



Appendix E-2

Preliminary Drainage Study for General Pump Company
APN 0410-072-06 in the City of Hesperia

Capstone Engineering

October 21, 2024



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Bakersfield, California 93312
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Preliminary Drainage Study

For

General Pump Company
APN 0410-072-06

In the
City of Hesperia

Prepared for:

General Pump Company



Andrew Bell, PE RCE No. 88480
October 21, 2024

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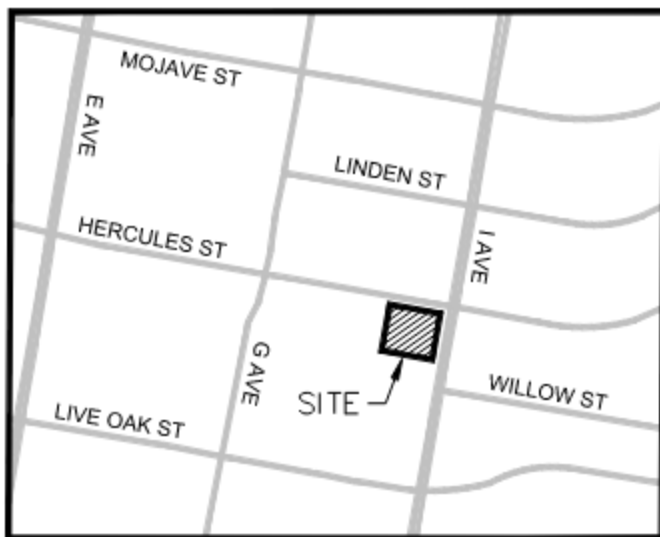
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Project:

The 4.5 Acre site is located at the southwest corner of Hercules St and I Avenue, (APN 0410-072-06). The existing land is vacant and will be developed into proposed storage and a 3,500 SF office building. FEMA reports the property is in Zone "X". The storage and office building will be on the east side of the site, along with offsite parking. Improvements will consist of curb gutter and sidewalk on the south side of Hercules St and west side of I Avenue with two drive approaches. An underground ADS Stormtech chamber is proposed to capture increased runoff volume.. There is approximately 1.6 acres at the southwest portion of the property that will not be utilized and will remain undisturbed.

Existing Impervious Area = 0 Acres

Proposed Impervious Area = 109,910 SF (2.52 Acres)



VICINITY MAP
N.T.S.



Existing Drainage:

The existing onsite drainage flows from the southwest to the northeast at about 1.2%, which follows the overall drainage of the area. No drainage courses flow through the site, however there is offsite flows on the southwest portion of the property.

Proposed Drainage:

The proposed site maintains a high point at the southwesterly area of the site. Hercules Street will flow from west to east, while I Avenue will flow from south to north. The onsite flows will be sheet flow to vegetated swales at the north and east side of the site, until it drains into an onsite in ground Stormtech chamber at the northeast area of the site, which meets not only water quality standards, but also increased onsite runoff. See the proposed drainage exhibit in this report.

Offsite flow will be managed by a swale and undersidewalk drain on the west edge of the site, as well as two PVC drain pipes to collect flow from the undeveloped portion of the site and discharge it through the curb face on the south side of Hercules St.

Drainage Design:

The following factors were used in the design:

Existing Drainage: 100 year Storm Event

Proposed Drainage: 100 year Storm Event

Rainfall Information was gathered from NOAA's precipitation data frequency server per the County Drainage Addendum.

The Rational Method was prepared using AES software. Appropriate charts and references are included in this report.

Conclusion:

Onsite hydrology indicates the following:

Existing 100 year peak flow rate of 6.41 CFS and 31,399 CF of runoff.

Proposed 100 year peak flow rate of 11.72 CFS and 42,350 CF of runoff.

An in ground infiltration basin will provide 14,343 CF of storage and will reduce the discharge volume to 27,997 CF. This brings runoff below 90% of pre project runoff (28,260 CF).

The proposed development of the site adequately handles runoff produced by onsite development and will not adversely affect downstream facilities. Impacts to any existing downstream properties are less than or equal to existing conditions.

