988.812
E:6278657.671

CONSTRUCTION NOTES

1. INSTALL 96" CIPP PER PLAN
2. INSTALL 96" RCP D-LOAD PER PLAN
7. CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STANDARD DWG. NO. MH252
13. CONSTRUCT CONCRETE COLLAR PER RCFC & WCD STANDARD DWG. NO. M803

MANHOLE / TRANSITION STRUCTURE DATA					
LATERAL	℄ STATION	WALL STATION	STRUCTURE	A	C
–	18+46.43	–	MH NO. 2	–	–

*FOR CIPP–WHERE PIPE VELOCITIES ARE GREATER THAN 10 FPS BUT NOT MORE THAN 20 FPS, A 140 DEGREE SEGMENT OF INVERT SHALL BE THICKENED 2 INCHES IN WALL THICKNESS AS A "SACRIFICIAL CONCRETE"

NOTE: ANY FUTURE PARALLEL TRENCHING ADJACENT TO CIPP SHALL REQUIRE A CITY ENCROACHMENT PERMIT. IF LATERAL SUPPORT ADJACENT TO CIPP IS COMPROMISED, THE FILL OVER THE CIPP WILL NEED TO BE REMOVED PRIOR TO TRENCHING.

TRACT 38236 PEN21–0184

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER MICHAEL R. BRENDECKE NO. 83363 CIVIL STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering-Surveying-Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 · Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993"
ELEV. 1603.71 (NAVD88)

REF	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CC
DRAWN BY: CC
CHECKED BY: MB
P8 NO.: _____

RECOMMENDED FOR APPROVAL BY: _____ CHIEF, DEVELOPER SERVICES DATE:_____

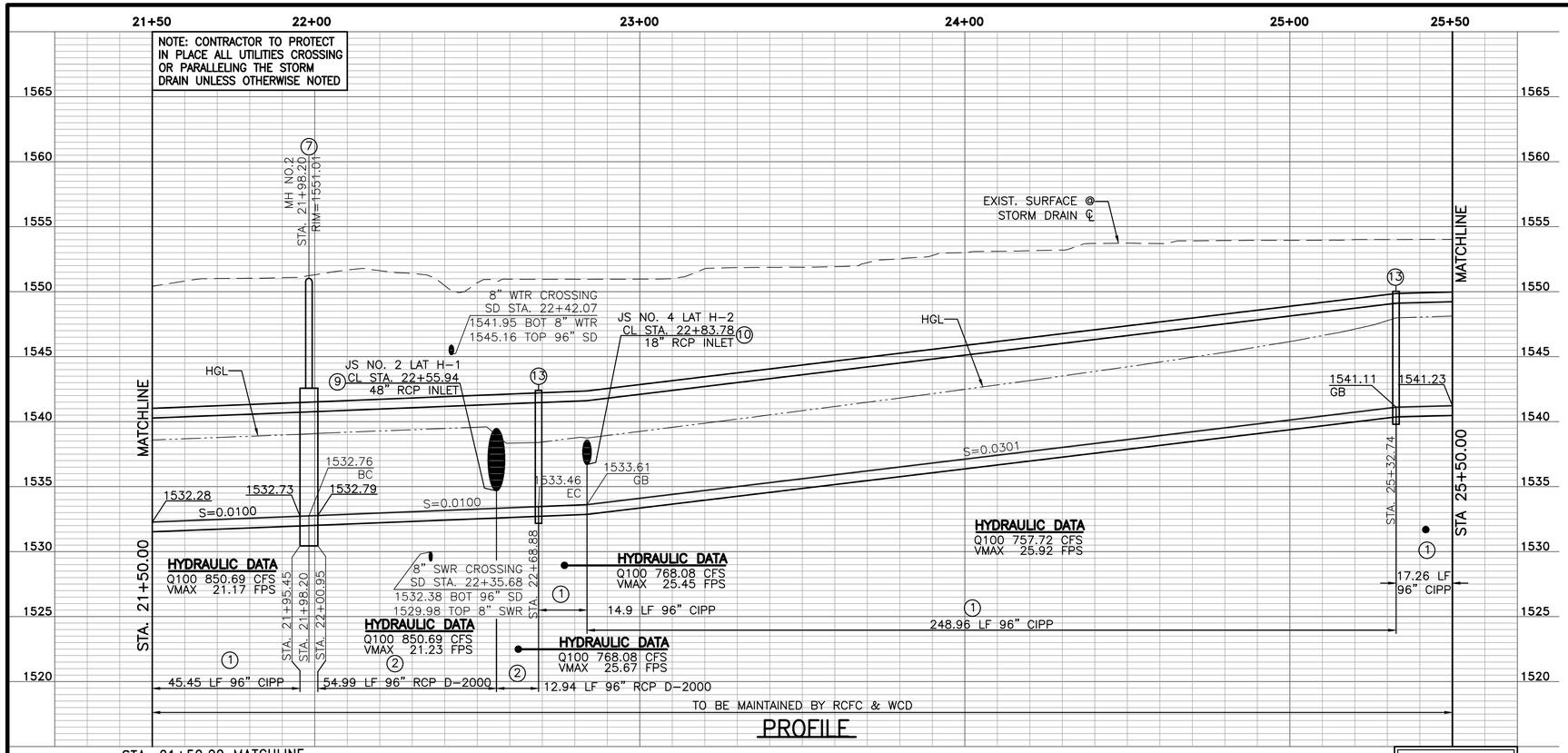
APPROVED BY: _____ GENERAL MANAGER–CHIEF ENGINEER DATE:_____

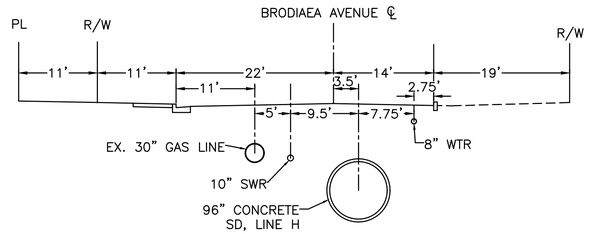
MORENO VALLEY MDP LINE H STA. 17+50.00–21+50.00

CITY ID: LC022–0019
PROJECT NO. X–X–XXXXX
DRAWING NO. X–XXXX
SHEET NO. 4 OF 19

PLOT DATE: 11/1/2022 1:53 PM

U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_04.DWG





SECTION AT STA. 23+50.00
TYPICAL FROM STA. 22+68.88 TO 23+78.97

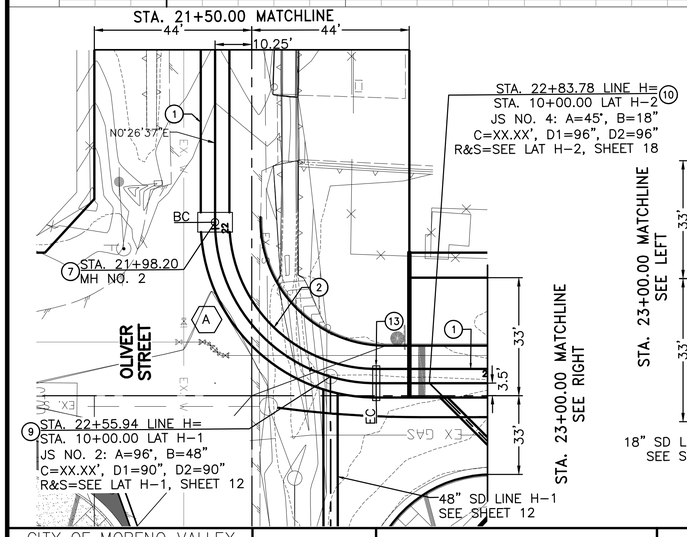
SCALE: 1" = 10

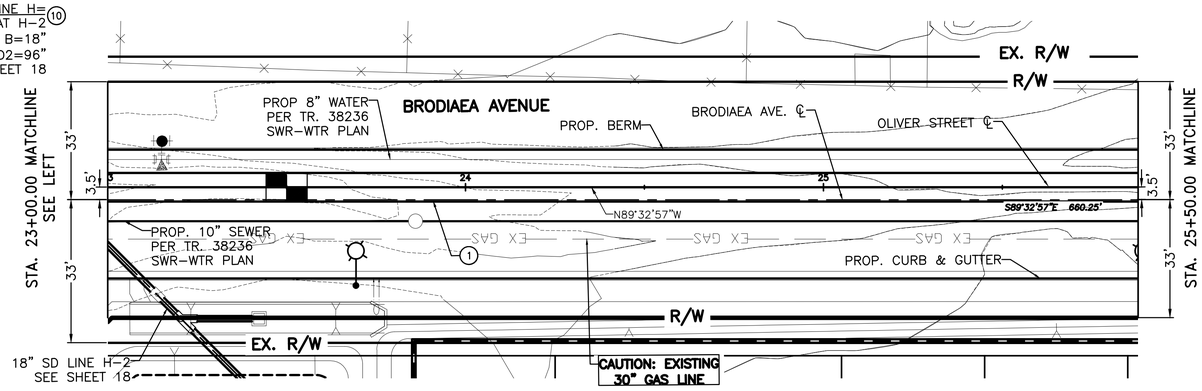
A ℄ CURVE DATA
△=89°59'34"
R=45.00'
T=44.99'
L=70.68'
BC=21+98.20
EC=22+68.88
PI= N:2277374.525
E:6278660.657

CONSTRUCTION NOTES

1. INSTALL 96" CIPP PER PLAN
2. INSTALL 96" RCP D-LOAD PER PLAN
7. CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STANDARD DWG. NO. MH252
9. CONSTRUCT JUNCTION STRUCTURE NO. 2 PER RCFC & WCD STANDARD DWG. NO. JS227
10. CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC & WCD STANDARD DWG. NO. JS229
13. CONSTRUCT CONCRETE COLLAR PER RCFC & WCD STANDARD DWG. NO. M803

PROFILE SCALES
HORIZ. 1"= 20'
VERT. 1" =5'





PLAN

MANHOLE / TRANSITION STRUCTURE DATA					
LATERAL	℄ STATION	WALL STATION	STRUCTURE	A	C
H-1	22+55.94	22+56.96	JS NO. 2	90°	XX.XX'
H-2	22+83.78	22+87.53	JS NO. 4	45°	–
–	21+98.20	–	MH NO. 2	–	–

*FOR CIPP-WHERE PIPE VELOCITIES ARE GREATER THAN 10 FPS BUT NOT MORE THAN 20 FPS, A 140 DEGREE SEGMENT OF INVERT SHALL BE THICKENED 2 INCHES IN WALL THICKNESS AS A "SACRIFICIAL CONCRETE"

NOTE: ANY FUTURE PARALLEL TRENCHING ADJACENT TO CIPP SHALL REQUIRE A CITY ENCROACHMENT PERMIT. IF LATERAL SUPPORT ADJACENT TO CIPP IS COMPROMISED, THE FILL OVER THE CIPP WILL NEED TO BE REMOVED PRIOR TO TRENCHING.

SCALE: 1" = 20'

TRACT 38236 PEN21-0184

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER
MICHAEL R. BRENDECKE
NO. 83363
CIVIL
STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering·Surveying·Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993" ELEV. 1603.71 (NAVD88)

REF	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CC
DRAWN BY: CC
CHECKED BY: MB
P8 NO.: _____

RECOMMENDED FOR APPROVAL BY:
CHIEF, DEVELOPER SERVICES
DATE:_____

APPROVED BY:
GENERAL MANAGER-CHIEF ENGINEER
DATE:_____

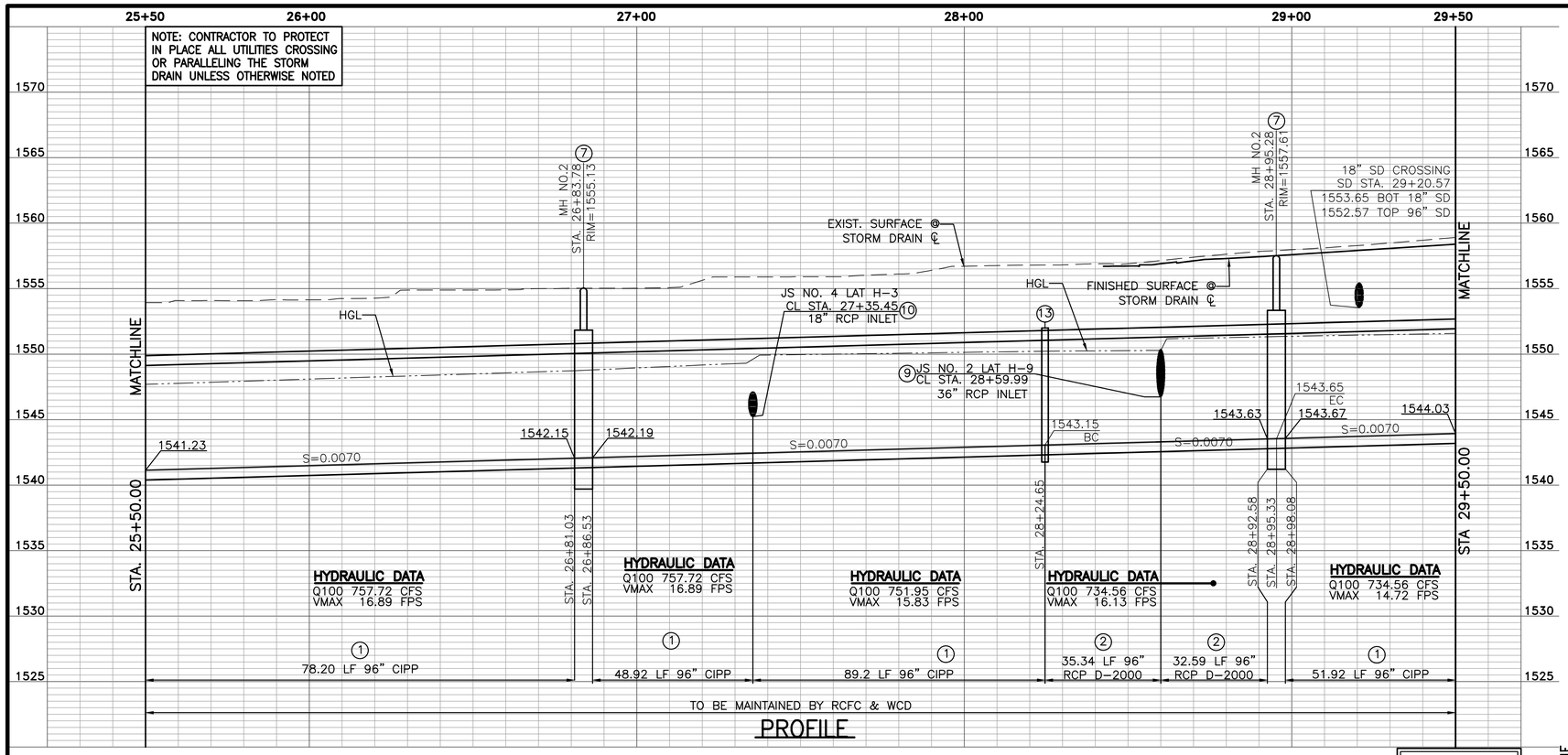
MORENO VALLEY
MDP LINE H
STA. 21+50.00-25+50.00

CITY ID: LC022-0019
PROJECT NO. X-X-XXXXX
DRAWING NO. X-XXXX
SHEET NO. 5 OF 19

PLOT DATE: 11/7/2022 1:55 PM

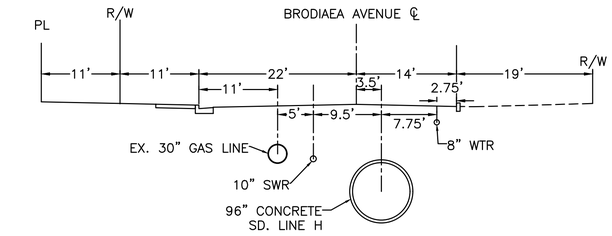
U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_05.DWG

NOTE: CONTRACTOR TO PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED



PROFILE

PROFILE SCALES
HORIZ. 1"= 20'
VERT. 1" =5'



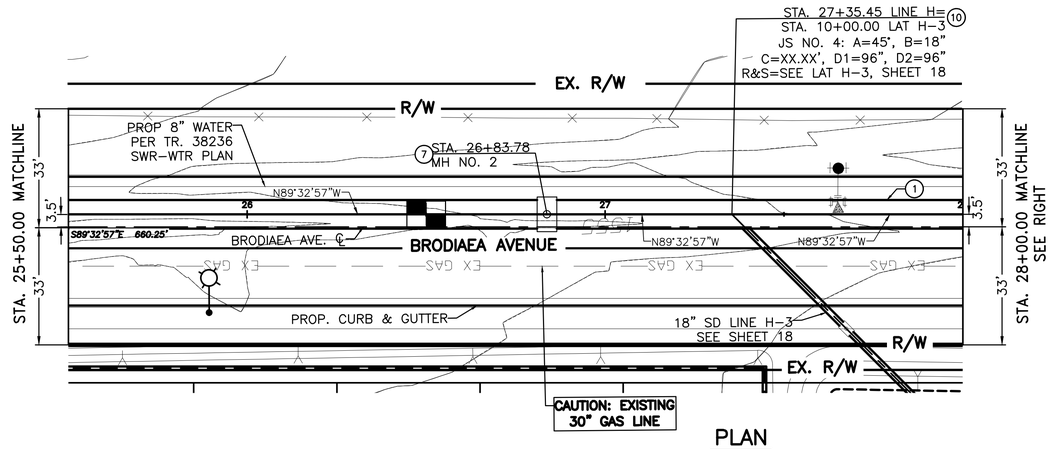
SECTION AT STA. 26+50.00
TYPICAL FROM STA. 25+50.00 TO 28+24.65

SCALE: 1" = 10'

℄ CURVE DATA
A
△=89°59'19"
R=45.00'
T=.44.99'
L=70.68'
BC=28+24.65
EC=28+95.33
PI= N:2277379.606
E:6278014.922

CONSTRUCTION NOTES

1. INSTALL 96" CIPP PER PLAN
2. INSTALL 96" RCP D-LOAD PER PLAN
7. CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STANDARD DWG. NO. MH252
9. CONSTRUCT JUNCTION STRUCTURE NO. 2 PER RCFC & WCD STANDARD DWG. NO. JS227
10. CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC & WCD STANDARD DWG. NO. JS229
13. CONSTRUCT CONCRETE COLLAR PER RCFC & WCD STANDARD DWG. NO. M803

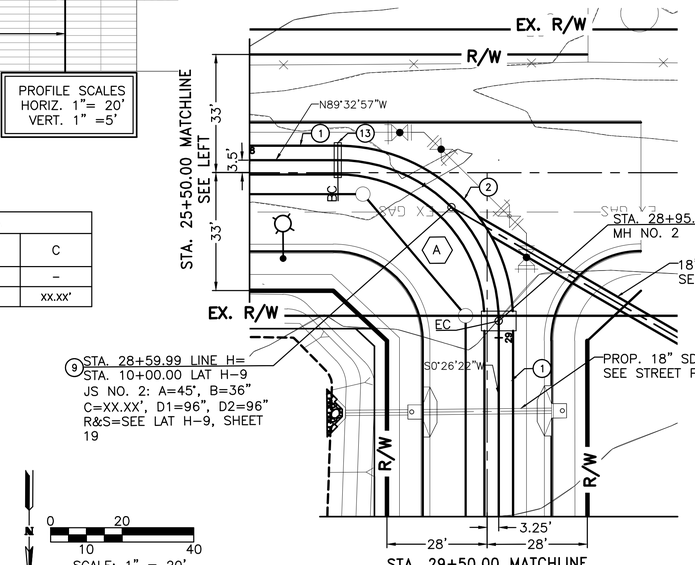


PLAN

MANHOLE / TRANSITION STRUCTURE DATA					
LATERAL	℄ STATION	WALL STATION	STRUCTURE	A	C
H-3	27+59.99	27+39.20	JS NO. 4	45°	–
H-9	**28+59.99**	**28+69.35**	JS NO. 2	45°	XX.XX'

*FOR CIPP-WHERE PIPE VELOCITIES ARE GREATER THAN 10 FPS BUT NOT MORE THAN 20 FPS, A 140 DEGREE SEGMENT OF INVERT SHALL BE THICKENED 2 INCHES IN WALL THICKNESS AS A "SACRIFICIAL CONCRETE"

NOTE: ANY FUTURE PARALLEL TRENCHING ADJACENT TO CIPP SHALL REQUIRE A CITY ENCROACHMENT PERMIT. IF LATERAL SUPPORT ADJACENT TO CIPP IS COMPROMISED, THE FILL OVER THE CIPP WILL NEED TO BE REMOVED PRIOR TO TRENCHING.



SCALE: 1" = 20'

TRACT 38236 PEN21-0184

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER
MICHAEL R. BRENDECKE
NO. 83363
CIVIL
STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering-Surveying-Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993"
ELEV. 1603.71 (NAVD88)

REF	DESCRIPTION	APPR.	DATE
	REVISIONS		

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CC
DRAWN BY: CC
CHECKED BY: MB
P8 NO.: _____

RECOMMENDED FOR APPROVAL BY: _____ CHIEF, DEVELOPER SERVICES DATE:_____

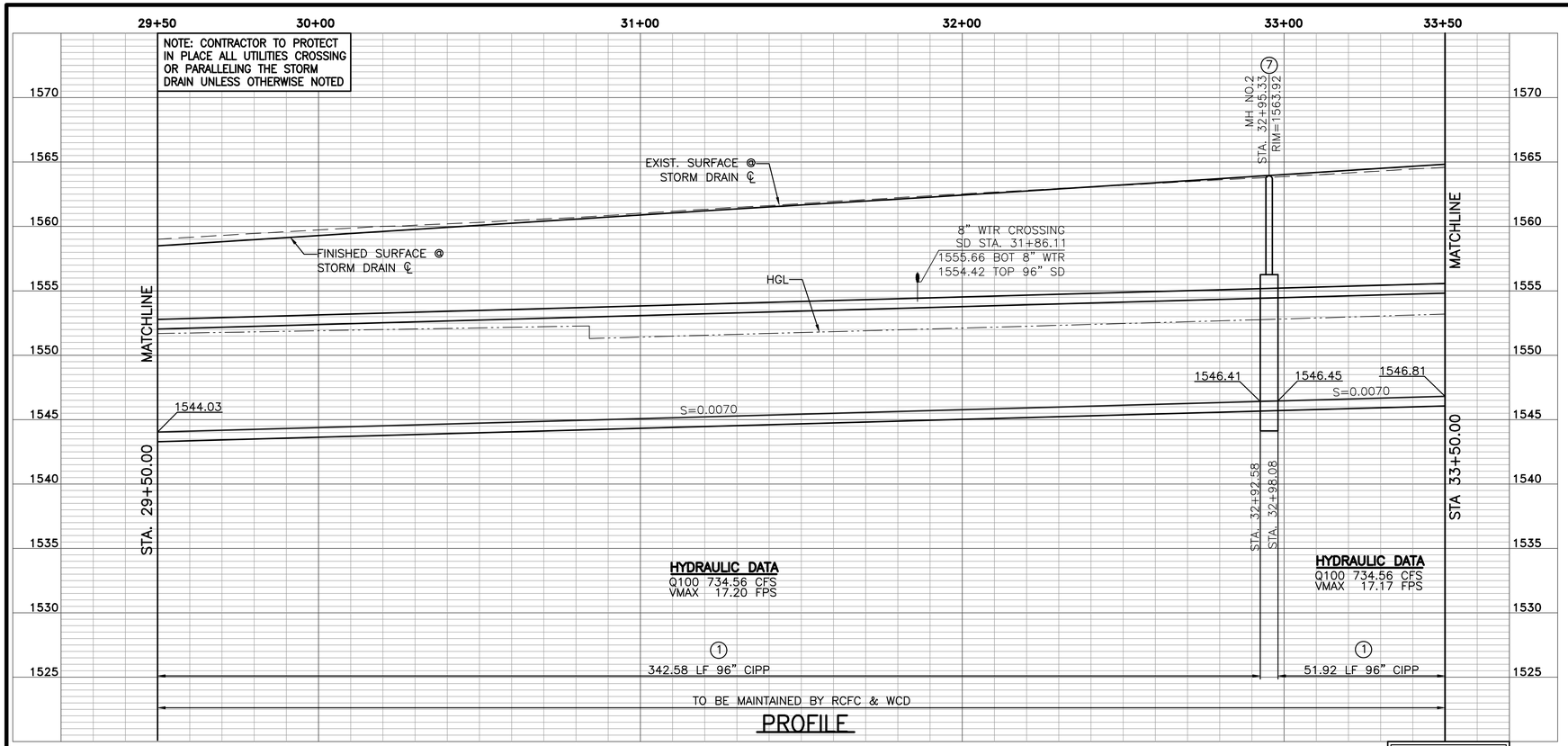
APPROVED BY: _____ GENERAL MANAGER-CHIEF ENGINEER DATE:_____

MORENO VALLEY
MDP LINE H
STA. 25+50.00-29+50.00

CITY ID: LC022-0019
PROJECT NO. X-X-XXXXX
DRAWING NO. X-XXXX
SHEET NO. 6 OF 19

PLOT DATE: 11/1/2022 1:56 PM

U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_06.DWG

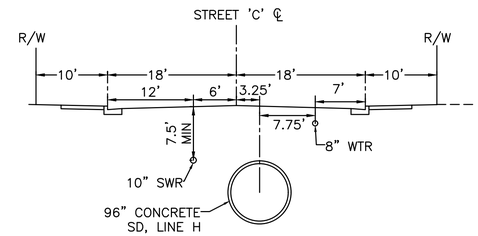


PROFILE

PROFILE SCALES
HORIZ. 1"= 20'
VERT. 1" =5'

0 10 20 40
SCALE: 1" = 20'

PLAN



SECTION AT STA. 30+50.00
TYPICAL FROM STA. 30+12.77 TO 31+98.11

0 5 10 20
SCALE: 1" = 10'

CONSTRUCTION NOTES

1. INSTALL 96" CIPP PER PLAN
7. CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STANDARD DWG. NO. MH252

MANHOLE / TRANSITION STRUCTURE DATA					
LATERAL	℄ STATION	WALL STATION	STRUCTURE	A	C
–	32+95.33	–	MH NO. 2	–	–

*FOR CIPP–WHERE PIPE VELOCITIES ARE GREATER THAN 10 FPS BUT NOT MORE THAN 20 FPS, A 140 DEGREE SEGMENT OF INVERT SHALL BE THICKENED 2 INCHES IN WALL THICKNESS AS A "SACRIFICIAL CONCRETE"

NOTE: ANY FUTURE PARALLEL TRENCHING ADJACENT TO CIPP SHALL REQUIRE A CITY ENCROACHMENT PERMIT. IF LATERAL SUPPORT ADJACENT TO CIPP IS COMPROMISED, THE FILL OVER THE CIPP WILL NEED TO BE REMOVED PRIOR TO TRENCHING.

TRACT 38236 PEN21–0184

CITY ID: LC022–0019

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER MICHAEL R. BRENDECKE NO. 83363 CIVIL STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering-Surveying-Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993" ELEV. 1603.71 (NAVD88)

REF	DESCRIPTION	APPR.	DATE
	REVISIONS		

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CC
DRAWN BY: CC
CHECKED BY: MB
P8 NO.: _____

RECOMMENDED FOR APPROVAL BY: _____ CHIEF, DEVELOPER SERVICES DATE:_____

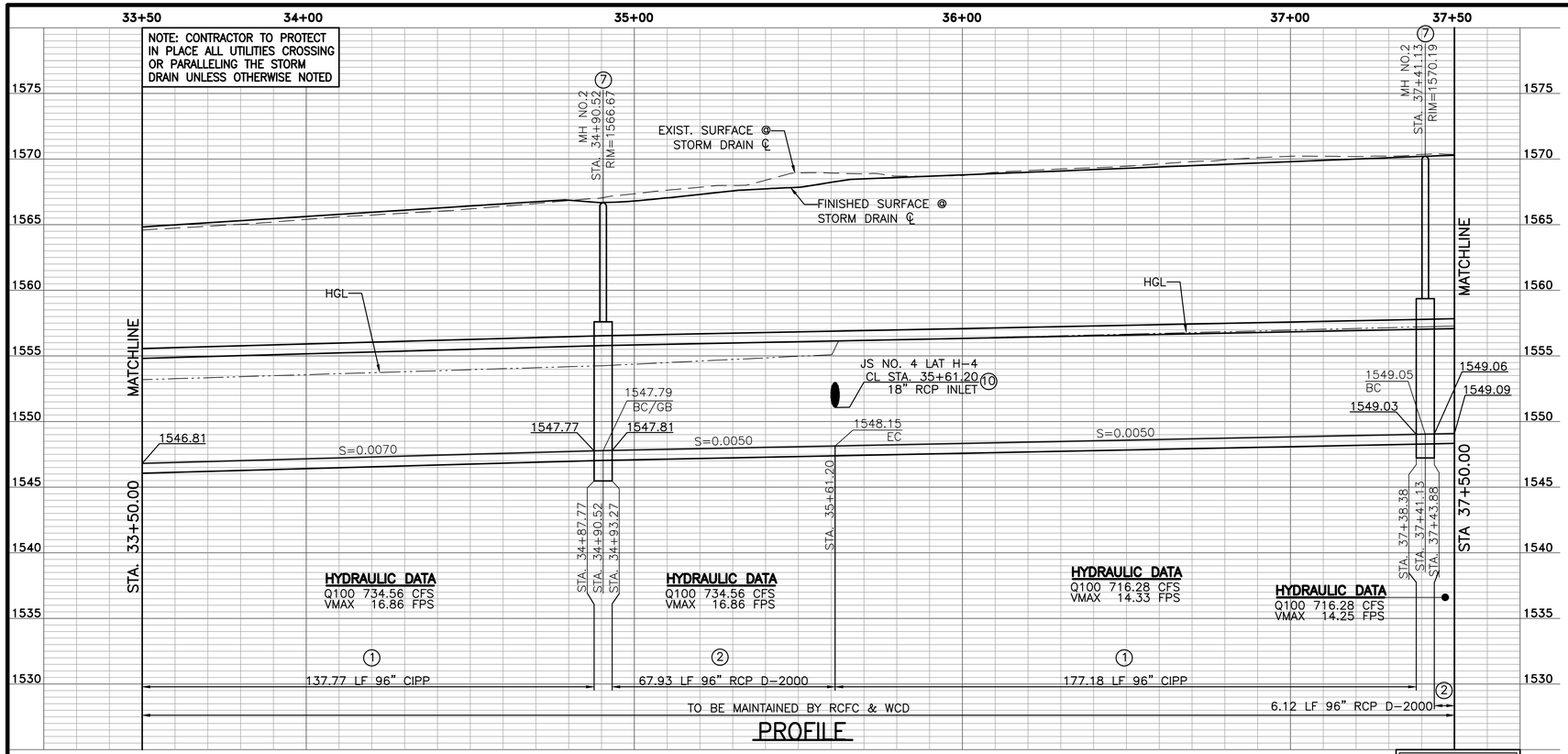
APPROVED BY: _____ GENERAL MANAGER–CHIEF ENGINEER DATE:_____

MORENO VALLEY MDP LINE H STA. 29+50.00–33+50.00

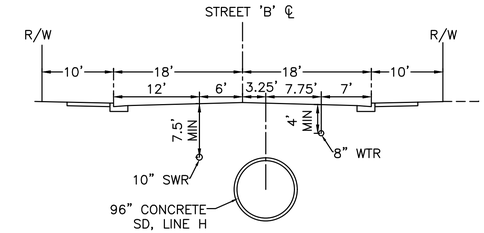
PROJECT NO. X–X–XXXXX
DRAWING NO. X–XXXX
SHEET NO. 7 OF 19

PLOT DATE: 11/1/2022 1:58 PM

U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_07.DWG



PROFILE



SECTION AT STA. 36+50.00
TYPICAL FROM STA. 35+61.23 TO 36+54.04

SCALE: 1" = 10'

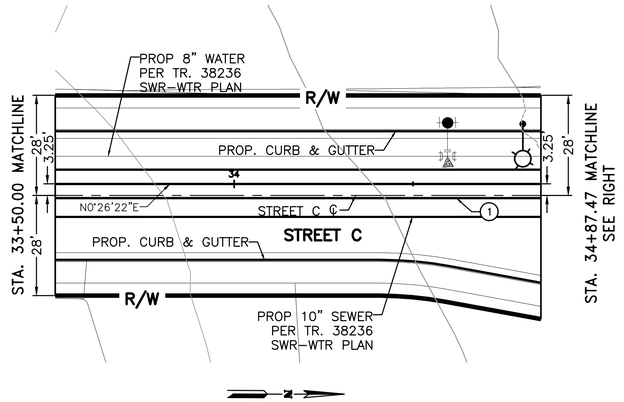
A ℄ CURVE DATA
△=89°59'28"
R=45.00'
T=44.99'
L=70.68
BC=34+90.52
EC=35+61.20
PI= N:2278064.768
E:6278020.177

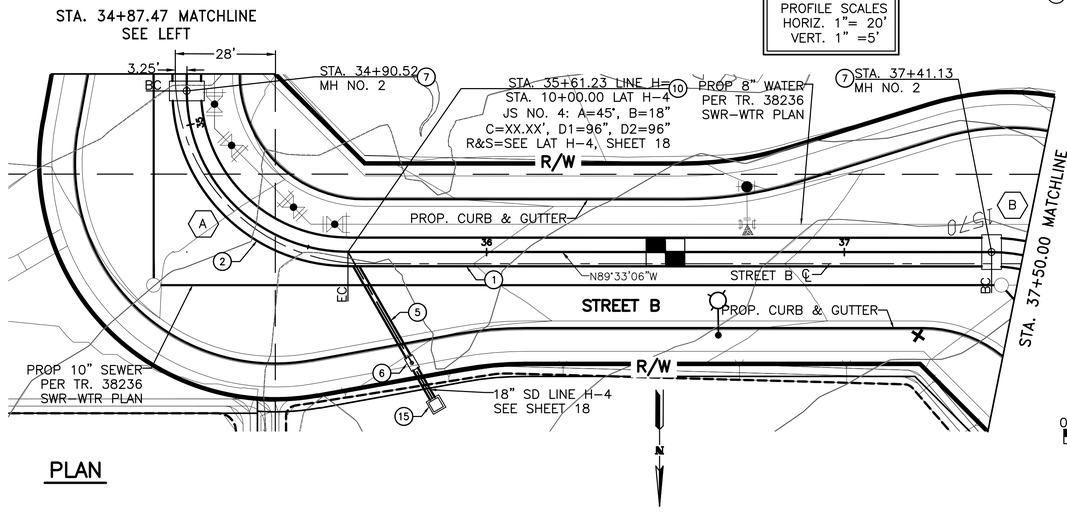
B ℄ CURVE DATA
△=89°59'49"
R=45.00'
T=45.00'
L=70.68
BC=37+41.13
EC=38+11.81
PI= N:2278065.887
E:6277750.268

CONSTRUCTION NOTES

1. INSTALL 96" CIPP PER PLAN
2. INSTALL 96" RCP D-LOAD PER PLAN
7. CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STANDARD DWG. NO. MH252
10. CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC & WCD STANDARD DWG. NO. JS229
13. CONSTRUCT CONCRETE COLLAR PER RCFC & WCD STANDARD DWG. NO. M803
14. CONSTRUCT CATCH BASIN NO. 1 PER RCFC & WCD STANDARD DWG. NO. CB100

PROFILE SCALES
HORIZ. 1"= 20'
VERT. 1" =5'





PLAN

MANHOLE / TRANSITION STRUCTURE DATA					
LATERAL	℄ STATION	WALL STATION	STRUCTURE	A	C
H-4	35+61.23	35+63.39	JS NO. 4	45°	–
–	37.41.13	–	MH NO. 2	–	–

*FOR CIPP-WHERE PIPE VELOCITIES ARE GREATER THAN 10 FPS BUT NOT MORE THAN 20 FPS, A 140 DEGREE SEGMENT OF INVERT SHALL BE THICKENED 2 INCHES IN WALL THICKNESS AS A "SACRIFICIAL CONCRETE"

NOTE: ANY FUTURE PARALLEL TRENCHING ADJACENT TO CIPP SHALL REQUIRE A CITY ENCROACHMENT PERMIT. IF LATERAL SUPPORT ADJACENT TO CIPP IS COMPROMISED, THE FILL OVER THE CIPP WILL NEED TO BE REMOVED PRIOR TO TRENCHING.

