PRELIMINARY DRAINAGE STUDY

IN THE

CITY OF VICTORVILLE

FOR

TENTATIVE TRACT 20544

SEPTEMBER 8TH, 2022

Reference: 1028-2913

PREPARED BY:

Madole & Associates, Inc.

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Engineering Communities for Life

Reference: 1028-2913

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SECTION A-1
INTRODUCTION

DISCUSSION

EXECUTIVE SUMMARY

The following report is a hydrologic and hydraulic analysis of the contributing drainage areas discharging storm water flows from the proposed development of Tentative Tract 20544 in the City of Victorville, County of San Bernardino, California. The proposed tract is located on the southeast corner of Bear Valley Road and Verbana Road, approximately one mile west of the 395 Interstate Highway.

The proposed development will be a residential tract with 3.8 dwellings per acre on about 19.6 gross acres. There will be interior and exterior street improvements with an intract storm drain system that will collect the storm water runoff. The interior storm flows will be directed near the northeast corner of the tract where there will be a site detention and infiltration basin that will also serve as a Water Quality BMP Infiltration Basin. The proposed tract will be a Water Quality "Priority Project".

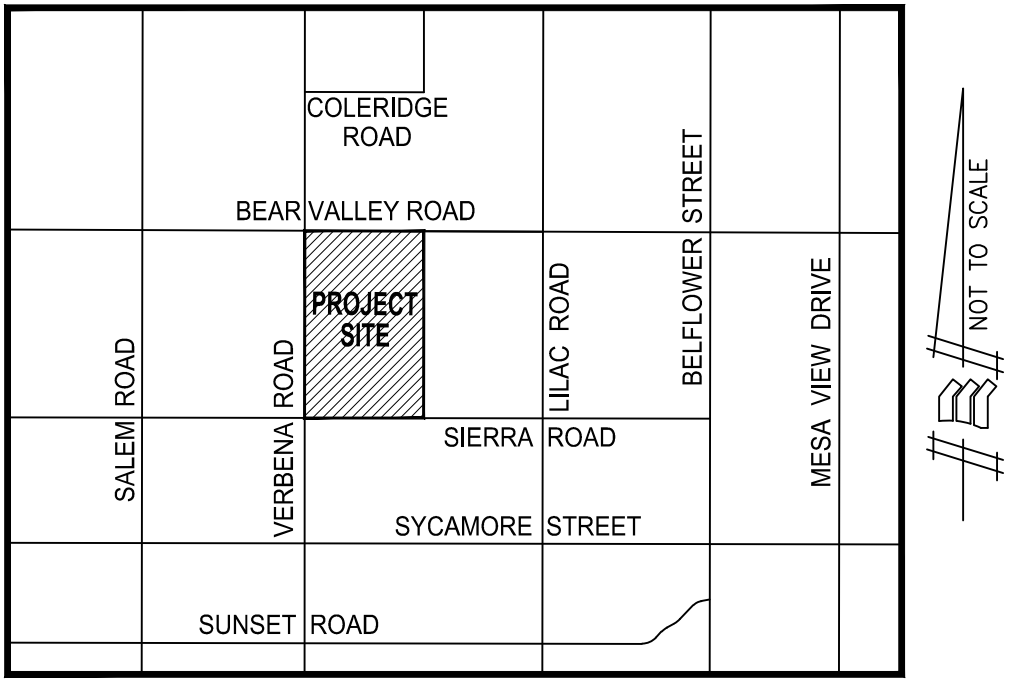
Net On Site Area:	17.4 acres
Numbered Lots:	66
Units per Acre:	3.8
Minimum Lot Size:	7,200 S.F.
Zoning Land Use:	R-1
General Plan:	Low Density Residential

Owner/Developer: Bear Valley 60, LLC
2630 Walnut Avenue, Suite A
Tustin, CA 92780

The proposed development will intercept the in-tract storm water and mitigate the 100-year peak runoff flow with the detention basin. The Peak Flow from the proposed development will be reduced to less than the Predeveloped Peak Flow generated from the project area.

The Basin will also serve to infiltrate runoff from the tract. The Basin will have 1.21 acre-feet of capacity for the infiltration of water quality storm water and nuisance flow runoff.

TENTATIVE TRACT 20544
VICTORVILLE, CA



VICINITY MAP

NTS

FIGURE 1

SECTION A-2
INTRODUCTION

EXISTING CONDITIONS

The topographic contours, provided by aerial drone flight for the area, as well as U.S.G.S. data, indicate that the general terrain falls from the south to the north northeast at a 2% average gradient. The surrounding area is largely undeveloped, with various single family residential lots to the south.

The site is sparsely covered with desert brush, and the soil is typically silty granular sand. According to the San Bernardino County Stormwater Mapping Tool, the site is considered Class A soils (Section R).

A preliminary review of the drainage area and the topography over the project site indicates that the general area sheet flows in a northeasterly direction towards the Baldy Mesa Master Plan drainage path Line A-03.

Various portions of offsite areas run-on to the site from the southern boundary. Upon development, a drainage swale will be added to the southern boundary to direct flows around the tract to either Verbana Road or existing drainage paths to the east of the project boundary. Under existing conditions, the flows cross Bear Valley Road and continue north northeast until reaching MPD Line A-03.

The parcel to the south of the project has developed two natural drainage courses that run from the west to the east directing offsite flows to MPD Line A-03. Therefore, there are minimal offsite flows entering the southern project boundary or Verbana Road (See Existing Conditions Exhibit – Figure 2).

PROPOSED SITE DEVELOPMENT

The proposed site is a tract in its entirety, with street and utility improvements. The proposed site will intercept onsite storm water runoff with various curb opening catch basins and underground storm drain. The storm drain will route flows to the northeast corner of the project site where a proposed detention and LID infiltration basin will be located. The basin will retain and infiltrate the site design capture volume and detain 100-year peak flows.

Confluenced flows from the site development will be routed via underground 36-inch RCP storm drain into the basin. The low flows will remain in the basin to be infiltrated, and the reduced peak flows will be discharged via an 12-inch pipe and parkway drain to Bear Valley Road. Flows will then cross over Bear Valley Road to the north as they would under existing conditions and travel to MPD Line A-03.

Upon development of Bear Valley Road and Verbana Road, flows will be contained in the street and and will cross Bear Valley Road and travel to Line A-03 as they would under existing conditions.

Upon development of Sierra Road at the southern tract boundary, flows coming from the undeveloped areas to the south will be directed via AC berm to the west and Verbana Road or the eastern project boundary where they will continue flowing north.

The parcel to the south will eventually be developed by the same owner, and an underground storm drain will be considered for offsite flows in the future.

TENTATIVE TRACT 20544
VICTORVILLE, CA
EXISTING CONDITIONS EXHIBIT

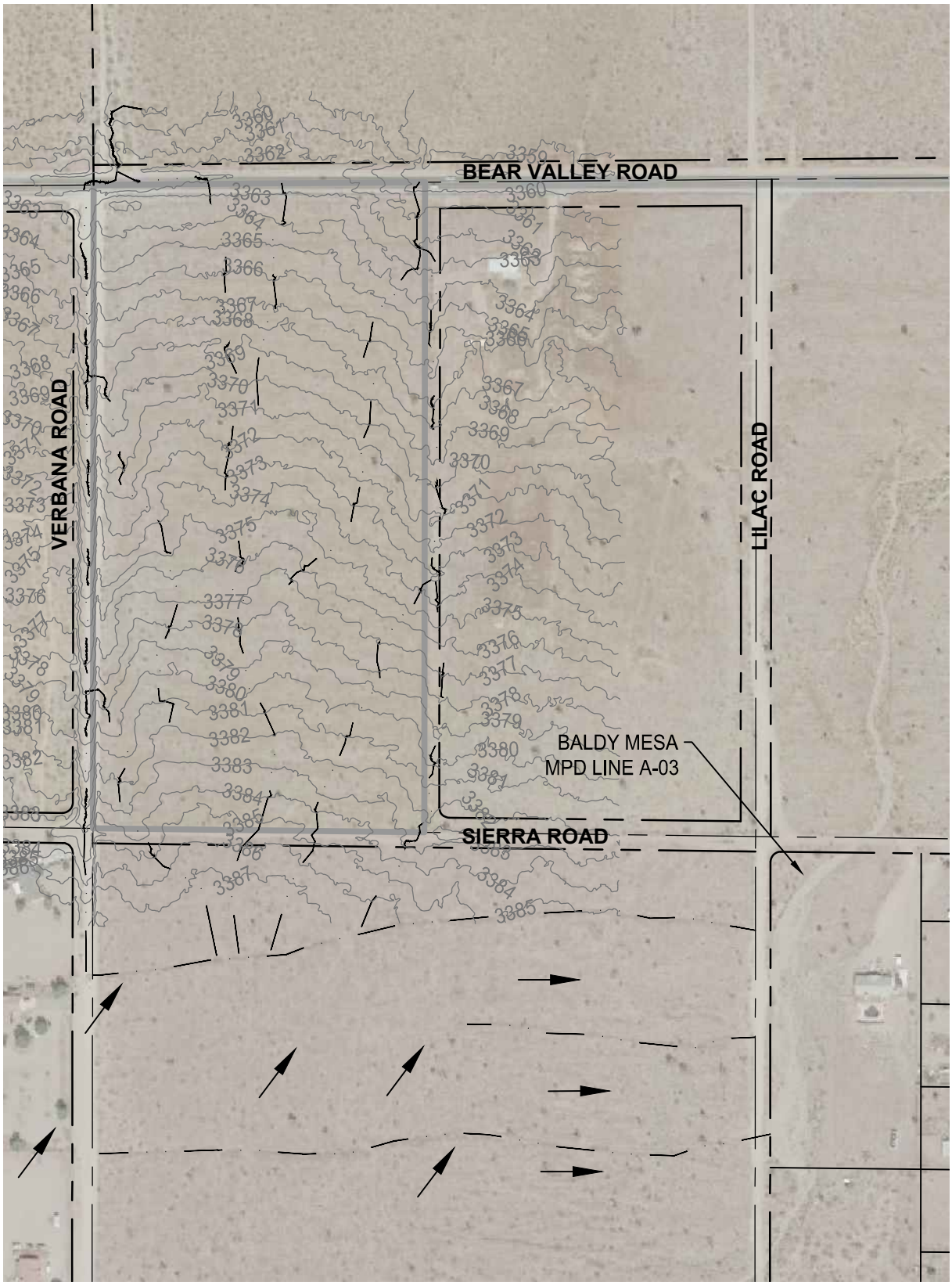


FIGURE 2

SECTION A-3
RAINFALL, HYDROLOGIC, HYDRAULIC, AND LAND USE DATA

METHOD OF STUDY

Rational Method and Unit Hydrograph Method
The Rational Method of Hydrologic Modeling and the Unit Hydrograph for Catchment Runoff, as defined by the County of San Bernardino Hydrology Manual, 1986, was performed in the estimation of the storm water runoff peak flow rates (See Section B) and flood routing analysis (Section B). AES software was utilized for the hydrologic calculations, street flow analysis, and detention basin analysis.

Hydrologic Data
The storm water runoff losses as listed in Section C of the County's Hydrology Manual were incorporated and accounted for in the study and analysis. The Hydrologic Soil Groups, the Hydrologic Conditions, and the Development Conditions were considered in the estimation of loss rates. For this project:

Soil Groups: A

Rainfall Intensities: Refer to the table on the following page.

(The Stormwater Mapping Tool and NOAA Atlas 14 Data the site are in Section R Hydrologic References & Maps).

Rational Method (Reference Appendix, Sections B-1 & B-2)

100-Year Study
AMC II
1-Hour Rainfall Intensity: 1.2 in/hr.
Soil Group: A

PreDeveloped Conditions: Desert Brush 50% Coverage

Developed Conditions: 3-4 DU/Ac

<u>Antecedent Moisture Condition</u>

For this project, AMC II was used in the 100-year study.

(Reference is made to San Bernardino County Hydrology Manual, 1986 and the revision dated April 6, 2010).

Proposed Land Use

RESIDENTIAL
The data input of dwelling units / acre for computer software:

3-4 DU/Ac.

For this project, a Commercial designation was used for the street.

(Refer to Appendix, Section 8.1.4. Hydrologic References & Maps for Impervious Cover for Developed Areas).

WATERSHED AREA-AVERAGED POINT RAINFALL DATA INPUT FOR RATIONAL METHOD AND UNIT HYDROGRAPH

(Table 1)

100-YEAR DEVELOPED

5-Minute Point Rainfall	inches	**0.33**
30-Minute Point Rainfall	inches	**0.87**
1-Hour Point Rainfall	inches	**1.20**
3-Hour Point Rainfall	inches	**1.93**
6-Hour Point Rainfall	inches	**2.69**
24-Hour Point Rainfall	inches	**5.75**

SECTION A-4
STORMWATER RUNOFF

DISCUSSION OF RESULTS

PREDEVELOPMENT ANALYSIS (EXISTING CONDITIONS)
The rational method was performed on the predeveloped and developed conditions of the proposed project site.

A summary of the predeveloped flows is in Table 2 below, and the analysis and Hydrologic Map can be found in section B of this report.

Table 2 – Predeveloped Rational Method Flow Summary

NODE	AREA (AC.)	RUNOFF (CFS)	TOTAL AREA (AC)	TOTAL RUNOFF (CFS)	CFS/ACRE	OFFSITE AREA (AC.)	ONSITE AREA (AC.)	EXISTING ONSITE AREA FLOWRATE (SUM) (CFS)
1.4	15.7	30.8	29.6	57.2	1.93	12.2	17.4	33.6
4.0	1.2	2.6						
3.4	12.7	23.8						

Based on the results of the predeveloped rational method analysis the allowable discharge from the proposed project was determine using the ratio method.

$$\frac{total\ runoff\ (cfs)}{total\ area\ (acres)} = \frac{cfs}{acre}$$

$$\frac{57.2\ cfs}{29.6\ acres} = 1.93\ cfs/acre$$

$$Proposed\ onsite\ area\ (ac.)\ x\ 1.93\frac{cfs}{acre} = 17.4\ ac.\ x\ 1.93\frac{cfs}{acre} = 33.6\ cfs$$

$$Allowable\ Discharge = 33.6\ cfs\ \ x\ \ 0.9 = 30.2\ cfs$$

PROPOSED DEVELOPMENT ANALYSIS

The rational method was performed on the tentative tract to determine the developed peak flow rates of the various drainage areas.

The results of the analysis can be found in Table 3 below. The hydrologic drainage map and rational method analysis can be found in Section B of this report.

Table 3 – Developed Rational Method Flow Summary

NODE	AREA (AC.)	RUNOFF (CFS)	TIME OF CONCENTRATION (MIN.)
5.2	7.8	16.6	15.2
6.2	5.2	8.0	29.4
1.6	**16.6**	**38.3**	**14.2**

Table 4 – Unit Hydrograph Input Information

NODE	LAG TIME (HR.)	Tc (MIN.)	AREA (AC.)	S-GRAPH	MAX. LOSS, Fm (IN/HR)	LOW LOSS Y-BAR
10.9	0.21	14.2	16.6	DESERT	0.44	0.60

The determined time of concentration from the rational method analysis was used to develop the inflow hydrograph.

The detention and infiltration basin will be in the northeast corner of the proposed tract, within lettered Lot ‘D’. The basin will be 6 feet deep with 3:1 max side slopes, 2:1 cut slopes on the south and east sides. The west side will contain the 10:1 max slope concrete access road, as well as the 36-inch RCP inlet pipe and headwall. The north side of the basin will have the 18” outlet pipe and headwall, as well as a PCC spillway (Figure 6).

For preliminary design purposes, a design infiltration rate of 6.5 in/hour was used in the design of the infiltration basin and will be adjusted during final engineering.

The results of the basin routing can be found in Section B of this report as well as in the summary in Table 5 below.