This report is a preliminary assessment to illustrate how onsite an offsite flow will be managed. The report has demonstrated proposed flows will be reduced to less than existing, and drainage infrastructure is adequately sized to safely convey offsite flows through the site. A more detailed drainage report will be provided with the final design. Calculations and exhibits accompany this discussion to illustrate these findings.

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NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: CA

Data description

Data type: Precipitation depth Units: English Time series type: Partial duration

Select location

1) Manually:

- a) By location (decimal degrees, use ~" for S and W): Latitude: Longitude: Submit
- b) By station (list of CA stations): Select station
- c) By address Search

2) Use map:

Satellite
Labels

a) Select location
Move crosshair or double click

b) Click on station icon
☐ Show stations on map

Location information:
Name: Hesperia, California, USA*
Latitude: 34.4296°
Longitude: -117.2820°
Elevation: 3104 ft **

* Source: ESRI Maps
** Source: USGS

POINT PRECIPITATION FREQUENCY (PF) ESTIMATES WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION NOAA Atlas 14, Volume 6, Version 2

PF tabular

PF graphical

Supplementary information

Print page

PDS-based 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	0.086 (0.071-0.105)	0.120 (0.099-0.146)	0.166 (0.136-0.203)	0.204 (0.167-0.253)	0.259 (0.205-0.331)	0.303 (0.235-0.396)	0.349 (0.264-0.467)	0.398 (0.293-0.548)	0.467 (0.329-0.670)	0.523 (0.356-0.776)
10-min	0.123 (0.102-0.151)	0.172 (0.142-0.210)	0.237 (0.196-0.291)	0.293 (0.239-0.362)	0.372 (0.294-0.475)	0.435 (0.336-0.567)	0.501 (0.378-0.670)	0.571 (0.419-0.786)	0.670 (0.472-0.961)	0.749 (0.510-1.11)
15-min	0.149 (0.123-0.182)	0.207 (0.171-0.254)	0.287 (0.237-0.352)	0.354 (0.289-0.438)	0.449 (0.355-0.575)	0.526 (0.407-0.696)	0.606 (0.457-0.810)	0.691 (0.507-0.950)	0.810 (0.571-1.15)	0.906 (0.617-1.34)
30-min	0.212 (0.175-0.259)	0.295 (0.244-0.361)	0.409 (0.337-0.501)	0.504 (0.412-0.623)	0.639 (0.505-0.817)	0.748 (0.579-0.976)	0.862 (0.651-1.15)	0.983 (0.722-1.35)	1.15 (0.812-1.65)	1.29 (0.877-1.91)
60-min	0.278 (0.230-0.340)	0.387 (0.319-0.473)	0.536 (0.441-0.657)	0.661 (0.540-0.817)	0.838 (0.662-1.07)	0.980 (0.758-1.28)	1.13 (0.853-1.51)	1.29 (0.946-1.77)	1.51 (1.06-2.17)	1.69 (1.15-2.51)