0 20 10 40
SCALE: 1" = 20'

TRACT 38236 PEN21-0184

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER MICHAEL R. BRENDECKE NO. 83363 CIVIL STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering·Surveying·Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 · Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993"
ELEV. 1603.71 (NAVD88)

REF	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CC	RECOMMENDED FOR APPROVAL BY:	APPROVED BY:
DRAWN BY: CC	CHIEF, DEVELOPER SERVICES	GENERAL MANAGER-CHIEF ENGINEER
CHECKED BY: MB	DATE:	DATE:
P8 NO.:		

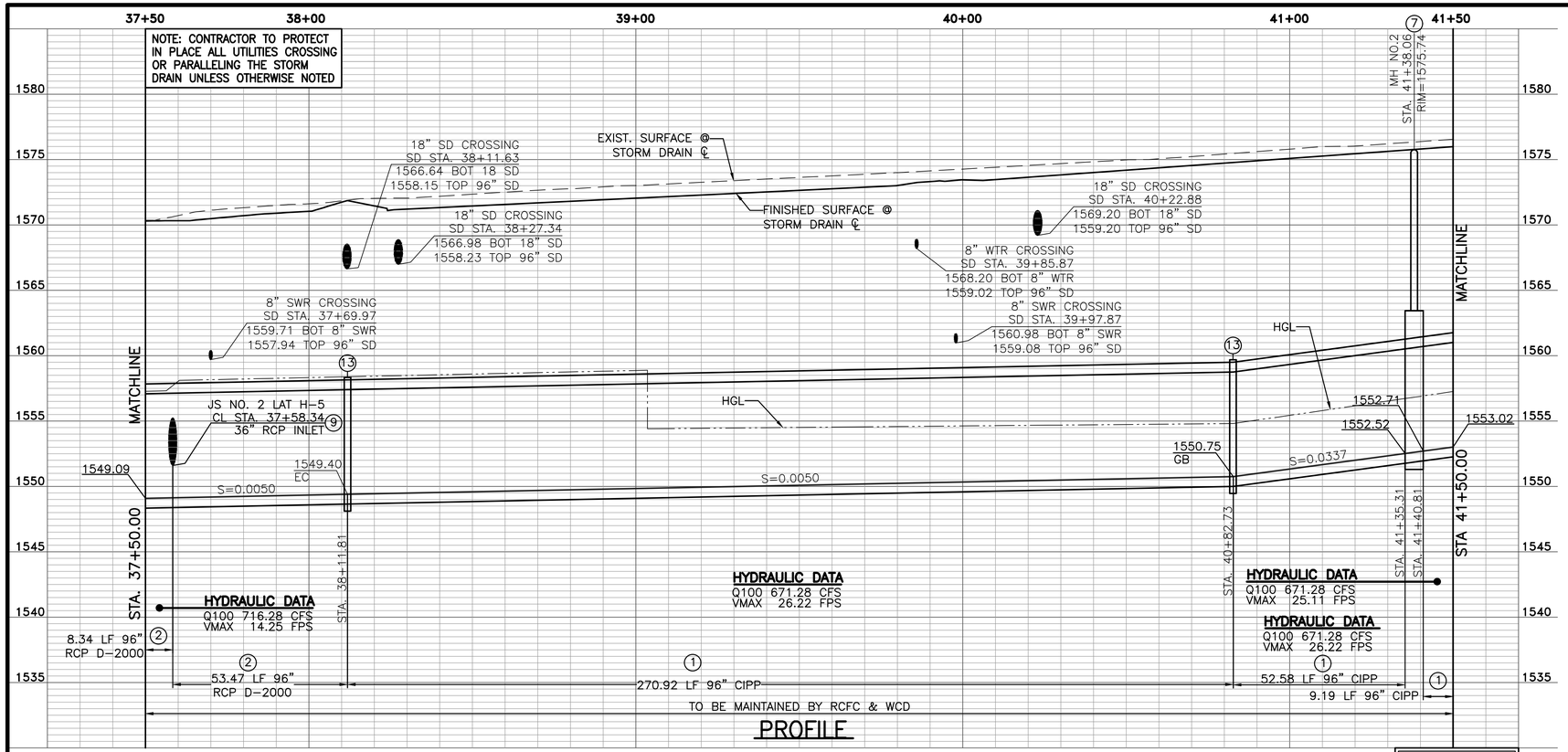
MORENO VALLEY
MDP LINE H
STA. 33+50.00-37+50.00

CITY ID: LC022-0019
PROJECT NO. X-X-XXXXX
DRAWING NO. X-XXXX
SHEET NO. 8 OF 19

PLOT DATE: 11/1/2022 2:00 PM

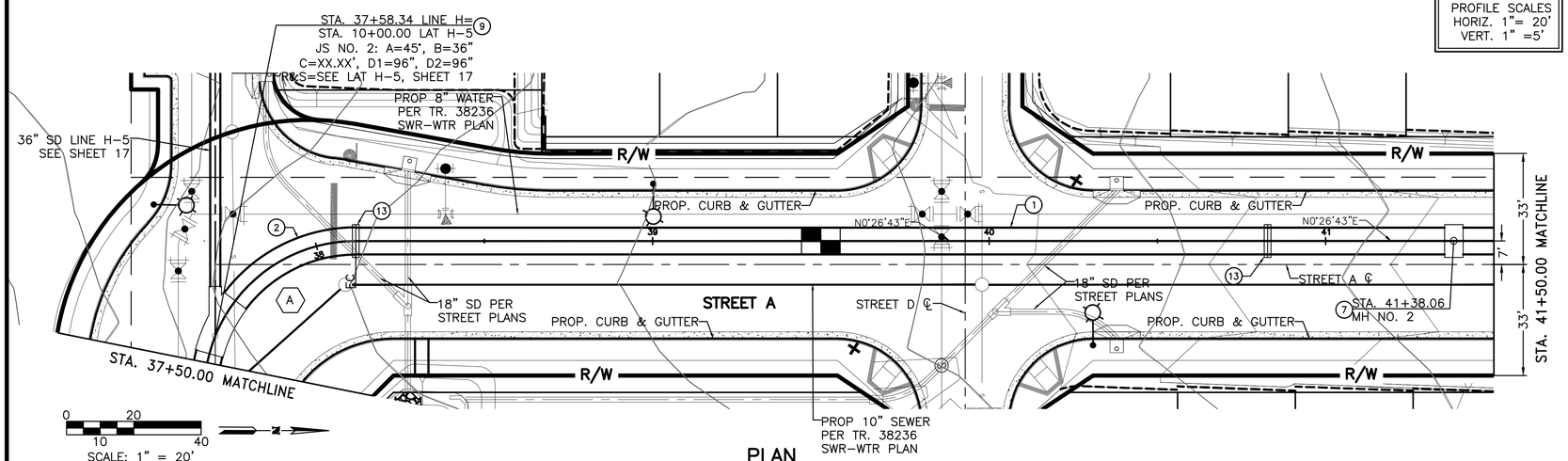
U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_08.DWG

NOTE: CONTRACTOR TO PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED

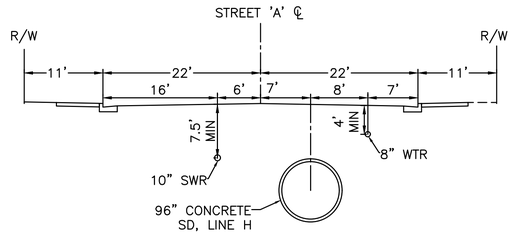


PROFILE

PROFILE SCALES
HORIZ. 1"= 20'
VERT. 1" =5'



PLAN



SECTION AT STA. 39+50.00
TYPICAL FROM STA. 38+11.81 TO 39+98.87

0 5 10 20
SCALE: 1" = 10'

(A) ℄ CURVE DATA
△=89°59'49"
R=45.00'
T=45.00'
L=70.68'
BC=37+41.13
EC=38+11.81
PI= N:2278065.887
E:6277750.268

CONSTRUCTION NOTES

1. INSTALL 96" CIPP PER PLAN
2. INSTALL 96" RCP D-LOAD PER PLAN
7. CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STANDARD DWG. NO. MH252
9. CONSTRUCT JUNCTION STRUCTURE NO. 2 PER RCFC & WCD STANDARD DWG. NO. JS227
13. CONSTRUCT CONCRETE COLLAR PER RCFC & WCD STANDARD DWG. NO. M803

MANHOLE / TRANSITION STRUCTURE DATA					
LATERAL	℄ STATION	WALL STATION	STRUCTURE	A	C
H-5	37+58.34	37+65.54	JS NO. 2	45°	XX.XX'
–	41+38.06	–	MH NO. 2	–	–

*FOR CIPP-WHERE PIPE VELOCITIES ARE GREATER THAN 10 FPS BUT NOT MORE THAN 20 FPS, A 140 DEGREE SEGMENT OF INVERT SHALL BE THICKENED 2 INCHES IN WALL THICKNESS AS A "SACRIFICIAL CONCRETE"

NOTE: ANY FUTURE PARALLEL TRENCHING ADJACENT TO CIPP SHALL REQUIRE A CITY ENCROACHMENT PERMIT. IF LATERAL SUPPORT ADJACENT TO CIPP IS COMPROMISED, THE FILL OVER THE CIPP WILL NEED TO BE REMOVED PRIOR TO TRENCHING.

TRACT 38236 PEN21-0184

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER
MICHAEL R. BRENDECKE
NO. 83363
CIVIL
STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering·Surveying·Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241·Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993"
ELEV. 1603.71 (NAVD88)

REF	REVISIONS DESCRIPTION	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY:	CC	RECOMMENDED FOR APPROVAL BY:	APPROVED BY:
DRAWN BY:	CC	CHIEF, DEVELOPER SERVICES	GENERAL MANAGER-CHIEF ENGINEER
CHECKED BY:	MB	DATE:	DATE:
P8 NO.:	———		

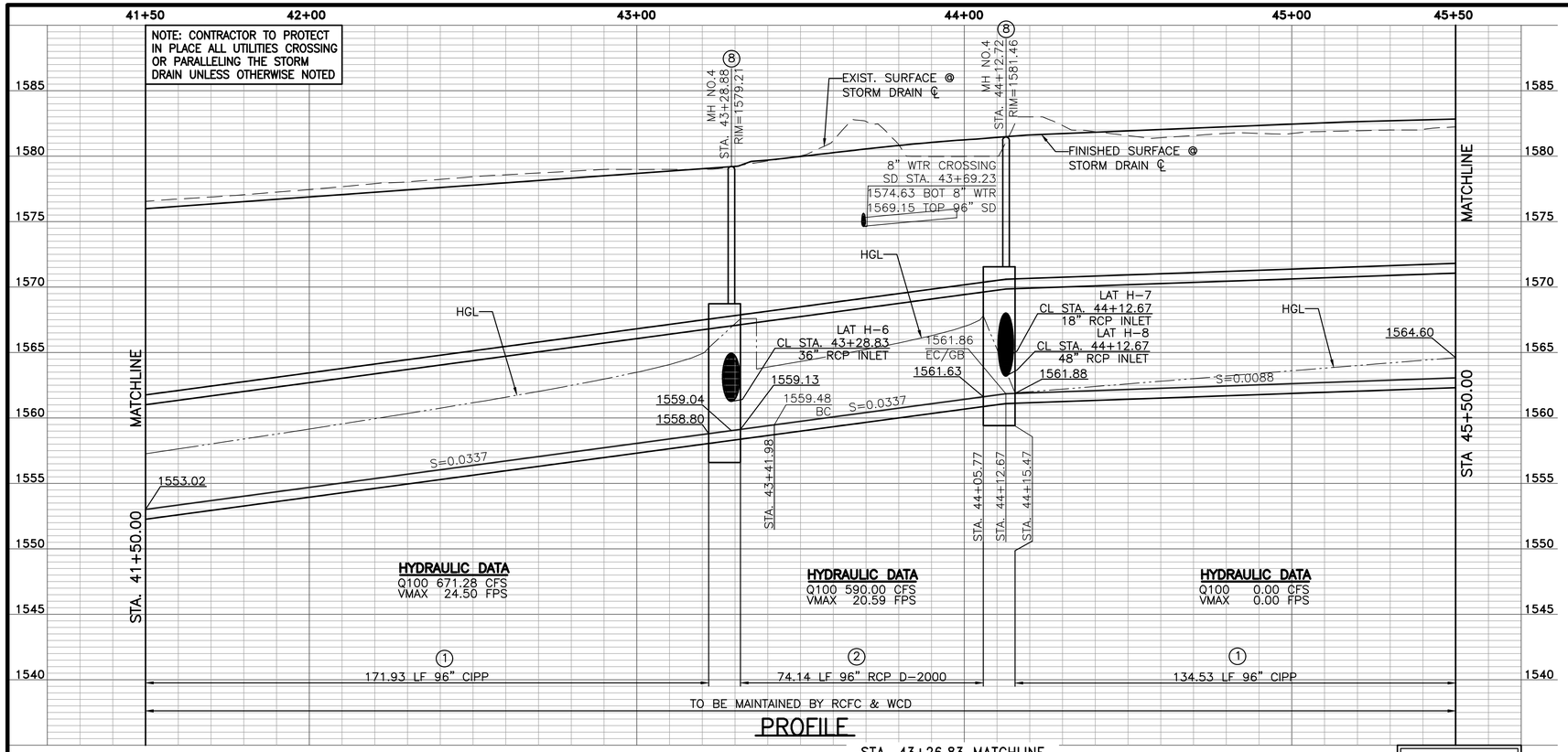
MORENO VALLEY
MDP LINE H
STA. 37+50.00-41+50.00

CITY ID: LG22-0019
PROJECT NO. X-X-XXXXX
DRAWING NO. X-XXXX
SHEET NO. 9 OF 19

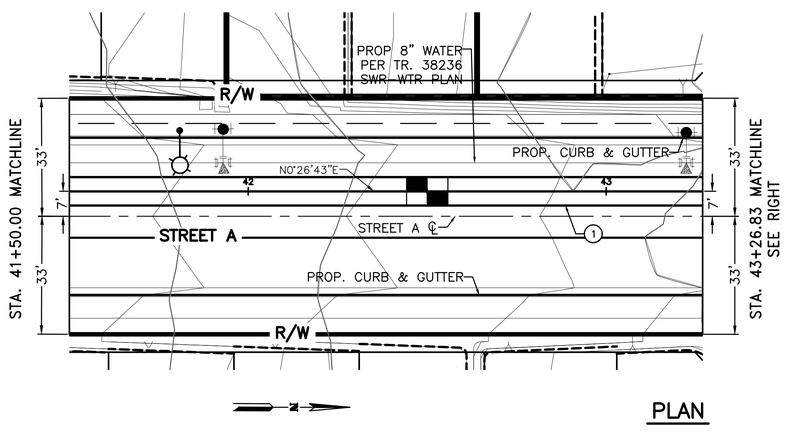
PLOT DATE: 11/1/2022 2:01 PM

U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_09.DWG

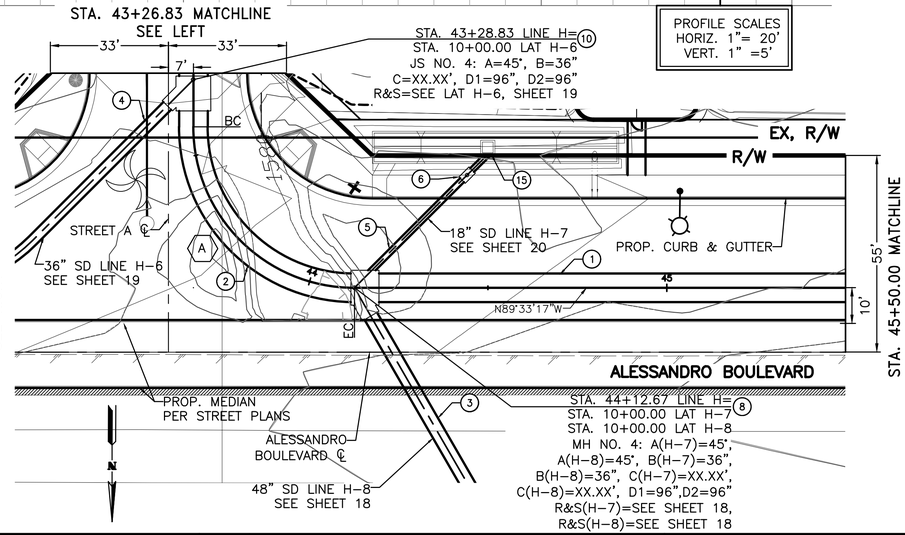
NOTE: CONTRACTOR TO PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED



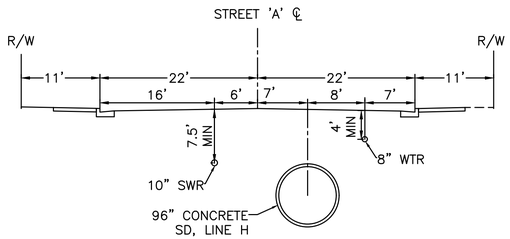
PROFILE



PLAN



PROFILE SCALES
HORIZ. 1"= 20'
VERT. 1" =5'



SECTION AT STA. 42+50.00
TYPICAL FROM STA. 41+50.00 TO 43+41.98

0 5 10 20
SCALE: 1" = 10'

0 10 20 40
SCALE: 1" = 20'

Ⓐ ℄ CURVE DATA
△=90°00'00"
R=45.00'
T=45.00'
L=70.68'
BC=43+41.98
EC=43+28.83
PI= N:2278687.030
E:6277755.087

CONSTRUCTION NOTES

① INSTALL 96" CIPP PER PLAN
② INSTALL 96" RCP D-LOAD PER PLAN
⑧ CONSTRUCT MANHOLE NO. 4 PER RCFC & WCD. STANDARD DWG. NO. MH254
⑩ CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC & WCD STANDARD DWG. NO. JS229

MANHOLE / TRANSITION STRUCTURE DATA					
LATERAL	℄ STATION	WALL STATION	STRUCTURE	A	C
H-6	43+28.83	43+32.58	JS NO. 4	45°	XX.XX'
H-7	44+12.67	44+16.42	MH NO. 4	45°	–
H-8	44+12+67	44+14.83	MH NO. 4	45°	XX.XX'

*FOR CIPP-WHERE PIPE VELOCITIES ARE GREATER THAN 10 FPS BUT NOT MORE THAN 20 FPS, A 140 DEGREE SEGMENT OF INVERT SHALL BE THICKENED 2 INCHES IN WALL THICKNESS AS A "SACRIFICIAL CONCRETE"

NOTE: ANY FUTURE PARALLEL TRENCHING ADJACENT TO CIPP SHALL REQUIRE A CITY ENCROACHMENT PERMIT. IF LATERAL SUPPORT ADJACENT TO CIPP IS COMPROMISED, THE FILL OVER THE CIPP WILL NEED TO BE REMOVED PRIOR TO TRENCHING.

TRACT 38236 PEN21-0184

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER MICHAEL R. BRENDECKE NO. 83363 CIVIL STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering·Surveying·Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241·Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993" ELEV. 1603.71 (NAVD88)

REF	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

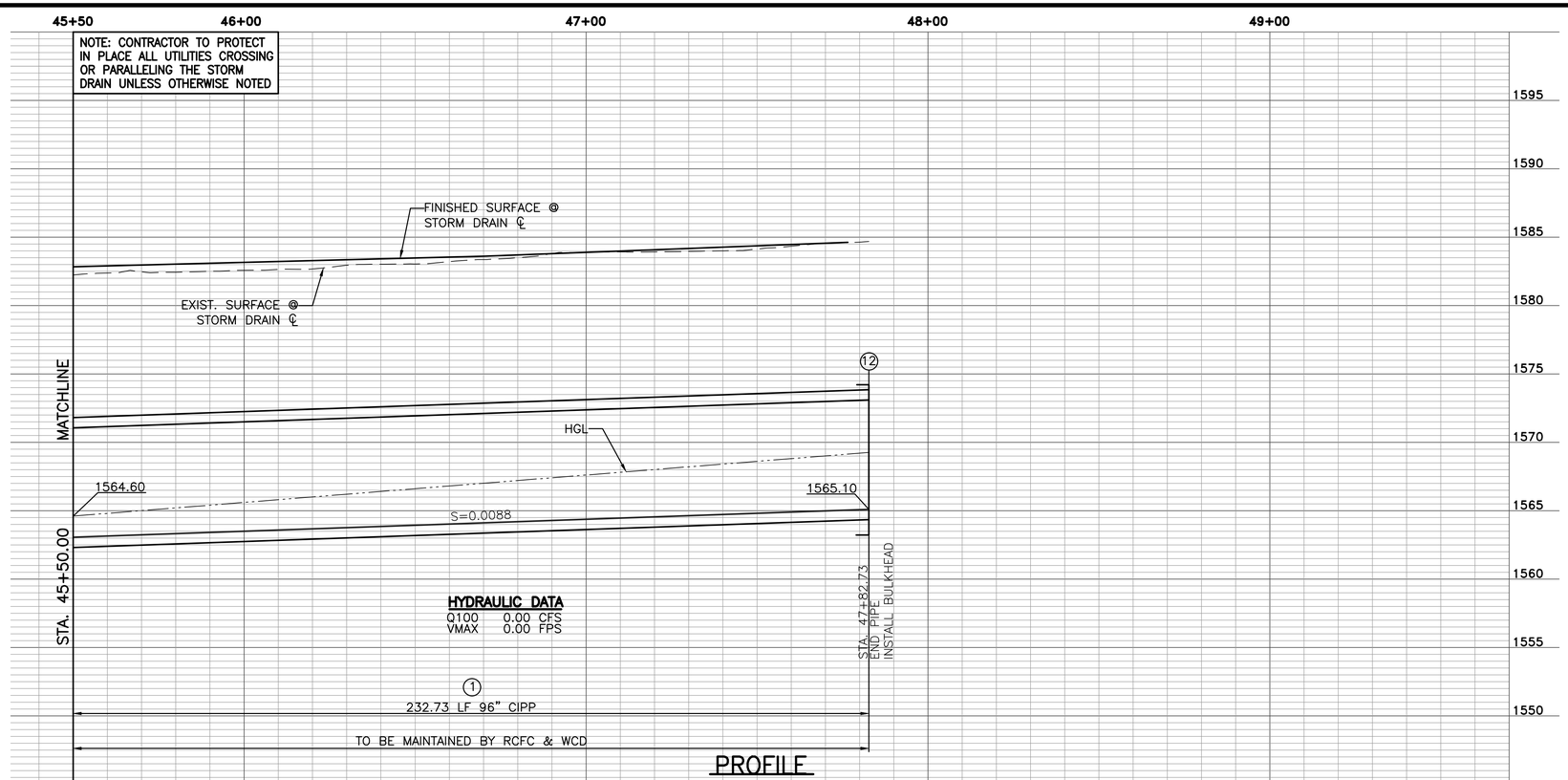
DESIGNED BY: CC	RECOMMENDED FOR APPROVAL BY:	APPROVED BY:
DRAWN BY: CC		
CHECKED BY: MB	CHIEF, DEVELOPER SERVICES	GENERAL MANAGER-CHIEF ENGINEER
P8 NO.: ———	DATE:_____	DATE:_____

MORENO VALLEY MDP LINE H STA. 41+50.00-45+50.00

CITY ID: LC022-0019
PROJECT NO. X-X-XXXXX
DRAWING NO. X-XXXX
SHEET NO. 10 OF 19

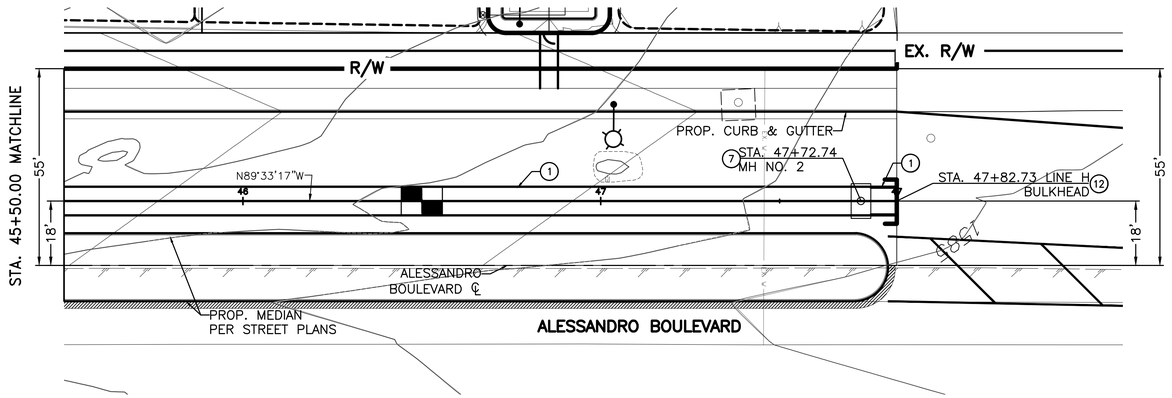
PLOT DATE: 11/17/2022 2:03 PM

U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_10.DWG

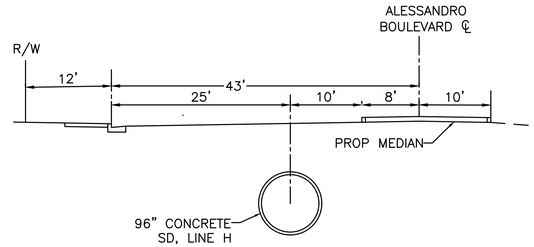


PROFILE

PROFILE SCALES
HORIZ. 1"= 20'
VERT. 1" =5'



PLAN



SECTION AT STA. 46+50.00
TYPICAL FROM STA. 45+50.00 TO 47+82.73

10
0 5 20
SCALE: 1" = 10'

CONSTRUCTION NOTES

1. INSTALL 96" CIPP PER PLAN
7. CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STANDARD DWG. NO. MH252
12. CONSTRUCT BULKHEAD STANDARD DWG. NO. M816 FOR FUTURE CONNECTIONS.

N
0 20
10 40
SCALE: 1" = 20'

*FOR CIPP–WHERE PIPE VELOCITIES ARE GREATER THAN 10 FPS BUT NOT MORE THAN 20 FPS, A 140 DEGREE SEGMENT OF INVERT SHALL BE THICKENED 2 INCHES IN WALL THICKNESS AS A "SACRIFICIAL CONCRETE"

NOTE: ANY FUTURE PARALLEL TRENCHING ADJACENT TO CIPP SHALL REQUIRE A CITY ENCROACHMENT PERMIT. IF LATERAL SUPPORT ADJACENT TO CIPP IS COMPROMISED, THE FILL OVER THE CIPP WILL NEED TO BE REMOVED PRIOR TO TRENCHING.