Table 5 – Unit Hydrograph and Basin Routing Summary

	RATIONAL Qp INFLOW (C.F.S.)	UNIT HYDRO. Qp INFLOW (C.F.S.)	BASIN BOTTOM ELEV.	PEAK DISCHARGE (C.F.S.)	WATER SURFACE ELEV.	TOP OF BASIN ELEV.	FREEBOARD (FT)	PEAK VOL. STORED (AC.-FT.)	BASIN STORAGE VOL. AT ELEV. 3244 (AC.-FT.)	RUNOFF VOL. (AC.-FT.)
PREDEVEL.	33.6									
DEVELOPED (to Basin)	38.3	36.8	3355	**3.2**	**3359.5**	3361	1.5	1.32	2.0	3.9

TENTATIVE TRACT 20544
VICTORVILLE, CA

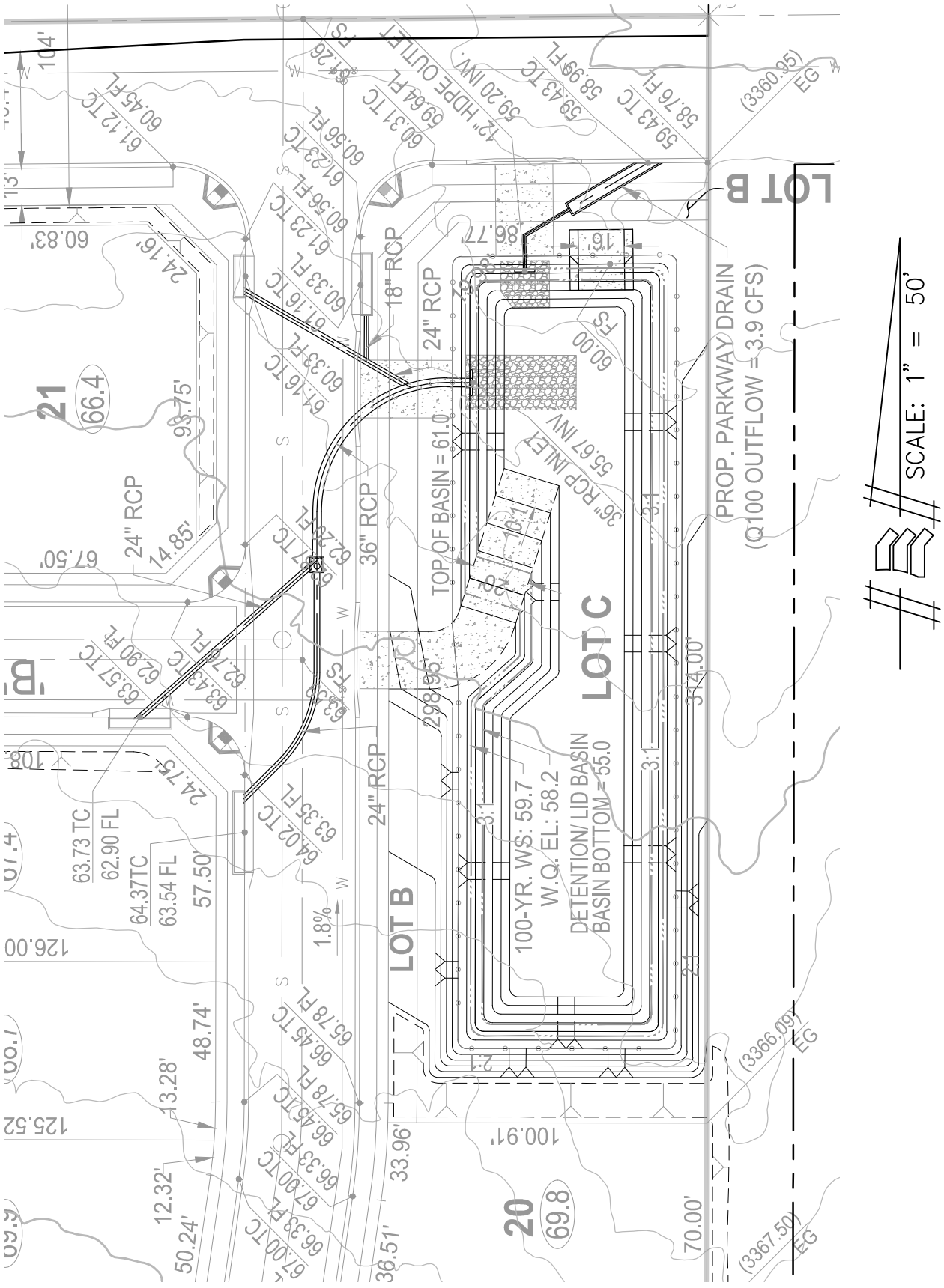


FIGURE 6 - BASIN DETAILS

Most of the site runoff is detained within the basin. Therefore, flows exiting the basin through the 12-inch pipe will be routed into a parkway drain and into Bear Valley Road to the north.

SECTION A-5
STORM WATER QUALITY TREATMENT

STORMWATER QUALITY SUMMARY

In tract stormwater runoff will be intercepted by various curb opening catch basins and routed into the proposed underground storm drain. The storm drain will outlet into a proposed detention and infiltration basin in the northeast corner of the project site. The basin will have an outlet pipe set above the site design capture volume water surface elevation to retain the flows.

Site design Capture Volume =	20,190 ft^3
HCOC Volume =	15,682 ft^3
Total required retention =	**35,782 ft^3 (0.86 ac.-ft.)**

The Hydrologic Conditions of Concern (HCOC) volume was determined using the difference between the predeveloped and post developed 10-year stormflow hydrographs.

Basin Bottom =	3355.0
Water Quality Water Surface =	3358.2 (0.86 ac.-ft.)
Water Quality Depth =	3.2 feet
Basin Outlet El. =	3359.2
Allowable Ponding Depth =	4.2 feet
Overall Retention Volume =	**1.2 ac.-ft.**
Drawdown Period (PER UH) =	**32.1 hours**

SECTION A-6
CONCLUSION

CONCLUSION

Stormwater runoff from in the proposed tract will be routed via underground storm drain to a proposed detention and LID and HCOC infiltration basin located in the northeast corner of the project site. The Basin will retain up to 1.2 ac.-ft of dead storage for water quality infiltration and release a reduced peak flow, from the existing 33.6 cfs, to approximately 3.2 cfs via a parkway drain and into Bear Valley Road.

Flows from south of the project site will be carried within Verbana Road or along the eastern tract boundary and eventually confluence with Baldy Mesa MP Drain Line A-03. Line A-03 is a natural drainage course to the east that ultimately leads to the Mojave River.

Overall, the proposed project site and resulting improvements will not have any negative impact on the existing downstream drainage.

Node 5.2 = 16.6 cfs
Detention Basin outflow = 3.2 cfs
Node 6.2 = 8.0 cfs

Total Site Developed Runoff = 16.6 cfs + 3.2 cfs + 8.0 cfs = 27.8 cfs

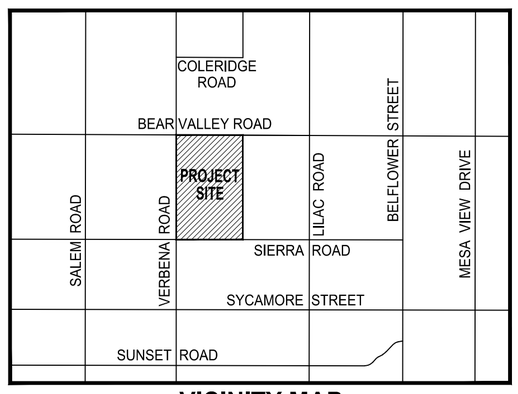
Allowable Outlfow = 30.2 cfs

SECTION B
Q100-YEAR HYDROLOGY

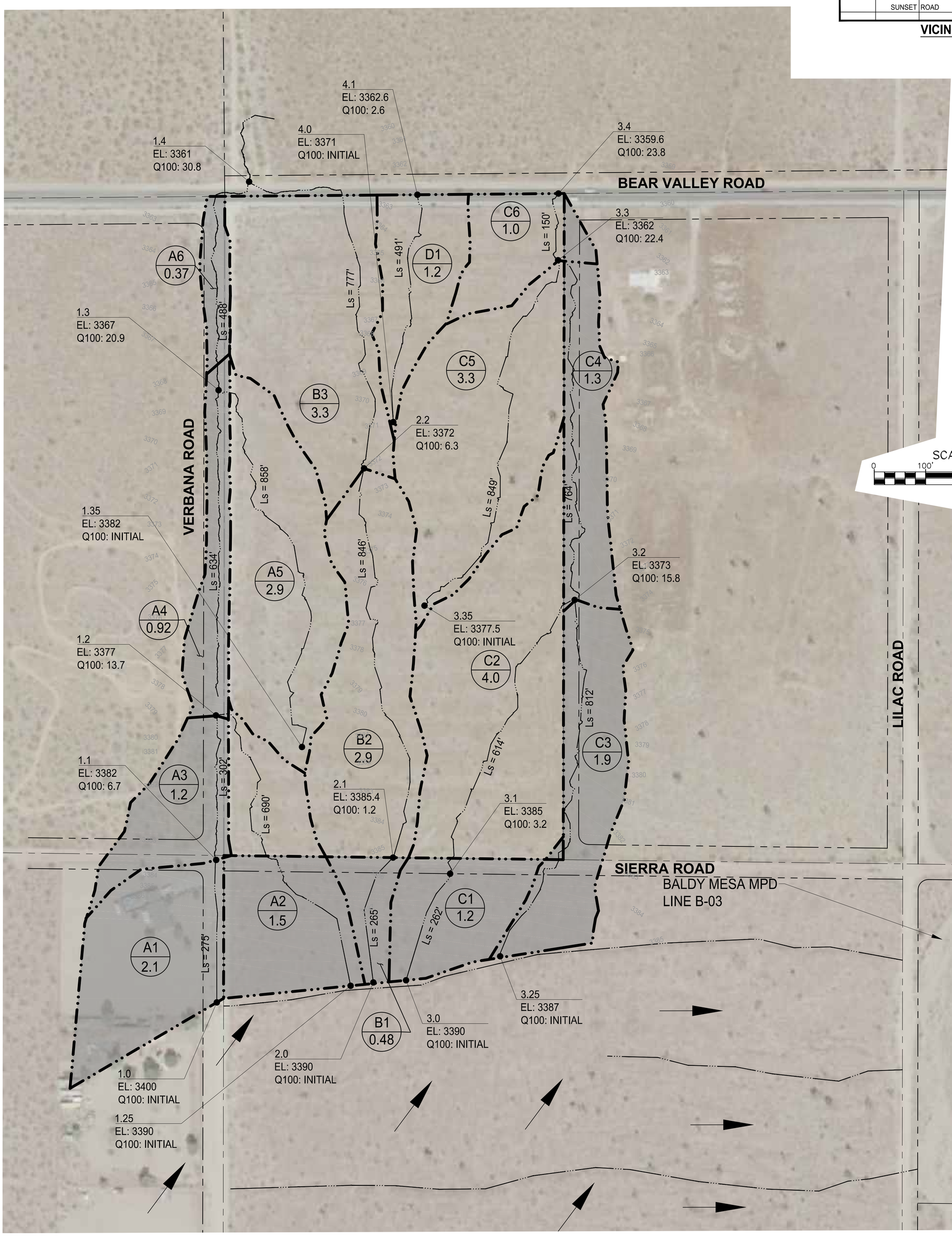
SECTION B-1:
PREDEVELOPED CONDITION
HYDROLOGY MAP
RATIONAL METHOD ANALYSIS

TENTATIVE TRACT 20544

CITY OF VICTORVILLE, CALIFORNIA
100-YEAR PREDEVELOPED HYDROLOGIC
DRAINAGE MAP



VICINITY MAP
NTS



NOTE

ALL SOILS GROUP "A"
PER SAN BERNARDINO COUNTY
WATERSHED MAPPING TOOL

KEY

NODE DESCRIPTION — 3.0 / EL: 3390 / Q100: INITIAL

SUBAREA DESIGNATION / SUBAREA ACRAGE — B2 / 5.9

LENGTH BETWEEN NODES — L=500'

FLOW ARROW

DRAINAGE BOUNDARY

OFF SITE FLOWS - TO BE INCLUDED IN DEVELOPED CONDITION (11.1 ACRES)

03/23/2022

FIGURE 4

HYDROLOGIC DRAINAGE MAP

TRACT 20544
PRE-DEVELOPED 100-YEAR FLOW

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FAX: 909.481.6320

JOB NUMBER 1028-2913
SHEET 1 OF 1

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
         (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
        (c) Copyright 1983-2016 Advanced Engineering Software (aes)
            Ver. 23.0  Release Date: 07/01/2016  License ID 1251

                              Analysis prepared by:

                           MADOLE & ASSOCIATES, INC.
                         9302 PITTSBURGH AVENUE, SUITE 230
                            RANCHO CUCAMONGA, CA 91730


 ************************** DESCRIPTION OF STUDY **************************
* Tentative Tract 20544, Victorville, CA                                  *
* 100-year Predeveloped Rational Method Analysis                          *
* 1028-2913        TGS        03/23/2022                                  *
 **************************************************************************

  FILE NAME: 20544PRE.DAT
  TIME/DATE OF STUDY: 15:12 03/23/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.2000

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.10 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =   3400.00  DOWNSTREAM(FEET) =   3382.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.517
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.810
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        2.10      0.29     1.000    85   11.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      6.65
  TOTAL AREA(ACRES) =      2.10   PEAK FLOW RATE(CFS) =      6.65

**************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  52
--------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3382.00  DOWNSTREAM(FEET) =   3377.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   302.00   CHANNEL SLOPE =  0.0166
  CHANNEL FLOW THRU SUBAREA(CFS) =       6.65
  FLOW VELOCITY(FEET/SEC) =   2.91 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =   13.25
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.20 =     577.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.20 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN.) =   13.25
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.454
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        1.20      0.29     1.000    85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    3.42
  EFFECTIVE AREA(ACRES) =      3.30   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        3.3       PEAK FLOW RATE(CFS) =       9.40

**************************************************************************
  FLOW PROCESS FROM NODE      1.25 TO NODE      1.20 IS CODE =  82
--------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   690.00
  ELEVATION DATA: UPSTREAM(FEET) =   3390.00  DOWNSTREAM(FEET) =   3382.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   23.523
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.311
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        1.50      0.29     1.000    85   23.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.50   INITIAL SUBAREA RUNOFF(CFS) =    2.73

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.25
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.454
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    4.27
  EFFECTIVE AREA(ACRES) =      4.80   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        4.8       PEAK FLOW RATE(CFS) =      13.67

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3377.00  DOWNSTREAM(FEET) =   3367.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   634.00   CHANNEL SLOPE =  0.0158
  CHANNEL FLOW THRU SUBAREA(CFS) =      13.67
  FLOW VELOCITY(FEET/SEC) =   3.40 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.11   Tc(MIN.) =   16.36
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.30 =    1211.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.36
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.981
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        0.92      0.29     1.000    85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.92      SUBAREA RUNOFF(CFS) =    2.23
  EFFECTIVE AREA(ACRES) =      5.72   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        5.7       PEAK FLOW RATE(CFS) =      13.85

****************************************************************************
  FLOW PROCESS FROM NODE      1.35 TO NODE      1.30 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
```

```
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   858.00
  ELEVATION DATA: UPSTREAM(FEET) =   3382.00  DOWNSTREAM(FEET) =   3367.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   23.642
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.303
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        2.90      0.29     1.000    85   23.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    2.90   INITIAL SUBAREA RUNOFF(CFS) =    5.25

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   16.36
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.981
  SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    7.02
  EFFECTIVE AREA(ACRES) =      8.62   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        8.6       PEAK FLOW RATE(CFS) =      20.87

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3367.00  DOWNSTREAM(FEET) =   3361.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   488.00   CHANNEL SLOPE =  0.0123
  CHANNEL FLOW THRU SUBAREA(CFS) =      20.87
  FLOW VELOCITY(FEET/SEC) =   3.36 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.42   Tc(MIN.) =   18.78
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.40 =    1699.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.78
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.706
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        0.37      0.29     1.000    85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.37      SUBAREA RUNOFF(CFS) =    0.80
  EFFECTIVE AREA(ACRES) =      8.99   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        9.0       PEAK FLOW RATE(CFS) =      20.87
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.78
  RAINFALL INTENSITY(INCH/HR) =   2.71
  AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       8.99
  TOTAL STREAM AREA(ACRES) =       8.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.87