24-hr	0.395 (0.327-0.483)	0.529 (0.437-0.647)	0.713 (0.587-0.874)	0.868 (0.709-1.07)	1.09 (0.860-1.39)	1.26 (0.979-1.65)	1.45 (1.10-1.94)	1.65 (1.21-2.27)	1.92 (1.36-2.76)	2.15 (1.46-3.19)
34-hr	0.488 (0.403-0.596)	0.644 (0.532-0.788)	0.859 (0.707-1.05)	1.04 (0.850-1.29)	1.30 (1.03-1.66)	1.51 (1.17-1.97)	1.73 (1.30-2.31)	1.96 (1.44-2.69)	2.28 (1.61-3.28)	2.54 (1.73-3.78)
6-hr	0.674 (0.557-0.823)	0.883 (0.729-1.08)	1.17 (0.962-1.43)	1.41 (1.15-1.74)	1.75 (1.38-2.24)	2.03 (1.57-2.65)	2.32 (1.75-3.10)	2.63 (1.93-3.61)	3.06 (2.16-4.39)	3.41 (2.32-5.06)
12-hr	0.868 (0.718-1.06)	1.16 (0.957-1.42)	1.55 (1.29-1.91)	1.89 (1.54-2.33)	2.35 (1.86-3.01)	2.72 (2.11-3.56)	3.11 (2.35-4.16)	3.53 (2.59-4.85)	4.10 (2.89-5.88)	4.56 (3.11-6.77)
24-hr	1.16 (1.03-1.33)	1.59 (1.41-1.83)	2.17 (1.92-2.51)	2.65 (2.32-3.09)	3.33 (2.82-4.01)	3.86 (3.21-4.75)	4.42 (3.58-5.57)	5.01 (3.94-6.48)	5.83 (4.41-7.87)	6.49 (4.74-9.06)
2-day	1.33 (1.18-1.53)	1.85 (1.64-2.13)	2.55 (2.25-2.94)	3.13 (2.74-3.65)	3.95 (3.35-4.76)	4.60 (3.82-5.66)	5.29 (4.28-6.66)	6.01 (4.74-7.78)	7.02 (5.31-9.48)	7.84 (5.73-10.9)
3-day	1.43 (1.27-1.65)	2.00 (1.77-2.30)	2.78 (2.45-3.21)	3.42 (3.00-3.99)	4.34 (3.67-5.22)	5.06 (4.20-6.22)	5.82 (4.72-7.34)	6.64 (5.23-8.59)	7.78 (5.86-10.5)	8.71 (6.36-12.2)
4-day	1.53 (1.36-1.76)	2.14 (1.90-2.47)	2.98 (2.63-3.44)	3.68 (3.22-4.29)	4.66 (3.95-5.62)	5.45 (4.52-6.70)	6.28 (5.08-7.90)	7.15 (5.64-9.27)	8.40 (6.35-11.3)	9.40 (6.87-13.1)
7-day	1.68 (1.49-1.93)	2.34 (2.08-2.70)	3.25 (2.87-3.78)	4.02 (3.52-4.68)	5.10 (4.32-6.14)	5.95 (4.94-7.32)	6.85 (5.55-8.63)	7.81 (6.15-10.1)	9.15 (6.92-12.4)	10.2 (7.48-14.3)
10-day	1.78 (1.58-2.06)	2.49 (2.20-2.87)	3.45 (3.05-3.99)	4.26 (3.73-4.97)	5.41 (4.58-6.52)	6.32 (5.25-7.78)	7.28 (5.90-9.17)	8.30 (6.51-10.7)	9.73 (7.39-13.1)	10.9 (7.95-15.2)
20-day	2.10 (1.86-2.41)	2.93 (2.60-3.38)	4.09 (3.62-4.73)	5.08 (4.45-5.91)	6.48 (5.49-7.80)	7.60 (6.31-9.34)	8.78 (7.11-11.1)	10.0 (7.90-13.0)	11.8 (8.91-15.9)	13.2 (9.94-18.4)
30-day	2.42 (2.14-2.78)	3.38 (3.00-3.90)	4.73 (4.19-5.47)	5.88 (5.15-6.85)	7.53 (6.38-9.07)	8.86 (7.35-10.9)	10.3 (8.31-12.9)	11.7 (9.25-15.2)	13.8 (10.25-19.7)	15.5 (11.3-21.7)
45-day	2.84 (2.52-3.27)	3.97 (3.52-4.58)	5.56 (4.91-6.42)	6.93 (6.07-8.07)	8.91 (7.55-10.7)	10.5 (8.73-12.9)	12.2 (9.89-15.4)	14.0 (11.1-18.2)	16.6 (12.5-22.4)	18.7 (13.6-26.1)
60-day	3.18 (2.82-3.66)	4.41 (3.90-5.08)	6.14 (5.42-7.10)	7.65 (6.70-9.32)	9.84 (8.34-11.9)	11.6 (9.66-14.3)	13.6 (11.0-17.1)	15.6 (12.3-20.2)	18.5 (14.0-25.0)	20.9 (15.3-29.2)

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.