TRACT 38236 PEN21–0184

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER MICHAEL R. BRENDECKE NO. 83363 CIVIL STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering·Surveying·Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241·Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993" ELEV. 1603.71 (NAVD88)

REF	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CC	RECOMMENDED FOR APPROVAL BY:	APPROVED BY:
DRAWN BY: CC	CHIEF, DEVELOPER SERVICES	GENERAL MANAGER–CHIEF ENGINEER
CHECKED BY: MB	DATE:_____	DATE:_____
P8 NO.: _____		

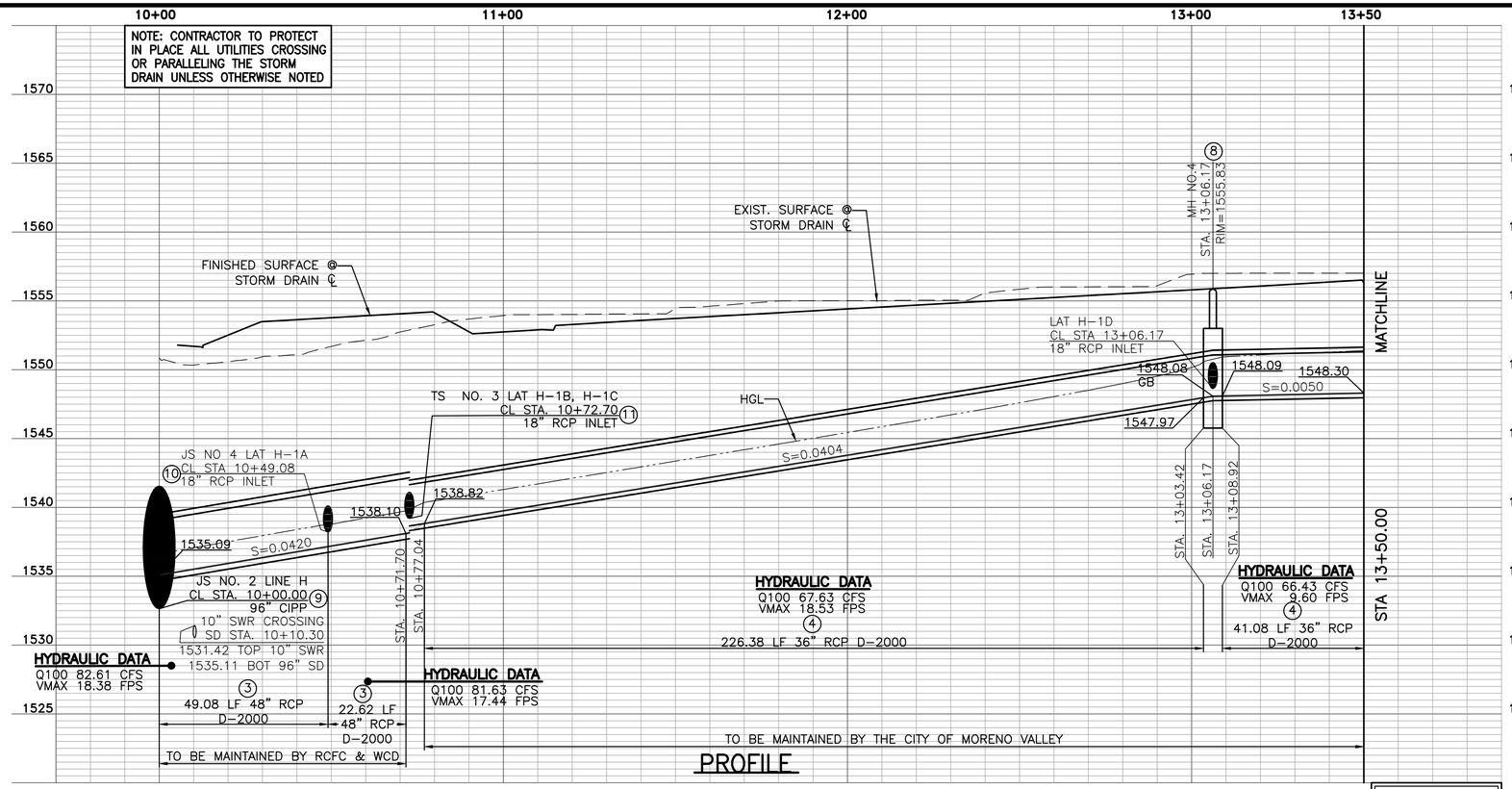
MORENO VALLEY MDP LINE H STA. 45+50.00–47+82.73

CITY ID: LC022–0019
PROJECT NO. X–X–XXXXX
DRAWING NO. X–XXXX
SHEET NO. 11 OF 19

PLOT DATE: 11/17/2022 2:05 PM

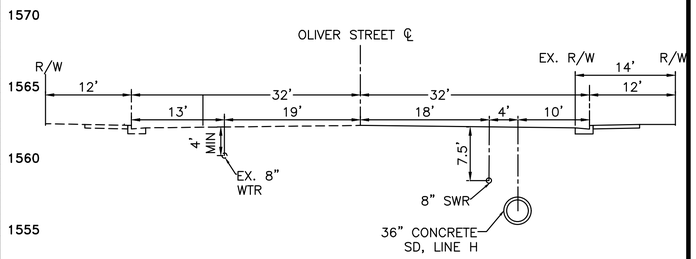
U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_11.DWG

NOTE: CONTRACTOR TO PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED



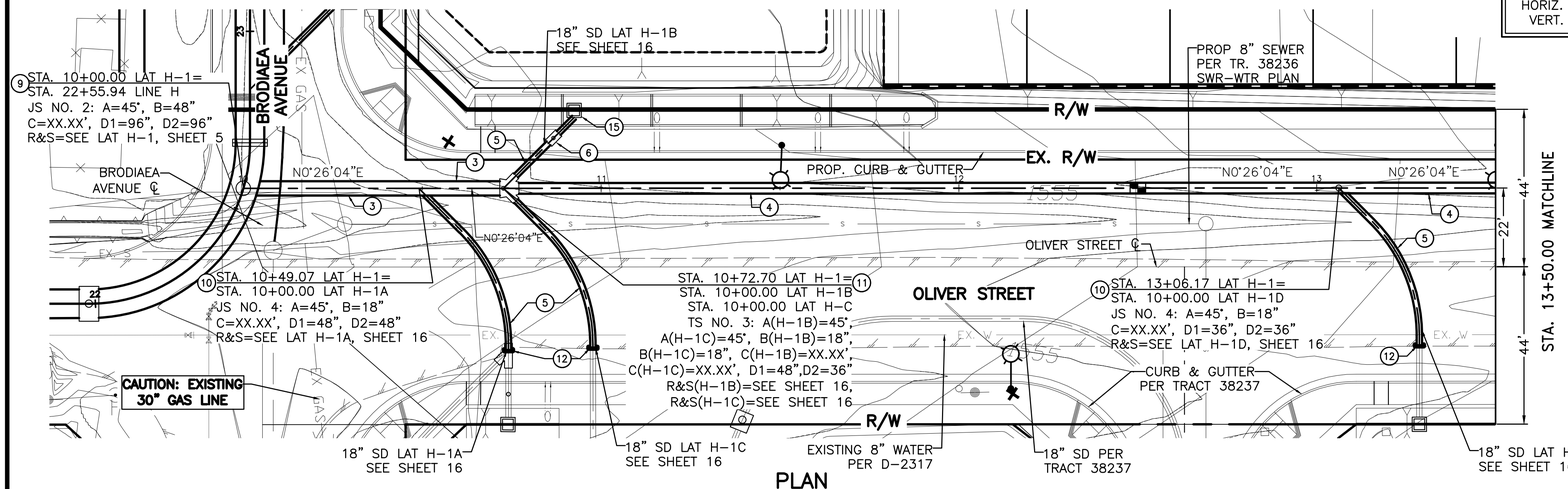
PROFILE

PROFILE SCALES
HORIZ. 1"= 20'
VERT. 1" =5'



SECTION AT STA. 12+50.00
TYPICAL FROM STA. 10+62.36 TO 12+70.03

SCALE: 1" = 10'



PLAN

SCALE: 1" = 20'

CONSTRUCTION NOTES

(3) INSTALL 48" RCP D-LOAD PER PLAN
(4) INSTALL 36" RCP D-LOAD PER PLAN
(5) INSTALL 18" RCP D-LOAD PER PLAN
(6) CONSTRUCT MANHOLE NO. 1 PER RCFC & WCD STANDARD DWG. NO. MH251
(9) CONSTRUCT JUNCTION STRUCTURE NO. 2 PER RCFC & WCD STANDARD DWG. NO. JS227
(10) CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC & WCD STANDARD DWG. NO. JS229
(11) CONSTRUCT TRANSITION STRUCTURE NO. 3 PER RCFC & WCD STANDARD DWG. NO. TS303
(12) CONSTRUCT BULKHEAD STANDARD DWG. NO. M816 FOR FUTURE CONNECTIONS.
(15) CONSTRUCT CONCRETE DROP INLET PER RCFC & WCD. STANDARD DWG. CB110

MANHOLE / TRANSITION STRUCTURE DATA					
LATERAL	℄ STATION	WALL STATION	STRUCTURE	A	C
H-1A	10+49.07	–	JS NO. 4	45°	–
H-1B	10+72.70	10+74.20	TS NO. 3	45°	XX.XX'
H-1C	10+72.70	10+74.20	TS NO. 3	45°	XX.XX'
H-1D	13+06.17	–	JS NO. 4	45°	–

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER MICHAEL R. BRENDECKE NO. 83363 CIVIL STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering-Surveying-Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993" ELEV. 1603.71 (NAVD88)

REF	REVISIONS	APPR.	DATE

DESIGNED BY:	CC
DRAWN BY:	CC
CHECKED BY:	MB
P8 NO.:	———

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: CHIEF, DEVELOPER SERVICES DATE:
APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE:

TRACT 38236 PEN21-0184

MORENO VALLEY
STORM DRAIN LATERAL
H-1
STA. 10+00.00-13+50+00

CITY ID: LC022-0019
PROJECT NO. X-X-XXXXX
DRAWING NO. X-XXXX
SHEET NO. 12 OF 19

PLOT DATE: 11/1/2022 2:07 PM

U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_12.DWG

NOTE: CONTRACTOR TO PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED

13+50 14+00 15+00 16+00 17+00 17+50

1580 1575 1570 1565 1560 1555 1550 1545 1540 1535

STA. 13+50.00 MATCHLINE

STA 17+50.00 MATCHLINE

EXIST. SURFACE ℄ STORM DRAIN

FINISHED SURFACE ℄ STORM DRAIN

HGL

MH NO.4 (8) STA. 16+17.38 RIM=1559.45

JS NO 4 LAT H-1E (10) CL STA 14+54.30 18" RCP INLET

LAT H-1F CL STA 16+17.38 18" RCP INLET

8" WTR CROSSING SD STA. 16+95.53 1555.48 BOT 8" WTR 1553.94 TOP 36" SD

1548.30

S=0.0050

S=0.0050

1549.63 GB

1549.67

1549.62

S=0.0125

1551.29

STA. 16+14.63

STA. 16+20.13

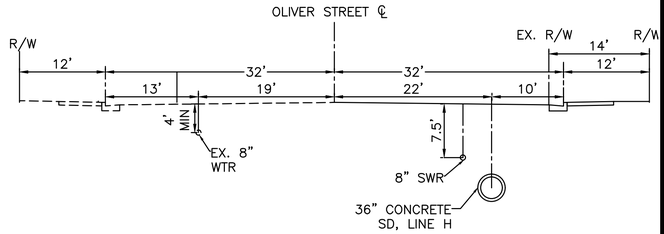
HYDRAULIC DATA
Q100 66.43 CFS
VMAX 9.40 FPS
(4)
104.3 LF 36" RCP D-2000

HYDRAULIC DATA
Q100 51.90 CFS
VMAX 7.34 FPS
(4)
160.32 LF 36" RCP D-2000

HYDRAULIC DATA
Q100 45.31 CFS
VMAX 6.41 FPS
(4)
129.87 LF 36" RCP D-2000

TO BE MAINTAINED BY THE CITY OF MORENO VALLEY

PROFILE



SECTION AT STA. 15+50.00
TYPICAL FROM STA. 13+50.00 TO 17+50.00

0 5 10 20
SCALE: 1" = 10'

PROFILE SCALES
HORIZ. 1"= 20'
VERT. 1" =5'

(10) STA. 14+54.30 LAT H-1=
STA. 10+00.00 LAT H-1E
JS NO. 4: A=45°, B=18"
C=XX.XX', D1=36", D2=36"
R&S=SEE LAT H-1E, SHEET 16

18" SD LAT H-1E SEE SHEET 16

R/W

EX. R/W

STREET N ℄

N0°26'04"E

PROP. CURB & GUTTER

STA. 14+00.00 MH NO. 2 (7)

EXISTING EDGE OF PAVEMENT

OLIVER STREET ℄

OLIVER STREET

CURB & GUTTER PER TRACT 38237

EXISTING 8" WATER PER D-2317

18" SD LAT H-1F SEE SHEET 16

EXISTING CURB & GUTTER

44' 22' 44'

STA. 13+50.00 MATCHLINE

STA. 17+50.00 MATCHLINE

(8) STA. 16+17.38 LAT H-1=
STA. 10+00.00 LAT H-1F
MH NO. 4: A=45°, B=18"
C=XX.XX', D1=36", D2=36"
R&S=SEE LAT H-1F, SHEET 16

0 10 20 40
SCALE: 1" = 20'

PLAN

CONSTRUCTION NOTES

(4) INSTALL 36" RCP D-LOAD PER PLAN
(5) INSTALL 18" RCP D-LOAD PER PLAN
(6) CONSTRUCT MANHOLE NO. 1 PER RCFC & WCD STANDARD DWG. NO. MH251
(7) CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STANDARD DWG. NO. MH252
(8) CONSTRUCT MANHOLE NO. 4 PER RCFC & WCD. STANDARD DWG. NO. MH254
(10) CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC & WCD STANDARD DWG. NO. JS229
(14) CONSTRUCT CATCH BASIN NO. 1 PER RCFC & WCD STANDARD DWG. NO. CB100
(15) CONSTRUCT CONCRETE DROP INLET PER RCFC & WCD. STANDARD DWG. CB110

MANHOLE / TRANSITION STRUCTURE DATA					
LATERAL	℄ STATION	WALL STATION	STRUCTURE	A	C
–	14+00.00	–	MH NO. 2	–	–
H-1E	14+54.30	14+55.80	JS NO. 4	45°	–
H-1F	16+17.38	16+18.88	MH NO. 4	45°	XX.XX'

TRACT 38236 PEN21-0184

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER MICHAEL R. BRENDECKE NO. 83363 CIVIL STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering-Surveying-Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993"
ELEV. 1603.71 (NAVD88)

REF	REVISIONS DESCRIPTION	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CC
DRAWN BY: CC
CHECKED BY: MB
P8 NO.: _____

RECOMMENDED FOR APPROVAL BY: CHIEF, DEVELOPER SERVICES DATE:

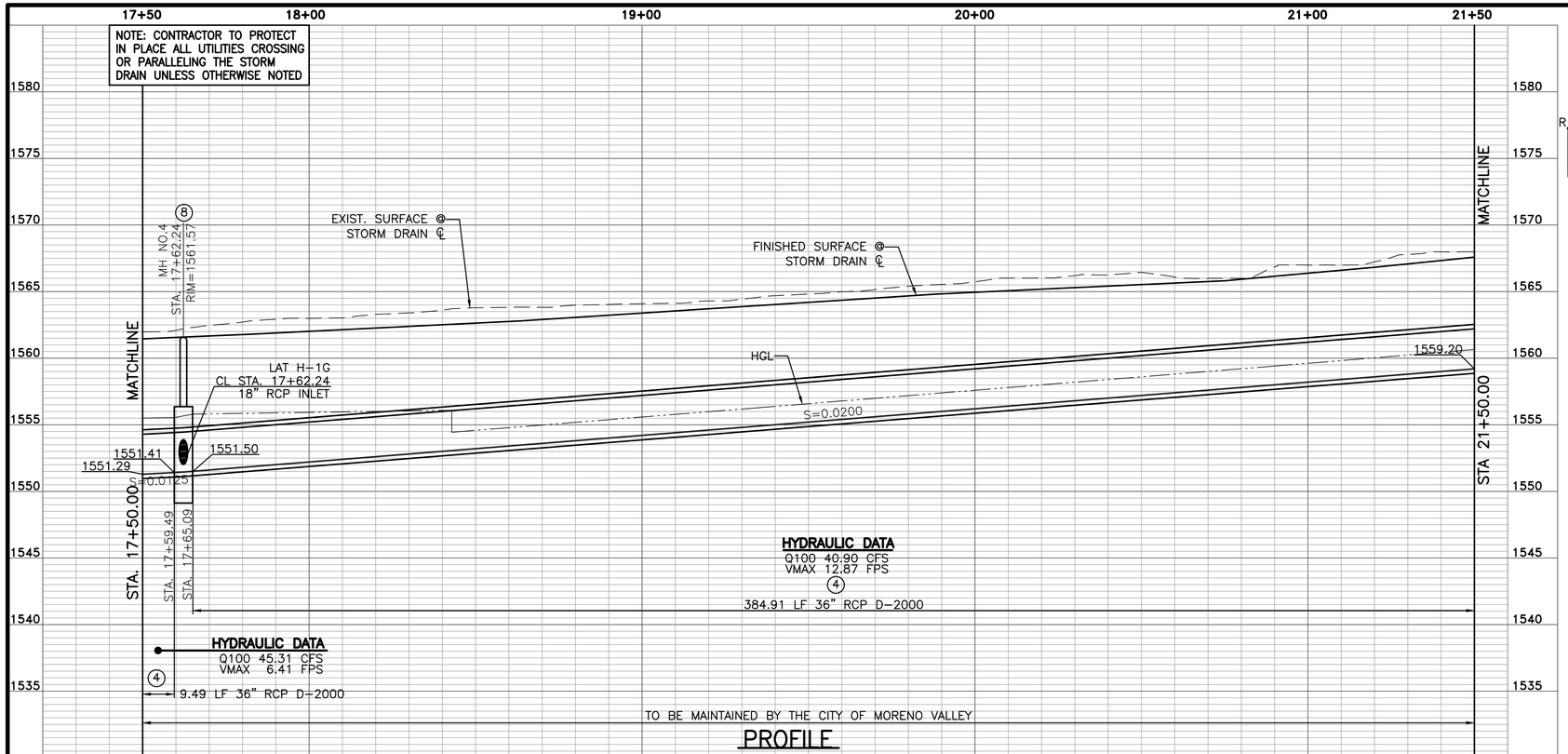
APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE:

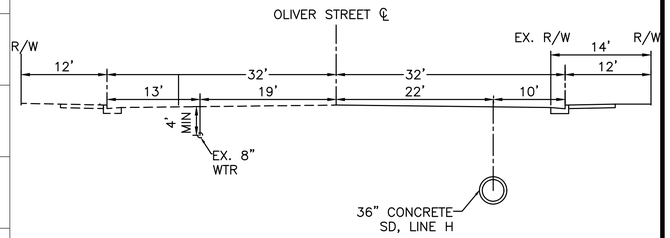
MORENO VALLEY STORM DRAIN LATERAL H-1 STA. 13+50.00-17+50.00

CITY ID: LC022-0019
PROJECT NO. X-X-XXXXX
DRAWING NO. X-XXXX
SHEET NO. 13 OF 19

PLOT DATE: 11/1/2022 2:08 PM

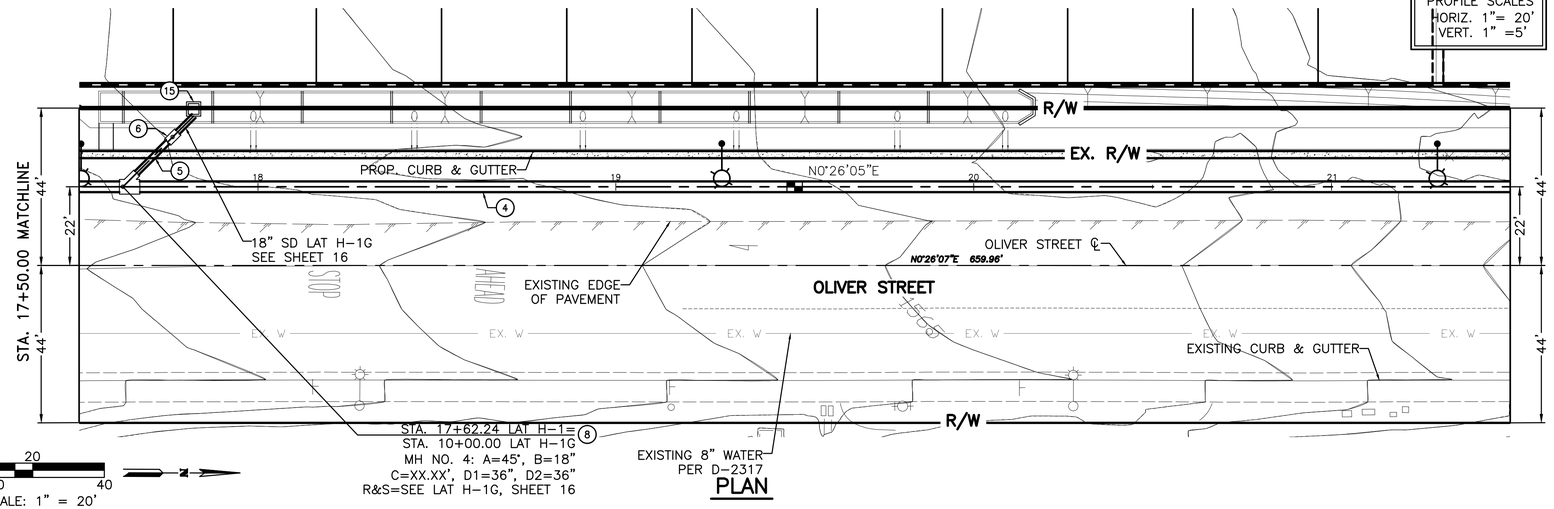
U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_13.DWG





SECTION AT STA. 19+50.00
TYPICAL FROM STA. 17+50.00 TO 21+50.00

10
0 5 20
SCALE: 1" = 10'



CONSTRUCTION NOTES

4. INSTALL 36" RCP D-LOAD PER PLAN
5. INSTALL 18" RCP D-LOAD PER PLAN
6. CONSTRUCT MANHOLE NO. 1 PER RCFC & WCD STANDARD DWG. NO. MH251
7. CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STANDARD DWG. NO. MH252
8. CONSTRUCT MANHOLE NO. 4 PER RCFC & WCD. STANDARD DWG. NO. MH254
10. CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC & WCD STANDARD DWG. NO. JS229
14. CONSTRUCT CATCH BASIN NO. 1 PER RCFC & WCD STANDARD DWG. NO. CB100
15. CONSTRUCT CONCRETE DROP INLET PER RCFC & WCD. STANDARD DWG. CB110

MANHOLE / TRANSITION STRUCTURE DATA					
LATERAL	℄ STATION	WALL STATION	STRUCTURE	A	C
H-1G	17+62.24	17+63.73	MH NO. 4	45°	XX.XX'

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER
MICHAEL R. BRENDECKE
NO. 83363
CIVIL
STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering·Surveying·Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241·Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993"
ELEV. 1603.71 (NAVD88)

REF	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CC
DRAWN BY: CC
CHECKED BY: MB
P8 NO.: _____

RECOMMENDED FOR APPROVAL BY: CHIEF, DEVELOPER SERVICES DATE:
APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE:

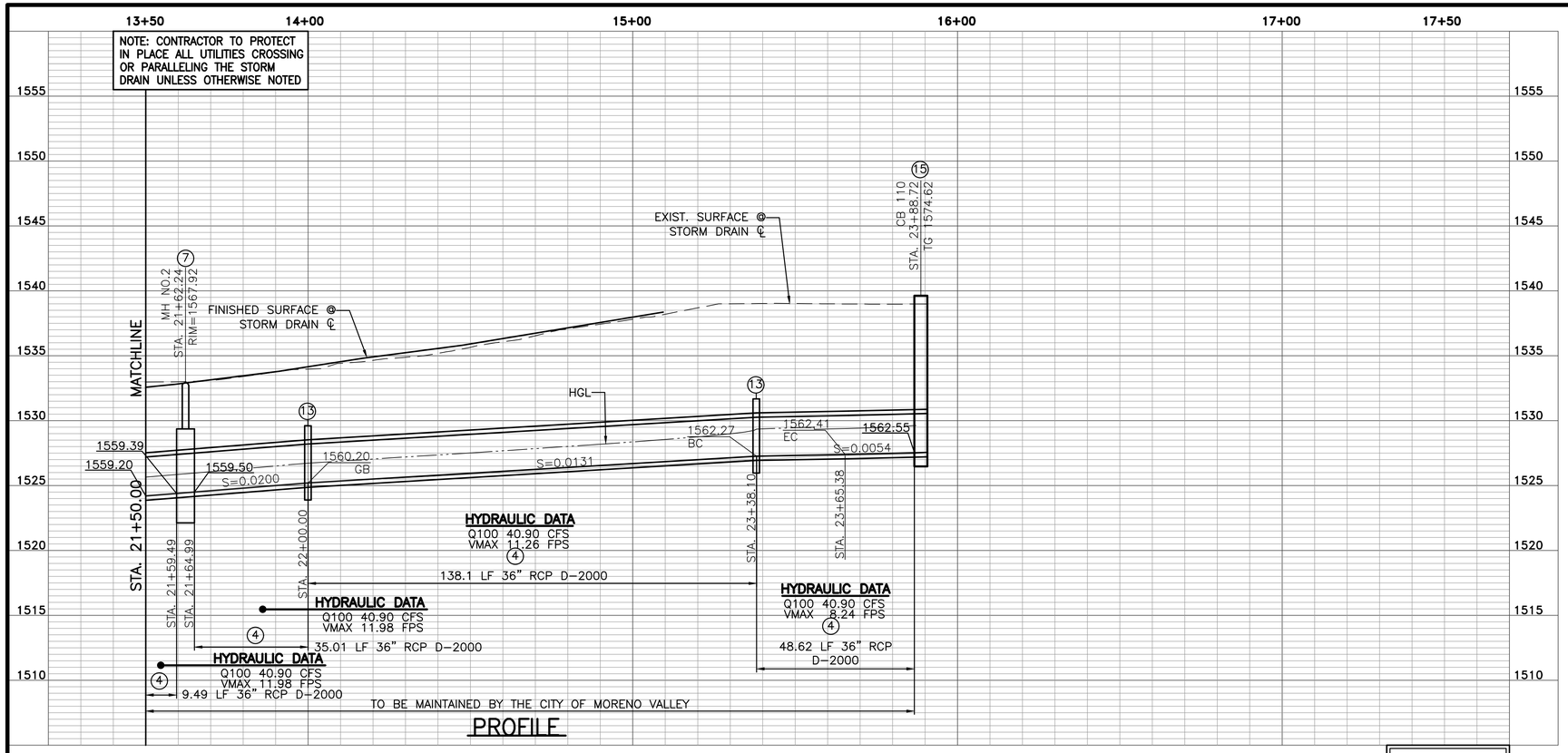
TRACT 38236 PEN21-0184

MORENO VALLEY STORM DRAIN LATERAL H-1 STA. 17+50.00-21+50.00

CITY ID: LC022-0019
PROJECT NO. X-X-XXXXX
DRAWING NO. X-XXXX
SHEET NO. 14 OF 19

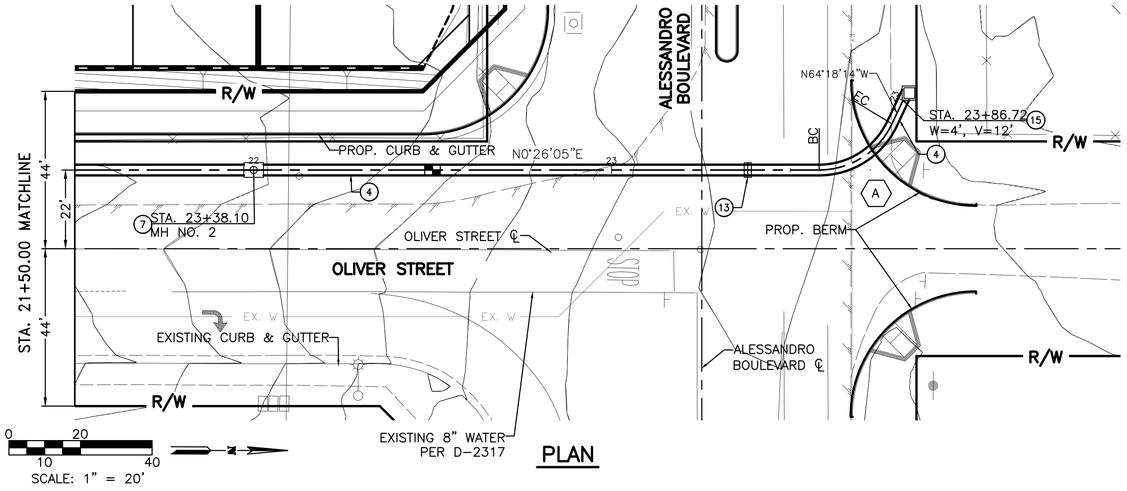
PLOT DATE: 11/1/2022 2:10 PM

U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_14.DWG

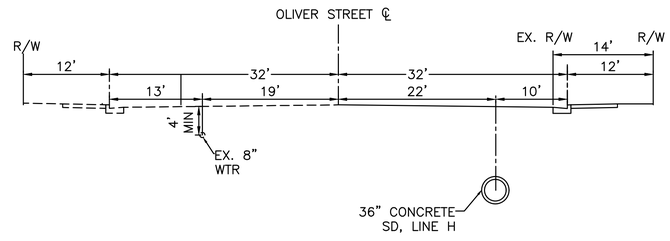


PROFILE

PROFILE SCALES
HORIZ. 1"= 20'
VERT. 1" =5'



PLAN



SECTION AT STA. 22+50.00
TYPICAL FROM STA. 21+50.00 TO 22+37.40

10
0 5 20
SCALE: 1" = 10'

Ⓐ ℄ CURVE DATA
△=34°44'22"
R=45.00'
T=14.08'
L=27.28'
BC=23+38.10
EC=23+65.38
PI= N:2278725.067
E:6278638.672

CONSTRUCTION NOTES

④ INSTALL 36" RCP D-LOAD PER PLAN

⑦ CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STANDARD DWG. NO. MH252

⑬ CONSTRUCT CONCRETE COLLAR PER RCFC & WCD STANDARD DWG. NO. M803

⑮ CONSTRUCT CONCRETE DROP INLET PER RCFC & WCD. STANDARD DWG. CB110

MANHOLE / TRANSITION STRUCTURE DATA					
LATERAL	℄ STATION	WALL STATION	STRUCTURE	A	C
–	23+38.10	–	MH NO. 2	–	–

TRACT 38236 PEN21-0184

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER
MICHAEL R. BRENDECKE
NO. 83363
CIVIL
STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering-Surveying-Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993"
ELEV. 1603.71 (NAVD88)

REF	DESCRIPTION	APPR.	DATE
	REVISIONS		

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CC
DRAWN BY: CC
CHECKED BY: MB
P8 NO.: _____