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =   3390.00  DOWNSTREAM(FEET) =   3385.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   15.458
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.101
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        0.48      0.29     1.000    85   15.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.21
  TOTAL AREA(ACRES) =      0.48   PEAK FLOW RATE(CFS) =      1.21

****************************************************************************
  FLOW PROCESS FROM NODE      2.10 TO NODE      2.20 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3385.40  DOWNSTREAM(FEET) =   3372.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   846.00   CHANNEL SLOPE =  0.0158
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.21
  FLOW VELOCITY(FEET/SEC) =   1.96 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   7.20   Tc(MIN.) =   22.66
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.20 =    1131.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =   22.66
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.373
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        2.90      0.29     1.000    85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    5.44
  EFFECTIVE AREA(ACRES) =      3.38   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =       6.34

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      1.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3372.00  DOWNSTREAM(FEET) =   3361.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   777.00   CHANNEL SLOPE =  0.0142
  CHANNEL FLOW THRU SUBAREA(CFS) =       6.34
  FLOW VELOCITY(FEET/SEC) =   2.66 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.88   Tc(MIN.) =   27.53
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      1.40 =    1908.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   27.53
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.070
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        3.30      0.29     1.000    85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    5.29
  EFFECTIVE AREA(ACRES) =      6.68   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.7       PEAK FLOW RATE(CFS) =      10.70

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   27.53
  RAINFALL INTENSITY(INCH/HR) =   2.07
  AREA-AVERAGED Fm(INCH/HR) =  0.29
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       6.68
  TOTAL STREAM AREA(ACRES) =       6.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.70

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       20.87   18.78    2.706  0.29( 0.29) 1.00       9.0       1.00
      2       10.70   27.53    2.070  0.29( 0.29) 1.00       6.7       2.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       30.78   18.78    2.706  0.29( 0.29) 1.00      13.5       1.00
      2       26.08   27.53    2.070  0.29( 0.29) 1.00      15.7       2.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.78    Tc(MIN.) =    18.78
  EFFECTIVE AREA(ACRES) =      13.55   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       15.7
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      1.40 =    1908.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   262.00
  ELEVATION DATA: UPSTREAM(FEET) =   3390.00  DOWNSTREAM(FEET) =   3385.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   14.454
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.250
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        1.20      0.29     1.000    85   14.45
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.20
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      3.20

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

```
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3385.00  DOWNSTREAM(FEET) =   3373.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   614.00   CHANNEL SLOPE =  0.0195
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.20
  FLOW VELOCITY(FEET/SEC) =   2.66 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.84   Tc(MIN.) =   18.30
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      3.20 =     876.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.756
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        4.00      0.29     1.000    85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.00      SUBAREA RUNOFF(CFS) =    8.88
  EFFECTIVE AREA(ACRES) =      5.20   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        5.2       PEAK FLOW RATE(CFS) =      11.54

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.20 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   812.00
  ELEVATION DATA: UPSTREAM(FEET) =   3387.00  DOWNSTREAM(FEET) =   3373.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   23.191
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.334
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        1.90      0.29     1.000    85   23.19
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.90   INITIAL SUBAREA RUNOFF(CFS) =    3.50

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   18.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.756
  SUBAREA AREA(ACRES) =    1.90      SUBAREA RUNOFF(CFS) =    4.22
  EFFECTIVE AREA(ACRES) =      7.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
```

```
 AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        7.1       PEAK FLOW RATE(CFS) =      15.75

****************************************************************************
 FLOW PROCESS FROM NODE      3.20 TO NODE      3.30 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3373.00  DOWNSTREAM(FEET) =   3362.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   764.00   CHANNEL SLOPE =  0.0144
 CHANNEL FLOW THRU SUBAREA(CFS) =      15.75
 FLOW VELOCITY(FEET/SEC) =   3.37 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   3.77   Tc(MIN.) =   22.07
 LONGEST FLOWPATH FROM NODE      3.00 TO NODE      3.30 =    1640.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.30 TO NODE      3.30 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   22.07
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.417
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL DESERT COVER
 "DESERT BRUSH"   (50.0%)   C        1.30      0.29     1.000    85
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    2.49
 EFFECTIVE AREA(ACRES) =      8.40   AREA-AVERAGED Fm(INCH/HR) =  0.29
 AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        8.4       PEAK FLOW RATE(CFS) =      16.08

****************************************************************************
 FLOW PROCESS FROM NODE      3.35 TO NODE      3.30 IS CODE =  82
----------------------------------------------------------------------------
 >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
 >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   849.00
 ELEVATION DATA: UPSTREAM(FEET) =   3377.50  DOWNSTREAM(FEET) =   3362.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   23.339
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.324
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL DESERT COVER
 "DESERT BRUSH"   (50.0%)   C        3.30      0.29     1.000    85   23.34
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    3.30   INITIAL SUBAREA RUNOFF(CFS) =    6.04

 ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
```

```
  MAINLINE Tc(MIN.) =   22.07
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.417
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    6.32
  EFFECTIVE AREA(ACRES) =     11.70   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       11.7       PEAK FLOW RATE(CFS) =      22.39

****************************************************************************
  FLOW PROCESS FROM NODE      3.30 TO NODE      3.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3362.00  DOWNSTREAM(FEET) =   3359.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0160
  CHANNEL FLOW THRU SUBAREA(CFS) =      22.39
  FLOW VELOCITY(FEET/SEC) =   3.91 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.64   Tc(MIN.) =   22.71
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      3.40 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.40 TO NODE      3.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.71
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.369
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        1.00      0.29     1.000    85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    1.87
  EFFECTIVE AREA(ACRES) =     12.70   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       12.7       PEAK FLOW RATE(CFS) =      23.76

****************************************************************************
  FLOW PROCESS FROM NODE      3.40 TO NODE      3.40 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   491.00
  ELEVATION DATA: UPSTREAM(FEET) =   3371.00  DOWNSTREAM(FEET) =   3362.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   18.993
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.685
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        1.20      0.29     1.000    85   18.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.59
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      2.59
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.2  TC(MIN.) =     18.99
  EFFECTIVE AREA(ACRES) =      1.20  AREA-AVERAGED Fm(INCH/HR)=  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =       2.59
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

SECTION B-2:

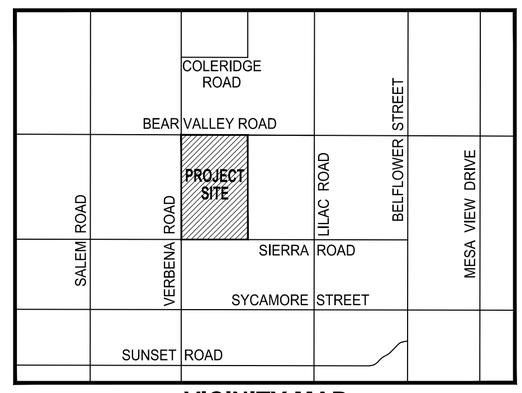
DEVELOPED CONDITION

HYDROLOGY MAP

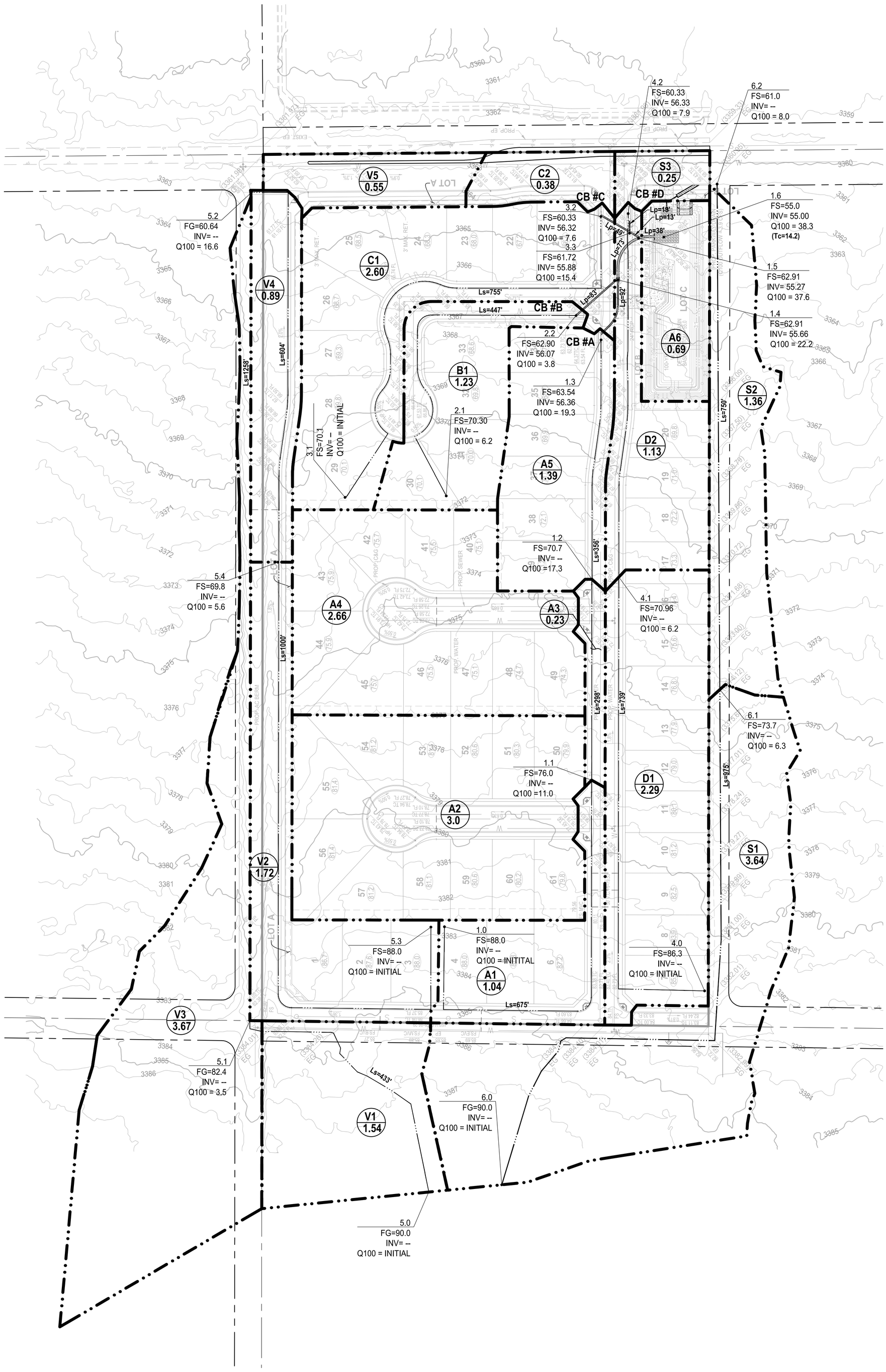
RATIONAL METHOD ANALYSIS

TENTATIVE TRACT 20544

CITY OF VICTORVILLE, CALIFORNIA
100-YEAR DEVELOPED HYDROLOGIC
DRAINAGE MAP



VICINITY MAP
NTS



NOTE

ALL SOILS GROUP "A"
PER SAN BERNARDINO COUNTY
WATERSHED MAPPING TOOL

KEY

NODE DESCRIPTION — 3.0 / EL: 3390 / Q100: INITIAL

SUBAREA DESIGNATION / SUBAREA ACRAGE — B2 / 5.9

LENGTH BETWEEN NODES — L=500'

FLOW ARROW

DRAINAGE BOUNDARY

9/8/2022

FIGURE 5
HYDROLOGIC DRAINAGE MAP

TRACT 20544
DEVELOPED 100-YEAR FLOW

JOB NUMBER 1028-2913
SHEET 1 OF 1

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
         (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
        (c) Copyright 1983-2016 Advanced Engineering Software (aes)
            Ver. 23.0  Release Date: 07/01/2016  License ID 1251

                              Analysis prepared by:

                           MADOLE & ASSOCIATES, INC.
                         9302 PITTSBURGH AVENUE, SUITE 230
                            RANCHO CUCAMONGA, CA 91730


 ************************** DESCRIPTION OF STUDY **************************
* Tentative Tract 20544, Victorville, CA                                  *
* 100-year Predeveloped Rational Method Analysis                          *
* 1028-2913        TGS        03/23/2022                                  *
 **************************************************************************

  FILE NAME: 20544PRE.DAT
  TIME/DATE OF STUDY: 15:12 03/23/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.2000

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.10 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =   3400.00  DOWNSTREAM(FEET) =   3382.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.517
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.810
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        2.10      0.29     1.000    85   11.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      6.65
  TOTAL AREA(ACRES) =      2.10   PEAK FLOW RATE(CFS) =      6.65

**************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  52
--------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3382.00  DOWNSTREAM(FEET) =   3377.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   302.00   CHANNEL SLOPE =  0.0166
  CHANNEL FLOW THRU SUBAREA(CFS) =       6.65
  FLOW VELOCITY(FEET/SEC) =   2.91 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =   13.25
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.20 =     577.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.20 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN.) =   13.25
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.454
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        1.20      0.29     1.000    85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    3.42
  EFFECTIVE AREA(ACRES) =      3.30   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        3.3       PEAK FLOW RATE(CFS) =       9.40

**************************************************************************
  FLOW PROCESS FROM NODE      1.25 TO NODE      1.20 IS CODE =  82
--------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   690.00
  ELEVATION DATA: UPSTREAM(FEET) =   3390.00  DOWNSTREAM(FEET) =   3382.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   23.523
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.311
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        1.50      0.29     1.000    85   23.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.50   INITIAL SUBAREA RUNOFF(CFS) =    2.73

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.25
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.454
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    4.27
  EFFECTIVE AREA(ACRES) =      4.80   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        4.8       PEAK FLOW RATE(CFS) =      13.67

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3377.00  DOWNSTREAM(FEET) =   3367.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   634.00   CHANNEL SLOPE =  0.0158
  CHANNEL FLOW THRU SUBAREA(CFS) =      13.67
  FLOW VELOCITY(FEET/SEC) =   3.40 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.11   Tc(MIN.) =   16.36
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.30 =    1211.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.36
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.981
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        0.92      0.29     1.000    85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.92      SUBAREA RUNOFF(CFS) =    2.23
  EFFECTIVE AREA(ACRES) =      5.72   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        5.7       PEAK FLOW RATE(CFS) =      13.85

****************************************************************************
  FLOW PROCESS FROM NODE      1.35 TO NODE      1.30 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
```

```
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   858.00
  ELEVATION DATA: UPSTREAM(FEET) =   3382.00  DOWNSTREAM(FEET) =   3367.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   23.642
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.303
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        2.90      0.29     1.000    85   23.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    2.90   INITIAL SUBAREA RUNOFF(CFS) =    5.25

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   16.36
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.981
  SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    7.02
  EFFECTIVE AREA(ACRES) =      8.62   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        8.6       PEAK FLOW RATE(CFS) =      20.87

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3367.00  DOWNSTREAM(FEET) =   3361.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   488.00   CHANNEL SLOPE =  0.0123
  CHANNEL FLOW THRU SUBAREA(CFS) =      20.87
  FLOW VELOCITY(FEET/SEC) =   3.36 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.42   Tc(MIN.) =   18.78
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.40 =    1699.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.78
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.706
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        0.37      0.29     1.000    85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.37      SUBAREA RUNOFF(CFS) =    0.80
  EFFECTIVE AREA(ACRES) =      8.99   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        9.0       PEAK FLOW RATE(CFS) =      20.87
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.78
  RAINFALL INTENSITY(INCH/HR) =   2.71
  AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       8.99
  TOTAL STREAM AREA(ACRES) =       8.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.87

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =   3390.00  DOWNSTREAM(FEET) =   3385.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   15.458
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.101
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        0.48      0.29     1.000    85   15.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.21
  TOTAL AREA(ACRES) =      0.48   PEAK FLOW RATE(CFS) =      1.21

****************************************************************************
  FLOW PROCESS FROM NODE      2.10 TO NODE      2.20 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3385.40  DOWNSTREAM(FEET) =   3372.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   846.00   CHANNEL SLOPE =  0.0158
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.21
  FLOW VELOCITY(FEET/SEC) =   1.96 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   7.20   Tc(MIN.) =   22.66
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.20 =    1131.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =   22.66
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.373
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        2.90      0.29     1.000    85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    5.44
  EFFECTIVE AREA(ACRES) =      3.38   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =       6.34

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      1.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3372.00  DOWNSTREAM(FEET) =   3361.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   777.00   CHANNEL SLOPE =  0.0142
  CHANNEL FLOW THRU SUBAREA(CFS) =       6.34
  FLOW VELOCITY(FEET/SEC) =   2.66 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.88   Tc(MIN.) =   27.53
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      1.40 =    1908.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   27.53
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.070
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        3.30      0.29     1.000    85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    5.29
  EFFECTIVE AREA(ACRES) =      6.68   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.7       PEAK FLOW RATE(CFS) =      10.70

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   27.53
  RAINFALL INTENSITY(INCH/HR) =   2.07
  AREA-AVERAGED Fm(INCH/HR) =  0.29
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       6.68
  TOTAL STREAM AREA(ACRES) =       6.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.70

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       20.87   18.78    2.706  0.29( 0.29) 1.00       9.0       1.00
      2       10.70   27.53    2.070  0.29( 0.29) 1.00       6.7       2.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       30.78   18.78    2.706  0.29( 0.29) 1.00      13.5       1.00
      2       26.08   27.53    2.070  0.29( 0.29) 1.00      15.7       2.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.78    Tc(MIN.) =    18.78
  EFFECTIVE AREA(ACRES) =      13.55   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       15.7
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      1.40 =    1908.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   262.00
  ELEVATION DATA: UPSTREAM(FEET) =   3390.00  DOWNSTREAM(FEET) =   3385.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   14.454
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.250
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        1.20      0.29     1.000    85   14.45
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.20
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      3.20

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