Estimates from the table in CSV format: Precipitation frequency estimates 

Main Link Categories:
[Home](#) | [OWP](#)

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
Office of Water Prediction (OWP)
1325 East West Highway
Silver Spring, MD 20910
Page Author: [HIDSC webmaster](#)
Page last modified: April 21, 2017

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Ver. 18.0 Release Date: 07/01/2011 License ID 1501

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* APN 0410-072-06 *
* Offsite Existing Condition *
* 100 Year Storm Event *

FILE NAME: PUMPOF.DAT
TIME/DATE OF STUDY: 15:24 10/17/2024

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 6.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
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) = 1.1300

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

	HALF- WIDTH	CROWN TO CROSSFALL	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
NO.	(FT)	(FT)						
===	=====	=====	=====	=====	=====	=====	=====	=====
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	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 20.00 TO NODE 21.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 980.00
ELEVATION DATA: UPSTREAM(FEET) = 3127.00 DOWNSTREAM(FEET) = 3104.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION \ CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 17.557

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.671

SUBAREA T_c AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
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NATURAL POOR COVER

"GRASS"	C	2.92	0.27	1.000	86	17.56
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SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 1.000

SUBAREA RUNOFF (CFS) = 6.30

TOTAL AREA (ACRES) = 2.92 PEAK FLOW RATE (CFS) = 6.30

FLOW PROCESS FROM NODE 30.00 TO NODE 31.00 IS CODE = 21

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

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 825.00

ELEVATION DATA: UPSTREAM (FEET) = 3120.00 DOWNSTREAM (FEET) = 3102.70

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION \ CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 16.689

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.768

SUBAREA T_c AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
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NATURAL POOR COVER

"GRASS"	C	3.52	0.27	1.000	86	16.69
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SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 1.000

SUBAREA RUNOFF (CFS) = 7.91

TOTAL AREA (ACRES) = 3.52 PEAK FLOW RATE (CFS) = 7.91

FLOW PROCESS FROM NODE 40.00 TO NODE 41.00 IS CODE = 21

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

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 345.00

ELEVATION DATA: UPSTREAM (FEET) = 3105.30 DOWNSTREAM (FEET) = 3100.60

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION \ CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 12.836

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.326

SUBAREA T_c AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
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NATURAL POOR COVER

"GRASS"	C	1.03	0.27	1.000	86	12.84
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SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 1.000

SUBAREA RUNOFF (CFS) = 2.83

TOTAL AREA (ACRES) = 1.03 PEAK FLOW RATE (CFS) = 2.83

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1.0 T_c (MIN.) = 12.84

EFFECTIVE AREA (ACRES) = 1.03 AREA-AVERAGED F_m (INCH/HR) = 0.27
AREA-AVERAGED F_p (INCH/HR) = 0.27 AREA-AVERAGED A_p = 1.000
PEAK FLOW RATE (CFS) = 2.83

=====

=====

END OF RATIONAL METHOD ANALYSIS

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Ver. 18.0 Release Date: 07/01/2011 License ID 1501

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* APN 0410-072-06 *
* Predeveloped Condition *
* 100 Year Storm Event *

FILE NAME: PUMPEX.DAT
TIME/DATE OF STUDY: 15:18 10/17/2024

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 6.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
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) = 1.1300

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

	HALF- WIDTH	CROWN TO CROSSFALL	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
NO.	(FT)	(FT)						
===	=====	=====	=====	=====	=====	=====	=====	=====
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 0.00 TO NODE 1.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 580.00
ELEVATION DATA: UPSTREAM(FEET) = 3103.00 DOWNSTREAM(FEET) = 3096.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION\ CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 16.430

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.798

SUBAREA T_c AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
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NATURAL POOR COVER

"GRASS"	C	2.82	0.27	1.000	86	16.43
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SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 1.000

SUBAREA RUNOFF (CFS) = 6.41

TOTAL AREA (ACRES) = 2.82 PEAK FLOW RATE (CFS) = 6.41

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 2.8 TC (MIN.) = 16.43

EFFECTIVE AREA (ACRES) = 2.82 AREA-AVERAGED F_m (INCH/HR) = 0.27

AREA-AVERAGED F_p (INCH/HR) = 0.27 AREA-AVERAGED A_p = 1.000

PEAK FLOW RATE (CFS) = 6.41

=====

END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* APN 0410-072-06 *
* Developed Condition *
* 100 Year Storm Event *