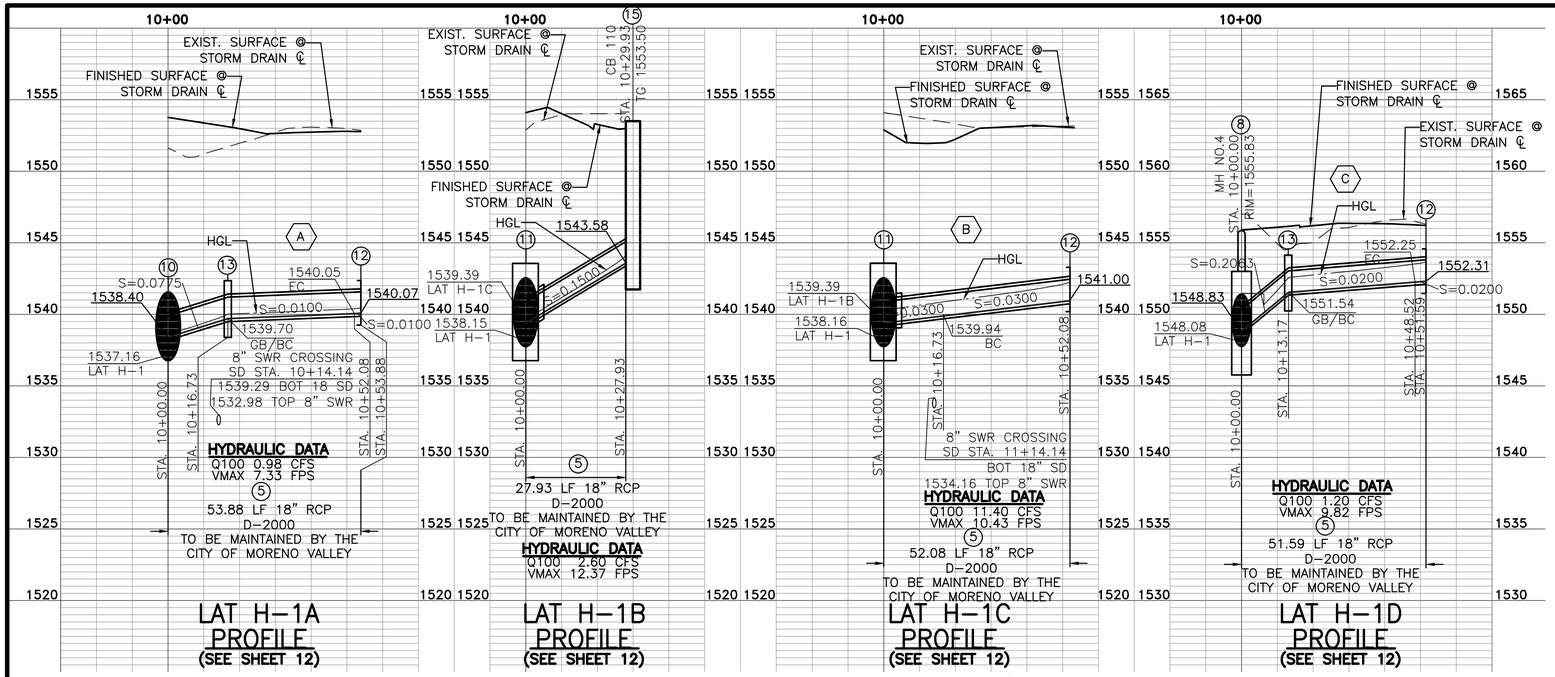
RECOMMENDED FOR APPROVAL BY: CHIEF, DEVELOPER SERVICES DATE:
APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE:

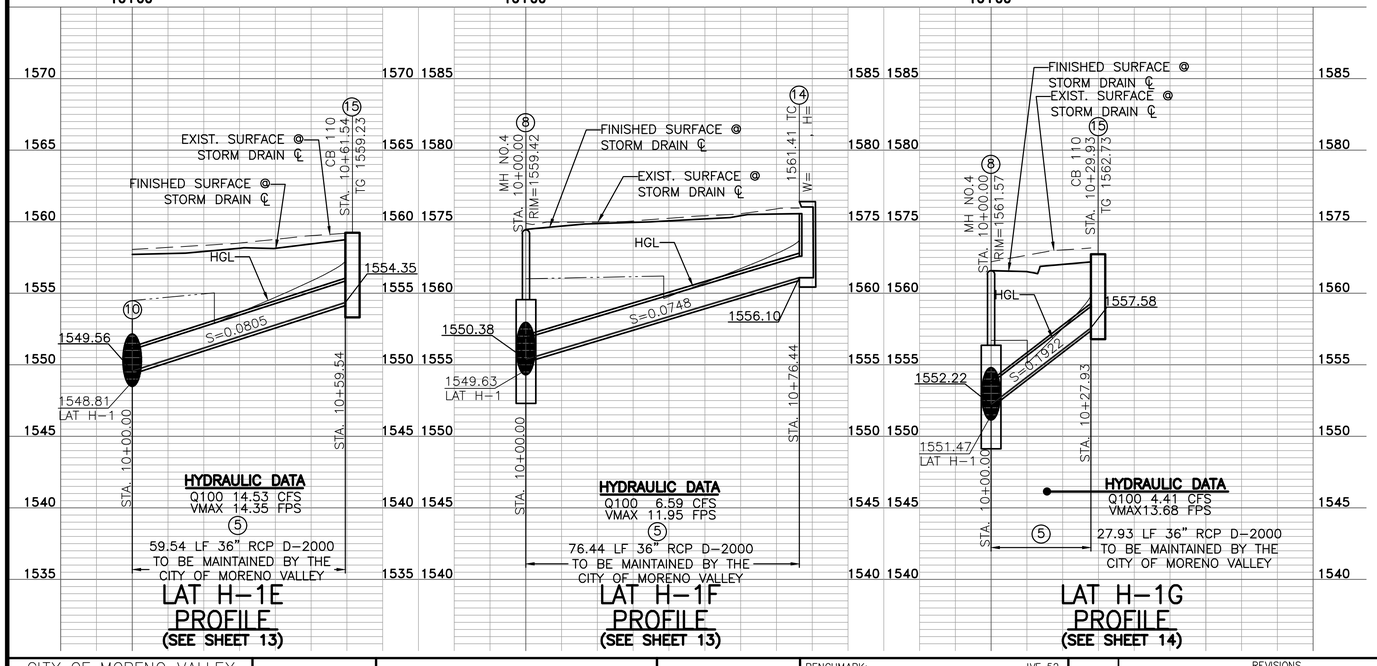
MORENO VALLEY STORM DRAIN LATERAL H-1 STA. 21+50.00-23+86.72

CITY ID: LC022-0019
PROJECT NO. X-X-XXXXX
DRAWING NO. X-XXXX
SHEET NO. 15 OF 19

PLOT DATE: 11/1/2022 2:12 PM

U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_15.DWG





A ℄ CURVE DATA
△=45°00'02"
R=45.00'
T=18.64'
L=35.43'
BC=10+16.73
EC=10+52.08
PI= N:2277446.818
E:-6278653.968

B ℄ CURVE DATA
△=45°00'02"
R=45.00'
T=18.64'
L=35.34'
BC=10+28.63
EC=10+52.07
PI= N:2277470.448
E:-6278654.147

C ℄ CURVE DATA
△=45°00'54"
R=45.00'
T=18.65'
L=35.35'
BC=10+13.17
EC=10+51.70
PI= N:2277701.418
E:-6278653.392

CONSTRUCTION NOTES

(5) INSTALL 18" RCP D-LOAD PER PLAN

(6) CONSTRUCT MANHOLE NO. 1 PER RCFC & WCD STANDARD DWG. NO. MH251

(10) CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC & WCD STANDARD DWG. NO. JS229

(11) CONSTRUCT TRANSITION STRUCTURE NO. 3 PER RCFC & WCD STANDARD DWG. NO. TS303

(13) CONSTRUCT CONCRETE COLLAR PER RCFC & WCD STANDARD DWG. NO. M803

(14) CONSTRUCT CATCH BASIN NO. 1 PER RCFC & WCD STANDARD DWG. NO. CB100

(15) CONSTRUCT CONCRETE DROP INLET PER RCFC & WCD. STANDARD DWG. CB110

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER — MICHAEL R. BRENDECKE — NO. 83363 — CIVIL — STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering-Surveying-Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993"
ELEV. 1603.71 (NAVD88)

REF	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CC
DRAWN BY: CC
CHECKED BY: MB
P8 NO.: _____

RECOMMENDED FOR APPROVAL BY: CHIEF, DEVELOPER SERVICES DATE:
APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE:

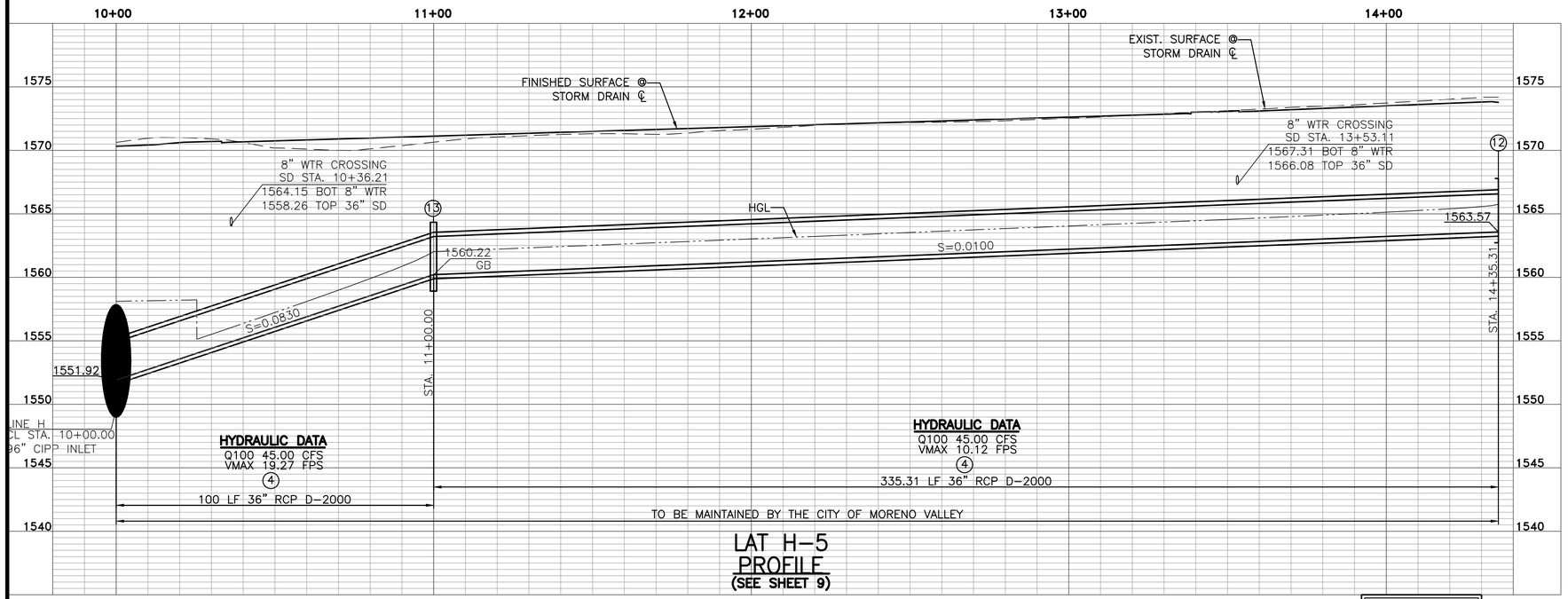
MORENO VALLEY STORM DRAIN LATERALS H-1A, H-1B, H-1C, H-1D, H-1E, H-1F & H-1G

TRACT 38236 PEN21-0184

CITY ID: LC022-0019
PROJECT NO. X-X-XXXXX
DRAWING NO. X-XXXX
SHEET NO. 16 OF 19

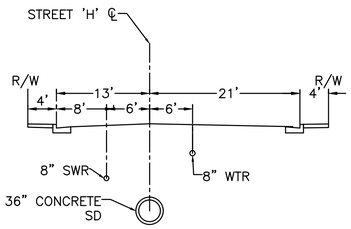
PLOT DATE: 11/1/2022 2:14 PM

U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_16.DWG



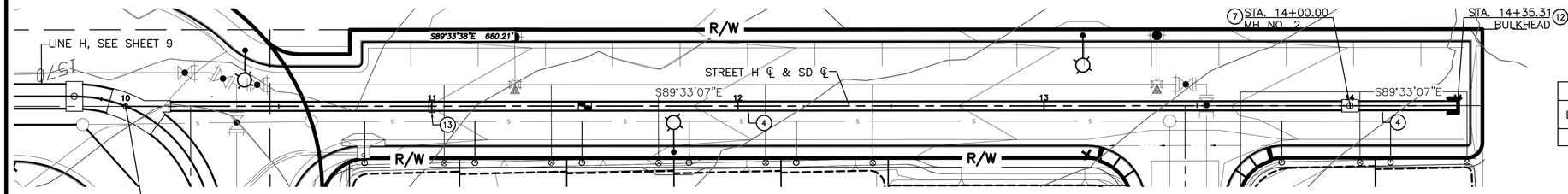
LAT H-5
PROFILE
(SEE SHEET 9)

PROFILE SCALES
HORIZ. 1"= 20'
VERT. 1" =5'



SECTION AT STA. 11+50.00
TYPICAL FROM STA. 10+00.00 TO 14+35.31

10
0 5 20
SCALE: 1" = 10'



LAT H-2A
PLAN

N

0 20
10 40
SCALE: 1" = 20'

CONSTRUCTION NOTES

4. INSTALL 36" RCP D-LOAD PER PLAN
7. CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STANDARD DWG. NO. MH252
9. CONSTRUCT JUNCTION STRUCTURE NO. 2 PER RCFC & WCD STANDARD DWG. NO. JS227
12. CONSTRUCT BULKHEAD STANDARD DWG. NO. M816 FOR FUTURE CONNECTIONS.
13. CONSTRUCT CONCRETE COLLAR PER RCFC & WCD STANDARD DWG. NO. M803

MANHOLE / TRANSITION STRUCTURE DATA					
LATERAL	℄ STATION	WALL STATION	STRUCTURE	A	C
–	14+00.00	–	MH NO. 2	–	–

TRACT 38236 PEN21-0184

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER
MICHAEL R. BRENDECKE
NO. 83363
CIVIL
STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering-Surveying-Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of:
Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993"
ELEV. 1603.71 (NAVD88)

REF	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CC
DRAWN BY: CC
CHECKED BY: MB
P8 NO.: _____

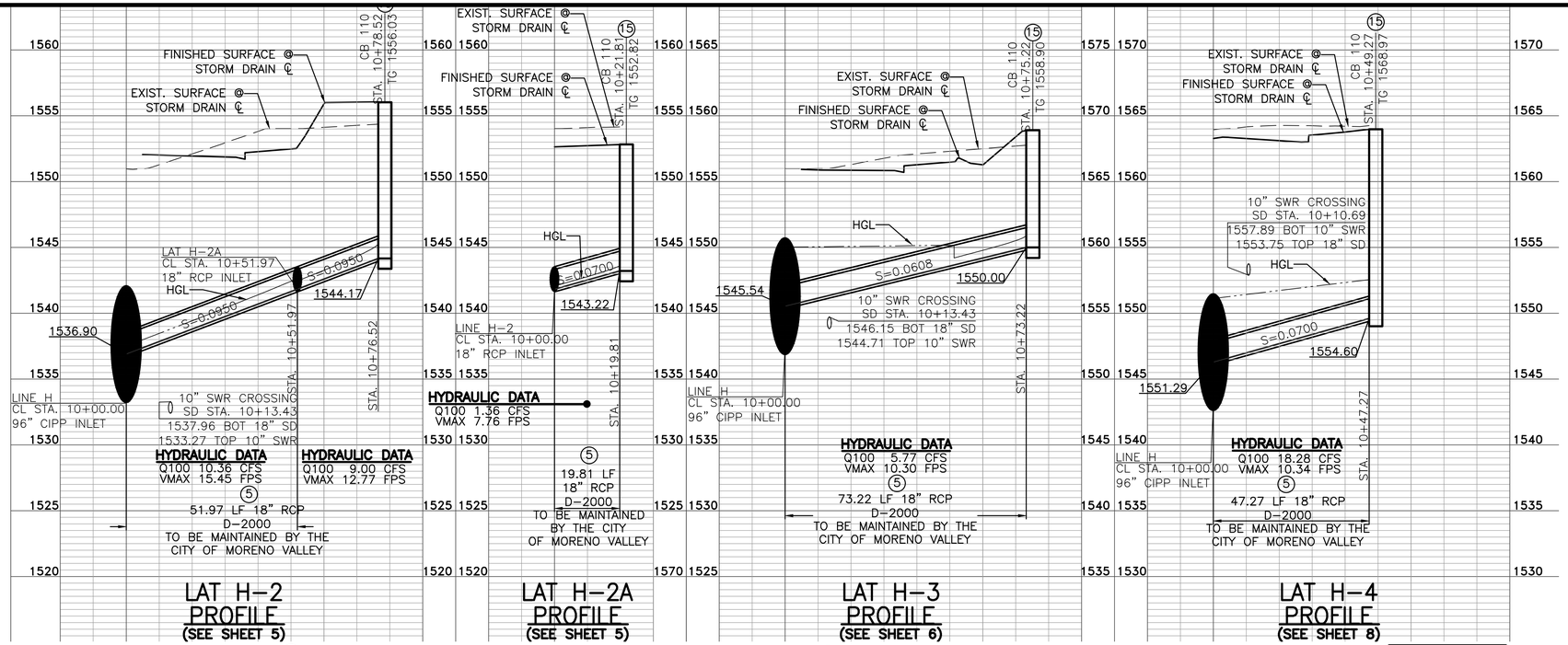
RECOMMENDED FOR APPROVAL BY: CHIEF, DEVELOPER SERVICES DATE:
APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE:

MORENO VALLEY
STORM DRAIN LATERAL
H-5

CITY ID: LC022-0019
PROJECT NO. X-X-XXXXX
DRAWING NO. X-XXXX
SHEET NO. 17 OF 19

PLOT DATE: 11/1/2022 2:15 PM

U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_17.DWG



CONSTRUCTION NOTES

(5) INSTALL 18" RCP D-LOAD PER PLAN

(6) CONSTRUCT MANHOLE NO. 1 PER RCFC & WCD STANDARD DWG. NO. MH251

(10) CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC & WCD STANDARD DWG. NO. JS229

(11) CONSTRUCT TRANSITION STRUCTURE NO. 3 PER RCFC & WCD STANDARD DWG. NO. TS303

(13) CONSTRUCT CONCRETE COLLAR PER RCFC & WCD STANDARD DWG. NO. M803

(14) CONSTRUCT CATCH BASIN NO. 1 PER RCFC & WCD STANDARD DWG. NO. CB100

(15) CONSTRUCT CONCRETE DROP INLET PER RCFC & WCD. STANDARD DWG. CB110

PROFILE SCALES
HORIZ. 1"= 20'
VERT. 1" =5'

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER
MICHAEL R. BRENDECKE
NO. 83363
CIVIL
STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering·Surveying·Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241·Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993"
ELEV. 1603.71 (NAVD88)

REF	DESCRIPTION	APPR.	DATE
	REVISIONS		

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CC	RECOMMENDED FOR APPROVAL BY: CHIEF, DEVELOPER SERVICES DATE:	APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE:
DRAWN BY: CC		
CHECKED BY: MB		
P8 NO.:		

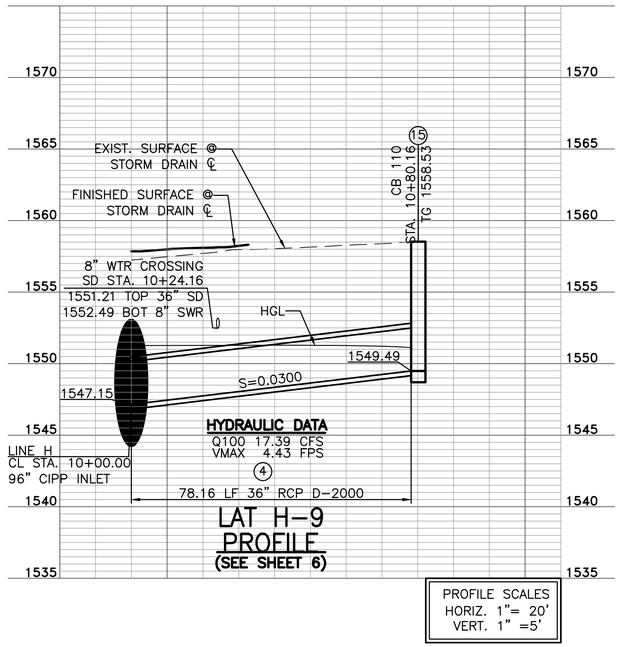
TRACT 38236 PEN21-0184

MORENO VALLEY STORM DRAIN LATERALS H-2, H-3, H-4, H-7, & H-8

CITY ID: LC022-0019
PROJECT NO. X-X-XXXXX
DRAWING NO. X-XXXX
SHEET NO. 18 OF 19

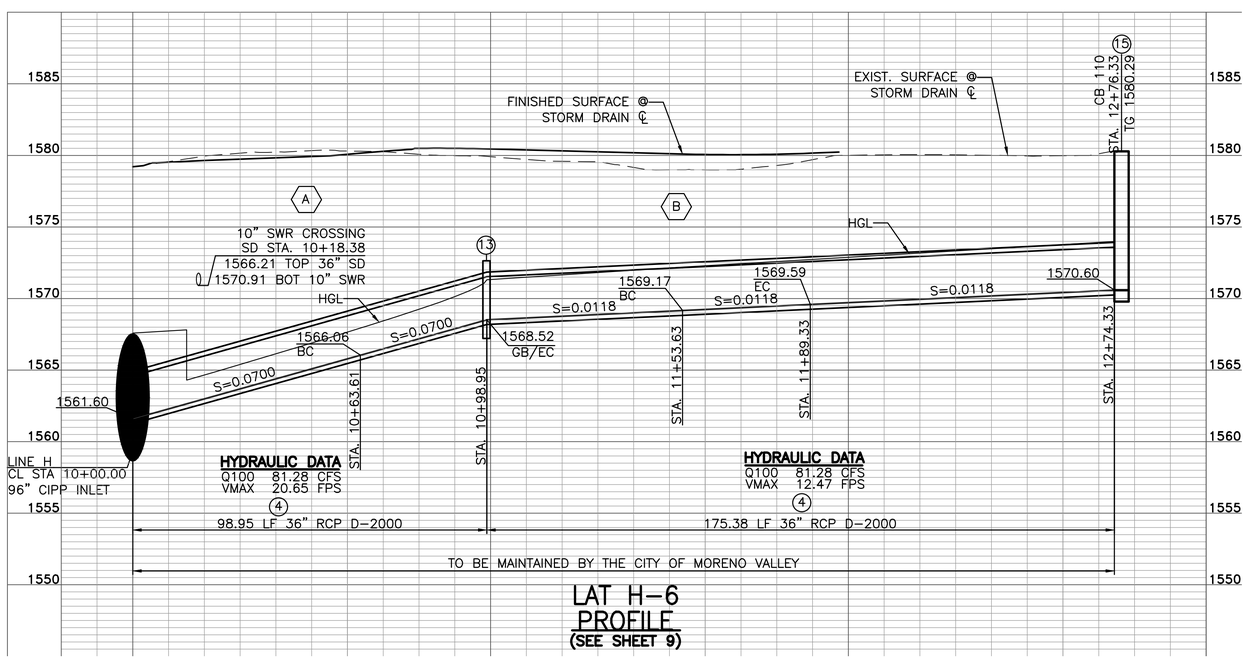
PLOT DATE: 11/1/2022 2:17 PM

U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_18.DWG



LAT H-9
PROFILE
(SEE SHEET 6)

PROFILE SCALES
HORIZ. 1"= 20'
VERT. 1" =5'



LAT H-6
PROFILE
(SEE SHEET 9)

CONSTRUCTION NOTES

(4) INSTALL 36" RCP D-LOAD PER PLAN

(10) CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC & WCD STANDARD DWG. NO. JS229

(13) CONSTRUCT CONCRETE COLLAR PER RCFC & WCD STANDARD DWG. NO. M803

(15) CONSTRUCT CONCRETE DROP INLET PER RCFC & WCD. STANDARD DWG. CB110

(A) ℄ CURVE DATA
△=45°00'00"
R=45.00'
T=18.64'
L=35.34'
BC=10+63.61
EC=10+98.95
PI= N:2278686.578
E:6277813.243

(B) ℄ CURVE DATA
△=45°26'43"
R=45.00'
T=18.84'
L=35.69'
BC=11+53.63
EC=11+89.33
PI= N:2278685.862
E:6277905.406

TRACT 38236 PEN21-0184

CITY OF MORENO VALLEY

REGISTERED PROFESSIONAL ENGINEER
MICHAEL R. BRENDECKE
NO. 83363
CIVIL
STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering·Surveying·Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: Michael R. Brendecke, R.C.E. 83363 Exp. 03.31.23 Date:

811 Know what's below. Call before you dig.

BENCHMARK: IVF 52
BRASS DISK AT THE NW CORNER OF ALESSANDRO BLVD. AND REDLANDS BLVD. 170.0 FEET NORTH OF ALESSANDRO BLVD.; 43.0 FEET WEST OF REDLANDS BLVD.; 2.0 FEET SE OF POWER POLE #21599 C.W.T.; 1.0 FEET NORTH OF A MARKER POST, A BRASS DISK SET IN THE TOP OF A CONCRETE POST AND MARKED "IVF 52 1993"
ELEV. 1603.71 (NAVD88)

REF	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CC	RECOMMENDED FOR APPROVAL: CHIEF, DEVELOPER SERVICES DATE:	APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE:
DRAWN BY: CC		
CHECKED BY: MB		
P8 NO.: _____		

MORENO VALLEY STORM DRAIN LATERALS H-9 & H-6

CITY ID: LC022-0019
PROJECT NO. X-X-XXXXX
DRAWING NO. X-XXXX
SHEET NO. 19 OF 19

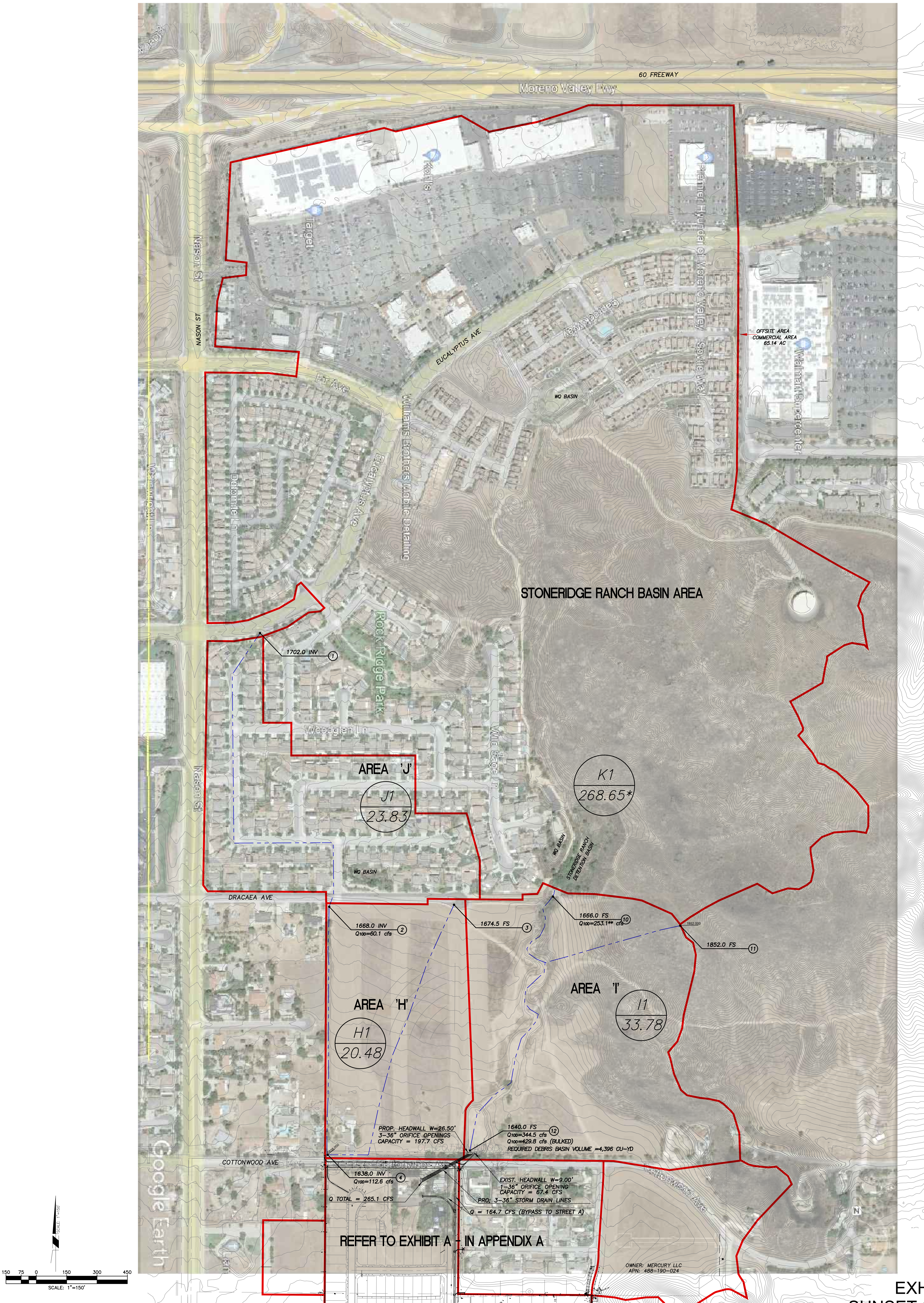
PLOT DATE: 11/1/2022 2:18 PM

U:\Projects\DR Horton\9971\Engineering\RCFC\9971 RCFC SD TR_38236_19.DWG

APPENDIX I

OFFSITE HYDROLOGY CALCULATIONS

OFFSITE HYDROLOGY MAP



LEGEND

- A / 0.9 — SUBAREA NO. / SUBAREA AREA – Acre
- (32) —— NODE NO. & ELEVATION
- — — - — FLOW LINE
- DRAINAGE AREA (DA) BOUNDARY

DEBRIS CALCULATIONS

29,700 CU YD/SQ MILE
AREA K + AREA I = 94.58 AC 0.148 SQ-MILES (HILLSIDE AREAS)
DEBRIS BASIN VOLUME = 29,700 X 0.148
= 4,396 CU-YD

NOTES:
*DRAINAGE AREA BASED ON APPROVED DRAINAGE STUDY FOR TRACT 32834 & 32836

**PEAK FLOW RATE BASED ON RECORD DRAWING MORENO-COLD CREEKK COURT STORM DRAIN
DWG NO. 4-929
PROJECT NO. 4-0-00961

EXHIBIT C
SUNSET CROSSINGS
HYDROLOGY MAP
OFFSITE HYDROLOGY

PROACTIVE
ENGINEERING CONSULTANTS

2/15/2024

OFFSITE 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 09/29/23 File: AREAHUH1100.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 H
100-YR
1-HR

Drainage Area = 20.48(Ac.) = 0.032 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 20.48(Ac.) = 0.032 Sq. Mi.
Length along longest watercourse = 1511.00(Ft.)
Length along longest watercourse measured to centroid = 672.00(Ft.)
Length along longest watercourse = 0.286 Mi.
Length along longest watercourse measured to centroid = 0.127 Mi.
Difference in elevation = 36.50(Ft.)
Slope along watercourse = 127.5447 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.081 Hr.
Lag time = 4.88 Min.
25% of lag time = 1.22 Min.
40% of lag time = 1.95 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]
20.48	0.49	10.04

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
20.48	1.20	24.58

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 %
20.480	78.00	0.000

Total Area Entered = 20.48(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
78.0	89.8	0.132	0.000	0.132	1.000	0.132
					Sum (F) =	0.132

Area averaged mean soil loss (F) (In/Hr) = 0.132
Minimum soil loss rate ((In/Hr)) = 0.066
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

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	102.387	19.933	4.114
2	0.167	204.773	48.564	10.024
3	0.250	307.160	15.285	3.155
4	0.333	409.546	6.937	1.432
5	0.417	511.933	3.882	0.801
6	0.500	614.320	2.503	0.517
7	0.583	716.706	1.526	0.315
8	0.667	819.093	1.370	0.283
		Sum = 100.000	Sum=	20.640