```
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3385.00  DOWNSTREAM(FEET) =   3373.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   614.00   CHANNEL SLOPE =  0.0195
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.20
  FLOW VELOCITY(FEET/SEC) =   2.66 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.84   Tc(MIN.) =   18.30
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      3.20 =     876.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.756
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        4.00      0.29     1.000    85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.00      SUBAREA RUNOFF(CFS) =    8.88
  EFFECTIVE AREA(ACRES) =      5.20   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        5.2       PEAK FLOW RATE(CFS) =      11.54

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.20 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   812.00
  ELEVATION DATA: UPSTREAM(FEET) =   3387.00  DOWNSTREAM(FEET) =   3373.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   23.191
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.334
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        1.90      0.29     1.000    85   23.19
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.90   INITIAL SUBAREA RUNOFF(CFS) =    3.50

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   18.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.756
  SUBAREA AREA(ACRES) =    1.90      SUBAREA RUNOFF(CFS) =    4.22
  EFFECTIVE AREA(ACRES) =      7.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
```

```
 AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        7.1       PEAK FLOW RATE(CFS) =      15.75

****************************************************************************
 FLOW PROCESS FROM NODE      3.20 TO NODE      3.30 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3373.00  DOWNSTREAM(FEET) =   3362.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   764.00   CHANNEL SLOPE =  0.0144
 CHANNEL FLOW THRU SUBAREA(CFS) =      15.75
 FLOW VELOCITY(FEET/SEC) =   3.37 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   3.77   Tc(MIN.) =   22.07
 LONGEST FLOWPATH FROM NODE      3.00 TO NODE      3.30 =    1640.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.30 TO NODE      3.30 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   22.07
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.417
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL DESERT COVER
 "DESERT BRUSH"   (50.0%)   C        1.30      0.29     1.000    85
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    2.49
 EFFECTIVE AREA(ACRES) =      8.40   AREA-AVERAGED Fm(INCH/HR) =  0.29
 AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        8.4       PEAK FLOW RATE(CFS) =      16.08

****************************************************************************
 FLOW PROCESS FROM NODE      3.35 TO NODE      3.30 IS CODE =  82
----------------------------------------------------------------------------
 >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
 >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   849.00
 ELEVATION DATA: UPSTREAM(FEET) =   3377.50  DOWNSTREAM(FEET) =   3362.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   23.339
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.324
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL DESERT COVER
 "DESERT BRUSH"   (50.0%)   C        3.30      0.29     1.000    85   23.34
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    3.30   INITIAL SUBAREA RUNOFF(CFS) =    6.04

 ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
```

```
  MAINLINE Tc(MIN.) =   22.07
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.417
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    6.32
  EFFECTIVE AREA(ACRES) =     11.70   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       11.7       PEAK FLOW RATE(CFS) =      22.39

****************************************************************************
  FLOW PROCESS FROM NODE      3.30 TO NODE      3.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3362.00  DOWNSTREAM(FEET) =   3359.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0160
  CHANNEL FLOW THRU SUBAREA(CFS) =      22.39
  FLOW VELOCITY(FEET/SEC) =   3.91 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.64   Tc(MIN.) =   22.71
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      3.40 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.40 TO NODE      3.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.71
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.369
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        1.00      0.29     1.000    85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    1.87
  EFFECTIVE AREA(ACRES) =     12.70   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       12.7       PEAK FLOW RATE(CFS) =      23.76

****************************************************************************
  FLOW PROCESS FROM NODE      3.40 TO NODE      3.40 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   491.00
  ELEVATION DATA: UPSTREAM(FEET) =   3371.00  DOWNSTREAM(FEET) =   3362.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   18.993
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.685
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (50.0%)   C        1.20      0.29     1.000    85   18.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.59
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      2.59
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.2  TC(MIN.) =     18.99
  EFFECTIVE AREA(ACRES) =      1.20  AREA-AVERAGED Fm(INCH/HR)=  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =       2.59
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

SECTION B-3:
DETENTION BASIN AND FLOOD ROUTING ANALYSIS

UNIT HYDROGRAPH DEVELOPMENT

BASIN DETAILS

FLOOD ROUTING

TTM20544
100-YR STORM - DEVELOPED CONDITION

1028-2913
4/9/2019

Low Loss Fraction & Maximum Loss Rate | **100 Developed** | Set # 1

Cover	Area	%	Soil type	Area	%	CN-II	CN-III	Ap	%	S	Ia	Y	Y (wght)	Fp (F.C-6)	Fm	Fm (wght)
Area1 (onsite)	17.4	1.00	A	17.4	100%	32	52	0.6	60%	21.25	4.25	0.02	0.01	0.74	0.44	0.44
		0.00		0	0.00	46	66	0	0.00	5.15	1.03	0.39	0.00	0.54	0	0.00
		0.00		0	0.00	46	66	0	0.00	5.15	1.03	0.39	0.00	0.54	0	0.00
		0.00		0	0.00	32	52	0	0.00	9.23	1.85	0.2	0.00	0.74	0	0.00
(AutoCalc: Impervious)				(7)	(0.4)		98	0	0.40	0.2	0.04	0.96	0.38			
	17.4			17.4								Y=	0.40		Fm=	0.44

P-24 5.75 in

Est Vol = 3 ac-ft

Low Loss Fraction,Y-bar = 0.60

Return Period 100
AMC Type II

Lag Time

Tc = 15.6 min from Rational Method Study
Lag = 12.48 min Run:
Lag = 0.21 hr

Project: **TTM 20544** Date: 3/29/2022 1028-2913

Engineer: TAYLOR SKAHILL

Notes: **100 Developed** **Set #1**

					1st-24hr	2nd-24hr
1	Design Storm			yr	100	
2	Catchment Lag time			hrs	0.21	
3	Catchment Area			acres	17.4	
4	Base flow			cfs/sq mi	0	
5	S-graph					
6	Maximum loss rate, Fm			in/hr	0.44	
7	Low loss fraction, Y-bar				0.60	
8	Watershed area-averaged	5	-minute point rainfall	inches	0.33	0.12
	Watershed area-averaged	30	-minute point rainfall	inches	0.87	0.31
	Watershed area-averaged	1	-hour point rainfall	inches	1.20	0.43
	Watershed area-averaged	3	-hour point rainfall	inches	1.93	0.69
	Watershed area-averaged	6	-hour point rainfall	inches	2.69	0.97
	Watershed area-averaged	24	-hour point rainfall	inches	5.75	2.07
9	24-hour storm unit interval			minutes	5	

Point rainfall unadjusted by depth-area factors

10	Depth-area adjustment factors (Fig E-4)	5-min	0.980
		30-min	0.980
		1-hr	0.990
		3-hr	0.990
		6-hr	1.000
		24-hr	1.000

TTM 20544

Detention Basin Volume

3/29/2022

J.N 1028-2913

Contours Elevation	Area (Sf)	Depth (Ft)	Volume (Cu. Ft)	Volume (Ac. Ft)	Total Volume (Ac-Ft)	
3355	8,334		0		0	
		0.5	4,403	0.10		
3355.5	9,277				0.10	
		0.5	4,884	0.11		
3356	10,257				0.21	
		0.5	5,374	0.12		
3356.5	11,237				0.34	
		0.5	5,873	0.13		
3357	12,253				0.47	
		0.5	6,381	0.15		
3357.5	13,269				0.62	
		0.5	6,897	0.16		
3358	14,320				0.78	
		0.5	7,411	0.17		
3358.5	15,323				0.95	WQ EL: 3358.2
		0.5	7,946	0.18		VOLUME=0.86 AC.FT.
3359	16,460				1.13	
		0.5	8,502	0.20		
3359.5	17,549				1.32	
		0.5	9,055	0.21		
3360	18,671				1.53	
		0.5	9,565	0.22		
3360.5	19,589				1.75	
		0.5	10,185	0.23		
3361	21,149				1.99	

C		0.75	
D		1	ft
A		0.8	ft2
g		32.2	ft/sec

$Q=C*A*((2*g*H_0)^{0.5})$

INFILTRATION RATE	13	IN/HR
FACTOR OF SAFETY	2	
	0.000150463	FT/SEC

No. of Pipes	1

INLET EL. 3359.2
H0 3359.70

Elevation	Depth	Area	Head	H0	Volume	Infiltration	Single Pipe Outflow	Total Pipe Outflow	Effective Outflow
ft	ft	sq. ft.	ft	ft	ac-ft	cfs	cfs	cfs	cfs
3355.0	0.0	8,334	0.00	0.00	0	0.0	0.0	0.0	0.0
3355.5	0.5	9,277	0.00	0.00	0.10	1.4	0.0	0.0	1.4
3356.0	1.0	10,257	0.00	0.00	0.21	1.5	0.0	0.0	1.5
3356.5	1.5	11,237	0.00	0.00	0.34	1.7	0.0	0.0	1.7
3357.0	2.0	12,253	0.00	0.00	0.47	1.8	0.0	0.0	1.8
3357.5	2.5	13,269	0.00	0.00	0.62	2.0	0.0	0.0	2.0
3358.0	3.0	14,320	0.00	0.00	0.78	2.2	0.0	0.0	2.2
3358.5	3.5	15,323	0.00	0.00	0.95	2.3	0.0	0.0	2.3
3359.0	4.0	16,460	0.00	0.00	1.13	2.5	0.0	0.0	2.5
3359.5	4.5	17,549	0.30	0.00	1.32	2.6	0.6	0.6	3.2
3360.0	5.0	18,671	0.80	0.30	1.53	2.8	2.6	2.6	5.4
3360.5	5.5	19,589	1.30	0.80	1.75	2.9	4.2	4.2	7.2
3361.0	6.0	21,149	1.80	1.30	1.99	3.2	5.4	5.4	8.6

```
**************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==========================================================================
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1251

                              Analysis prepared by:

                                 MADOLE & ASSOCIATES, INC.
                               9302 PITTSBURGH AVENUE, SUITE 230
                                  RANCHO CUCAMONGA, CA 91730


**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  TENTATIVE TRACT 20544 – 100 YEAR DETENTION BASIN ROUTING
  100 YEAR DEVELOPED UNIT HYDROGRAPH

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


    RATIONAL METHOD CALIBRATION COEFFICIENT = 1.10
    TOTAL CATCHMENT AREA(ACRES) =   16.60
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.440
    LOW LOSS FRACTION = 0.600
    TIME OF CONCENTRATION(MIN.) = 14.20
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.33
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.20
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.93
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.69
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.75

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

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     3.93
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     4.02

**************************************************************************
  TIME     VOLUME       Q    0.       10.0      20.0      30.0      40.0
 (HOURS)    (AF)      (CFS)
--------------------------------------------------------------------------
  0.14      0.0057      0.96  Q         .         .         .         .
  0.38      0.0245      0.96  Q         .         .         .         .
  0.62      0.0434      0.97  Q         .         .         .         .
  0.85      0.0625      0.98  Q         .         .         .         .
  1.09      0.0816      0.99  Q         .         .         .         .
  1.33      0.1010      0.99  Q         .         .         .         .
  1.56      0.1204      1.00  Q         .         .         .         .
  1.80      0.1400      1.00  .Q        .         .         .         .
  2.04      0.1598      1.01  .Q        .         .         .         .
```

2.27	0.1797	1.02	.Q	.	.	.	.
2.51	0.1997	1.03	.Q	.	.	.	.
2.75	0.2199	1.04	.Q	.	.	.	.
2.98	0.2403	1.05	.Q	.	.	.	.
3.22	0.2608	1.05	.Q	.	.	.	.
3.46	0.2815	1.06	.Q	.	.	.	.
3.69	0.3024	1.07	.Q	.	.	.	.
3.93	0.3235	1.08	.Q	.	.	.	.
4.17	0.3447	1.09	.Q	.	.	.	.
4.40	0.3661	1.10	.Q	.	.	.	.
4.64	0.3878	1.11	.Q	.	.	.	.
4.88	0.4096	1.12	.Q	.	.	.	.
5.11	0.4316	1.13	.Q	.	.	.	.
5.35	0.4539	1.14	.Q	.	.	.	.
5.59	0.4763	1.15	.Q	.	.	.	.
5.82	0.4990	1.17	.Q	.	.	.	.
6.06	0.5220	1.18	.Q	.	.	.	.
6.30	0.5451	1.19	.Q	.	.	.	.
6.53	0.5686	1.20	.Q	.	.	.	.
6.77	0.5923	1.22	.Q	.	.	.	.
7.01	0.6162	1.23	.Q	.	.	.	.
7.24	0.6405	1.25	.Q	.	.	.	.
7.48	0.6650	1.26	.Q	.	.	.	.
7.72	0.6898	1.28	.Q	.	.	.	.
7.95	0.7150	1.29	.Q	.	.	.	.
8.19	0.7405	1.31	.Q	.	.	.	.
8.43	0.7663	1.33	.Q	.	.	.	.
8.66	0.7925	1.35	.Q	.	.	.	.
8.90	0.8190	1.36	.Q	.	.	.	.
9.14	0.8460	1.39	.Q	.	.	.	.
9.37	0.8733	1.41	.Q	.	.	.	.
9.61	0.9011	1.44	.Q	.	.	.	.
9.85	0.9294	1.45	.Q	.	.	.	.
10.08	0.9581	1.49	.Q	.	.	.	.
10.32	0.9873	1.50	.Q	.	.	.	.
10.56	1.0171	1.54	.Q	.	.	.	.
10.79	1.0474	1.56	.Q	.	.	.	.
11.03	1.0784	1.60	.Q	.	.	.	.
11.27	1.1100	1.63	.Q	.	.	.	.
11.50	1.1423	1.68	.Q	.	.	.	.
11.74	1.1753	1.70	.Q	.	.	.	.
11.98	1.2092	1.76	.Q	.	.	.	.
12.21	1.2431	1.71	.Q	.	.	.	.
12.45	1.2758	1.63	.Q	.	.	.	.
12.69	1.3081	1.67	.Q	.	.	.	.
12.92	1.3415	1.75	.Q	.	.	.	.
13.16	1.3762	1.80	.Q	.	.	.	.
13.40	1.4124	1.90	.Q	.	.	.	.
13.63	1.4502	1.96	.Q	.	.	.	.
13.87	1.4900	2.10	. Q	.	.	.	.
14.11	1.5318	2.18	. Q	.	.	.	.
14.34	1.5741	2.15	. Q	.	.	.	.
14.58	1.6172	2.26	. Q	.	.	.	.
14.82	1.6643	2.55	. Q	.	.	.	.
15.05	1.7161	2.74	. Q	.	.	.	.
15.29	1.7748	3.27	. Q	.	.	.	.
15.53	1.8432	3.73	. Q	.	.	.	.