FILE NAME: PUMP.DAT
TIME/DATE OF STUDY: 13:51 10/24/2024

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 6.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
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) = 1.1300

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 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 10.00 TO NODE 12.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 447.00
ELEVATION DATA: UPSTREAM(FEET) = 3101.90 DOWNSTREAM(FEET) = 3095.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION \ CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 8.163
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.566
 SUBAREA T_c AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
COMMERCIAL	C	0.66	0.57	0.100	69	8.16

 SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA RUNOFF (CFS) = 2.68
 TOTAL AREA (ACRES) = 0.66 PEAK FLOW RATE (CFS) = 2.68

 FLOW PROCESS FROM NODE 12.00 TO NODE 12.00 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.) = 8.16
 RAINFALL INTENSITY (INCH/HR) = 4.57
 AREA-AVERAGED F_m (INCH/HR) = 0.06
 AREA-AVERAGED F_p (INCH/HR) = 0.57
 AREA-AVERAGED A_p = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 0.66
 TOTAL STREAM AREA (ACRES) = 0.66
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 2.68

 FLOW PROCESS FROM NODE 11.00 TO NODE 12.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 389.00
 ELEVATION DATA: UPSTREAM (FEET) = 3104.28 DOWNSTREAM (FEET) = 3095.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION \ CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 7.049
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 5.059
 SUBAREA T_c AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
COMMERCIAL	C	1.04	0.57	0.100	69	7.05

 SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA RUNOFF (CFS) = 4.68
 TOTAL AREA (ACRES) = 1.04 PEAK FLOW RATE (CFS) = 4.68

 FLOW PROCESS FROM NODE 12.00 TO NODE 12.00 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.) = 7.05
 RAINFALL INTENSITY (INCH/HR) = 5.06
 AREA-AVERAGED F_m (INCH/HR) = 0.06
 AREA-AVERAGED F_p (INCH/HR) = 0.57

AREA-AVERAGED $A_p = 0.10$
 EFFECTIVE STREAM AREA(ACRES) = 1.04
 TOTAL STREAM AREA(ACRES) = 1.04
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.68

**** CONFLUENCE DATA ****

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	A_p	Ae (ACRES)	HEADWATER NODE
1	2.68	8.16	4.566	0.57(0.06)	0.10	0.7	10.00
2	4.68	7.05	5.059	0.57(0.06)	0.10	1.0	11.00

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

**** PEAK FLOW RATE TABLE ****

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	A_p	Ae (ACRES)	HEADWATER NODE
1	7.25	7.05	5.059	0.57(0.06)	0.10	1.6	11.00
2	6.90	8.16	4.566	0.57(0.06)	0.10	1.7	10.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 7.25 Tc(MIN.) = 7.05
 EFFECTIVE AREA(ACRES) = 1.61 AREA-AVERAGED Fm(INCH/HR) = 0.06
 AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED $A_p = 0.10$
 TOTAL AREA(ACRES) = 1.7
 LONGEST FLOWPATH FROM NODE 10.00 TO NODE 12.00 = 447.00 FEET.

 FLOW PROCESS FROM NODE 12.00 TO NODE 13.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 3093.50 DOWNSTREAM(FEET) = 3087.50
 FLOW LENGTH(FEET) = 12.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 9.0 INCH PIPE IS 5.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.77
 ESTIMATED PIPE DIAMETER(INCH) = 9.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 7.25
 PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 7.06
 LONGEST FLOWPATH FROM NODE 10.00 TO NODE 13.00 = 459.00 FEET.

 FLOW PROCESS FROM NODE 13.00 TO NODE 13.00 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.) = 7.06
 RAINFALL INTENSITY(INCH/HR) = 5.06
 AREA-AVERAGED Fm(INCH/HR) = 0.06
 AREA-AVERAGED Fp(INCH/HR) = 0.57
 AREA-AVERAGED $A_p = 0.10$
 EFFECTIVE STREAM AREA(ACRES) = 1.61
 TOTAL STREAM AREA(ACRES) = 1.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.25

 FLOW PROCESS FROM NODE 14.00 TO NODE 15.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 190.00
ELEVATION DATA: UPSTREAM(FEET) = 3107.00 DOWNSTREAM(FEET) = 3101.90