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	0.132	(0.544)	0.472
2	0.17	4.30	0.619	0.132	(0.557)	0.487
3	0.25	5.00	0.720	0.132	(0.648)	0.588
4	0.33	5.00	0.720	0.132	(0.648)	0.588
5	0.42	5.80	0.835	0.132	(0.752)	0.703
6	0.50	6.50	0.936	0.132	(0.842)	0.804
7	0.58	7.40	1.065	0.132	(0.959)	0.933
8	0.67	8.60	1.238	0.132	(1.114)	1.106
9	0.75	12.30	1.771	0.132	(1.594)	1.639

```
 10   0.83    29.10      4.190          0.132    (  3.771)        4.057
 11   0.92     6.80      0.979          0.132    (  0.881)        0.847
 12   1.00     5.00      0.720          0.132    (  0.648)        0.588
          (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    12.8
    Flood volume = Effective rainfall      1.07(In)
     times area      20.5(Ac.)/[(In)/(Ft.)] =       1.8(Ac.Ft)
    Total soil loss =      0.13(In)
    Total soil loss =     0.226(Ac.Ft)
    Total rainfall =      1.20(In)
    Flood volume =       79360.3 Cubic Feet
    Total soil loss =        9834.0 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =     52.483(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       15.0      30.0      45.0      60.0
 ------------------------------------------------------------------------
   0+ 5       0.0134      1.94  VQ        |         |         |         |
   0+10       0.0598      6.74  |V  Q     |         |         |         |
   0+15       0.1204      8.79  | V  Q    |         |         |         |
   0+20       0.1929     10.52  |   V  Q  |         |         |         |
   0+25       0.2735     11.72  |     VQ  |         |         |         |
   0+30       0.3678     13.69  |       VQ|         |         |         |
   0+35       0.4768     15.83  |         Q         |         |         |
   0+40       0.6043     18.52  |         | QV      |         |         |
   0+45       0.7636     23.12  |         |    QV   |         |         |
   0+50       1.0344     39.32  |         |         | V   Q   |         |
   0+55       1.3958     52.48  |         |         |         V   Q     |
   1+ 0       1.5879     27.89  |         |       Q |         |   V     |
   1+ 5       1.7035     16.78  |         |Q        |         |      V  |
   1+10       1.7571      7.78  |    Q    |         |         |       V |
   1+15       1.7877      4.45  | Q       |         |         |        V|
   1+20       1.8060      2.65  |Q        |         |         |        V|
   1+25       1.8178      1.72  |Q        |         |         |        V|
   1+30       1.8207      0.42  Q         |         |         |        V|
   1+35       1.8219      0.17  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 09/29/23 File: AREAI1100.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 I
100-YR
1-HR

Drainage Area = 33.78(Ac.) = 0.053 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 33.78(Ac.) = 0.053 Sq. Mi.
Length along longest watercourse = 1804.00(Ft.)
Length along longest watercourse measured to centroid = 1018.00(Ft.)
Length along longest watercourse = 0.342 Mi.
Length along longest watercourse measured to centroid = 0.193 Mi.
Difference in elevation = 212.00(Ft.)
Slope along watercourse = 620.4878 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.075 Hr.
Lag time = 4.53 Min.
25% of lag time = 1.13 Min.
40% of lag time = 1.81 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]
33.78	0.49	16.55

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
33.78	1.20	40.54

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 %
33.780	81.50	0.000

Total Area Entered = 33.78(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
81.5	91.9	0.105	0.000	0.105	1.000	0.105
					Sum (F) =	0.105

Area averaged mean soil loss (F) (In/Hr) = 0.105
Minimum soil loss rate ((In/Hr)) = 0.053
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

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

Combination of 'S' Curves:
VALLEY 'S' Curve Percentage = 56.00
FOOTHILL 'S' Curve Percentage = 44.00
MOUNTAIN 'S' Curve Percentage = 0.00
DESERT 'S' Curve Percentage = -0.00

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	110.406	20.490	6.976
2	0.167	220.812	52.070	17.727
3	0.250	331.218	15.381	5.236
4	0.333	441.625	6.371	2.169
5	0.417	552.031	2.751	0.937
6	0.500	662.437	1.598	0.544
7	0.583	772.843	0.877	0.299
8	0.667	883.249	0.461	0.157
		Sum = 100.000	Sum=	34.044

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	0.105	(0.544)	0.499
2	0.17	4.30	0.619	0.105	(0.557)	0.514
3	0.25	5.00	0.720	0.105	(0.648)	0.614
4	0.33	5.00	0.720	0.105	(0.648)	0.614
5	0.42	5.80	0.835	0.105	(0.751)	0.730

6	0.50	6.50	0.936	0.105	(0.842)	0.830
7	0.58	7.40	1.065	0.105	(0.959)	0.960
8	0.67	8.60	1.238	0.105	(1.114)	1.133
9	0.75	12.30	1.771	0.105	(1.594)	1.665
10	0.83	29.10	4.189	0.105	(3.770)	4.084
11	0.92	6.80	0.979	0.105	(0.881)	0.874
12	1.00	5.00	0.720	0.105	(0.648)	0.614

(Loss Rate Not Used)

Sum = 100.0 Sum = 13.1

Flood volume = Effective rainfall 1.09(In)
times area 33.8(Ac.)/[(In)/(Ft.)] = 3.1(Ac.Ft)
Total soil loss = 0.11(In)
Total soil loss = 0.296(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 134188.6 Cubic Feet
Total soil loss = 12912.0 Cubic Feet

Peak flow rate of this hydrograph = 91.376(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	25.0	50.0	75.0	100.0
0+ 5	0.0240	3.48	VQ				
0+10	0.1097	12.44	V Q				
0+15	0.2200	16.02	V Q				
0+20	0.3506	18.96	V Q				
0+25	0.4938	20.79	V Q				
0+30	0.6594	24.04	VQ				
0+35	0.8494	27.59	Q				
0+40	1.0698	32.01	QV				
0+45	1.3441	39.83	Q V				
0+50	1.8090	67.51	V Q				
0+55	2.4384	91.38	V Q				
1+ 0	2.7602	46.74	Q				
1+ 5	2.9457	26.93	Q				
1+10	3.0169	10.34	Q				
1+15	3.0517	5.05	Q				
1+20	3.0692	2.53	Q				
1+25	3.0777	1.24	Q				
1+30	3.0799	0.32	Q				
1+35	3.0805	0.10	Q				

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

Study date 10/02/23 File: MOVALTR32834OFFSITE1100.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

UNIT HYDROGRAPH
PROPOSED CONDITIONS
100-YR 1-HR
AREA J

Drainage Area = 23.83(Ac.) = 0.037 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 23.83(Ac.) = 0.037 Sq. Mi.
Length along longest watercourse = 1880.00(Ft.)
Length along longest watercourse measured to centroid = 1507.00(Ft.)
Length along longest watercourse = 0.356 Mi.
Length along longest watercourse measured to centroid = 0.285 Mi.
Difference in elevation = 34.00(Ft.)
Slope along watercourse = 95.4894 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.085 Hr.
Lag time = 5.08 Min.
25% of lag time = 1.27 Min.
40% of lag time = 2.03 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
23.83	0.50	11.91

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
23.83	1.20	28.60

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.500(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 %
23.830	56.00	0.500

Total Area Entered = 23.83(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	74.8	0.305	0.500	0.168	1.000	0.168
					Sum (F) =	0.168

Area averaged mean soil loss (F) (In/Hr) = 0.168
Minimum soil loss rate ((In/Hr)) = 0.084
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

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	98.426	18.716	4.495
2	0.167	196.851	48.270	11.593
3	0.250	295.277	15.879	3.814
4	0.333	393.702	7.147	1.716
5	0.417	492.128	4.040	0.970
6	0.500	590.553	2.621	0.629
7	0.583	688.979	1.650	0.396
8	0.667	787.404	1.058	0.254
9	0.750	885.830	0.618	0.148
		Sum = 100.000	Sum=	24.016

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

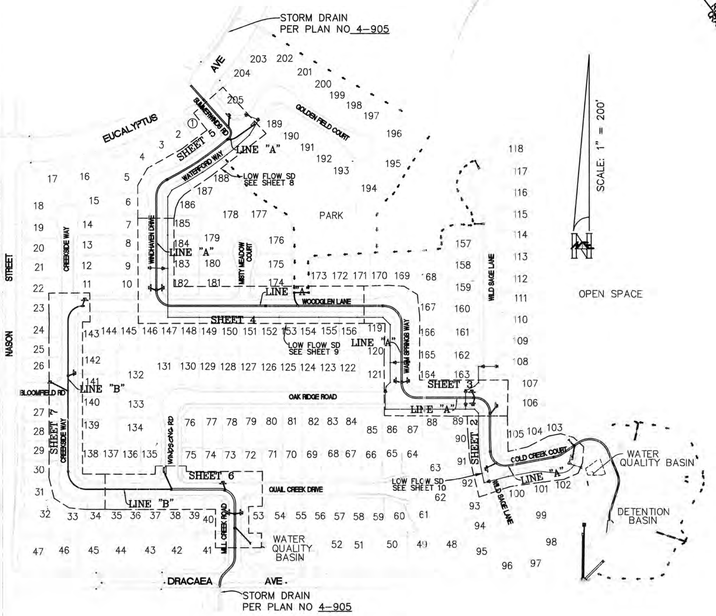
Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.605	0.168	(0.302)	0.437
2	0.17	4.30	0.619	0.168	(0.310)	0.451
3	0.25	5.00	0.720	0.168	(0.360)	0.552
4	0.33	5.00	0.720	0.168	(0.360)	0.552
5	0.42	5.80	0.835	0.168	(0.418)	0.667
6	0.50	6.50	0.936	0.168	(0.468)	0.768
7	0.58	7.40	1.065	0.168	(0.533)	0.897
8	0.67	8.60	1.238	0.168	(0.619)	1.070