15.76	1.9363	5.79	. Q	.	.	.	.
16.00	2.1136	12.34	.	. Q	.	.	.
16.24	**2.5937**	**36.75**	**.**	**.**	**.**	**.**	**Q .**
16.47	2.9972	4.51	. Q	.	.	.	.
16.71	3.0704	2.97	. Q	.	.	.	.
16.95	3.1229	2.39	. Q	.	.	.	.
17.18	3.1670	2.12	. Q	.	.	.	.
17.42	3.2076	2.03	. Q	.	.	.	.
17.66	3.2455	1.85	.Q	.	.	.	.
17.89	3.2803	1.71	.Q	.	.	.	.
18.13	3.3126	1.60	.Q	.	.	.	.
18.37	3.3451	1.73	.Q	.	.	.	.
18.60	3.3782	1.65	.Q	.	.	.	.
18.84	3.4098	1.58	.Q	.	.	.	.
19.08	3.4402	1.52	.Q	.	.	.	.
19.31	3.4694	1.47	.Q	.	.	.	.
19.55	3.4977	1.42	.Q	.	.	.	.
19.79	3.5250	1.38	.Q	.	.	.	.
20.02	3.5516	1.34	.Q	.	.	.	.
20.26	3.5774	1.30	.Q	.	.	.	.
20.50	3.6026	1.27	.Q	.	.	.	.
20.73	3.6271	1.24	.Q	.	.	.	.
20.97	3.6511	1.21	.Q	.	.	.	.
21.21	3.6745	1.18	.Q	.	.	.	.
21.44	3.6975	1.16	.Q	.	.	.	.
21.68	3.7199	1.14	.Q	.	.	.	.
21.92	3.7420	1.12	.Q	.	.	.	.
22.15	3.7636	1.10	.Q	.	.	.	.
22.39	3.7848	1.08	.Q	.	.	.	.
22.63	3.8057	1.06	.Q	.	.	.	.
22.86	3.8263	1.04	.Q	.	.	.	.
23.10	3.8465	1.03	.Q	.	.	.	.
23.34	3.8664	1.01	.Q	.	.	.	.
23.57	3.8860	0.99	Q	.	.	.	.
23.81	3.9053	0.98	Q	.	.	.	.
24.05	3.9243	0.97	Q	.	.	.	.
24.28	3.9338	0.00	Q	.	.	.	.

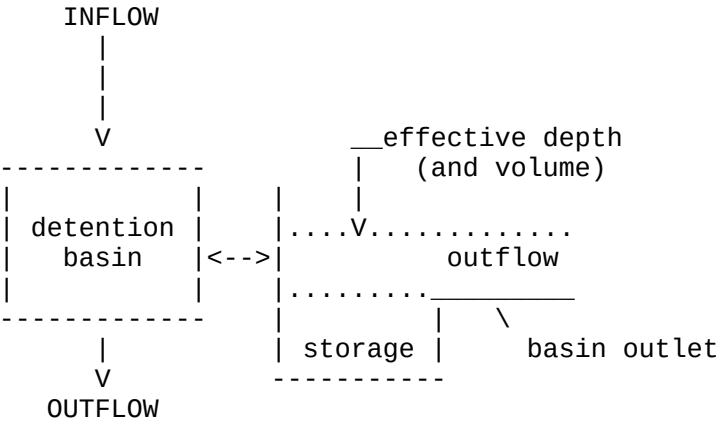
TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1448.4
10%	71.0
20%	28.4
30%	28.4
40%	14.2
50%	14.2
60%	14.2
70%	14.2
80%	14.2
90%	14.2

Problem Descriptions:

```
================================================================================
     FLOW-THROUGH DETENTION BASIN MODEL

     SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
     CONSTANT HYDROGRAPH TIME UNIT(MINUTES) =   14.200
     DEAD STORAGE(AF) =       0.00
     SPECIFIED DEAD STORAGE(AF) FILLED =       0.00
     ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN =    0.00
```




```
     DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
     TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES =  13
     *BASIN-DEPTH  STORAGE    OUTFLOW  **BASIN-DEPTH  STORAGE    OUTFLOW  *
     *   (FEET)  (ACRE-FEET)   (CFS)   **   (FEET)  (ACRE-FEET)   (CFS)   *
     *      0.000      0.000      0.000**      0.500      0.100      1.400*
     *      1.000      0.210      1.500**      1.500      0.340      1.700*
     *      2.000      0.470      1.800**      2.500      0.620      2.000*
     *      3.000      0.780      2.200**      3.500      0.950      2.300*
     *      4.000      1.130      2.500**      4.500      1.320      3.200*
     *      5.000      1.530      5.400**      5.500      1.750      7.200*
     *      6.000      1.990      8.600**
--------------------------------------------------------------------------------
     BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:
      INTERVAL   DEPTH   {S-O*DT/2}   {S+O*DT/2}
       NUMBER   (FEET)   (ACRE-FEET)  (ACRE-FEET)
           1     0.00       0.00000      0.00000
           2     0.50       0.08631      0.11369
           3     1.00       0.19533      0.22467
           4     1.50       0.32337      0.35663
           5     2.00       0.45240      0.48760
           6     2.50       0.60044      0.63956
           7     3.00       0.75848      0.80152
           8     3.50       0.92751      0.97249
           9     4.00       1.10555      1.15445
```

10	4.50	1.28871	1.35129
11	5.00	1.47719	1.58281
12	5.50	1.67959	1.82041
13	6.00	1.90590	2.07410

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.143	0.000	0.96	0.08	0.12	0.017
0.380	0.000	0.96	0.15	0.32	0.029
0.617	0.000	0.97	0.19	0.48	0.039
0.853	0.000	0.98	0.23	0.60	0.046
1.090	0.000	0.99	0.26	0.69	0.052
1.327	0.000	0.99	0.28	0.76	0.057
1.563	0.000	1.00	0.30	0.82	0.060
1.800	0.000	1.00	0.31	0.86	0.063
2.037	0.000	1.01	0.33	0.90	0.065
2.273	0.000	1.02	0.34	0.93	0.067
2.510	0.000	1.03	0.34	0.95	0.069
2.747	0.000	1.04	0.35	0.97	0.070
2.983	0.000	1.05	0.36	0.99	0.071
3.220	0.000	1.05	0.36	1.00	0.072
3.457	0.000	1.06	0.37	1.02	0.073
3.693	0.000	1.07	0.37	1.03	0.074
3.930	0.000	1.08	0.37	1.04	0.075
4.167	0.000	1.09	0.38	1.05	0.075
4.403	0.000	1.10	0.38	1.06	0.076
4.640	0.000	1.11	0.38	1.07	0.077
4.877	0.000	1.12	0.39	1.08	0.078
5.113	0.000	1.13	0.39	1.09	0.078
5.350	0.000	1.14	0.40	1.10	0.079
5.587	0.000	1.15	0.40	1.11	0.080
5.823	0.000	1.17	0.40	1.13	0.081
6.060	0.000	1.18	0.41	1.14	0.082
6.297	0.000	1.19	0.41	1.15	0.082
6.533	0.000	1.20	0.42	1.16	0.083
6.770	0.000	1.22	0.42	1.17	0.084
7.007	0.000	1.23	0.43	1.19	0.085
7.243	0.000	1.25	0.43	1.20	0.086
7.480	0.000	1.26	0.44	1.21	0.087
7.717	0.000	1.28	0.44	1.23	0.088
7.953	0.000	1.29	0.45	1.24	0.089
8.190	0.000	1.31	0.45	1.26	0.090
8.427	0.000	1.33	0.46	1.27	0.091
8.663	0.000	1.35	0.46	1.29	0.093
8.900	0.000	1.36	0.47	1.30	0.094
9.137	0.000	1.39	0.48	1.32	0.095
9.373	0.000	1.41	0.48	1.34	0.096
9.610	0.000	1.44	0.49	1.36	0.098
9.847	0.000	1.45	0.50	1.38	0.099
10.083	0.000	1.49	0.50	1.40	0.101

10.320	0.000	1.50	0.51	1.40	0.103
10.557	0.000	1.54	0.53	1.40	0.106
10.793	0.000	1.56	0.54	1.41	0.109
11.030	0.000	1.60	0.56	1.41	0.113
11.267	0.000	1.63	0.58	1.41	0.117
11.503	0.000	1.68	0.60	1.42	0.122
11.740	0.000	1.70	0.62	1.42	0.127
11.977	0.000	1.76	0.65	1.43	0.134
12.213	0.000	1.71	0.68	1.43	0.139
12.450	0.000	1.63	0.70	1.44	0.143
12.687	0.000	1.67	0.72	1.44	0.147
12.923	0.000	1.75	0.74	1.45	0.153
13.160	0.000	1.80	0.77	1.45	0.160
13.397	0.000	1.90	0.81	1.46	0.169
13.633	0.000	1.96	0.86	1.47	0.179
13.870	0.000	2.10	0.91	1.48	0.191
14.107	0.000	2.18	0.97	1.49	0.204
14.343	0.000	2.15	1.03	1.50	0.217
14.580	0.000	2.26	1.08	1.52	0.231
14.817	0.000	2.55	1.16	1.55	0.251
15.053	0.000	2.74	1.24	1.58	0.274
15.290	0.000	3.27	1.37	1.62	0.306
15.527	0.000	3.73	1.52	1.68	0.346
15.763	0.000	5.79	1.83	1.74	0.425
16.000	0.000	12.34	2.53	1.89	0.630
16.237	**0.000**	**36.75**	4.44	2.57	1.298
16.473	0.000	4.51	**4.51**	**3.18**	**1.324**
16.710	0.000	2.97	4.50	3.22	1.319
16.947	0.000	2.39	4.46	3.17	1.304
17.183	0.000	2.12	4.41	3.11	1.285
17.420	0.000	2.03	4.36	3.03	1.265
17.657	0.000	1.85	4.30	2.96	1.244
17.893	0.000	1.71	4.24	2.88	1.221
18.130	0.000	1.60	4.18	2.79	1.197
18.367	0.000	1.73	4.13	2.71	1.178
18.603	0.000	1.65	4.08	2.64	1.159
18.840	0.000	1.58	4.02	2.57	1.139
19.077	0.000	1.52	3.97	2.51	1.120
19.313	0.000	1.47	3.92	2.48	1.100
19.550	0.000	1.42	3.86	2.46	1.080
19.787	0.000	1.38	3.80	2.43	1.059
20.023	0.000	1.34	3.75	2.41	1.038
20.260	0.000	1.30	3.69	2.39	1.017
20.497	0.000	1.27	3.63	2.36	0.996
20.733	0.000	1.24	3.57	2.34	0.974
20.970	0.000	1.21	3.51	2.32	0.953
21.207	0.000	1.18	3.44	2.30	0.931
21.443	0.000	1.16	3.38	2.28	0.909
21.680	0.000	1.14	3.31	2.27	0.887
21.917	0.000	1.12	3.25	2.26	0.865
22.153	0.000	1.10	3.18	2.24	0.842
22.390	0.000	1.08	3.12	2.23	0.820
22.627	0.000	1.06	3.05	2.22	0.797
22.863	0.000	1.04	2.98	2.20	0.774
23.100	0.000	1.03	2.91	2.18	0.752
23.337	0.000	1.01	2.84	2.15	0.729
23.573	0.000	0.99	2.77	2.12	0.707

23.810	0.000	0.98	2.70	2.10	0.686
24.047	0.000	0.97	2.64	2.07	0.664
24.283	0.000	0.00	2.51	2.03	0.624
24.520	0.000	0.00	2.39	1.98	0.586
24.757	0.000	0.00	2.26	1.93	0.548
24.993	0.000	0.00	2.14	1.88	0.511
25.230	0.000	0.00	2.02	1.83	0.475
25.467	0.000	0.00	1.89	1.79	0.440
25.703	0.000	0.00	1.75	1.76	0.406
25.940	0.000	0.00	1.62	1.74	0.372
26.177	0.000	0.00	1.49	1.71	0.338
26.413	0.000	0.00	1.37	1.67	0.306
26.650	0.000	0.00	1.25	1.62	0.274
26.887	0.000	0.00	1.13	1.57	0.243
27.123	0.000	0.00	1.01	1.53	0.213
27.360	0.000	0.00	0.88	1.49	0.184
27.597	0.000	0.00	0.75	1.46	0.155
27.833	0.000	0.00	0.62	1.44	0.127
28.070	0.000	0.00	0.50	1.41	0.100
28.307	0.000	0.00	0.38	1.23	0.076
28.543	0.000	0.00	0.29	0.93	0.057
28.780	0.000	0.00	0.22	0.71	0.044
29.017	0.000	0.00	0.17	0.54	0.033
29.253	0.000	0.00	0.13	0.41	0.025
29.490	0.000	0.00	0.10	0.31	0.019
29.727	0.000	0.00	0.07	0.23	0.014
29.963	0.000	0.00	0.05	0.18	0.011
30.200	0.000	0.00	0.04	0.14	0.008
30.437	0.000	0.00	0.03	0.10	0.006
30.673	0.000	0.00	0.02	0.08	0.005
30.910	0.000	0.00	0.02	0.06	0.004
31.147	0.000	0.00	0.01	0.04	0.003
31.383	0.000	0.00	0.01	0.03	0.002
31.620	0.000	0.00	0.01	0.03	0.002
31.857	0.000	0.00	0.01	0.02	0.001
32.093	0.000	0.00	0.00	0.01	0.001

TENTATIVE TRACT 20544
VICTORVILLE, CA

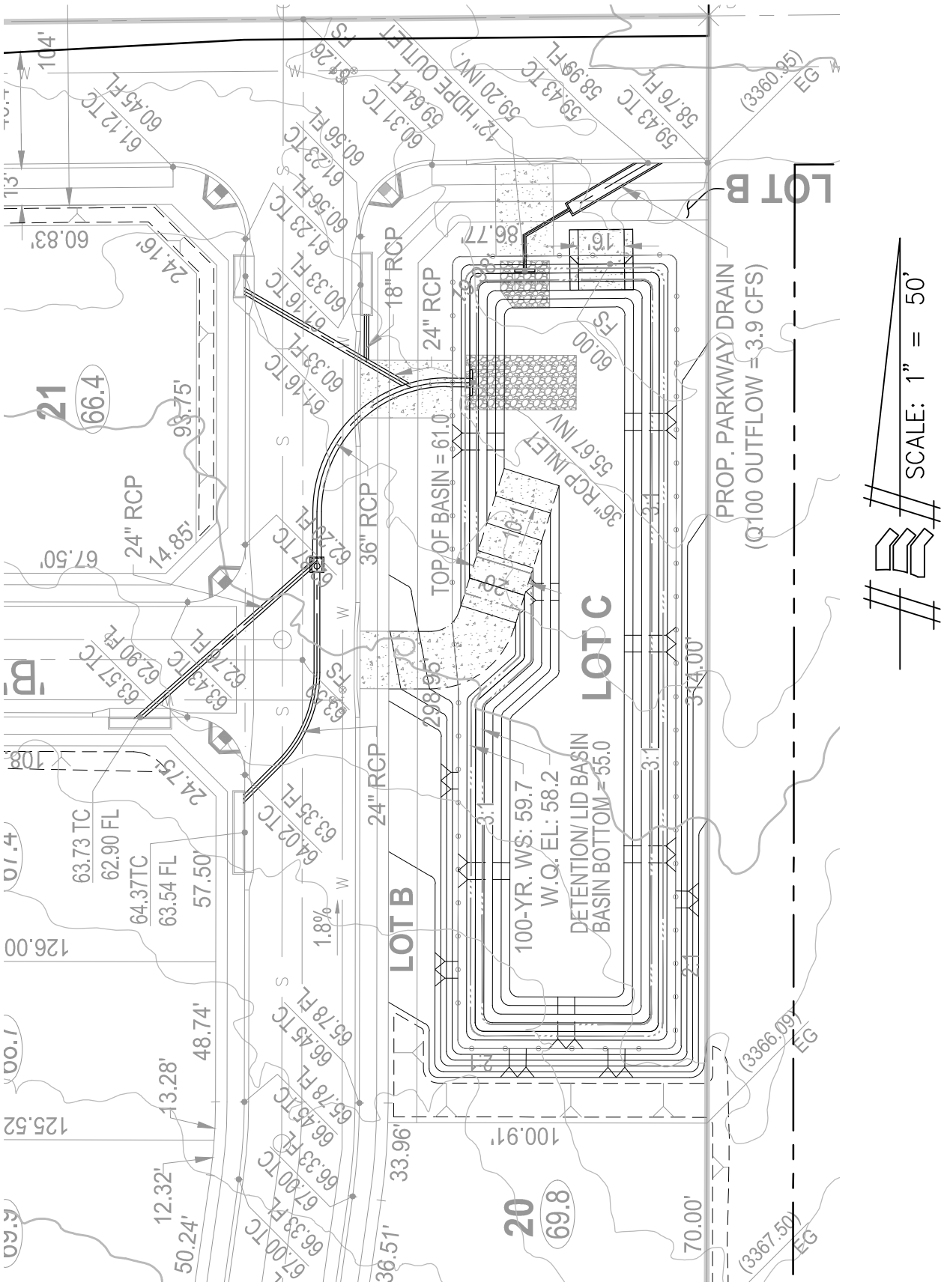


FIGURE 6 - BASIN DETAILS

SECTION C
HYDRAULICS

SECTION C
CATCH BASIN CALCULATIONS

STREET CALCULATIONS INCLUDED IN DEVELOPED RATIONAL METHOD ANALYSIS; MORE DETAIL WILL BE ADDED IN FINAL DESIGN

CB #A

****

>>>>FLOWBY CATCH BASIN INLET CAPACITY INPUT INFORMATION<<<<

Curb Inlet Capacities are approximated based on the Bureau of
Public Roads nomograph plots for flowby basins and sump basins.