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 5.112

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 6.335

SUBAREA T_c AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
COMMERCIAL	C	0.18	0.57	0.100	69	5.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.57

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100

SUBAREA RUNOFF (CFS) = 1.02

TOTAL AREA (ACRES) = 0.18 PEAK FLOW RATE (CFS) = 1.02

FLOW PROCESS FROM NODE 15.00 TO NODE 16.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 3101.90 DOWNSTREAM(FEET) = 3097.50
CHANNEL LENGTH THRU SUBAREA(FEET) = 304.00 CHANNEL SLOPE = 0.0145
CHANNEL FLOW THRU SUBAREA(CFS) = 1.02
FLOW VELOCITY (FEET/SEC) = 1.81 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME (MIN.) = 2.80 T_c (MIN.) = 7.91
LONGEST FLOWPATH FROM NODE 14.00 TO NODE 16.00 = 494.00 FEET.

FLOW PROCESS FROM NODE 16.00 TO NODE 16.00 IS CODE = 81

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

=====

MAINLINE T_c (MIN.) = 7.91

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.667

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	C	0.94	0.57	0.100	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.57

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100

SUBAREA AREA (ACRES) = 0.94 SUBAREA RUNOFF (CFS) = 3.90

EFFECTIVE AREA (ACRES) = 1.12 AREA-AVERAGED F_m (INCH/HR) = 0.06

AREA-AVERAGED F_p (INCH/HR) = 0.57 AREA-AVERAGED A_p = 0.10

TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 4.65

FLOW PROCESS FROM NODE 16.00 TO NODE 17.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 3095.50 DOWNSTREAM(FEET) = 3087.50
FLOW LENGTH (FEET) = 97.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.8 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.22
ESTIMATED PIPE DIAMETER (INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 4.65

PIPE TRAVEL TIME (MIN.) = 0.13 Tc (MIN.) = 8.04
LONGEST FLOWPATH FROM NODE 14.00 TO NODE 17.00 = 591.00 FEET.

FLOW PROCESS FROM NODE 17.00 TO NODE 13.00 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.) = 8.04
RAINFALL INTENSITY (INCH/HR) = 4.61
AREA-AVERAGED Fm (INCH/HR) = 0.06
AREA-AVERAGED Fp (INCH/HR) = 0.57
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA (ACRES) = 1.12
TOTAL STREAM AREA (ACRES) = 1.12
PEAK FLOW RATE (CFS) AT CONFLUENCE = 4.65

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	7.25	7.06	5.055	0.57 (0.06)	0.10	1.6	11.00
1	6.90	8.17	4.563	0.57 (0.06)	0.10	1.7	10.00
2	4.65	8.04	4.613	0.57 (0.06)	0.10	1.1	14.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	11.72	7.06	5.055	0.57 (0.06)	0.10	2.6	11.00
2	11.59	8.04	4.613	0.57 (0.06)	0.10	2.8	14.00
3	11.49	8.17	4.563	0.57 (0.06)	0.10	2.8	10.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 11.72 Tc (MIN.) = 7.06
EFFECTIVE AREA (ACRES) = 2.59 AREA-AVERAGED Fm (INCH/HR) = 0.06
AREA-AVERAGED Fp (INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 2.8
LONGEST FLOWPATH FROM NODE 14.00 TO NODE 13.00 = 591.00 FEET.

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 2.8 TC (MIN.) = 7.06
EFFECTIVE AREA (ACRES) = 2.59 AREA-AVERAGED Fm (INCH/HR) = 0.06
AREA-AVERAGED Fp (INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.100
PEAK FLOW RATE (CFS) = 11.72

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	11.72	7.06	5.055	0.57 (0.06)	0.10	2.6	11.00
2	11.59	8.04	4.613	0.57 (0.06)	0.10	2.8	14.00
3	11.49	8.17	4.563	0.57 (0.06)	0.10	2.8	10.00