```
 9   0.75    12.30      1.771          0.168    (  0.885)        1.603
10   0.83    29.10      4.189          0.168    (  2.095)        4.022
11   0.92     6.80      0.979          0.168    (  0.489)        0.811
12   1.00     5.00      0.720          0.168    (  0.360)        0.552
          (Loss Rate Not Used)
   Sum =     100.0                                    Sum =    12.4
    Flood volume = Effective rainfall      1.03(In)
     times area      23.8(Ac.)/[(In)/(Ft.)] =       2.0(Ac.Ft)
    Total soil loss =      0.17(In)
    Total soil loss =     0.334(Ac.Ft)
    Total rainfall =      1.20(In)
    Flood volume =       89253.1 Cubic Feet
    Total soil loss =       14528.0 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =     60.087(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       17.5      35.0      52.5      70.0
 ----------------------------------------------------------------------
   0+ 5       0.0135      1.96  VQ        |         |         |         |
   0+10       0.0624      7.09  |V  Q     |         |         |         |
   0+15       0.1270      9.38  | V  Q    |         |         |         |
   0+20       0.2052     11.35  |   V Q   |         |         |         |
   0+25       0.2927     12.71  |    V Q  |         |         |         |
   0+30       0.3957     14.96  |      VQ |         |         |         |
   0+35       0.5157     17.43  |        QV         |         |         |
   0+40       0.6567     20.47  |         |QV       |         |         |
   0+45       0.8341     25.76  |         |   Q V   |         |         |
   0+50       1.1364     43.89  |         |         | V  Q    |         |
   0+55       1.5502     60.09  |         |         |         V   Q     |
   1+ 0       1.7716     32.15  |         |       Q |         |   V     |
   1+ 5       1.9044     19.28  |         |Q        |         |      V  |
   1+10       1.9676      9.18  |    Q    |         |         |       V |
   1+15       2.0042      5.31  |  Q      |         |         |        V|
   1+20       2.0263      3.21  |Q        |         |         |        V|
   1+25       2.0396      1.93  |Q        |         |         |        V|
   1+30       2.0466      1.02  Q         |         |         |        V|
   1+35       2.0484      0.26  Q         |         |         |        V|
   1+40       2.0490      0.08  Q         |         |         |         V
-----------------------------------------------------------------------
```

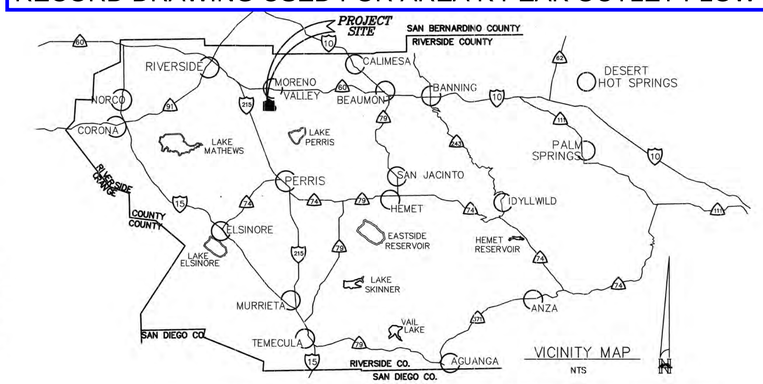
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECORD DRAWING USED FOR AREA K PEAK OUTLET FLOW RATE



INDEX MAP

1" = 200'



SCALE: 1" = 200'

OPEN SPACE

CONSTRUCTION NOTES AND QUANTITIES

ITEM	DESCRIPTION	QUANTITY	
(7)	CONST. CATCH BASIN NO.1 W/LOCAL DEPRESSION NO.2--CASE "B" PER RCFC STD. CB 100 & LD 201	18	EA
(8)	INSTALL 24" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)	1,886	LF
(8B)	INSTALL 2~24" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)	942	LF
(9)	INSTALL 18" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)	57	LF
(10)	INSTALL 48" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)	705	LF
(11)	INSTALL 54" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)	2,221	LF
(12)	INSTALL 60" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)	77	LF
(13)	CONST. WING TYPE HEADWALL PER CALTRANS STD PLAN D90	3	EA
~~(13A)~~	~~CONST. 'L' TYPE HEADWALL PER CALTRANS STD. PLAN D89~~	~~1~~	~~EA~~
(13B)	CONST. BOX CULVERT HEAD WALL TYPE"A" PER CALTRANS STD. PLAN D84	1	EA
(13C)	CONST. 'L' TYPE, DOUBLE HEADWALL PER CALTRANS STD. PLAN D89	1	EA
(14)	CONST. MANHOLE NO. 2 PER RCFC & WCD STD. DWG MH 252	6	EA
(14B)	CONST. MODIFIED TS #1 WITH 4.5' H X 8'W RCB PER CALTRANS STD. PLAN D-76A. & MH #2 PER RCFC & WCD STD MH 252 PER DETAIL SHEET 11.	1	EA
(15)	CONST. JUNCTION STRUCTURE NO. 2 PER RCFC & WCD STD. DWG JS 227	6	EA
(15A)	CONST. JUNCTION STRUCTURE NO. 4 CASE-1 PER RCFC & WCD STD. DWG. JS 229.	1	EA
(16)	CONST. CONCRETE DROP INLET PER RFCD & WCD STD. DWG NO. CB 110	2	EA
(17)	CONSTRUCT RIP-RAP ENERGY DISSIPATOR PER DETAIL SHEET 11.	11	CY
(18)	CONSTRUCT 5'X4' RCB PER CALTRANS STD. PLAN D-76A	281	LF
(19)	CONST. MANHOLE NO. 1 PER RCFC & WCD STD. DWG MH 251	3	EA
(20)	CONST. LOW/NUISANCE FLOW INLET STRUCTURE PER CITY OF MORENO VALLEY STD PLAN NO. 302A WITH CATCH BASIN COVER PER DETAIL ON SHEET 10	13	EA
(22)	CONSTRUCT ORIFICE PLATE PER DETAIL ON SHEET 10.	13	EA
(23)	CONST. 8" NYLOPLAST SOLID GRATE PER DETAIL SHEET 11.	32	EA
(24)	CONST. TRANSITION STRUCTURE NO. 1 PER RCFD & WCD STD. DWG. NO. TS 301	1	EA
(25)	CONST. TRANSITION STRUCTURE NO. 3 PER RCFD & WCD STD. DWG. NO. TS 303	1	EA
(26)	INSTALL CONCRETE BULKHEAD PER RCFC & WCD STD. M816	1	EA
(27)	CONST. 8" PVC LOW FLOW STORM DRAIN PIPE (PVT.)	2000	LF
(28)	CONST. 12" PVC LOW FLOW STORM DRAIN PIPE (PVT.)	554	LF
(29)	CONST. 18" PVC LOW FLOW STORM DRAIN PIPE (PVT.)	295	EA

NOTE: QUANTITIES SHOWN HEREON ARE ESTIMATES ONLY. CONTRACTOR RECOMMENDED TO PERFORM INDEPENDENT ESTIMATES FOR BID PURPOSES.

GENERAL NOTES

1. THE CONTRACTOR SHALL CONSTRUCT THE FLOOD CONTROL IMPROVEMENTS SHOWN ON THE DRAWINGS IN CONFORMANCE WITH THE REQUIREMENTS OF THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT'S M.O.U. STANDARD SPECIFICATIONS DATED SEPTEMBER 1984, AND DESIGN MANUAL STANDARD DRAWINGS DATED APRIL 2005.
2. AN ENCROACHMENT PERMIT IS REQUIRED FROM RIVERSIDE COUNTY FLOOD CONTROL. CONTACT ED LOTZ AT 951/955-1266. AFTER THE PERMIT IS ISSUED THE DISTRICT MUST BE NOTIFIED ONE WEEK PRIOR TO CONSTRUCTION.
3. CONSTRUCTION INSPECTION WILL BE PERFORMED BY RIVERSIDE COUNTY FLOOD CONTROL. CONTACT DALE ANDERSON AT 951/955-1288. THE DISTRICT MUST BE NOTIFIED TWENTY DAYS (20) PRIOR TO CONSTRUCTION.
4. ALL STATIONING REFERS TO CENTERLINE OF CONSTRUCTION UNLESS OTHERWISE NOTED.
5. STATIONING FOR LATERALS AND CONNECTOR PIPE REFER TO THE CENTERLINE INTERSECTION STATIONS.
6. FORTY-EIGHT HOURS BEFORE EXCAVATION, CALL UNDERGROUND SERVICE ALERT 1-800-227-2600.
7. ALL ELEVATIONS SHOWN ARE IN FEET AND DECIMALS THEREOF BASED ON U.S.C. & G.S DATUM.

INDEX

R.C.F.C. & W.C.D. STANDARD DRAWINGS

CB 100	CATCH BASIN No. 1
CB 103	MANHOLE FRAME AND COVER
CB 105	DETAIL OF CATCH BASIN OPENING & INSTALLATION DETAILS/REMOVABLE PROTECTION BAR FOR C.B.
CB 106	CATCH BASIN REINFORCEMENT
CB 110	CONCRETE DROP INLET
MH 251	MANHOLE NO. 1
MH 252	MANHOLE NO. 2
JS 227	JUNCTION STRUCTURE NO. 2
JS 229	JUNCTION STRUCTURE NO. 4
MH 255	MANHOLE FRAME & COVER NON-ROCKING
MH 257	MANHOLE SHAFT FOR CAST PIPE
M 803	CONCRETE COLLAR FOR PIPE
M 806	PIPE SUPPORTS ACROSS TRENCHES
M 814	ABBREVIATIONS AND SYMBOLS
M 815	BEDDING AND PAY LINES
M 816	CONCRETE BULKHEAD
TS 301	TRANSITION STRUCTURE 301
TS 303	TRANSITION STRUCTURE 303

CALTRANS STANDARD DRAWINGS

D 76A	REINFORCED CONCRETE BOX
D 84	BOX CULVERT WING WALLS
D 89	"L" TYPE HEAD WALL
D 90	WING TYPE HEAD WALL

AS BUILT
APPROVED BY: [illegible]
DATE: 6-18-09

UTILITY NOTE

THE LOCATIONS AND SIZES OF THE EXISTING UTILITIES SHOWN HEREON HAVE BEEN OBTAINED FROM AVAILABLE RECORDS AND ARE SHOWN FOR THE BENEFIT OF THE CONTRACTOR. ACTUAL LOCATIONS AND SIZES MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. IT IS THE CONTRACTORS RESPONSIBILITY TO TAKE ALL NECESSARY PRECAUTIONARY MEASURES TO PROTECT ALL UNDERGROUND AND OVERHEAD STRUCTURES WHETHER SHOWN OR NOT ON THESE DRAWINGS.

GENERAL NOTES (CONTINUED)

8. ALL CROSS SECTIONS ARE TAKEN LOOKING DOWNSTREAM.
9. ELEVATIONS OF UTILITIES ARE APPROXIMATE UNLESS OTHERWISE NOTED.
10. OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OR SIMILAR STRUCTURES TO BE ABANDONED SHALL BE SEALED WITH 6" OF CLASS "B" CONCRETE.
11. PIPE CONNECTED TO THE MAINLINE PIPE SHALL CONFORM TO JUNCTION STRUCTURE NO. 4 (JS 229) UNLESS OTHERWISE NOTED.
12. PIPE BEDDING SHALL CONFORM TO RCFC&WCD STD. DWG. NO. M815 EXCEPT FOR COVER <2 FEET. FOR COVER <2 FEET, CONCRETE SLURRY (2000 PSI - 2 SACK) SHALL BE USED. THE ENTIRE TRENCH SHALL BE SLURRY EXTENDING 4 INCHES MINIMUM AND 12 INCHES MAXIMUM ABOVE THE TOP OF PIPE.
13. BH-1 INDICATES SOIL BORING LOCATIONS BASED ON THE SOILS REPORT DATED MAY 14, 2004. LOCATIONS SHOWN ARE APPROXIMATE.
14. "V" IS THE DEPTH OF CATCH BASINS MEASURED FROM THE TOP OF CURB TO INVERT OF CONNECTOR PIPE.
15. CATCH BASINS SHALL BE LOCATED SO THAT LOCAL DEPRESSION SHALL BEGIN AT EXISTING CURB RETURN JOINT, UNLESS SPECIFIED.
16. ALL CURBS, GUTTERS, SIDEWALKS, DRIVEWAYS AND OTHER EXISTING IMPROVEMENTS TO BE RECONSTRUCTED IN KIND AND AT THE SAME ELEVATION AND LOCATION AS THE EXISTING IMPROVEMENTS UNLESS OTHERWISE NOTED.
17. STANDARD DRAWINGS CALLED FOR ON THE PLAN AND PROFILE SHALL CONFORM TO DISTRICT STANDARD DRAWINGS UNLESS NOTED OTHERWISE.
18. THE CONTRACTOR IS REQUIRED TO CALL ALL UTILITY AGENCIES REGARDING TEMPORARY SHORING AND SUPPORT REQUIREMENTS FOR THE VARIOUS UTILITY LINES SHOWN ON THESE PLANS.
19. DURING ROUGH GRADING OPERATIONS AND PRIOR TO CONSTRUCTION OF PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE CONTROL SHOULD BE PROVIDED TO PREVENT PONDING WATER AND DAMAGE TO ADJACENT PROPERTIES.
20. APPROVAL OF THESE PLANS BY THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT DOES NOT RELIEVE THE DEVELOPER'S ENGINEER OF RESPONSIBILITY FOR THE ENGINEERING DESIGN. IF FIELD CHANGES ARE REQUIRED, IT WILL BE THE RESPONSIBILITY OF THE DESIGN ENGINEER TO MAKE THE NECESSARY CORRECTIONS.
21. THE CONTRACTOR OR DEVELOPER SHALL SECURE ALL REQUIRED ENCROACHMENT AND/OR STATE AND FEDERAL REGULATORY PERMITS PRIOR TO THE COMMENCEMENT OF ANY WORK.

NOTIFICATIONS:

AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION, CONTRACTOR SHALL NOTIFY THE FOLLOWING:

A. EASTERN MUNICIPAL WATER DISTRICT, (951) 928-3777 EXT. 4830.

B. UNDERGROUND SERVICE ALERT (USA), 1-800-227-2600

C. ALL OTHER AFFECTED UTILITIES AND PERMIT AGENCIES:

1. SO. CALIF. GAS TRANSMISSION DIV. @ BEAUMONT (USA), 1-800-227-2600.
2. SO. CALIF. GAS CO. @ RIVERSIDE (USA), 1-800-227-2600.
3. SO. CALIF. EDISON CO. (USA), 1-800-227-2600.
4. GENERAL TELEPHONE (USA), 1-800-227-2600.
5. CITY OF MORENO VALLEY, (951) 413-3350.

D. CONSTRUCTION UNDER MORENO VALLEY SUBDIVISION AGREEMENT: CONTRACTOR SHALL NOTIFY CITY OF MORENO VALLEY CONSTRUCTION SECTION AT (951) 413-3350 AT LEAST 48 HOURS IN ADVANCE OF CONSTRUCTION.

REVIEW BY CITY STAFF		
OFFICE	INITIAL	DATE
COMMUNITY SERVICES DISTRICT		
CAPITAL PROJECTS		
TRANSPORTATION DIVISION		
PARKS & RECREATION		
LAND DEVELOPMENT		

BASIS OF BEARINGS:

THE BASIS OF BEARINGS FOR THIS MAP, IS THE CENTERLINE OF OF NASON STREET, AS SHOWN ON RECORD OF SURVEY 11/92 I.E. N 00°00'00" E

REGISTERED PROFESSIONAL ENGINEER EDWIN CARL REESE No. 58619 Exp. 12/31/06 CIVIL STATE OF CALIFORNIA

TRACT NO. 32834 (ONSITE)

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK:

LOCATION: BRASS DISC SET IN TOP OF A CONCRETE POST LOCATED 6.8' WESTERLY OF THE NORTHWEST END OF A CONCRETE HEADWALL AT THE NORTHWEST CORNER OF NASON STREET AND EUCALYPTUS AVENUE F-446

ELEV: 1694.482

PREPARED UNDER THE SUPERVISION OF: [signature]
DATE: 10/16/06
EDWIN C. REESE RCE NO. 58619 (EXP. 12-31-06)

APPROVED BY: [signature] 11/16/06
CHRIS VOGT, CITY ENGINEER R.C.E 44250(EXP. DATE 6/30/2007) DATE

[signature] 11/6/06
PREM KUMAR, ASST. CITY ENGINEER R.C.E. NO. 52463(EXP. DATE 12/31/2006) DATE

REC. BY:

DESIGNED BY: ECR
DRAWN BY: AM
DATE DRAWN: 11-02-05

HALE ENGINEERING
CIVIL ENGINEERING SURVEYING LAND PLANNING
7910 CONVOY COURT SAN DIEGO, CA 92111
(858) 715-1420 (858) 715-1424 FAX

REF.	DESCRIPTION	APPR.	DATE	APPR.	DATE
P8/2486 07	REVISIONS	ENGINEER		RCFC/	
1	REVD SHEETS 2 AND 11, AS-BUILT	CR	6/18/09	CVL	6/16/09

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: [signature] PLANNING ENGINEER DATE: 11-30-2006

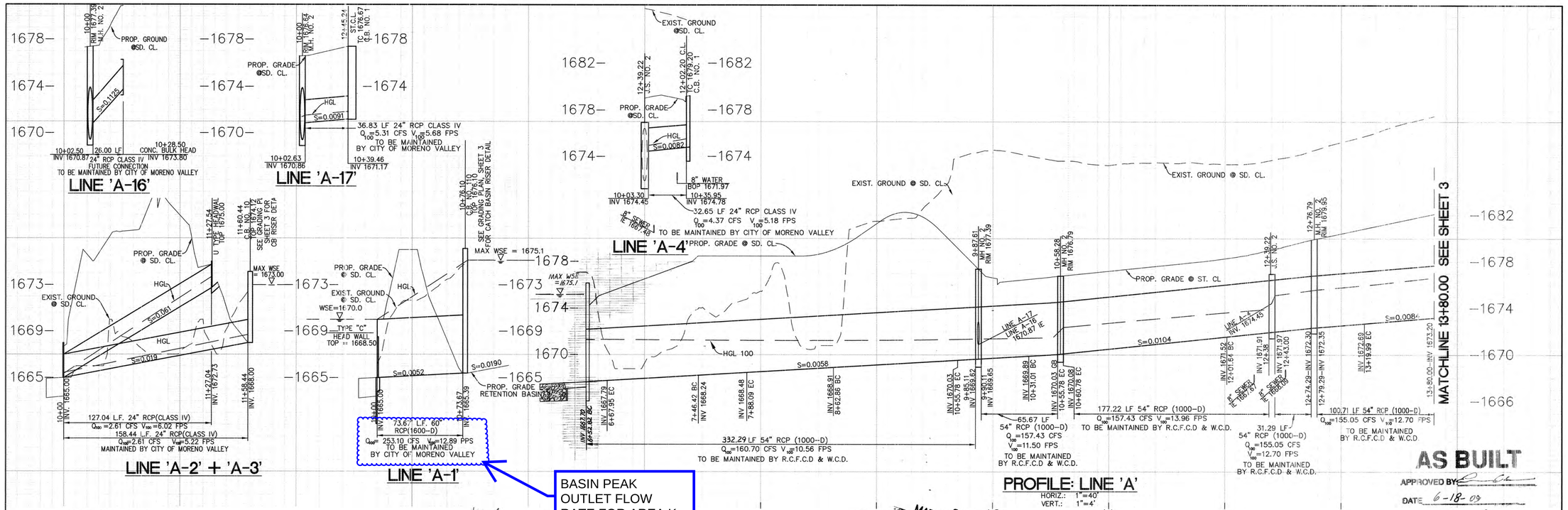
APPROVED BY: [signature] CHIEF ENGINEER DATE: 12/15/06

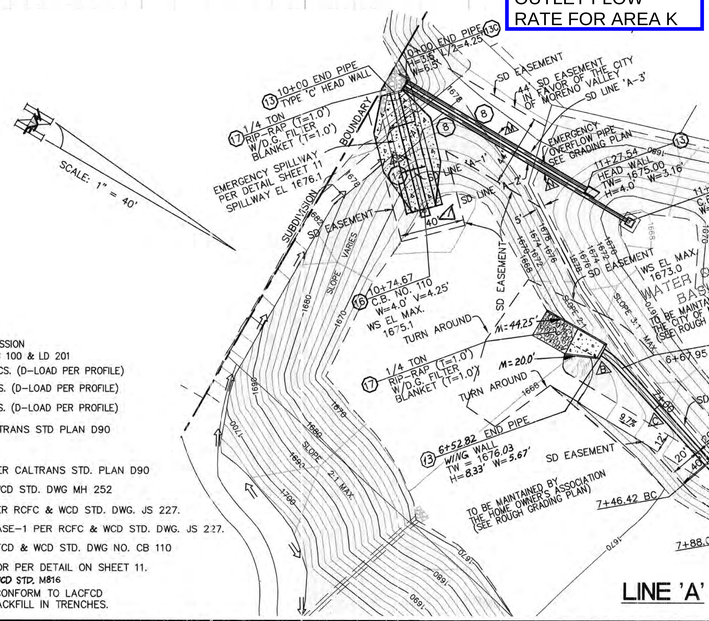
MORENO-COLD CREEK COURT
STORM DRAIN
TITLE SHEET

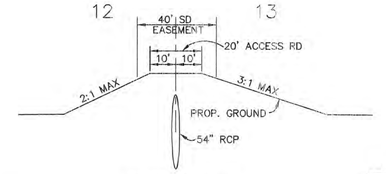
PROJECT NO. 4-0-00961
DRAWING NO. 4-929
SHEET NO. 1 OF 11

H.E. JOB NO. 0336 10/16/2006

CITY ID # 2811/3395







SECTION A-A
NOT TO SCALE

TYPICAL SECTION AT STA. 11+00
TYPICAL FROM 10+50 TO 12+01.64
SCALE 1"=40'
NOTE: ALL CROSS-SECTIONS TAKEN LOOKING DOWNSTREAM

STORM DRAIN DATA

	DELTA/BRG.	RADIUS	LENGTH
1	NOT USED		
2	22°24'02"	60.00'	15.13'
3	N 17°36'28" E		78.46'
4	39°47'32"	60.00'	41.67'
5	N 22°11'04" W		74.77'
6	102°04'04"	60.00'	106.89'
7	N 55°44'52" E		61.26'
8	19°23'19"	60.00'	24.77'
9	N 79°24'11" E		145.86'
10	95°40'33"	45.00'	75.14'
11	04°57'03"	500.00'	43.20'
12	N 00°01'47" E		60.00'
13	N 00°39'58" E		127.79'
14	N 00°39'58" E		159.19'
15	N 45°26'51" E		75.67'
16	N 10°44'52" E		36.83'
17	N 64°15'08" W		4.06'
18	27°48'58"	22.50'	10.92'
19	N 36°26'10" W		11.01'

CONSTRUCTION NOTES

(7) CONST. CATCH BASIN NO.1 W/LOCAL DEPRESSION NO. 2-CASE "B" PER RCFC & WCD STD. CB 100 & LD 201
(8) INSTALL 24" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)
(11) INSTALL 54" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)
(12) INSTALL 60" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)
(13) CONST. WING TYPE HEADWALL PER CALTRANS STD PLAN D90
(30) CONST. 'L' TYPE, DOUBLE HEADWALL PER CALTRANS STD. PLAN D90
(14) CONST. MANHOLE NO. 2 PER RCFC & WCD STD. DWG MH 252
(15) CONST. JUNCTION STRUCTURE NO. 2 PER RCFC & WCD STD. DWG. JS 227.
(5A) CONST. JUNCTION STRUCTURE NO. 4 CASE-1 PER RCFC & WCD STD. DWG. JS 227.
(16) CONST. CONCRETE DROP INLET PER RFCD & WCD STD. DWG NO. CB 110
(17) CONSTRUCT RIP-RAP ENERGY DISSIPATOR PER DETAIL ON SHEET 11.
(26) INSTALL CONCRETE BULKHEAD PER RCFC & WCD STD. M816
* PIPE WITH LESS THAN 2' OF COVER SHALL CONFORM TO LACFCD STD. 2-D213.3 & 2-D177 FOR CONCRETE BACKFILL IN TRENCHES.

REGISTERED PROFESSIONAL ENGINEER EDWIN CARL REESE No. 58619 Exp. 12/31/06 CIVIL STATE OF CALIFORNIA

SCALE 1" = 40'

TRACT NO. 32834

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK:
LOCATION: BRASS DISC SET IN TOP OF A CONCRETE POST LOCATED 5.8' WESTERLY OF THE NORTHWEST END OF A CONCRETE HEADWALL AT THE NORTHWEST CORNER OF NASON STREET AND EUCALYPTUS AVENUE F-446
ELEV: 1694.482

PREPARED UNDER THE SUPERVISION OF
DATE: 10/16/06
EDWIN C. REESE RCE NO. 58619 (EXP. 12-31-06)
APPROVED BY:
CHRIS VOGT, CITY ENGINEER R.C.E 44250(EXP. DATE 6/30/2007) DATE 11/6/06
PREM KUMAR, ASST. CITY ENGINEER R.C.E. NO. 52463(EXP. DATE 12/31/2006) DATE 11/6/06
REC. BY:

DESIGNED BY: ECR
DRAWN BY: AM
DATE DRAWN: 11-02-05

HALE ENGINEERING
CIVIL ENGINEERING SURVEYING LAND PLANNING
7910 CONVOY COURT SAN DIEGO, CA 92111
(858) 715-1420 (858) 715-1424 FAX

P8/2486 07 REVISIONS

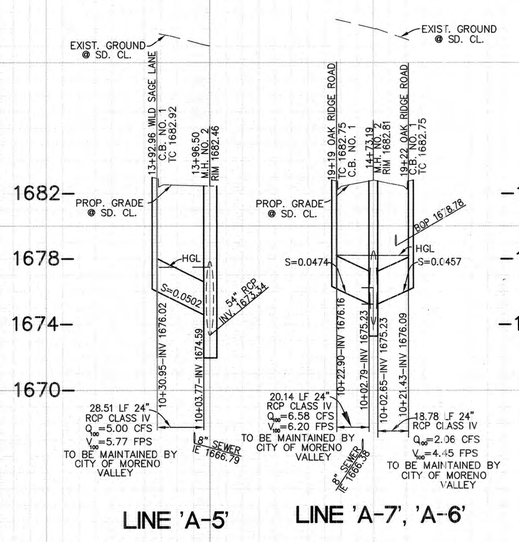
REF.	DESCRIPTION	ENGINEER APPR.	ENGINEER DATE	RCFC/ APPR.	RCFC/ DATE
1	ELONGATED SPILLWAY TO MATCH DETAIL, SHEET 11	EA	6/18/09	CVG	WATER

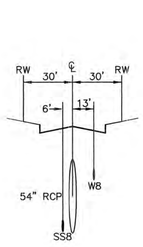
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: DATE: 11/30/06
APPROVED BY: DATE: 11-30-2006

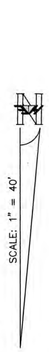
MORENO-COLD CREEK COURT STORM DRAIN
WILD SAGE LANE, COLD CREEK COURT STATION 6+71.73 TO 13+88.60

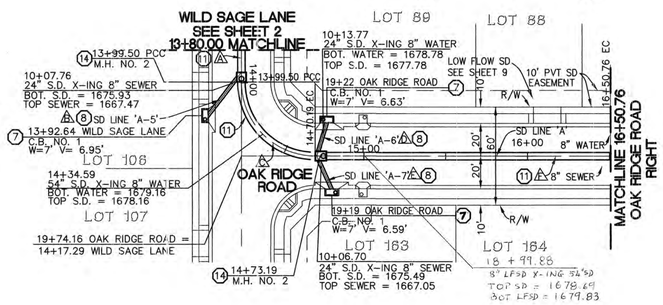
PROJECT NO. 4-0-00961
DRAWING NO. 4-929
SHEET NO. 2 OF 11

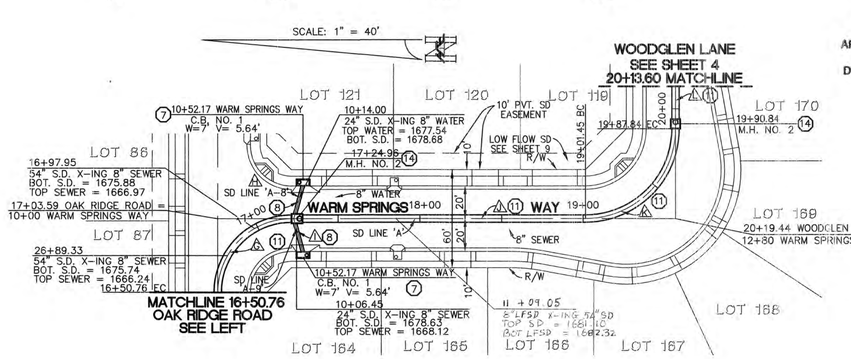
H.E. JOB NO. 0336 10/16/2006
CITY ID # 2811

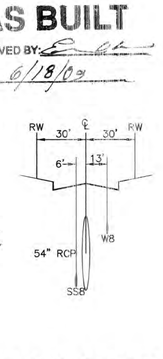












AS BUILT

APPROVED BY:

DATE 6/18/07

TYPICAL SECTION AT STA. 16+00

TYPICAL FROM 14+74.94 TO 16+50.76
SCALE 1"=40' HORIZ. 1"=4 VERT.

NOTE: ALL CROSS-SECTIONS TAKEN LOOKING DOWNSTREAM

LINE 'A'

TYPICAL SECTION AT STA. 19+00

TYPICAL FROM 17+24.95 TO 19+01.45
SCALE 1"=40' HORIZ. 1"=4 VERT.

NOTE: ALL CROSS-SECTIONS TAKEN LOOKING DOWNSTREAM

LINE 'A'

SD CENTERLINE DATA

LINE	LENGTH	RADIUS	DELTA / BRG.
1	10.91'	———	N 00°01'47" E
2	33.40'	———	N 37°56'41" E
3	70.69'	45.00'	90°00'00"
4	21.43'	———	N 16°45'03" E
5	22.48'	———	N 24°02'11" W
6	180.57'	———	N 89°58'13" W

SD CENTERLINE DATA

LINE	LENGTH	RADIUS	DELTA / BRG.
A	70.69'	45.00'	90°00'00"
B	21.29'	———	N 74°32'17" W
C	21.29'	———	N 74°35'42" E
D	180.00'	———	N 00°01'47" E
E	86.39'	55.00'	90°00'00"
F	25.75'	———	N 89°58'13" W

REGISTERED PROFESSIONAL ENGINEER — EDWIN CARL REESE — No. 58619 — Exp. 12/31/06 — CIVIL — STATE OF CALIFORNIA

CONSTRUCTION NOTES

(7) CONST. CATCH BASIN NO.1 W/LOCAL DEPRESSION NO. 2-CASE "B" PER RCFC & WCD STD. CB 100 & LD 201

(8) INSTALL 24" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)

(11) INSTALL 54" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)

(14) CONST. MANHOLE NO. 2 PER RCFC & WCD STD. DWG MH 252.

40 0 40 80 120

SCALE 1" = 40'

TRACT NO. 32834

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK:

LOCATION: BRASS DISC SET IN TOP OF A CONCRETE POST LOCATED 6.8' WESTERLY OF THE NORTHWEST END OF A CONCRETE HEADWALL AT THE NORTHWEST CORNER OF NASON STREET AND EUCALYPTUS AVENUE F-446

ELEV: 1694.482

PREPARED UNDER THE SUPERVISION OF

DATE: 10/16/06

EDWIN C. REESE RCE NO. 58619 (EXP. 12-31-06)

APPROVED BY: 11/6/06

CHRIS VOGT, CITY ENGINEER R.C.E 44250(EXP. DATE 6/30/2007) DATE

11/6/06

PREM KUMAR, ASST. CITY ENGINEER R.C.E. NO. 52463(EXP. DATE 12/31/2006) DATE

DESIGNED BY: ECR

DRAWN BY: AM

DATE DRAWN: 11-02-05

REC. BY:

HALE ENGINEERING
CIVIL ENGINEERING SURVEYING LAND PLANNING
7910 CONVOY COURT SAN DIEGO, CA 92111
(858) 715-1420
(858) 715-1424 FAX

P8/24807 REVISIONS

REF.	DESCRIPTION	ENGINEER APPR.	ENGINEER DATE	RCFC/ APPR.	RCFC/ DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: DATE: 11/30/06

APPROVED BY: DATE: 11-30-2006

MORENO-COLD CREEK COURT
STORM DRAIN
WARM SPRINGS WAY
OAK RIDGE ROAD
STATION 13+88.60 TO 20+13.60

PROJECT NO. 4-0-00961

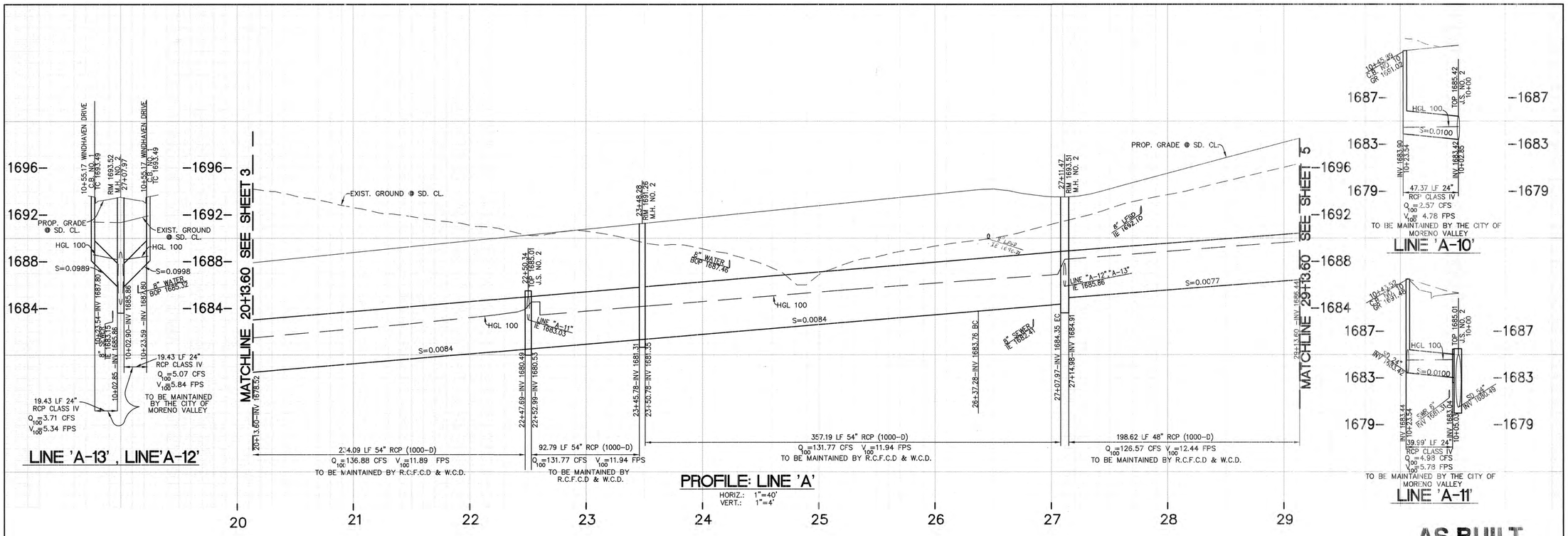
DRAWING NO. 4-929

SHEET NO. 3 OF 11

H.E. JOB NO. 0336

10/16/2006

CITY ID # 2811



TYPICAL SECTION AT STA. 23+00

TYPICAL FROM 20+13.60 TO 26+37.28
SCALE 1"=40'

NOTE: ALL CROSS-SECTIONS TAKEN LOOKING DOWNSTREAM

REGISTERED PROFESSIONAL ENGINEER — EDWIN CARL REESE — No. 58619 — Exp. 12/31/06 — CIVIL — STATE OF CALIFORNIA

CONSTRUCTION NOTES

(7) CONST. CATCH BASIN NO.1 W/LOCAL DEPRESSION NO. 2-CASE "B" PER RCFC & WCD STD. CB 100 & LD 201
(8) INSTALL 24" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)
(10) INSTALL 48" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)
(11) INSTALL 54" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)
(14) CONST. MANHOLE NO. 2 PER RCFC & WCD STD. DWG MH 252
(15) CONST. JUNCTION STRUCTURE NO. 2 PER RCFC & WCD STD. DWG JS 227
(16) CONST. CONCRETE DROP INLET PER RFCD & WCD STD. DWG NO. CB 110

SD CENTERLINE DATA

	DELTA/BRG.	RADIUS	LENGTH
1	N 89°58'13" W		623.68'
2	90°00'00"	45.00'	70.69'
3	N 67°04'45" W		22.28'
4	N 67°08'17" E		22.28'
5	N 00°01'47" E		205.63'
6	45°00'00"	45.00'	35.34'
7	N 00°01'47" E		8.18'
8	N 89°58'13" W		45.89'

40 0 40 80 120
SCALE 1" = 40'

TYPICAL SECTION AT STA. 28+00

TYPICAL FROM 27+11.47 TO 29+13.60
SCALE 1"=40'