STREETFLOW(CFS) = 19.30
GUTTER FLOWDEPTH(FEET) = 0.51
BASIN LOCAL DEPRESSION(FEET) = 0.33

FLOWBY BASIN ANALYSIS RESULTS:

BASIN WIDTH	FLOW INTERCEPTION
3.90	3.06
4.00	3.14
4.50	3.50
5.00	3.86
5.50	4.23
6.00	4.59
6.50	4.94
7.00	5.30
7.50	5.65
8.00	6.01
8.50	6.36
9.00	6.71
9.50	7.06
10.00	7.40
10.50	7.75
11.00	8.09
11.50	8.44
12.00	8.75
12.50	9.04
13.00	9.33
13.50	9.62
14.00	9.90
14.50	10.17
15.00	10.44
15.50	10.71
16.00	10.98
16.50	11.25
17.00	11.51
17.50	11.78
18.00	12.04
18.50	12.30
19.00	12.56
19.50	12.82
20.00	13.07
20.50	13.31
21.00	13.55
21.50	13.78
22.00	14.01
22.50	14.23
23.00	14.45
23.50	14.66
24.00	14.86
24.50	15.06
25.00	15.26
25.50	15.45

26.00	15.64
26.50	15.82
27.00	16.00
27.50	16.17
28.00	**16.34**
28.50	16.51
29.00	16.67
29.50	16.83
30.00	16.99
30.50	17.14
31.00	17.29
31.50	17.44
32.00	17.58
32.50	17.72
33.00	17.86
33.50	17.99
34.00	18.12
34.50	18.25
35.00	18.38
35.50	18.50
36.00	18.62
36.50	18.74
37.00	18.85
37.50	18.97
38.00	19.08
38.50	19.19
39.00	19.29
39.03	19.30

==========

19.3-16.3 = 3 CFS TO CB C

CB #B

****

>>>>FLOWBY CATCH BASIN INLET CAPACITY INPUT INFORMATION<<<<

Curb Inlet Capacities are approximated based on the Bureau of
Public Roads nomograph plots for flowby basins and sump basins.

STREETFLOW(CFS) = 3.80
GUTTER FLOWDEPTH(FEET) = 0.35
BASIN LOCAL DEPRESSION(FEET) = 0.33

FLOWBY BASIN ANALYSIS RESULTS:

BASIN WIDTH	FLOW INTERCEPTION	
1.14	0.55	
1.50	0.71	
2.00	0.93	
2.50	1.16	
3.00	1.38	
3.50	1.59	
4.00	1.81	
4.50	1.98	
5.00	2.15	
5.50	2.32	
6.00	2.49	
6.50	2.65	
7.00	2.80	
7.50	2.92	
8.00	3.05	
8.50	3.16	
9.00	3.28	
9.50	3.39	
10.00	3.50	
10.50	3.61	
11.00	3.71	
11.43	3.80	>> W = 14’

==========

CB #C (7.6+3 = 10.6 CFS)

****

>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<

Curb Inlet Capacities are approximated based on the Bureau of
Public Roads nomograph plots for flowby basins and sump basins.

BASIN INFLOW(CFS) = 10.60
BASIN OPENING(FEET) = 0.83
DEPTH OF WATER(FEET) = 0.43

>>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) = 12.18 >> W=14'

==========

CB #D

****

>>>>FLOWBY CATCH BASIN INLET CAPACITY INPUT INFORMATION<<<<

Curb Inlet Capacities are approximated based on the Bureau of
Public Roads nomograph plots for flowby basins and sump basins.

STREETFLOW(CFS) = 7.95
GUTTER FLOWDEPTH(FEET) = 0.40
BASIN LOCAL DEPRESSION(FEET) = 0.33

FLOWBY BASIN ANALYSIS RESULTS:

BASIN WIDTH	FLOW INTERCEPTION	
2.08	1.19	
2.50	1.42	
3.00	1.69	
3.50	1.95	
4.00	2.22	
4.50	2.48	
5.00	2.74	
5.50	3.00	
6.00	3.26	
6.50	3.51	
7.00	3.74	
7.50	3.96	
8.00	4.17	
8.50	4.37	
9.00	4.57	
9.50	4.77	
10.00	4.97	
10.50	5.16	
11.00	5.35	
11.50	5.53	
12.00	5.71	
12.50	5.89	
13.00	6.04	
13.50	6.18	
14.00	6.33	
14.50	6.47	
15.00	6.60	
15.50	6.73	
16.00	6.86	
16.50	6.99	
17.00	7.11	
17.50	7.23	
18.00	7.35	
18.50	7.46	
19.00	7.57	
19.50	7.68	
20.00	7.79	
20.50	7.89	
20.77	7.95	>> W=21’

==========

SECTION D-1:
HYDRAULICS - WSPG

Pipe design and hydraulics will be included in final report.

SECTION D-1:
HYDRAULICS
RIP RAP AND MISC HYDRAULICS DESIGN

PARKWAY DRAIN – BEAR VALLEY ROAD

```
**************************************************************************
 >>>>CHANNEL INPUT INFORMATION<<<<
--------------------------------------------------------------------------
    CHANNEL Z1(HORIZONTAL/VERTICAL) =    0.00
         Z2(HORIZONTAL/VERTICAL) =    0.00
    BASEWIDTH(FEET) =     4.00
       CONSTANT CHANNEL SLOPE(FEET/FEET) =
   0.005000  UNIFORM FLOW(CFS) =        3.20
          MANNINGS FRICTION FACTOR = 0.0150
==========================================================================
    NORMAL-DEPTH FLOW INFORMATION:
--------------------------------------------------------------------------
   >>>>> NORMAL DEPTH(FEET) =   0.29
    FLOW TOP-WIDTH(FEET) =         4.00
    FLOW AREA(SQUARE FEET) =          1.15
   HYDRAULIC DEPTH(FEET) =     0.29
    FLOW AVERAGE VELOCITY(FEET/SEC.) =     2.78
   UNIFORM FROUDE NUMBER =    0.912
   PRESSURE + MOMENTUM(POUNDS) =          27.58
   AVERAGED VELOCITY HEAD(FEET) =      0.120
   SPECIFIC ENERGY(FEET) =      0.408
==========================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
--------------------------------------------------------------------------
    CRITICAL FLOW TOP-WIDTH(FEET) =         4.00
    CRITICAL FLOW AREA(SQUARE FEET) =          1.08
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =     0.27
    CRITICAL FLOW AVERAGE VELOCITY(FEET/SEC.) =     2.96
   CRITICAL DEPTH(FEET) =     0.27
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =          27.47
   AVERAGED CRITICAL FLOW VELOCITY HEAD(FEET) =      0.136
   CRITICAL FLOW SPECIFIC ENERGY(FEET) =      0.406
==========================================================================
```

MADOLE & ASSOCIATES, INC.
Civil Engineers-Land Surveyors-Planners
9302 Pittsburgh Street, Suite 230
Rancho Cucamonga, CA 91730
(909) 481-6322

Sheet No.		of	
Calculated by:	TGS	Date	4/8/2022
Checked by:		Date	
		Scale	

EMERGENCY SPILLWAY

DESIGN CAPACITY = 1,000-YEAR PEAK FLOW RATE

$Q = 1.35 \times Q_{100}$

Q_{100} = **36.4**

DESIGN Q = **49.1** **C.F.S.**

Weir Discharge Equation (Trapezoidal)

Q = C L H ^(3/2)

Q =	**49.1**
C =	3.08
H =	1.00

L = **16.0** **FT.**

DESIGN L = **16.0** **FT.**

Rip Rap design and sizing to be included in final report.

SECTION R:
REFERENCES AND MAPS

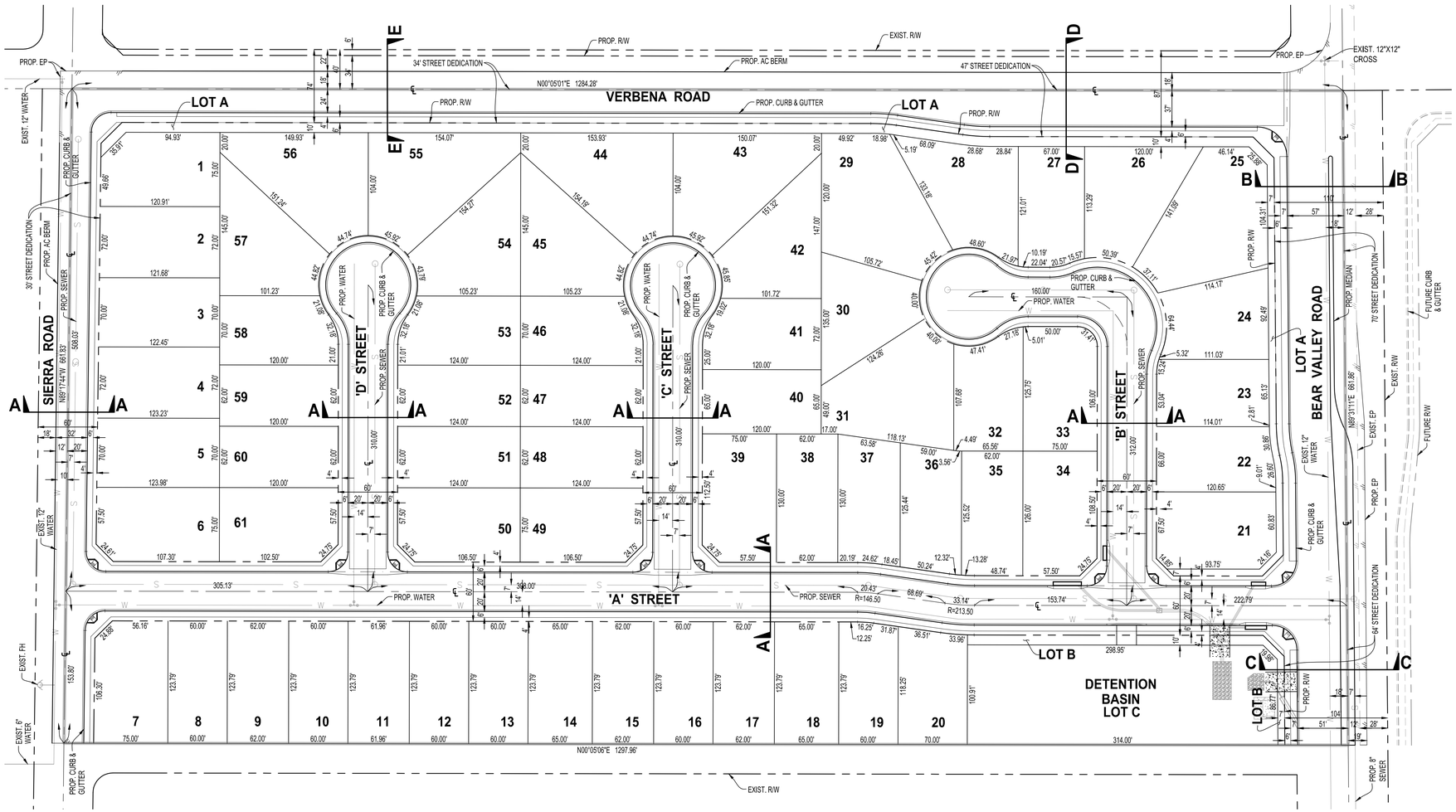
VESTING TENTATIVE MAP, TRACT NO. 20544

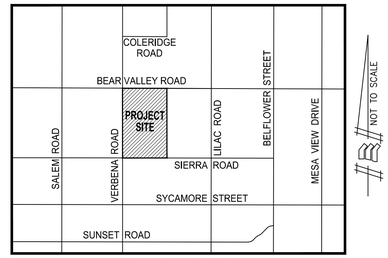
IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

BEING A PROPOSED SUBDIVISION OF A PORTION OF SECTION 5,
TOWNSHIP 4 NORTH, RANGE 5 WEST, S.B.M.

APN NO. 3071-111-01

LOT AREA	
LOT NO.	LOT SF
1	8,718
2	8,733
3	8,544
4	8,844
5	8,652
6	9,176
7	9,048
8	7,428
9	7,675
10	7,428
11	7,671
12	7,428
13	7,428
14	8,047
15	7,676
16	7,428
17	7,676
18	8,048
19	7,351
20	8,014
21	8,238
22	7,773
23	7,718
24	8,513
25	13,864
26	9,905
27	8,046
28	10,646
29	13,861
30	8,879
31	12,571
32	7,930
33	9,364
34	9,297
35	7,810
36	7,776
37	7,980
38	8,060
39	9,597
40	7,800
41	8,293
42	10,162
43	12,289
44	12,482
45	10,411
46	8,296
47	7,688
48	7,688
49	9,147
50	9,147
51	7,688
52	7,688
53	8,296
54	10,332
55	12,577
56	12,197
57	10,037
58	8,016
59	7,440
60	8,847
61	7,560





VICINITY MAP
NTS

NOTES:

1. TRACT 20544 ACREAGE _____ 20 +/- ACRES
2. TOTAL NUMBER OF LOTS _____ 61 SINGLE FAMILY
   3 LETTERED LOTS (TO BE DEDICATED IN FEE TO CITY)
   LOTS A, B - LMAD LANSCAPE LOTS
   LOT C - DETENTION BASIN AND PARK
3. LOT AREA _____ MIN. 7,200 S.F. FOR SINGLE FAMILY
4. EXISTING ZONING _____ R1
5. PROPOSED LAND USE _____ SINGLE FAMILY DETACHED
6. EXISTING LAND USE _____ VACANT LAND
7. PUBLIC UTILITIES:
   - WATER SERVICE _____ VICTORVILLE WATER DISTRICT
   - SEWER SERVICE _____ CITY OF VICTORVILLE
   - ELECTRIC SERVICE _____ SOUTHERN CALIFORNIA EDISON
   - GAS SERVICE _____ SOUTHWEST GAS CORPORATION
   - TELEPHONE SERVICE _____ VERIZON
   - CABLE TELEVISION SERVICE _____ CHARTER COMMUNICATION
8. ALL PROPOSED UTILITIES SHALL BE UNDERGROUND.