NOTE: ALL CROSS-SECTIONS TAKEN LOOKING DOWNSTREAM

TRACT NO. 32834

10/16/2006

Don't Dig...Until You Call U.S.A. Toll Free
1-800-227-2600
for the location of buried utility lines.
Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK:
LOCATION: BRASS DISC SET IN TOP OF A CONCRETE POST LOCATED 6.8' WESTERLY OF THE NORTHWEST END OF A CONCRETE HEADWALL AT THE NORTHWEST CORNER OF NASON STREET AND EUCALYPTUS AVENUE F-446
ELEV: 1694.482

PREPARED UNDER THE SUPERVISION OF:
DATE: 10/16/06
EDWIN C. REESE RCE NO. 58619 (EXP. 12-31-06)
APPROVED BY: 11/6/06
CHRIS VOOT, CITY ENGINEER DATE
R.C.E 44250(EXP. DATE 6/30/2007)
11/6/06
PREM KUMAR, ASST. CITY ENGINEER DATE
R.C.E NO. 52463(EXP. DATE 12/31/2006)

DESIGNED BY: ECR
DRAWN BY: AM
DATE DRAWN: 11-02-05
REC. BY:

HALE ENGINEERING
CIVIL ENGINEERING SURVEYING LAND PLANNING
7910 CONVOY COURT SAN DIEGO, CA 92111
(858) 715-1420
(858) 715-1424 FAX

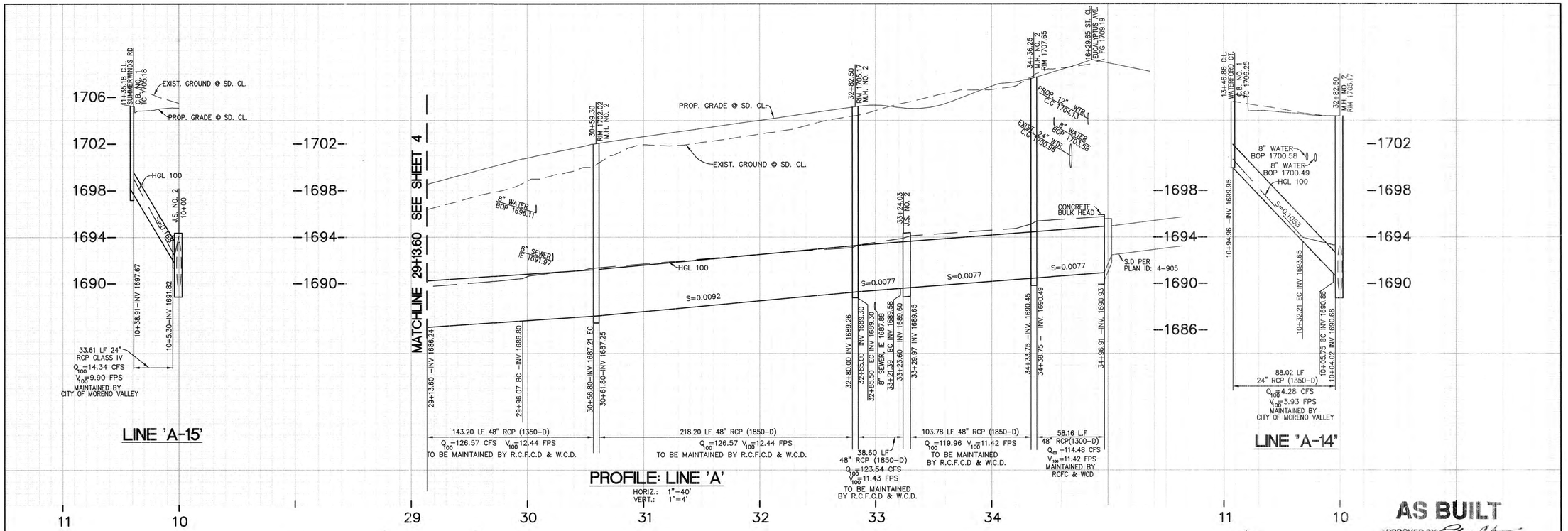
P8/24867 REVISIONS

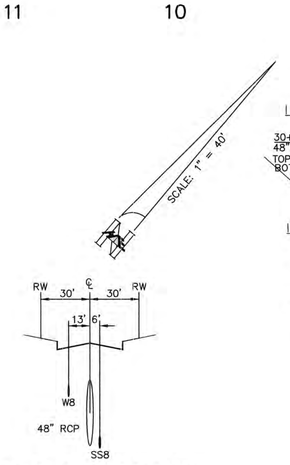
REF.	DESCRIPTION	ENGINEER APPR.	ENGINEER DATE	RCFC/ APPR.	RCFC/ DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: DATE: 11/30/06
APPROVED BY: DATE: 11-30-2006

MORENO-COLD CREEK COURT
STORM DRAIN LINE 'A'
WINDHAVEN DRIVE, WOODGLEN LANE
STATION 20+13.60 TO 29+13.60

4-0-00961
DRAWING NO. 4-929
SHEET NO. 4 OF 11
H.E. JOB NO. 0336
CITY ID # 2811

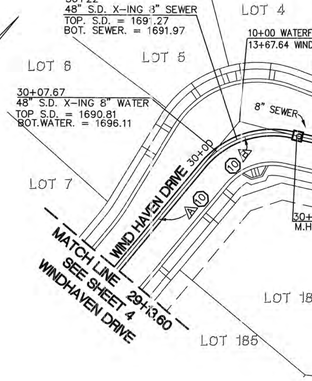




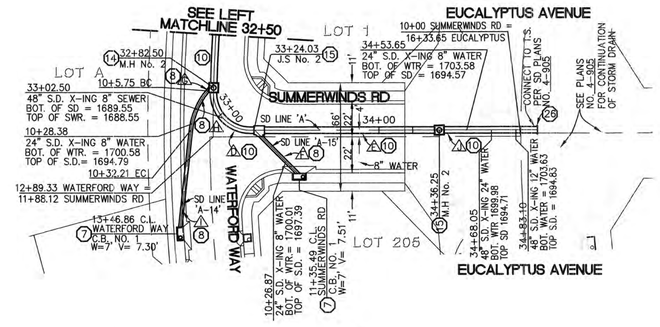
TYPICAL SECTION AT STA. 31+50

TYPICAL FROM 30+59.30 TO 32+50
SCALE 1"=40'

NOTE: ALL CROSS-SECTIONS TAKEN LOOKING DOWNSTREAM



LINE "A"



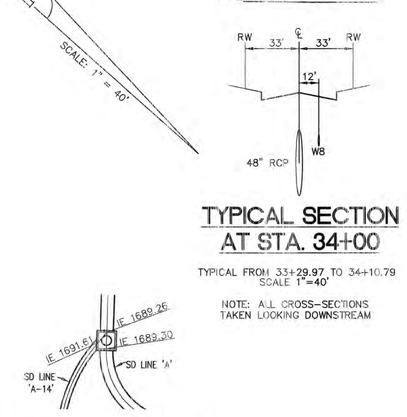
LINE "A"

SD CENTERLINE DATA

	DELTA/BRG.	RAD/US	LENGTH
1	N 00°01'47" E	---	82.48'
2	6.3°15'42"	55.00'	60.73'
3	13°43'15"	955.00'	228.70'
4	91°23'20"	22.50'	35.89'
5	N 41°49'07" W	---	115.53'
6	N 03°10'53" E	---	38.92'
7	N 88°16'13" E	---	1.74'
8	33°40'58"	45.00'	26.45'
9	N 54°35'15" E	---	59.83'
10	N 41°49'07" W	---	60.00'

CONSTRUCTION NOTES

7. CONST. CATCH BASIN NO.1 W/LOCAL DEPRESSION NO. 2-CASE "B" PER RCFC & WCD STD. CB 100 & LD 201
8. INSTALL 24" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)
10. INSTALL 48" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)
14. CONST. MANHOLE NO. 2 PER RCFC & WCD STD. DWG MH 252
15. CONST. JUNCTION STRUCTURE NO. 2 PER RCFC & WCD STD. DWG JS 227
26. INSTALL CONCRETE BULKHEAD PER RCFC & WCD STD. M816



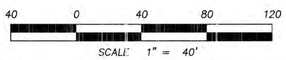
TYPICAL SECTION AT STA. 34+00

TYPICAL FROM 33+29.97 TO 34+10.79
SCALE 1"=40'

NOTE: ALL CROSS-SECTIONS TAKEN LOOKING DOWNSTREAM

CONNECTION DETAIL AT STA. 32+82.50

SCALE 1"=20'



REGISTERED PROFESSIONAL ENGINEER EDWIN CARL REESE No. 58619 Exp. 12/31/06 CIVIL STATE OF CALIFORNIA

AS BUILT
APPROVED BY
DATE 6-19-09

TRACT NO. 32834

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK: LOCATION: BRASS DISC SET IN TOP OF A CONCRETE POST LOCATED 8.8' WESTERLY OF THE NORTHWEST END OF A CONCRETE HEADWALL AT THE NORTHWEST CORNER OF NASON STREET AND EUCALYPTUS AVENUE. F-446
ELEV: 1694.482

PREPARED UNDER THE SUPERVISION OF
DATE: 10/16/06 EDWIN C. REESE RCE NO. 58619 (EXP. 12-31-06)
APPROVED BY: CHRIS VOGT, CITY ENGINEER R.C.E 44250(EXP. DATE 9/30/2007) DATE 11/6/06
PREM KUMAR, ASST. CITY ENGINEER R.C.E NO. 52463(EXP. DATE 12/31/2006) DATE 11/4/06

DESIGNED BY: ECR
DRAWN BY: AM
DATE DRAWN: 11-02-05
REC. BY:

HALE ENGINEERING
CIVIL ENGINEERING SURVEYING LAND PLANNING
7910 CONVOY COURT SAN DIEGO, CA 92111
(858) 715-1420 (858) 715-1424 FAX

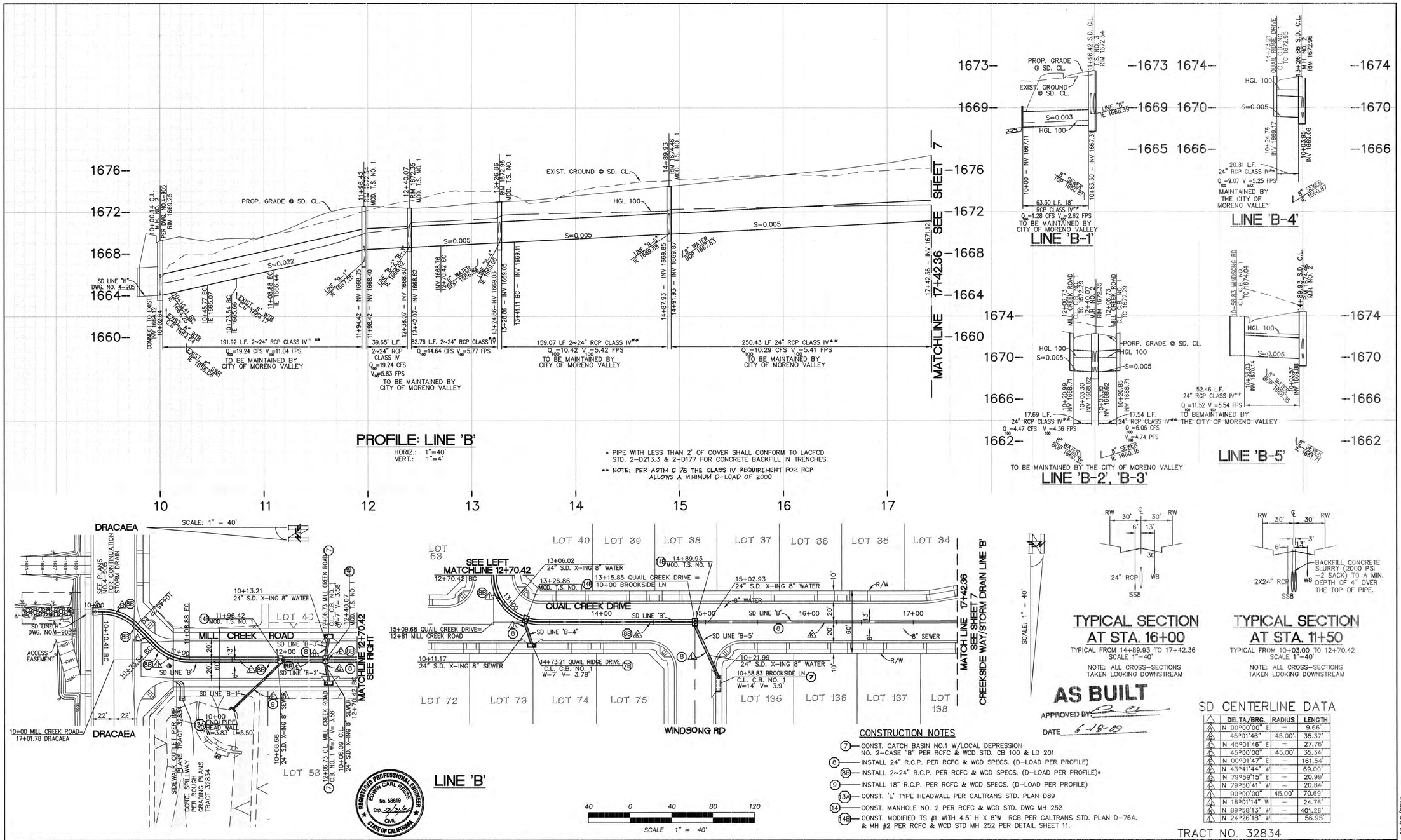
P8 / 24860 7 REVISIONS

REF.	DESCRIPTION	ENGINEER APPR.	ENGINEER DATE	RCFC/ APPR.	RCFC/ DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: DATE: 11/30/06
APPROVED BY: DATE: 11-30-2006

MORENO-COLD CREEK COURT
STORM DRAIN LINE 'A'
SUMMERWINDS RD, WATERFORD WAY
STATION 29+13.60 TO 34+10.79

PROJECT NO. 4-0-00961
DRAWING NO. 4-929
SHEET NO. 5 OF 11
H.E. JOB NO. 0336
10/16/2006
CITY ID # 2811



TYPICAL SECTION AT STA. 16+00

TYPICAL FROM 14+89.93 TO 17+42.36
SCALE 1"=40'

NOTE: ALL CROSS-SECTIONS TAKEN LOOKING DOWNSTREAM

TYPICAL SECTION AT STA. 11+50

TYPICAL FROM 10+03.00 TO 12+70.42
SCALE 1"=40'

NOTE: ALL CROSS-SECTIONS TAKEN LOOKING DOWNSTREAM

AS BUILT

APPROVED BY: _____

DATE 6-18-09

CONSTRUCTION NOTES

7 — CONST. CATCH BASIN NO.1 W/LOCAL DEPRESSION NO. 2-CASE "B" PER RCFC & WCD STD. CB 100 & LD 201
8 — INSTALL 24" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)
8B — INSTALL 2~24" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)*
9 — INSTALL 18" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)
13A — CONST. 'L' TYPE HEADWALL PER CALTRANS STD. PLAN D89
14 — CONST. MANHOLE NO. 2 PER RCFC & WCD STD. DWG MH 252
14B — CONST. MODIFIED TS #1 WITH 4.5' H X 8'W RCB PER CALTRANS STD. PLAN D-76A. & MH #2 PER RCFC & WCD STD MH 252 PER DETAIL SHEET 11.

SD CENTERLINE DATA

	DELTA/BRG.	RADIUS	LENGTH
1	N 00°00'00" E	–	9.66'
2	45°01'46"	45.00'	35.37'
3	N 45°01'46" E	–	27.76'
4	45°00'00"	45.00'	35.34'
5	N 00°01'47" E	–	161.54'
6	N 43°41'44" W	–	69.00'
7	N 78°59'15" E	–	20.99'
8	N 79°50'41" W	–	20.84'
9	90°00'00"	45.00'	70.69'
10	N 18°01'14" W	–	24.78'
11	N 89°58'13" W	–	401.26'
12	N 24°26'18" W	–	56.95'

TRACT NO. 32834

REGISTERED PROFESSIONAL ENGINEER EDWIN CARL REESE No. 58619 Exp. 12/31/06 CIVIL STATE OF CALIFORNIA

Don't Dig...Until You Call U.S.A. Toll Free
1-800-227-2600
for the location of buried utility lines.
Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK:
LOCATION: BRASS DISC SET IN TOP OF A CONCRETE POST LOCATED 6.8' WESTERLY OF THE NORTHWEST END OF A CONCRETE HEADWALL AT THE NORTHWEST CORNER OF NASON STREET AND EUCALYPTUS AVENUE F-446
ELEV: 1694.482

PREPARED UNDER THE SUPERVISION OF:
DATE: 10/6/06
EDWIN C. REESE RCE NO. 58619 (EXP. 12-31-06)
APPROVED BY: DATE 11/6/06
CHRIS VOGT, CITY ENGINEER R.C.E 44250(EXP. DATE 6/30/2007)
REC. BY: _____ DATE _____
PREM KUMAR, ASST. CITY ENGINEER R.C.E NO. 52463(EXP. DATE 12/31/2006) DATE 11/6/06

DESIGNED BY: ECR
DRAWN BY: AM
DATE DRAWN: 11-02-05

HALE ENGINEERING
CIVIL ENGINEERING SURVEYING LAND PLANNING
7910 CONVOY COURT SAN DIEGO, CA 92111
(858) 715-1420 (858) 715-1424 FAX

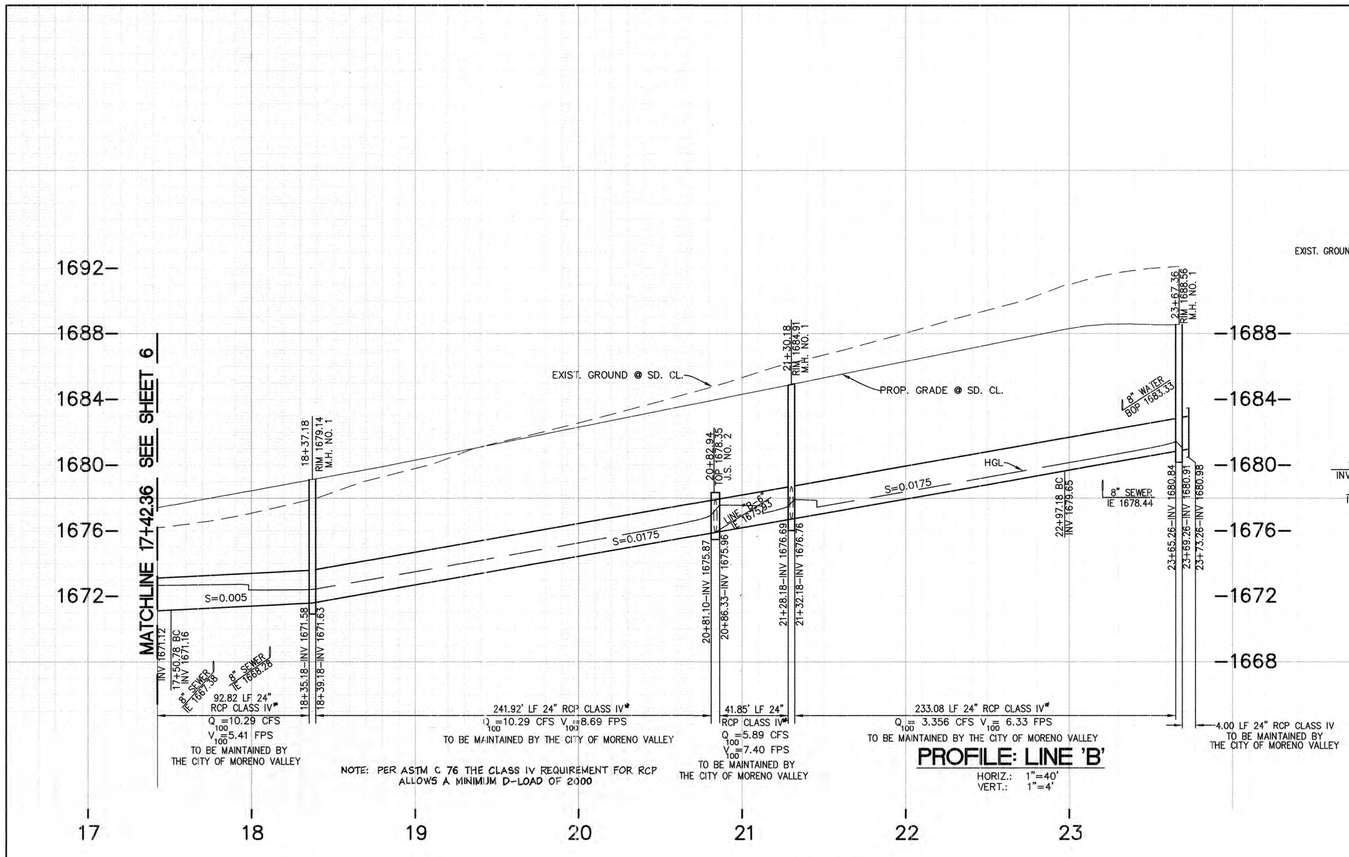
P8 / 2486 07 REVISIONS

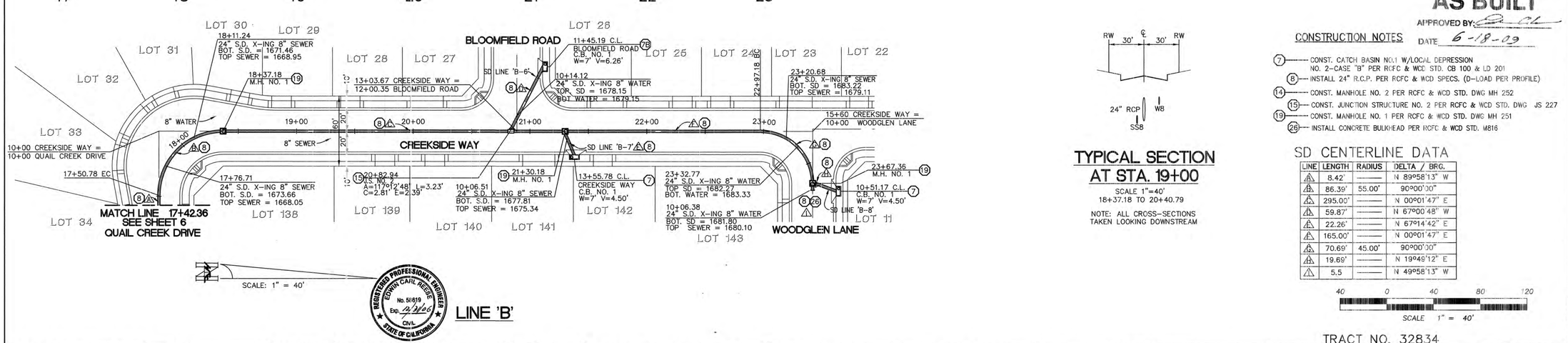
REF.	DESCRIPTION	ENGINEER APPR.	ENGINEER DATE	RCFC/ APPR.	RCFC/ DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

MORENO-COLD CREEK COURT STORM DRAIN LINE 'B'
QUAIL RIDGE DRIVE, MILL CREEK ROAD STATION 10+00 TO 17+42.36

PROJECT NO. 4-0-00961
DRAWING NO. 4-929
SHEET NO. 6 OF 11
H.E. JOB NO. 0336
10/16/2006
CITY ID # 2811





TYPICAL SECTION AT STA. 19+00

SCALE 1"=40'
18+37.18 TO 20+40.79

NOTE: ALL CROSS-SECTIONS TAKEN LOOKING DOWNSTREAM

AS BUILT

APPROVED BY: [signature]

DATE 6-18-09

CONSTRUCTION NOTES

(7) CONST. CATCH BASIN NO.1 W/LOCAL DEPRESSION NO. 2-CASE "B" PER RCFC & WCD STD. CB 100 & LD 201
(8) INSTALL 24" R.C.P. PER RCFC & WCD SPECS. (D-LOAD PER PROFILE)
(14) CONST. MANHOLE NO. 2 PER RCFC & WCD STD. DWG MH 252
(15) CONST. JUNCTION STRUCTURE NO. 2 PER RCFC & WCD STD. DWG JS 227
(19) CONST. MANHOLE NO. 1 PER RCFC & WCD STD. DWG MH 251
(26) INSTALL CONCRETE BULKHEAD PER RCFC & WCD STD. M816

SD CENTERLINE DATA

LINE	LENGTH	RADIUS	DELTA / BRG.
1	8.42'	———	N 89°58'13" W
2	86.39'	55.00'	90°00'00"
3	295.00'	———	N 00°01'47" E
4	59.87'	———	N 67°00'48" W
5	22.26'	———	N 67°14'42" E
6	165.00'	———	N 00°01'47" E
7	70.69'	45.00'	90°00'00"
8	19.69'	———	N 19°45'12" E
9	5.5	———	N 49°58'13" W

40 0 40 80 120
SCALE 1" = 40'

REGISTERED PROFESSIONAL ENGINEER EDWIN CARL REESE No. 58619 Exp. 12/31/06 CIVIL STATE OF CALIFORNIA

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK:
LOCATION: BRASS DISC SET IN TOP OF A CONCRETE POST LOCATED 6.8' WESTERLY OF THE NORTHWEST END OF A CONCRETE HEADWALL AT THE NORTHWEST CORNER OF NASON STREET AND EUCALYPTUS AVENUE F-446
ELEV: 1694.482

PREPARED UNDER THE SUPERVISION OF: [signature]
DATE: 10/16/06
EDWIN C. REESE RCE NO. 58619 (EXP. 12-31-06)
APPROVED BY: [signature] DATE 11/16/06
CHRIS VOGT, CITY ENGINEER R.C.E 44250(EXP. DATE 6/30/2007)
[signature] DATE 11/6/06
PREM KUMAR, ASST. CITY ENGINEER R.C.E NO. 52463(EXP. DATE 12/31/2006)
REC. BY:

DESIGNED BY: ECR
DRAWN BY: AM
DATE DRAWN: 11-02-05

HALE ENGINEERING
CIVIL ENGINEERING SURVEYING LAND PLANNING
7910 CONVOY COURT SAN DIEGO, CA 92111 (858) 715-1420 (858) 715-1424 FAX

P8 / 248607 REVISIONS	ENGINEER		RCFC/	
REF. DESCRIPTION	APPR.	DATE	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

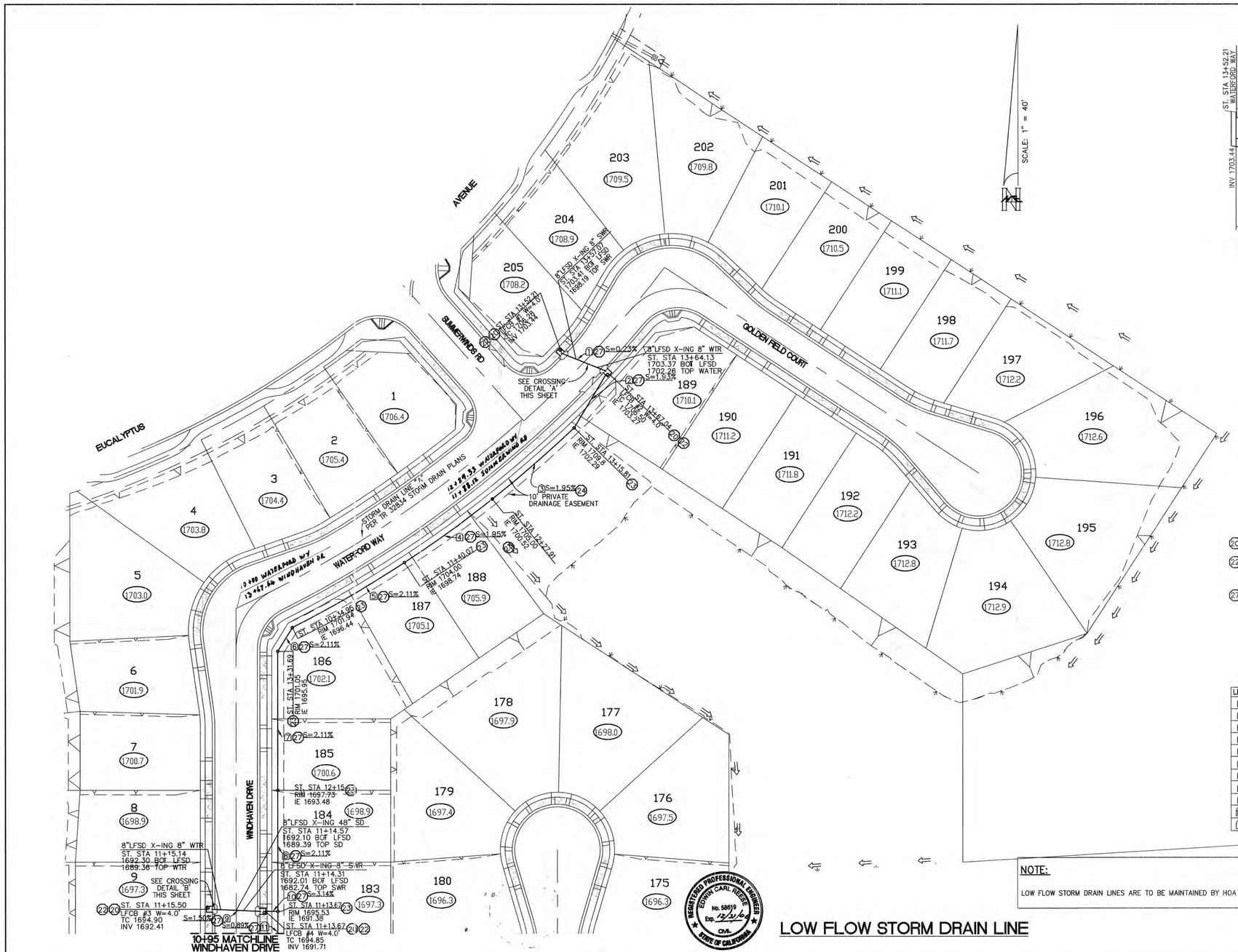
TRACT NO. 32834

MORENO-COLD CREEK COURT
STORM DRAIN LINE 'B'
CREEKSIDE WAY
STATION 17+42.36 TO 23+67.36

PROJECT NO. 4-0-00961
DRAWING NO. 4-929
SHEET NO. 7 OF 11

10/16/2006
H.E. JOB NO. 0336

CITY ID # 2811



CROSSING DETAIL

NO SCALE

ORIFICE DATA TABLE

LFCB#	Q(CFS)	ORIFICE DIA (IN)
1	0.2548	1.03
2	0.1425	2.43
3	0.2174	1.84
4	0.1570	2.25

CONSTRUCTION NOTES

(20) CONST. LOW/NUISANCE FLOW INLET STRUCTURE PER CITY OF MORENO VALLEY STD PLAN NO. 302A, WITH CATCH BASIN COVER PER DETAIL ON SHEET 10.

(22) CONST. ORIFICE PLATE PER DETAIL ON SHEET 10. SEE ORIFICE DATA TABLE ON THIS SHEET FOR ORIFICE DIA.

(23) CONST. 8" NYLOPLAST SOLID GRATE PER DETAIL SHEET 11

(27) CONST. 8" PVC LOW FLOW STORM DRAIN PIPE (PVT.)

AS BUILT

APPROVED BY: [signature]

DATE 6-18-09

LOW FLOW SD CENTERLINE DATA

LINE	LENGTH	RADIUS	DELTA / BRG.	REMARKS
(1)	54.09'	———	N 08°08'05" W	8" PVC, Q_{cap}=0.255 CFS
(2)	50.68'	———	S 30°54'35" W	8" PVC, Q_{cap}=0.397 CFS
(3)	90.06'	990.00'	05°12'43"	8" PVC, Q_{cap}=0.397 CFS
(4)	90.06'	990.00'	05°12'43"	8" PVC, Q_{cap}=0.397 CFS
(5)	108.97'	990.00'	06°18'24"	8" PVC, Q_{cap}=0.397 CFS
(6)	23.39'	———	N 31°39'38" E	8" PVC, Q_{cap}=0.397 CFS
(7)	116.69'	———	N 00°01'47" E	8" PVC, Q_{cap}=0.397 CFS
(8)	99.50'	———	N 00°01'47" E	8" PVC, Q_{cap}=3.46 CFS
(9)	41.00'	———	N 90°00'00" E	8" PVC, Q_{cap}=0.217 CFS
(10)	10.50'	———	N 00°01'47" E	8" PVC, Q_{cap}=0.374 CFS
(11)	20.50'	———	N 00°01'47" E	8" PVC, Q_{cap}=0.772 CFS

NOTE:

LOW FLOW STORM DRAIN LINES ARE TO BE MAINTAINED BY HOA

40 0 40 80 120

SCALE 1" = 40'

LOW FLOW STORM DRAIN LINE

TRACT NO. 32834

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK:
LOCATION: BRASS DISC SET IN TOP OF A CONCRETE POST LOCATED 8.8' WESTERLY OF THE NORTHWEST END OF A CONCRETE HEADWALL AT THE NORTHWEST CORNER OF NASON STREET AND EUCALYPTUS AVENUE
F-446
ELEV: 1694.482

PREPARED UNDER THE SUPERVISION OF
DATE: 10/24/06
EDWIN C. REESE RCE NO. 58619 (EXP. 12-31-06)

APPROVED BY:
CHRIS VOGT, CITY ENGINEER
R.C.E 44250(EXP. DATE 6/30/2007) DATE 11/6/06

PREM KUMAR, ASST. CITY ENGINEER
R.C.E NO. 52463(EXP. DATE 12/31/2008) DATE 11/6/06

DESIGNED BY: ECR
DRAWN BY: AM
DATE DRAWN: 11-02-05
REC. BY:

HALE ENGINEERING
CIVIL ENGINEERING SURVEYING LAND PLANNING
7910 CONVOY COURT
SAN DIEGO, CA 92111
(858) 715-1420
(858) 715-1424 FAX

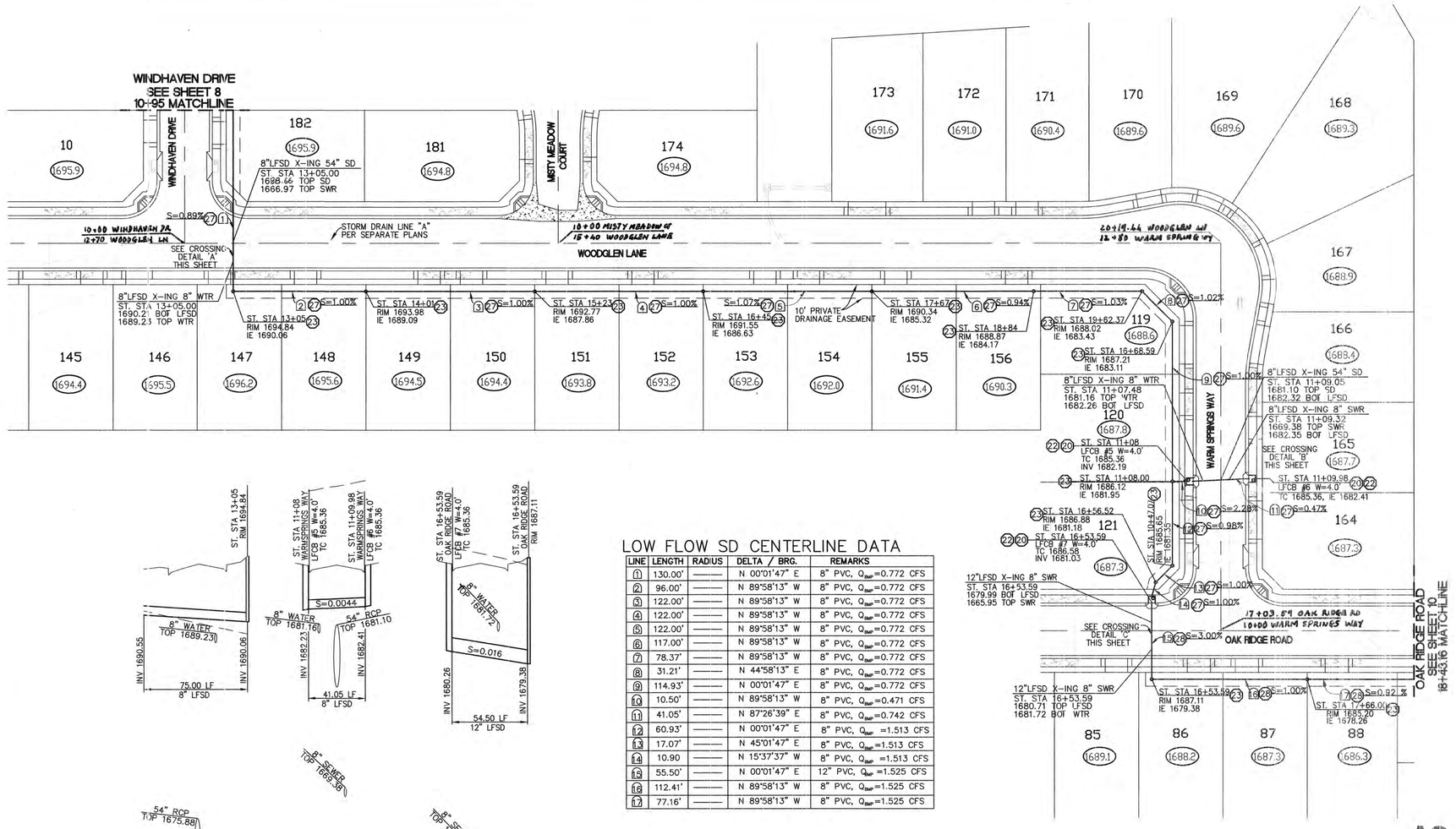
REF.	DESCRIPTION	ENGINEER APPR.	ENGINEER DATE	RCFC/ APPR.	RCFC/ DATE
P8 / 2486 07	REVISIONS				

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

MORENO-COLD CREEK COURT
LOW FLOW
STORM DRAIN LINE

PROJECT NO. 4-0-00961
DRAWING NO. 4-929
SHEET NO. 8 OF 11

10/16/2006
H.E. JOB NO. 0336



CROSSING DETAIL
NO SCALE

LOW FLOW SD CENTERLINE DATA

LINE	LENGTH	RADIUS	DELTA / BRG.	REMARKS
1	130.00'	———	N 00°01'47" E	8" PVC, Q_{cap}=0.772 CFS
2	96.00'	———	N 89°58'13" W	8" PVC, Q_{cap}=0.772 CFS
3	122.00'	———	N 89°58'13" W	8" PVC, Q_{cap}=0.772 CFS
4	122.00'	———	N 89°58'13" W	8" PVC, Q_{cap}=0.772 CFS
5	122.00'	———	N 89°58'13" W	8" PVC, Q_{cap}=0.772 CFS
6	117.00'	———	N 89°58'13" W	8" PVC, Q_{cap}=0.772 CFS
7	78.37'	———	N 89°58'13" W	8" PVC, Q_{cap}=0.772 CFS
8	31.21'	———	N 44°58'13" E	8" PVC, Q_{cap}=0.772 CFS
9	114.93'	———	N 00°01'47" E	8" PVC, Q_{cap}=0.772 CFS
10	10.50'	———	N 89°58'13" W	8" PVC, Q_{cap}=0.471 CFS
11	41.05'	———	N 87°26'39" E	8" PVC, Q_{cap}=0.742 CFS
12	60.93'	———	N 00°01'47" E	8" PVC, Q_{cap}=1.513 CFS
13	17.07'	———	N 45°01'47" E	8" PVC, Q_{cap}=1.513 CFS
14	10.90	———	N 15°37'37" W	8" PVC, Q_{cap}=1.513 CFS
15	55.50'	———	N 00°01'47" E	12" PVC, Q_{cap}=1.525 CFS
16	112.41'	———	N 89°58'13" W	8" PVC, Q_{cap}=1.525 CFS
17	77.16'	———	N 89°58'13" W	8" PVC, Q_{cap}=1.525 CFS

AS BUILT
APPROVED BY:
DATE 6-18-08

CONSTRUCTION NOTES

(20) CONST. LOW/NUISANCE FLOW INLET STRUCTURE PER CITY OF MORENO VALLEY STD PLAN NO. 302A, WITH CATCH BASIN COVER PER DETAIL ON SHEET 10.
(22) CONST. ORIFICE PLATE PER DETAIL ON SHEET 10. SEE ORIFICE DATA TABLE ON THIS SHEET FOR ORIFICE DIA.
(23) CONST. 8" NYLOPLAST SOLID GRATE PER DETAIL SHEET 11
(27) CONST. 8" PVC LOW FLOW STORM DRAIN PIPE (PVT.)
(28) CONST. 12" PVC LOW FLOW STORM DRAIN PIPE (PVT.)

REGISTERED PROFESSIONAL ENGINEER
EDWIN CARL REESE
No. 58619
Exp. 12/31/06
CIVIL
STATE OF CALIFORNIA

ORIFICE DATA TABLE

LFCB#	Q(CFS)	ORIFICE DIA (IN)
5	0.2704	3.20
6	0.4711	2.61
7	0.0114	2.77

LOW FLOW STORM DRAIN LINE PLAN

NOTE:
LOW FLOW STORM DRAIN LINES ARE TO BE MAINTAINED BY HOA

40 0 40 80 120
SCALE 1" = 40'

TRACT NO. 32834

Don't Dig...Until You Call U.S.A. Toll Free
1-800-227-2600
for the location of buried utility lines.
Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK:
LOCATION: BRASS DISC SET IN TOP OF A CONCRETE POST LOCATED 6.8' WESTERLY OF THE NORTHWEST END OF A CONCRETE HEADWALL AT THE NORTHWEST CORNER OF NASON STREET AND EUCALYPTUS AVENUE F-446
ELEV: 1694.482

PREPARED UNDER THE SUPERVISION OF
DATE: 10/20/06
EDWIN C. REESE RCE NO. 58619 (EXP. 12-31-06)
APPROVED BY:
CHRIS VOGT, CITY ENGINEER DATE
R.C.E 44250(EXP. DATE 6/30/2007)
PREM KUMAR, ASST. CITY ENGINEER 11/6/05 DATE
R.C.E NO. 52463(EXP. DATE 12/31/2006)
REC. BY:

DESIGNED BY: ECR
DRAWN BY: AM
DATE DRAWN: 11-02-05

HALE ENGINEERING
CIVIL ENGINEERING SURVEYING LAND PLANNING
7910 CONVOY COURT
SAN DIEGO, CA 92111
(858) 715-1420
(858) 715-1424 FAX

P8 / 248607 REVISIONS

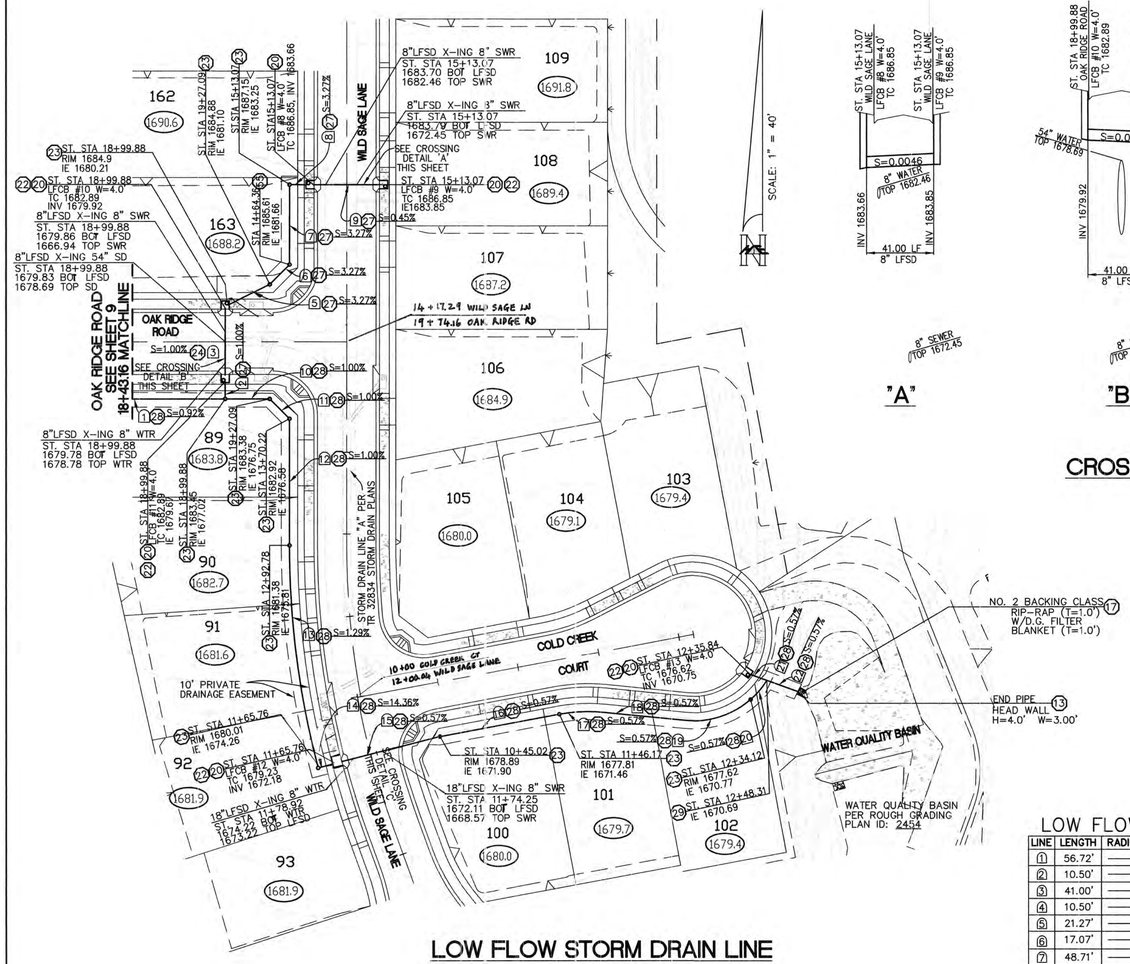
REF.	DESCRIPTION	ENGINEER APPR.	ENGINEER DATE	RCFC/ APPR.	RCFC/ DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

MORENO-COLD CREEK COURT
LOW FLOW
STORM DRAIN LINE

PROJECT NO. 4--0-00961
DRAWING NO. 4--929
SHEET NO. 9 OF 11

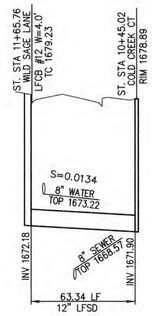
10/16/2006
H.E. JOB NO. 0336
CITY ID # 2811



SCALE: 1" = 40'

"A"

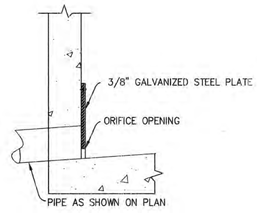
"B"



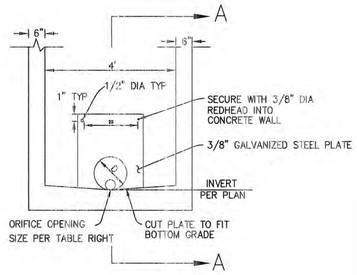
"C"

CROSSING DETAIL

NO SCALE

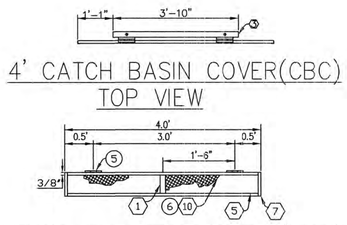


CROSS SECTION A-A



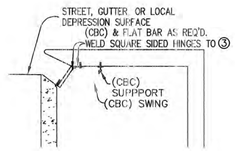
ORIFICE PLATE DETAIL

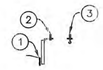
NOT TO SCALE



4' CATCH BASIN COVER(CBC) TOP VIEW

4' CATCH BASIN COVER(CBC) FRONT VIEW





4' CATCH BASIN COVER(CBC) RIGHT VIEW

LOW FLOW SD CENTERLINE DATA

LINE	LENGTH	RADIUS	DELTA / BRG.	REMARKS
①	56.72'	———	N 89°58'13" W	12" PVC, Q_{cap}=1.525 CFS
②	10.50'	———	N 00°01'45" W	8" PVC, Q_{cap}=0.657 CFS
③	41.00'	———	N 00°01'45" W	8" PVC, Q_{cap}=0.530 CFS
④	10.50'	———	N 00°01'47" W	8" PVC, Q_{cap}=0.271 CFS
⑤	21.27'	———	N 89°58'13" W	8" PVC, Q_{cap}=0.271 CFS
⑥	17.07'	———	N 45°01'47" E	8" PVC, Q_{cap}=0.271 CFS
⑦	48.71'	———	N 00°01'47" E	8" PVC, Q_{cap}=0.271 CFS
⑧	10.50'	———	N 89°58'14" E	8" PVC, Q_{cap}=0.271 CFS
⑨	41.00'	———	N 89°58'14" E	8" PVC, Q_{cap}=0.229 CFS
⑩	27.21'	———	N 89°58'13" W	12" PVC, Q_{cap}=2.182 CFS
⑪	17.07'	———	N 44°58'13" E	12" PVC, Q_{cap}=2.182 CFS
⑫	77.44'	———	N 00°01'47" W	12" PVC, Q_{cap}=2.182 CFS
⑬	119.78	535.00'	12°49'38"	12" PVC, Q_{cap}=2.182 CFS
⑭	10.51'	———	N 77°12'08" E	12" PVC, Q_{cap}=2.182 CFS
⑮	64.45	———	N 88°58'23" W	12" PVC, Q_{cap}=2.360 CFS
⑯	74.47'	———	N 79°24'11" E	12" PVC, Q_{cap}=2.360 CFS
⑰	27.05	95.00'	16°18'42"	12" PVC, Q_{cap}=2.360 CFS
⑱	50.00'	———	N 84°17'08" W	12" PVC, Q_{cap}=2.360 CFS
⑲	43.50'	53.00'	47°01'45"	12" PVC, Q_{cap}=2.360 CFS
⑳	15.37'	53.00'	16°37'09"	12" PVC, Q_{cap}=2.360 CFS
㉑	12.99'	———	N 68°50'57" W	8" PVC, Q_{cap}=0.252 CFS
㉒	20.00'	———	N 68°50'57" W	12" PVC, Q_{cap}=2.611 CFS

KEYED NOTES:

① BARREL BOLT

② 3/8"ø BOLT TO SUPPORT (CBC) POWER BULL, DROP-IN ANCHOR, WASHER 2" O.D. X 3/8" I.D.

③ USE HOOK TO SUPPORT (CBC) WHEN (CBC) IS OPENED FOR FILTER UNIT MAINTENANCE. COORDINATE WITH LYNDON GARCIA.

④ 5/8"ø SQUARE SIDED HINGES TO BE WELDED TO 9'-0" (CBC) AND TO FLAT BAR ITEM # 2. (REFER TO FRONT VIEW FOR LOCATION.)

⑤ 5/8"ø SQUARE SIDED HINGES TO BE WELDED TO 6'-0" (CBC) AND TO FLAT BAR ITEM # 3. (REFER TO FRONT VIEW FOR LOCATION.)

⑥ CATCH BASIN SCREEN COVERS SHALL BE MADE OF 3/16" THICK MILD STEEL PLATE. THE SCREEN SHALL HAVE 1 3/4" X 3/4" DIAMOND SHAPE, GRATE OPENINGS.

MATERIAL DATA SHEET

ITEM	DESCRIPTION	MATERIAL	SIZE	REQ'D
⟨1⟩	FLAT BAR	STEEL	3/16" x 2" x 6 3/4"	3
⟨2⟩	FLAT BAR	STEEL	3/16" x 2" x 6'-10"	1
⟨3⟩	FLAT BAR	STEEL	3/16" x 2" x 3'-10"	1
⟨4⟩	-	-	-	-
⟨5⟩	ANGLE	STEEL	3/16" x 1" x 1" x 6'-0"	2
⟨6⟩	ANGLE	STEEL	3/16" x 1" x 1" x 9'-0"	2
⟨7⟩	ANGLE	STEEL	3/16" x 1" x 1" x 8 3/4"	4
⟨8⟩	-	-	-	-
⟨9⟩	EXPANDED METAL	STEEL	3/16" x 8 3/4" x 8'-3/4"	1
⟨10⟩	EXPANDED METAL	STEEL	3/16" x 8 3/4" x 5'-3/4"	1
⟨11⟩	-	-	-	-
⟨12⟩	-	-	-	-

CATCH BASIN SCREEN

NOT TO SCALE

AS BUILT

APPROVED BY

DATE 6-18-09

LOW FLOW STORM DRAIN LINE PLAN

CONSTRUCTION NOTES

⑬ CONST. WING TYPE HEADWALL PER CALTRANS STD. PLAN D90.

⑰ CONSTRUCT RIP-RAP ENERGY DISSIPATOR PER DETAIL ON SHEET 8.

⑳ CONST. LOW/NUISANCE FLOW INLET STRUCTURE PER CITY OF MORENO VALLEY STD PLAN NO. 302A, WITH SCREEN PER DETAIL THIS SHEET

㉓ CONST. 8" NYLOPLAST SOLID GRATE PER DETAIL SHEET 11.

㉒ CONSTRUCT ORIFICE PLATE PER DETAIL ON THIS SHEET. SEE ORIFICE DATA TABLE ON THIS SHEET FOR ORIFICE DIA.

㉗ CONST. 8" PVC LOW FLOW STORM DRAIN PIPE (PVT.)

㉘ CONST. 12" PVC LOW FLOW STORM DRAIN PIPE (PVT.)

㉙ INSTALL 12" PVC TEE (PVT.)

40 0 40 80 120

SCALE 1" = 40'

ORIFICE DATA TABLE

LFCB#	Q(CFS)	ORIFICE DIA (IN)
8	0.0426	2.66
9	0.2288	2.66
10	0.3016	2.06
11	0.0842	2.57
12	0.1778	2.69
13	0.2517	1.63

REGISTERED PROFESSIONAL ENGINEER EDWIN CARL REESE No. 58619 Exp. 12-31-06 CIVIL STATE OF CALIFORNIA

NOTE:

LOW FLOW STORM DRAIN LINES ARE TO BE MAINTAINED BY HOA

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK:

LOCATION: BRASS DISC SET IN TOP OF A CONCRETE POST LOCATED 6.8' WESTERLY OF THE NORTHWEST END OF A CONCRETE HEADWALL AT THE NORTHWEST CORNER OF NASON STREET AND EUCALYPTUS AVENUE F-446

ELEV: 1694.482

PREPARED UNDER THE SUPERVISION OF

DATE: 11/24/06

EDWIN C. REESE RCE NO. 58619 (EXP. 12-31-06)

APPROVED BY: 11/6/06

CHRIS VOGT, CITY ENGINEER R.C.E 44250(EXP. DATE 6/30/2007) DATE

11/6/06

PREM KUMAR, ASST. CITY ENGINEER R.C.E NO. 52463(EXP. DATE 12/31/2006) DATE

DESIGNED BY: ECR

DRAWN BY: AM

DATE DRAWN: 11-02-05

REC. BY:

HALE ENGINEERING

CIVIL ENGINEERING SURVEYING LAND PLANNING

7910 CONVOY COURT SAN DIEGO, CA 92111

(858) 715-1420 (858) 715-1424 FAX

P8/24807 REVISIONS

REF.	DESCRIPTION	ENGINEER APPR.	ENGINEER DATE	RCFC/ APPR.	RCFC/ DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

MORENO-COLD CREEK COURT LOW FLOW STORM DRAIN LINE

TRACT NO. 32834

PROJECT NO. 4-0-00961

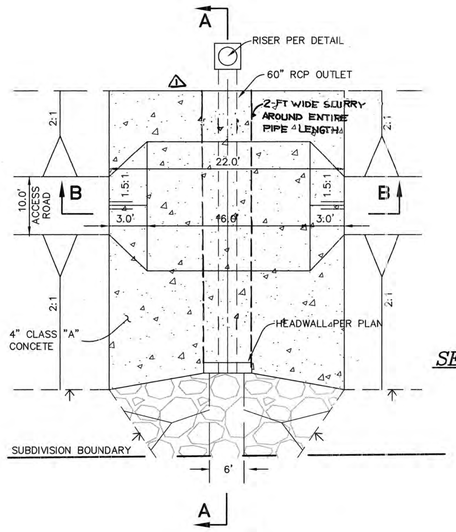
DRAWING NO. 4-929

SHEET NO. 10 OF 11

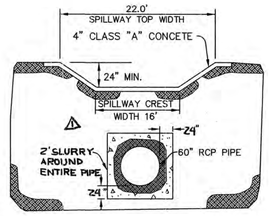
H.E. JOB NO. 0336

10/16/2006

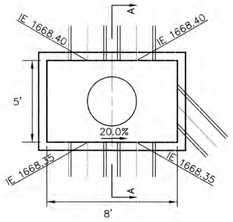
CITY ID # 2811

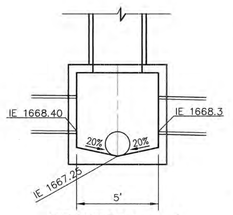


PLAN VIEW
NOT TO SCALE



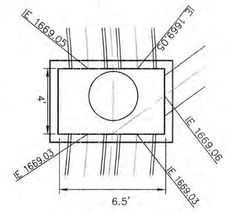
SECTION B–B: SECTION THROUGH CREST
NOT TO SCALE



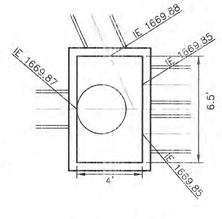


SECTION A–A

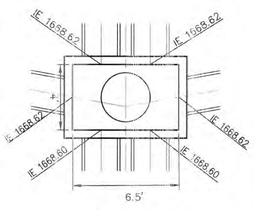
STA 11+96.42 /LOW FLOW SYSTEM



STA 13+26.86

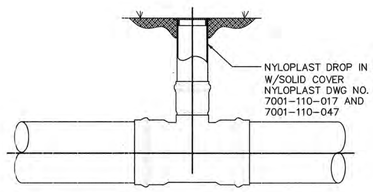


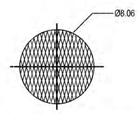
STA 14+89.93



STA 12+40.07

MODIFIED TS NO.1 W/ 4.5'H X6.5'W RCB
SCALE: 1" = 4'





APPROX. WEIGHT = 3.38 LBS.

SOLID
NOT TO SCALE

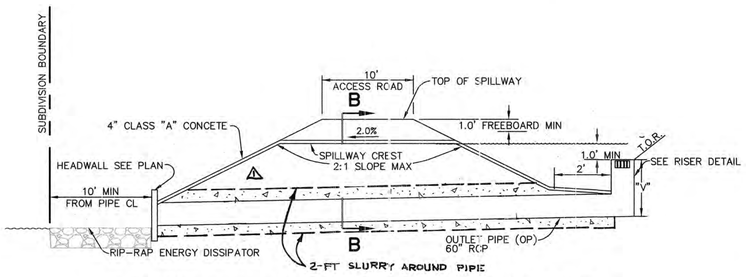
AS BUILT
APPROVED BY:
DATE 6-18-09

NYLOPLAST 8" GRATES/COVERS

STANDARD GRATE HAS A LIGHT DUTY RATING
SOLID COVER HAS A LIGHT DUTY RATING
QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70-50-05
MATERIAL: DUCTILE IRON
PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT
LOCKING DEVICE AVAILABLE UPON REQUEST FOR STANDARD & SOLID ONLY

Nyloplast
3130 VERONA AVE
BUFORD, GA 30518
PHN (770) 932-2443
FAX (770) 932-2490
www.nyloplast-us.com

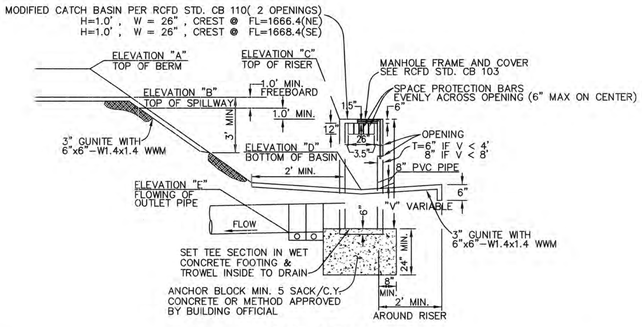
8" NYLOPLAST SOLID GRATE(OR APPROVED EQUIVALENT)
NOT TO SCALE



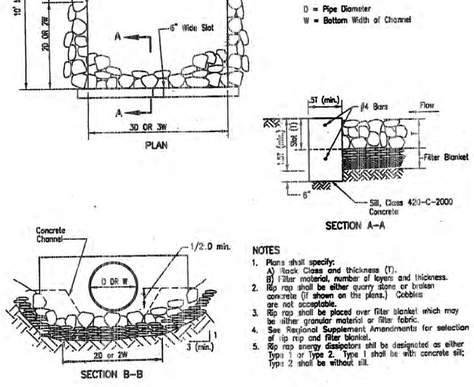
SECTION A–A: SECTION THROUGH EMBANKMENT
NOT TO SCALE

RETENTION BASIN PIPE CLASSIFICATIONS:
1. OUTLET PIPE SHALL BE REINFORCED CONCRETE PIPE (1600-D)

SPILLWAY/OUTLET TRANSITION
NOT TO SCALE



RISER DETAIL
NOT TO SCALE



NOTES
1. Plans shall specify:
   A) Rock Class and thickness (T).
   B) Filter material, number of layers and thickness.
2. Rip rap shall be either quarry stone or broken concrete (if shown on the plans.) Cobbles are not acceptable.
3. Rip rap shall be placed over filter blanket which may be either granular material or filter fabric.
4. See Regional Supplement Amendments for selection of rip rap and filter blanket.
5. Rip rap energy dissipators shll be designated as either Type 1 or Type 2. Type 1 shall be with concrete sill; Type 2 shall be without sill.

RIP-RAP ENERGY DISSIPATOR
NO SCALE

REGISTERED PROFESSIONAL ENGINEER
EDWIN CARL REESE
No. 58619
Exp. 12/31/06
CIVIL
STATE OF CALIFORNIA

TRACT NO. 32834

Don't Dig...Until You Call U.S.A. Toll Free
1-800-227-2600
for the location of buried utility lines.
Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK:
LOCATION: BRASS DISC SET IN TOP OF A CONCRETE POST LOCATED 6.8' WESTERLY OF THE NORTHWEST END OF A CONCRETE HEADWALL AT THE NORTHWEST CORNER OF NASON STREET AND EUCALYPTUS AVENUE. F-446
ELEV: 1694.482

PREPARED UNDER THE SUPERVISION OF
DATE: 10/16/06
EDWIN C. REESE RCE NO. 58619 (EXP. 12-31-06)
APPROVED BY: 11/6/06 DATE
CHRIS VOGT, CITY ENGINEER R.C.E 44250(EXP. DATE 6/30/2007)
11/2/06 DATE
PREM KUMAR, ASST. CITY ENGINEER R.C.E NO. 52463(EXP. DATE 12/31/2006)

DESIGNED BY: ECR
DRAWN BY: AM
DATE DRAWN: 11-02-05
REC. BY:

HALE ENGINEERING
CIVIL ENGINEERING SURVEYING LAND PLANNING
7910 CONVOY COURT (858) 715-1420
SAN DIEGO, CA 92111 (858) 715-1424 FAX

REF.	DESCRIPTION	ENGINEER APPR.	ENGINEER DATE	RCFC/ APPR.	RCFC/ DATE
1	P8/248607 REVISIONS				
2	ADDED 2'SLURRY AROUND PIPE UNDER SPILLWAY, NO COLLARS	CR	6/19/07	DVR	6/18/09

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: DATE: 11/30/06
APPROVED BY: DATE: 11-30-2006

MORENO-COLD CREEK COURT STORM DRAIN
CONNECTOR PIPE DETAILS/ MISCELLANEOUS DETAILS

PROJECT NO. 4-0-00961
DRAWING NO. 4-929
SHEET NO. 11 OF 11

H.E. JOB NO. 0336
10/16/2006
CITY ID # 2811

BULKED FLOW & SEDIMENT VOLUME CALCULATIONS

DEBRIS

General - Consideration of debris loads carried by streams below mountain and foothill areas is essential in the planning and design of flood control works. Unfortunately, this is one of the least understood, and most often neglected areas of flood control engineering. Failure to provide either debris storage facilities, or additional hydraulic capacity for debris bulked flows, could seriously affect the performance of flood control structures downstream of mountain and foothill watersheds.

Criteria for debris basin design is usually based on providing storage capacity for debris generated by a single major flood event at the minimum. Additional (or in some cases less) capacity may be provided depending on the physical constraints of the site.

Some of the many factors which influence the debris production characteristics of a particular drainage area are: the size and shape of the area; steepness of the stream channels and tributary surfaces; a wide range of geological factors; type and quality of vegetative cover; the likelihood of fires over the watershed as may be indicated by the burn history; and frequency of intense flood producing storms.

Little observational data is available in western Riverside County on debris production potential. The District operates a network of 12 dams and debris basins, however, most of these structures are relatively new, and the older structures are flood control dams located in relatively low debris production areas. Considerable information has been gathered by the Los Angeles County Flood Control District (LACFCD) on their large network of dams and debris basins. Maximum single storm debris production rates as high as 120,000-cubic yards from a one square mile watershed, and single season rates as high as 150-percent of the maximum single storm rate, have been recorded on these basins. Debris production rates have been found to be inversely proportional to drainage area size, with watersheds smaller than one-square mile having the highest rates, and larger watersheds typically having lower rates. Debris volumes carried by

flowing streams which equal the clear water volume of the stream (100-percent bulking) have also been recorded.

In the following paragraphs methods are discussed for estimating single major storm debris production rates, peak rate bulking factors, and average annual accumulation rates. It should be emphasized that this material is not recommended as a basis for design, but is presented to make the engineer aware of some of the information that is available, and some of the methods that have been commonly used in evaluating debris related problems in the Southern California area. Until additional data is available for Riverside County selection of design debris storage volumes, or peak bulking rates, should be made with extreme caution after a thorough evaluation of all available information.

Single Storm Debris Production - Single storm debris production estimates can be made using methods developed by LACFCD or the Los Angeles District Army Corps of Engineers (USCE). The methods of both agencies are based on records of debris flows in Los Angeles County, primarily on the coastal front of the San Gabriel Mountains. An enveloping curve based on these records, showing debris production potential in cubic yards per square mile per storm, is shown on Plate F-l. The enveloping curve can be used to make a quick "order of magnitude" estimate of debris potential of a watershed based on maximum recorded debris flows during major floods in Southern California. The LACFCD and USCE methods which provide more refined empirical estimates of debris production based on physical watershed characteristics are discussed in the following paragraphs.

The LACFCD method is presented in a report titled "Debris Reduction Studies for Mountain Watersheds of Los Angeles County", dated 1959. An equation is presented to estimate debris production based on peak flow rate, condition of the vegetative cover, and "relief ratio", a measure of the relative steepness of a watershed.

The USCE method is presented in a report by Fred E. Tatum titled "A New Method of Estimating Debris-Storage Requirements for Debris Basins", dated 1963. The USCE method is also often referred to as the Tatum method. In the USCE method a base maximum possible debris potential value for a one-square mile watershed is used. This base value is then reduced according to factors developed for: watershed slope; "drainage density", the total number of stream miles divided by the area; "hypsometric index", the relative height at which the drainage area is divided into two equal parts; and the 3-hour design rainfall intensity. The resulting debris production rate is the yield for one square mile in the watershed assuming a recent 100-percent burn. It is then further adjusted to the actual size watershed being considered, and to account for the assumed number of years recovery from a total burn.

Burn history is an important factor in debris studies, as all other factors being equal, debris discharges from totally burned watersheds may be many times the rate for an unburned watershed. Average annual burn rates may vary considerably for watersheds in the District according to such factors as accessibility to the public, climate, topography, etc. Valuable information on historical fires can often be obtained from the U. S. Forest Service or California Division of Forestry for use in making debris studies. Recovery from a total watershed burn has been found to take from 10 to 12 years. Typical designs assume 3 to 5 years recovery from a total burn for making estimates of design storm debris production since the probability of a design storm following a 100-percent burn of the entire watershed is extremely remote. Debris production potential in percent of the rate for a totally burned watershed, is given in the following tabulation for one through ten-year recovery periods.

Recovery time in years after total watershed burn.	1	2	3	4	5	6	7	8	9	10
Debris production rate in percent of the rate for a totally burned watershed (Per USCE Tatum Report)	100	35	22	15	11	7	5	4	3.5	3

0.22*135,000=29,700

Application of the LACFCD and USCE methods directly to basins in the District is questionable in light of significant differences in geology between certain areas of western Riverside County, and the coastal slopes of the San Gabriel Mountains. An example is in the San Jacinto Mountains where debris flows on some watersheds are anticipated to be much smaller than those in the San Gabriel Mountains, primarily due to the massive nature of the rock in the San Jacintos compared to the fractured nature of the San Gabriel formations. In such cases an evaluation of the geological conditions in the area under study, compared to conditions in areas where records are available, may lead to a reasonable estimate of debris potential. Such investigations should only be attempted by experienced professional engineers or geologists.

In some cases a detailed geological investigation of debris cone deposits below a mountain watershed may yield important information on the size of historical debris flows.

Peak Bulking Rates- - Debris volumes equal to the clear water volume have been recorded during major floods in Los Angeles County. This is equivalent to 100-percent bulking, or a bulking factor of 2. Since transport capacity increases with flow velocity, it is conceivable that peak bulking rates may have been even higher during these events. LACFCD has proposed relating the peak bulking rate to debris production volume by assigning the maximum observed bulking factor of 2 to the maximum observed single storm debris production rate of 120,000-cubic yards for a one-square mile area. The peak rate bulking factor would then be expressed by:

$$F_b = 1 + \left[\frac{D}{120{,}000}\right]$$

where:

D = Design storm debris production rate for the study watershed in cubic yards per square mile

To account for uncertainty LACFCD adds a factor of safety to this relationship for design purposes.

The peak bulking rate is applied to the peak flow rate where the entire drainage area contributes debris. Where portions of the watershed are either nonproductive, or debris control structures reduce the quantities available for transport, the bulking factor is applied on a proportionate basis.

As discussed in the previous section application of this information should only be attempted after a thorough geologic analysis of the study area.

Average Annual Debris Production - Estimates of average annual debris production rates are useful in evaluating the potential life expectancy of a basin before clean out is required. In many cases it may be most cost effective to provide additional storage above the single storm volume criteria, and extend the expected clean out interval required for maintenance of basin capacity.

A report titled "Factors Affecting Sediment Yield and Measures for the Reduction of Erosion and Sediment Yield" may be useful in estimating average annual debris production rates in the District, or in adjusting data from adjacent areas to conditions in Riverside County. This report dated October 1968, was developed for areas in the Pacific Southwest by the Water Management Subcommittee of the Pacific Southwest Inter-Agency Committee.

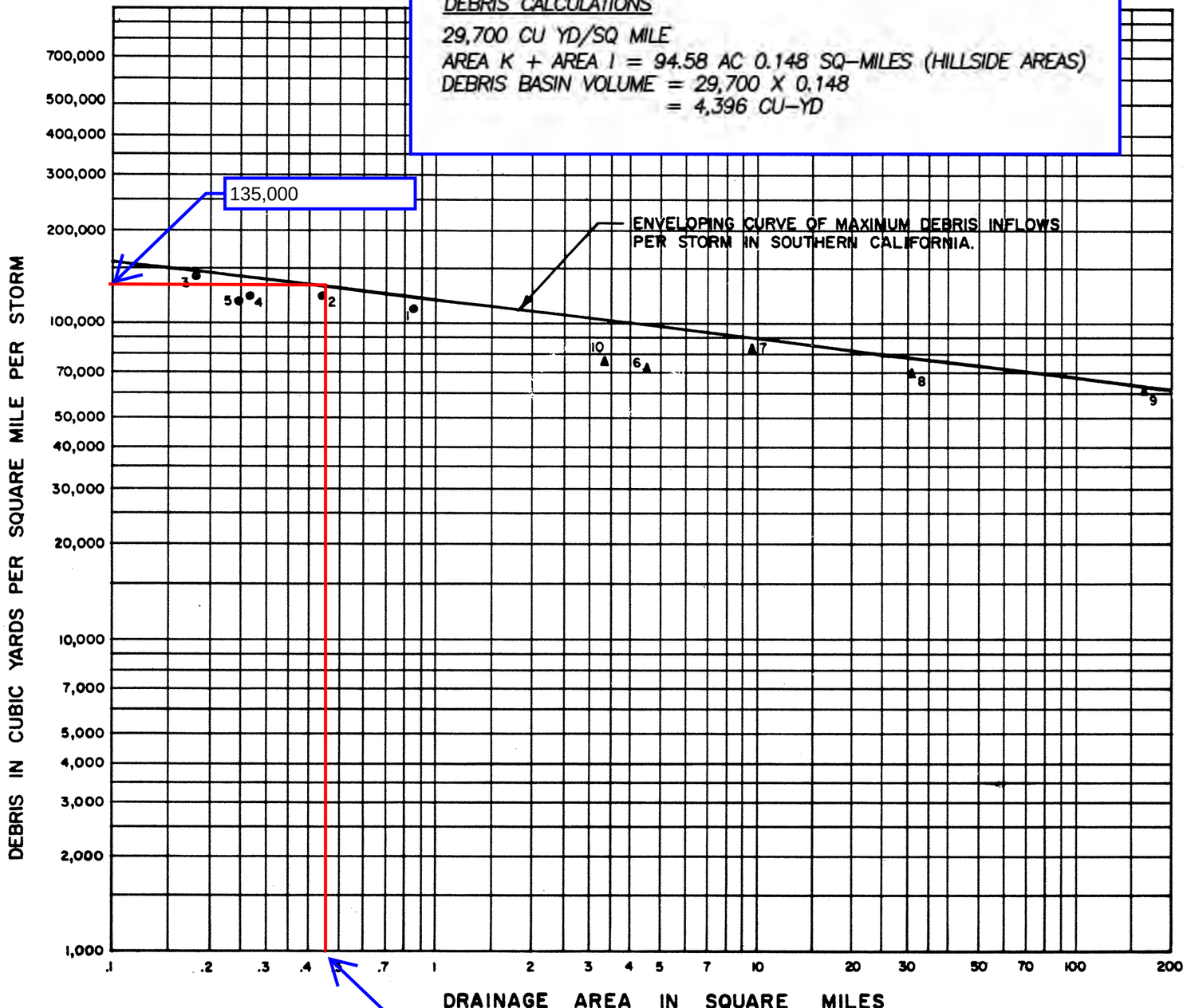
Based on long term records (30-years or more) from Los Angeles County, average annual debris production rates range from 700-cubic yards to 12,000-cubic yards per square mile for one-square mile watersheds in the San Gabriel Mountains. The average annual rate in these watersheds is approximately 6,450-cubic yards per square mile (about 4 acre-feet) for a one square mile watershed.

Average annual debris production rates in Riverside County are generally believed to be lower than those experienced in the western San Gabriel Mountains. It may be possible to

estimate average annual debris production rates for watersheds in Riverside County by using data developed in the Los Angeles area, and accounting for geologic and hydrologic differences. As previously discussed such evaluations should be made only by competent engineers and geologists.

DEBRIS CALCULATIONS

29,700 CU YD/SQ MILE
AREA K + AREA I = 94.58 AC 0.148 SQ-MILES (HILLSIDE AREAS)
DEBRIS BASIN VOLUME = 29,700 X 0.148
= 4,396 CU-YD



RECORDED OR ESTIMATED DEBRIS INFLOWS

● – DEBRIS BASINS

1.	HALL-BECKLEY	MARCH 1938
2.	HARROW	JANUARY 1969
3.	HOOK EAST	JANUARY 1969
4.	SHIELDS	MARCH 1938
5.	WEST RAVINE	MARCH 1938

▲ – RESERVOIRS

6.	BIG DALTON	JANUARY 1969
7.	EATON WASH	MARCH 1938
8.	DEVIL'S GATE	MARCH 1938
9.	SAN GABRIEL	MARCH 1938
10.	SAWPIT	JANUARY 1969

NOTES:

1. Recorded or estimated debris flows per Bibliography item No. 13. Values are for debris basins and dams in Los Angeles County.

Fb = 1+ (29,700/120,000)
= 1.2475

Q100 = 344.5 CFS
BULKED FACTOR = 1.2475

Q = 429.8 CFS (BULKED FLOWS)

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

ENVELOPING CURVES OF DEBRIS INFLOW IN SOUTHERN CALIFORNIA

PLATE F-1

SEDIMENT BASIN HYDRAULIC CALCULATIONS

Worksheet for EXIST. HEADWALL ENTRANCE

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	4.90	ft
Crest Elevation	0.00	ft
Tailwater Elevation	0.00	ft
Crest Surface Type	Paved	
Crest Breadth	1.00	ft
Crest Length	9.00	ft

Results

Discharge	301.35	ft³/s
Headwater Height Above Crest	4.90	ft
Tailwater Height Above Crest	0.00	ft
Weir Coefficient	3.09	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	3.09	US
Flow Area	44.10	ft²
Velocity	6.83	ft/s
Wetted Perimeter	18.80	ft
Top Width	9.00	ft

CAPACITY LIMITED TO 67.4 CFS BY THE EXISTING 36" OPENING.

Worksheet for EXISTI 1-36" OPENING

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	5.42	ft
Centroid Elevation	1.50	ft
Tailwater Elevation	0.00	ft
Discharge Coefficient	0.60	
Diameter	3.00	ft

TOP OF BERM = 1642.0
ORIFICE INVERT = 1636.58
HEAD = 5.42'

Results

Discharge	67.36	ft³/s
Headwater Height Above Centroid	3.92	ft
Tailwater Height Above Centroid	-1.50	ft
Flow Area	7.07	ft²
Velocity	9.53	ft/s

Worksheet for PROP. HEADWALL ENTRANCE

Project Description

Solve For	Headwater Elevation

Input Data

Discharge		323.00	ft³/s
Crest Elevation		0.00	ft
Tailwater Elevation		0.00	ft
Crest Surface Type	Paved		
Crest Breadth		1.00	ft
Crest Length		26.50	ft

CAPACITY LIMITED TO 191.1 CFS BY THE 3 PROPOSED 36" OPENINGS.

Results

Headwater Elevation	2.50	ft
Headwater Height Above Crest	2.50	ft
Tailwater Height Above Crest	0.00	ft
Weir Coefficient	3.09	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	3.09	US
Flow Area	66.20	ft²
Velocity	4.88	ft/s
Wetted Perimeter	31.50	ft
Top Width	26.50	ft

Worksheet for PROP 3-36" OPENINGS

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	5.25	ft
Centroid Elevation	1.50	ft
Tailwater Elevation	0.00	ft
Discharge Coefficient	0.60	
Diameter	3.00	ft

TOP OF BERM = 1642.0
ORIFICE INVERT = 1636.75
HEAD = 5.25'

Results

Discharge	65.88	ft³/s
Headwater Height Above Centroid	3.75	ft
Tailwater Height Above Centroid	-1.50	ft
Flow Area	7.07	ft²
Velocity	9.32	ft/s

3 - OPENINGS
TOTAL CAPACITY = 197.7 CFS

Worksheet for PROP 3 -36" RCP PIPE

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.03370	ft/ft
Diameter	3.00	ft
Discharge	88.40	ft³/s

3 PIPES TOTAL,
TOTAL CAPACITY =265.2 CFS,
THUS ENOUGH CAPACITY IS
PROVIDED TO CONVEY 265.1
CFS TO THE PROPOSED
SEDIMENT BASIN

Results

Normal Depth	1.89	ft
Flow Area	4.69	ft²
Wetted Perimeter	5.50	ft
Hydraulic Radius	0.85	ft
Top Width	2.90	ft
Critical Depth	2.84	ft
Percent Full	62.9	%
Critical Slope	0.01519	ft/ft
Velocity	18.86	ft/s
Velocity Head	5.53	ft
Specific Energy	7.42	ft
Froude Number	2.61	
Maximum Discharge	131.70	ft³/s
Discharge Full	122.44	ft³/s
Slope Full	0.01757	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	62.95	%
Downstream Velocity	Infinity	ft/s

Worksheet for PROP 3 -36" RCP PIPE

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.89	ft
Critical Depth	2.84	ft
Channel Slope	0.03370	ft/ft
Critical Slope	0.01519	ft/ft

STREET A – HYDRAULIC CAPACITY CALCULATIONS

Worksheet for ST A - CAPACITY

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.03720	ft/ft
Discharge	164.70	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.72
0+11	0.50
0+11	0.00
0+13	0.16
0+33	0.56
0+53	0.16
0+55	0.00
0+55	0.50
0+66	0.72

R/W ELEVATION

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.72)	(0+66, 0.72)	0.014

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.71	ft
Elevation Range	0.00 to 0.72 ft	
Flow Area	18.67	ft²
Wetted Perimeter	65.94	ft

FLOW CONTAINED WITHIN R/W

Worksheet for ST A - CAPACITY

Results

Hydraulic Radius		0.28	ft
Top Width		64.91	ft
Normal Depth		0.71	ft
Critical Depth		1.00	ft
Critical Slope		0.00354	ft/ft
Velocity		8.82	ft/s
Velocity Head		1.21	ft
Specific Energy		1.92	ft
Froude Number		2.90	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.71	ft
Critical Depth	1.00	ft
Channel Slope	0.03720	ft/ft
Critical Slope	0.00354	ft/ft