UTILITIES:

ELECTRIC:
SOUTHERN CALIFORNIA EDISON
12353 HESPERIA ROAD
VICTORVILLE, CA 92392
PHONE: (760) 951-3219

GAS:
SOUTHWEST GAS CORPORATION
13471 MARIPOSA ROAD
VICTORVILLE, CA 92392
PHONE: (760) 957-4044

TELEPHONE:
VERIZON
15055 LA PAZ DRIVE
VICTORVILLE, CA 92392
PHONE: (760) 243-0200

WATER
VICTORVILLE WATER DISTRICT
14343 CIVIC DRIVE
VICTORVILLE, CA 92392
PHONE: (760) 245-6424

SCHOOL DISTRICT:
SNOWLINE JOINT UNIFIED SCHOOL DISTRICT (K-12)
P.O. BOX 296000
PHELAN, CA 92329-6000
PHONE: (760) 868-5817

CABLE:
CHARTER COMMUNICATION
12490 BUSINESS CENTER DR., SUITE 2
VICTORVILLE, CA 92392
PHONE: (866) 499-8080

DEVELOPER:

JACK HERRON
BEAR VALLEY 60, LLC
2630 WALNUT AVENUE, SUITE A
TUSTIN, CA 92780
PHONE: (949) 633-7103

ENGINEER:

MADOLE & ASSOCIATES, INC.
9302 PITTSBURGH AVENUE, SUITE 230
RANCHO CUCAMONGA, CA 91730
CONTACT: MARK BERTONE
PHONE: (909) 481-6322

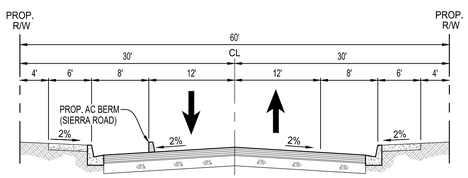
LEGEND:

- S — SEWER
- SD — STORM DRAIN
- W — WATER

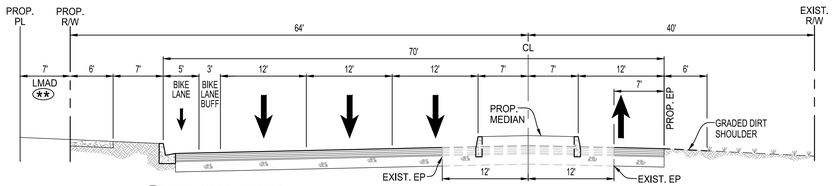
SCALE: 1" = 60'

SCALE IN FEET
0 60 120 180 240

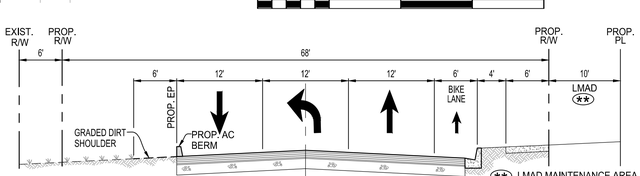
LOT AREA			
LOT NO.	LOT SF	LOT ACRE	%
TOTAL LOT AREA (1-61)	543,802	12.48	61.00%
LOT A	15,614	0.36	1.76%
LOT B	3,781	0.09	0.44%
LOT C	31,508	0.72	3.52%
ONSITE STREET	150,112	3.45	16.86%
OFF-SITE STREET	146,440	3.36	16.42%
TOTAL SITE	**891,257**	**20.46**	**100.00%**



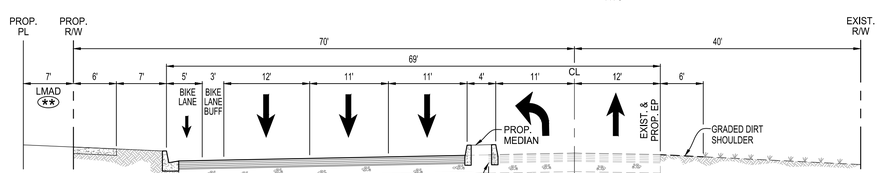
A TYPICAL SECTION FOR INTERIOR 60' STREET & LOCAL ROAD
A, B, C & D STREET & SIERRA ROAD
NTS



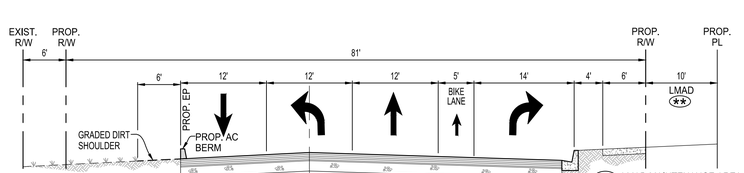
C SUPER ARTERIAL
BEAR VALLEY ROAD
NTS



E COLLECTOR
VERBENA ROAD
NTS



B SUPER ARTERIAL @ MASTER PLANNED INTERSECTIONS
BEAR VALLEY ROAD
NTS



D COLLECTOR @ MASTER PLANNED INTERSECTION
VERBENA ROAD
NTS

REGISTERED PROFESSIONAL ENGINEER
JEFFREY KARL ROTH
No. 42868
Exp: 03-31-24
CIVIL
STATE OF CALIFORNIA

CITY OF VICTORVILLE
TENTATIVE TRACT MAP NO. 20544

MADOLE & ASSOCIATES, INC.
Engineering Communities for Life
9302 PITTSBURGH AVE., SUITE 230
RANCHO CUCAMONGA, CA. 91730
PHONE: 909.481.6322
FAX: 909.481.6320

SCALE: AS SHOWN
JOB NUMBER: 1028-2913
SHEET 1 OF 3

J:\JN\ 1028-2913\ TENTATIVE TR. MAP 20544

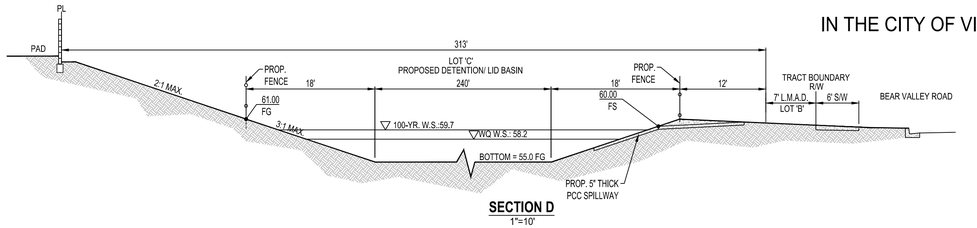
TENTATIVE TRACT NO. 20544

CONCEPTUAL GRADING EXHIBIT

IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

BEING A PROPOSED SUBDIVISION OF A PORTION OF SECTION 5,
TOWNSHIP 4 NORTH, RANGE 5 WEST, S.B.M.

APN NO. 3071-111-01



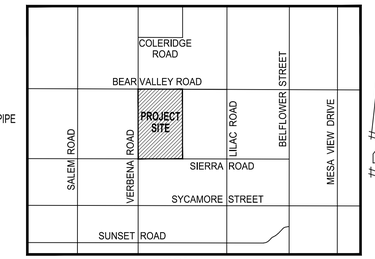
SECTION D
1"=10'

NOTE:
OFFSITE GRADING AND DRAINAGE CONTOURS, ELEVATIONS, AND SHOWN STORM DRAIN PIPE SIZES ARE PRELIMINARY AND CONCEPTUAL AND ARE SUBJECT TO CHANGE DURING FINAL ENGINEERING.

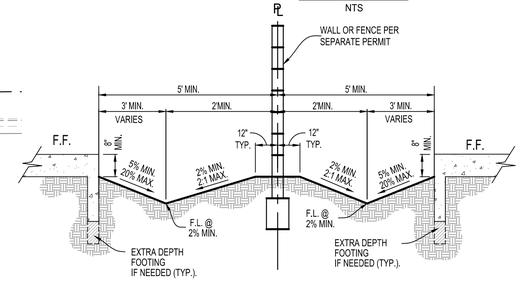
EARTHWORK QUANTITIES:
RAW CUT: 38,017 CU. YD.
RAW FILL: 34,324 CU. YD.
NET: 3,693 CU. YD.

LEGEND:

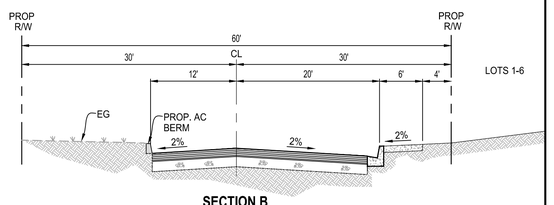
PL	PROPERTY LINE
R/W	RIGHT OF WAY
FG	FINISHED GRADE
HP	HIGH POINT
FL	FLOWLINE
EG	EXISTING GRADE
RCP	REINFORCED CONCRETE PIPE
— // —	DAYLIGHT LINE
(3200)	EXISTING ELEVATION
3200	PROPOSED ELEVATION
———	FLOWLINE
C&G	CURB AND GUTTER
EP	EDGE OF PAVEMENT
AC	ASPHALT CONCRETE
FS	FINISHED SURFACE
GB	GRADEBREAK
69.0	PAD ELEVATION



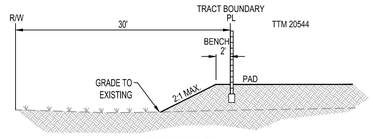
VICINITY MAP
NTS



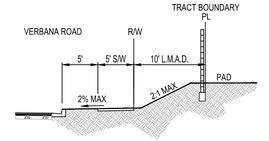
TYPICAL SIDEYARD SECTION A
NTS



SECTION B
1"=10'



SECTION C
1"=10'



SECTION F
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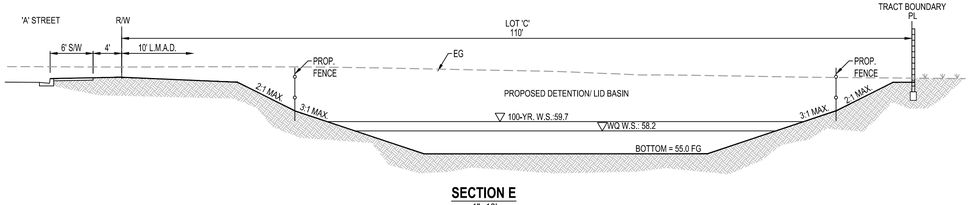
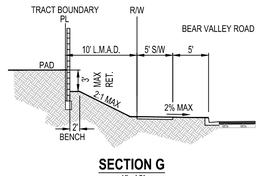


SECTION E
1"=10'



SECTION G
1"=10'

SCALE: 1" = 60'

SCALE IN FEET
0 60 120 180 240

DEVELOPER:
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BEAR VALLEY 60, LLC
2630 WALNUT AVENUE, SUITE A
TUSTIN, CA 92780
PHONE: (949) 633-7103

ENGINEER:
MADOLE & ASSOCIATES, INC.
9302 PITTSBURGH AVENUE, SUITE 230
RANCHO CUCAMONGA, CA 91730
CONTACT: MARK BERTONE
PHONE: (909) 481-6322

CITY OF VICTORVILLE

TENTATIVE TRACT MAP No. 20544
CONCEPTUAL GRADING PLAN

REGISTERED PROFESSIONAL ENGINEER
JEFFREY KARL HOFF
No. 42868
Exp: 03-31-24
CIVIL
STATE OF CALIFORNIA

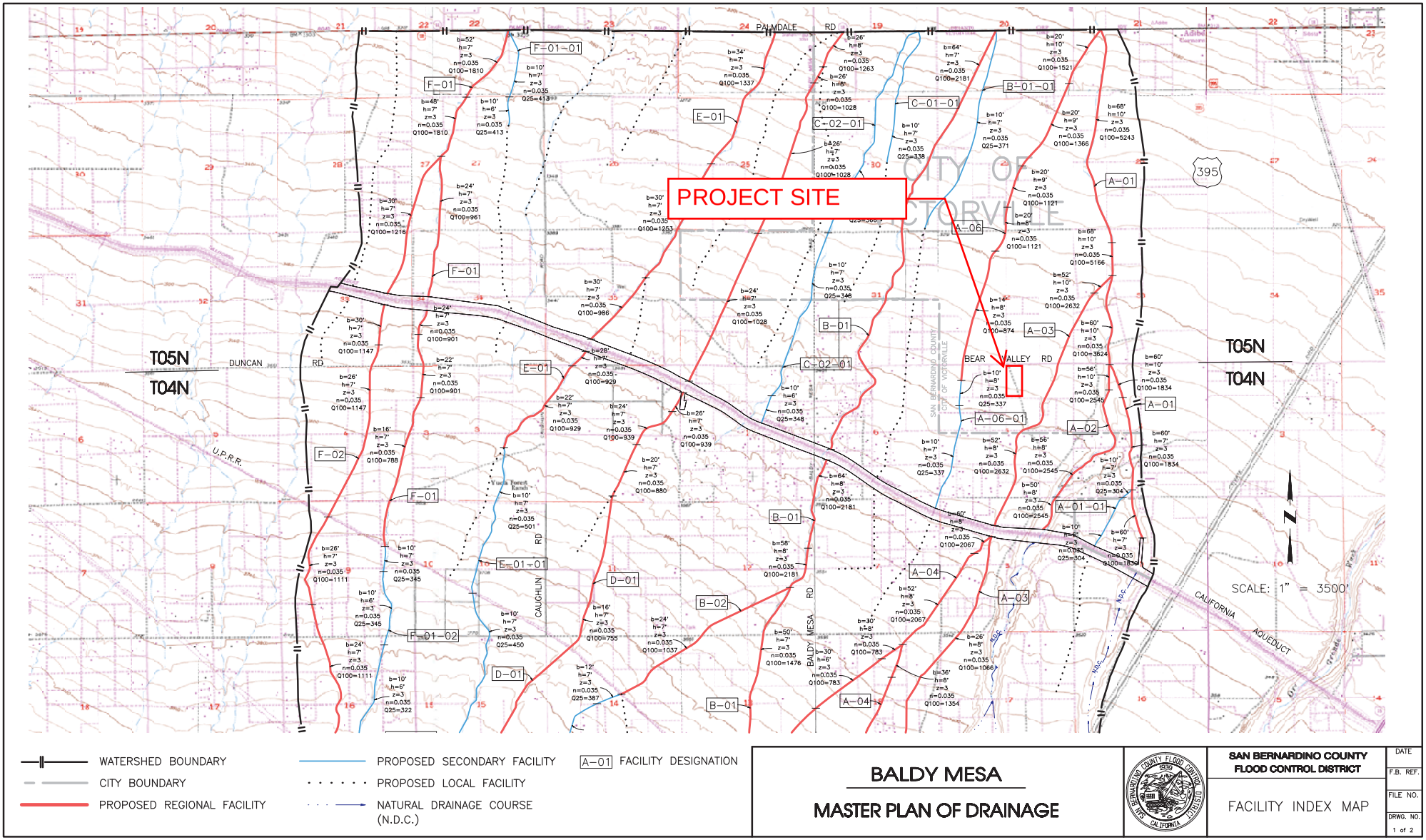
MADOLE & ASSOCIATES, INC.
Engineering Communities for Life
9302 PITTSBURGH AVE., SUITE 230
RANCHO CUCAMONGA, CA. 91730
PHONE: 909.481.6322
FAX: 909.481.6320

SCALE: 1"=60'

JOB NUMBER: 1028-2913

SHEET 2 OF 3

JN: 1028-2913; CONCEPTUAL GRADING TENTATIVE TR. MAP 20544



WATERSHED BOUNDARY
CITY BOUNDARY
PROPOSED REGIONAL FACILITY
PROPOSED SECONDARY FACILITY
PROPOSED LOCAL FACILITY
NATURAL DRAINAGE COURSE (N.D.C.)
A-01 FACILITY DESIGNATION

BALDY MESA
MASTER PLAN OF DRAINAGE

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

FACILITY INDEX MAP

DATE
F.B. REF.
FILE NO.
DRWG. NO. 1 of 2

FIGURE 3

NOAA Atlas 14, Volume 6, Version 2
Location name: Victorville, California, USA*
Latitude: 34.4687°, Longitude: -117.4249°
Elevation: 3375.82 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.080** (0.066-0.097)	**0.115** (0.095-0.140)	**0.161** (0.133-0.197)	**0.199** (0.162-0.246)	**0.250** (0.198-0.320)	**0.290** (0.225-0.379)	**0.331** (0.250-0.443)	**0.374** (0.274-0.514)	**0.431** (0.304-0.619)	**0.477** (0.324-0.708)
10-min	**0.114** (0.095-0.140)	**0.165** (0.136-0.201)	**0.231** (0.190-0.283)	**0.285** (0.233-0.352)	**0.359** (0.284-0.459)	**0.416** (0.322-0.543)	**0.475** (0.358-0.635)	**0.535** (0.393-0.737)	**0.618** (0.436-0.887)	**0.683** (0.465-1.01)
15-min	**0.138** (0.114-0.169)	**0.199** (0.164-0.243)	**0.279** (0.230-0.342)	**0.344** (0.281-0.426)	**0.434** (0.343-0.555)	**0.503** (0.389-0.657)	**0.574** (0.434-0.768)	**0.648** (0.475-0.891)	**0.748** (0.527-1.07)	**0.827** (0.562-1.23)
30-min	**0.210** (0.173-0.256)	**0.302** (0.249-0.369)	**0.423** (0.349-0.519)	**0.523** (0.427-0.646)	**0.658** (0.520-0.842)	**0.764** (0.591-0.997)	**0.871** (0.658-1.17)	**0.983** (0.721-1.35)	**1.14** (0.799-1.63)	**1.25** (0.853-1.86)
60-min	**0.290** (0.240-0.354)	**0.417** (0.345-0.510)	**0.585** (0.482-0.717)	**0.722** (0.590-0.893)	**0.910** (0.719-1.16)	**1.06** (0.816-1.38)	**1.20** (0.909-1.61)	**1.36** (0.997-1.87)	**1.57** (1.10-2.25)	**1.73** (1.18-2.57)
2-hr	**0.411** (0.340-0.502)	**0.560** (0.463-0.685)	**0.762** (0.628-0.934)	**0.932** (0.761-1.15)	**1.17** (0.925-1.50)	**1.36** (1.05-1.78)	**1.56** (1.18-2.09)	**1.77** (1.30-2.44)	**2.07** (1.46-2.97)	**2.31** (1.57-3.43)
3-hr	**0.519** (0.429-0.634)	**0.694** (0.573-0.849)	**0.936** (0.771-1.15)	**1.14** (0.933-1.41)	**1.44** (1.14-1.84)	**1.67** (1.30-2.19)	**1.93** (1.46-2.58)	**2.20** (1.61-3.03)	**2.59** (1.82-3.71)	**2.90** (1.98-4.31)
6-hr	**0.719** (0.595-0.879)	**0.954** (0.788-1.17)	**1.28** (1.06-1.57)	**1.57** (1.28-1.94)	**1.98** (1.57-2.53)	**2.32** (1.80-3.03)	**2.69** (2.03-3.60)	**3.09** (2.27-4.26)	**3.68** (2.59-5.27)	**4.16** (2.83-6.18)
12-hr	**0.912** (0.754-1.11)	**1.25** (1.03-1.53)	**1.73** (1.43-2.12)	**2.15** (1.75-2.65)	**2.75** (2.17-3.52)	**3.25** (2.51-4.24)	**3.79** (2.86-5.06)	**4.37** (3.21-6.02)	**5.23** (3.68-7.50)	**5.94** (4.04-8.82)
24-hr	**1.25** (1.11-1.44)	**1.79** (1.58-2.06)	**2.54** (2.24-2.93)	**3.19** (2.79-3.71)	**4.13** (3.50-4.97)	**4.91** (4.07-6.04)	**5.75** (4.65-7.24)	**6.66** (5.25-8.63)	**7.98** (6.04-10.8)	**9.09** (6.64-12.7)
2-day	**1.37** (1.22-1.58)	**1.95** (1.73-2.25)	**2.77** (2.44-3.20)	**3.48** (3.05-4.05)	**4.53** (3.84-5.45)	**5.40** (4.48-6.63)	**6.34** (5.13-7.99)	**7.38** (5.81-9.55)	**8.90** (6.72-12.0)	**10.2** (7.43-14.2)
3-day	**1.47** (1.30-1.69)	**2.07** (1.83-2.39)	**2.93** (2.59-3.38)	**3.68** (3.22-4.29)	**4.79** (4.06-5.77)	**5.71** (4.74-7.02)	**6.72** (5.44-8.46)	**7.83** (6.17-10.1)	**9.47** (7.16-12.8)	**10.8** (7.92-15.2)
4-day	**1.58** (1.40-1.82)	**2.23** (1.97-2.56)	**3.14** (2.77-3.63)	**3.94** (3.45-4.59)	**5.12** (4.34-6.16)	**6.10** (5.07-7.50)	**7.18** (5.81-9.04)	**8.36** (6.59-10.8)	**10.1** (7.64-13.6)	**11.6** (8.46-16.2)
7-day	**1.74** (1.54-2.00)	**2.42** (2.15-2.79)	**3.39** (2.99-3.91)	**4.23** (3.70-4.93)	**5.46** (4.63-6.58)	**6.49** (5.39-7.98)	**7.60** (6.16-9.58)	**8.83** (6.95-11.4)	**10.6** (8.03-14.3)	**12.1** (8.86-16.9)
10-day	**1.87** (1.66-2.15)	**2.58** (2.29-2.98)	**3.59** (3.17-4.15)	**4.47** (3.91-5.20)	**5.75** (4.87-6.92)	**6.81** (5.65-8.37)	**7.96** (6.44-10.0)	**9.22** (7.26-11.9)	**11.1** (8.35-14.9)	**12.6** (9.19-17.6)
20-day	**2.27** (2.01-2.61)	**3.12** (2.76-3.59)	**4.30** (3.79-4.97)	**5.32** (4.66-6.20)	**6.81** (5.77-8.20)	**8.04** (6.67-9.88)	**9.36** (7.58-11.8)	**10.8** (8.51-14.0)	**12.9** (9.76-17.4)	**14.7** (10.7-20.5)
30-day	**2.68** (2.37-3.08)	**3.64** (3.22-4.19)	**4.98** (4.40-5.76)	**6.15** (5.39-7.16)	**7.84** (6.64-9.44)	**9.23** (7.66-11.4)	**10.7** (8.69-13.5)	**12.4** (9.74-16.0)	**14.7** (11.1-19.9)	**16.7** (12.2-23.4)
45-day	**3.16** (2.80-3.64)	**4.24** (3.75-4.89)	**5.75** (5.07-6.64)	**7.05** (6.18-8.21)	**8.94** (7.58-10.8)	**10.5** (8.71-12.9)	**12.2** (9.86-15.3)	**14.0** (11.0-18.1)	**16.7** (12.6-22.5)	**18.9** (13.8-26.4)
60-day	**3.58** (3.17-4.12)	**4.73** (4.19-5.45)	**6.34** (5.60-7.32)	**7.73** (6.77-9.00)	**9.75** (8.26-11.7)	**11.4** (9.47-14.0)	**13.2** (10.7-16.6)	**15.2** (11.9-19.6)	**18.0** (13.6-24.3)	**20.4** (14.9-28.5)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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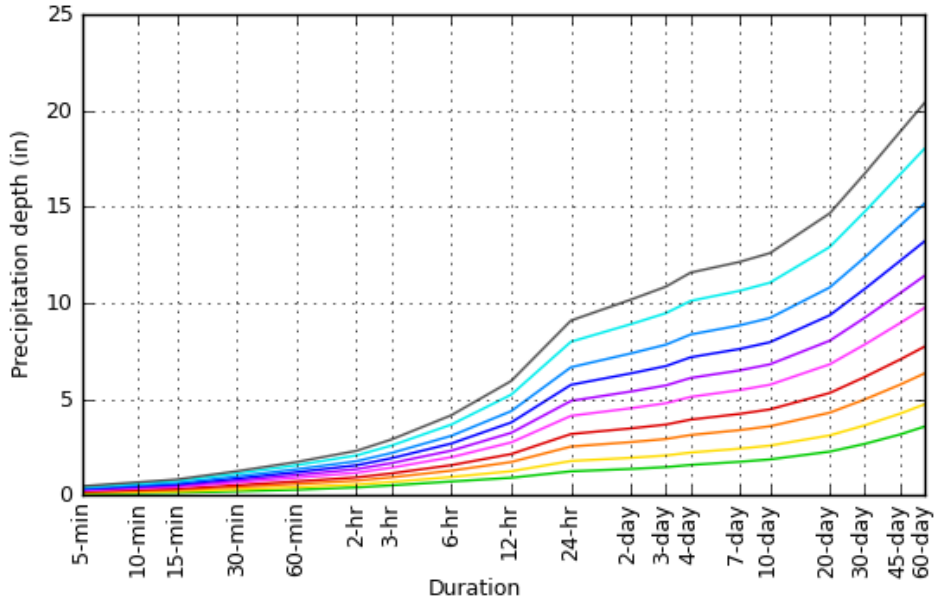
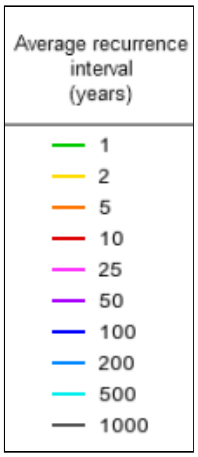
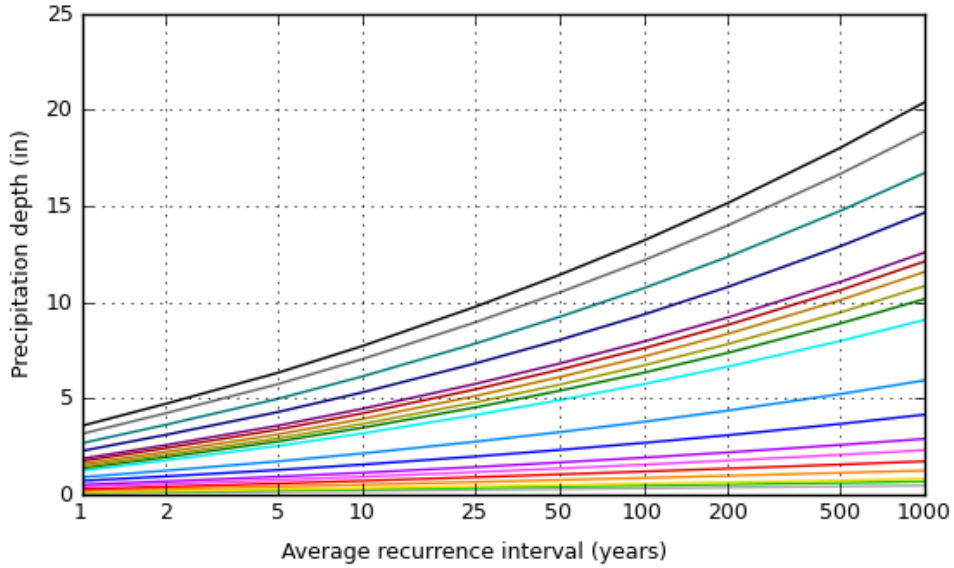
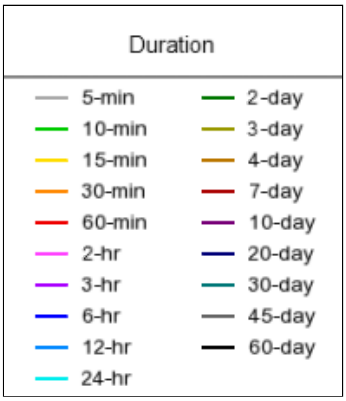
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 34.4687°, Longitude: -117.4249°









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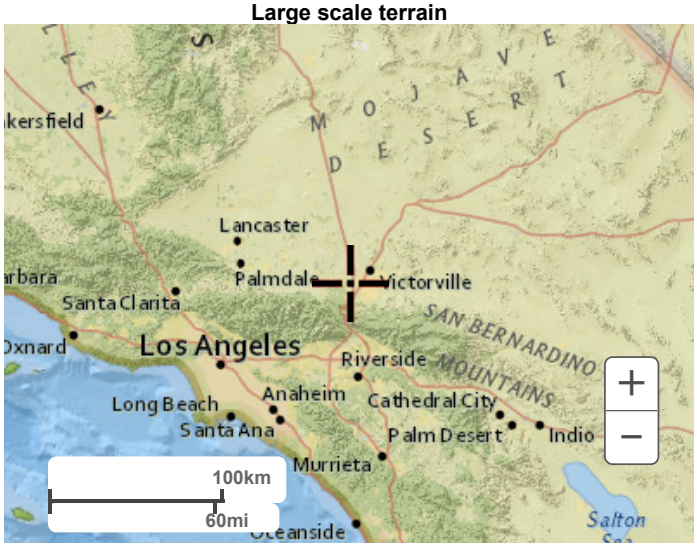
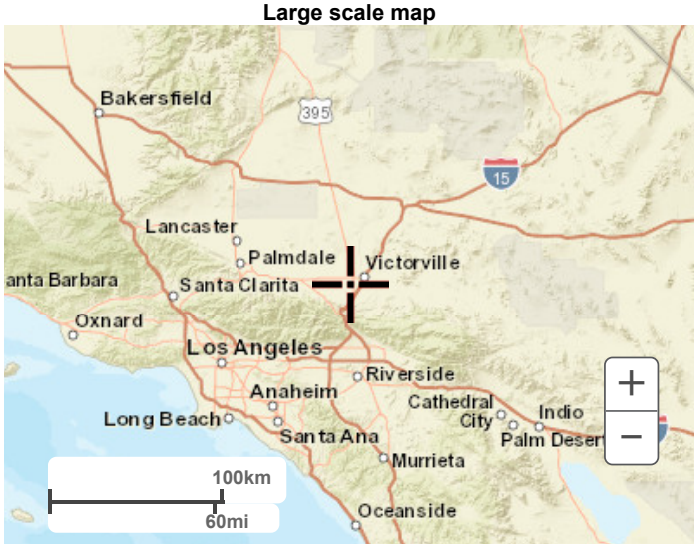
Maps & aerials

Small scale terrain

Large scale terrain



Large scale map



Large scale aerial

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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

WQMP Project Report

County of San Bernardino Stormwater Program

Santa Ana River Watershed Geodatabase

Friday, April 08, 2022

Note: The information provided in this report and on the Stormwater Geodatabase for the County of San Bernardino Stormwater Program is intended to provide basic guidance in the preparation of the applicant's Water Quality Management Plan (WQMP) and should not be relied upon without independent verification.

Project Site Parcel Number(s):	307111101
Project Site Acreage:	19.635
HCOC Exempt Area:	No
Closest Receiving Waters: (Applicant to verify based on local drainage facilities and topography.)	**System Number** - See Note **Facility Name** - See Note **Owner** - See Note
Closest channel segment's susceptibility to Hydromodification:	See Note
Highest downstream hydromodification susceptibility:	See Note
Is this drainage segment subject to TMDLs?	See Note
Are there downstream drainage segments subject to TMDLs?	See Note
Is this drainage segment a 303d listed stream?	See Note
Are there 303d listed streams downstream?	See Note
Are there unlined downstream waterbodies?	See Note
Project Site Onsite Soil Group(s):	A
Environmentally Sensitive Areas within 200':	DESERT TORTOISE HABITAT CAT 2
Groundwater Depth (FT):	No data available
Parcels with potential septic tanks within 1000':	Yes
Known Groundwater Contamination Plumes within 1000':	No
Studies and Reports Related to Project Site:	

Note: No drainage facilities located within 2 miles of site.