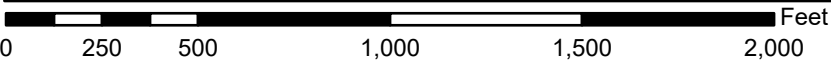
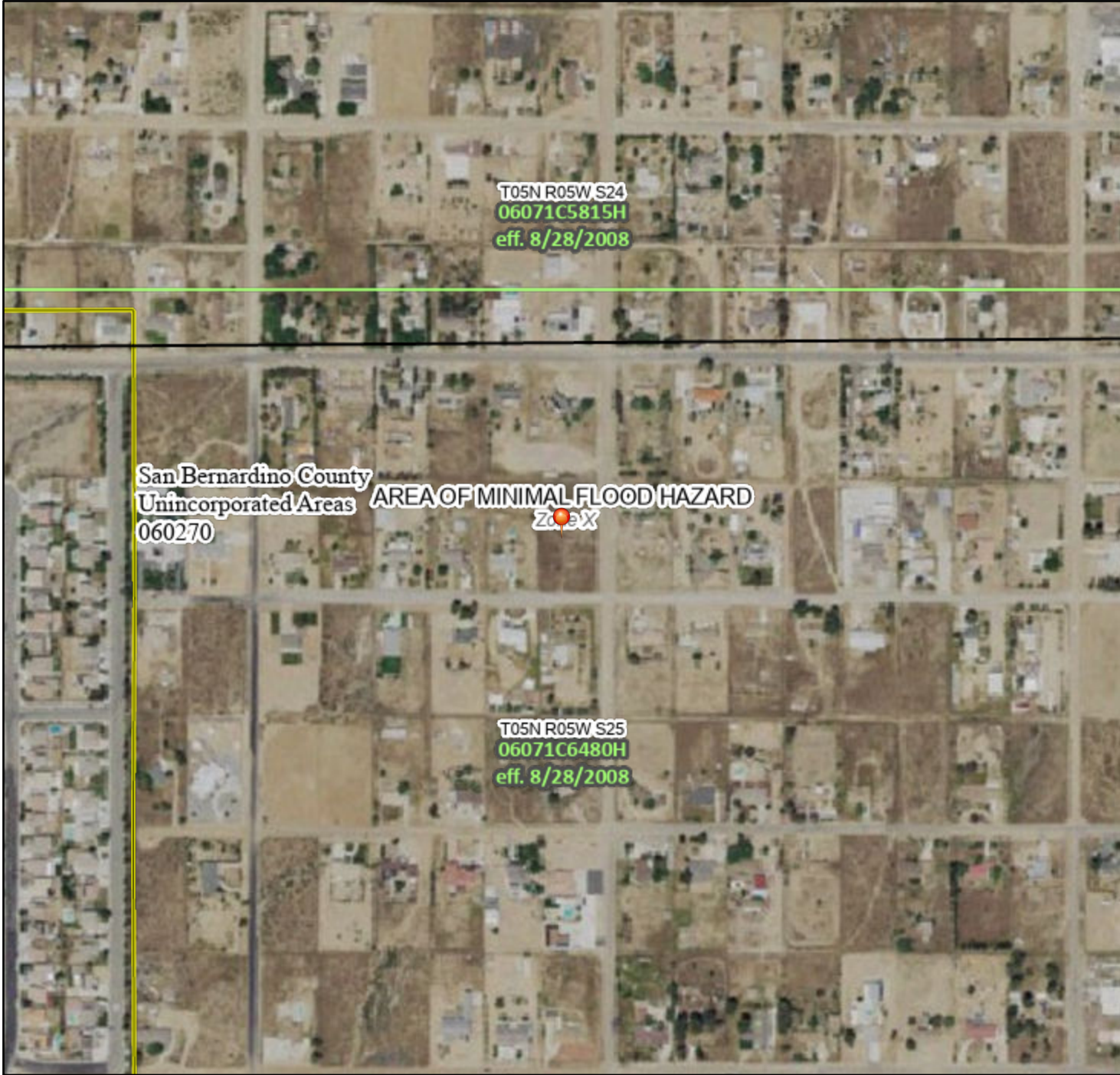
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END OF RATIONAL METHOD ANALYSIS

National Flood Hazard Layer FIRMette



117°21'40"W 34°30'8"N



1:6,000

117°21'3\"/>

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

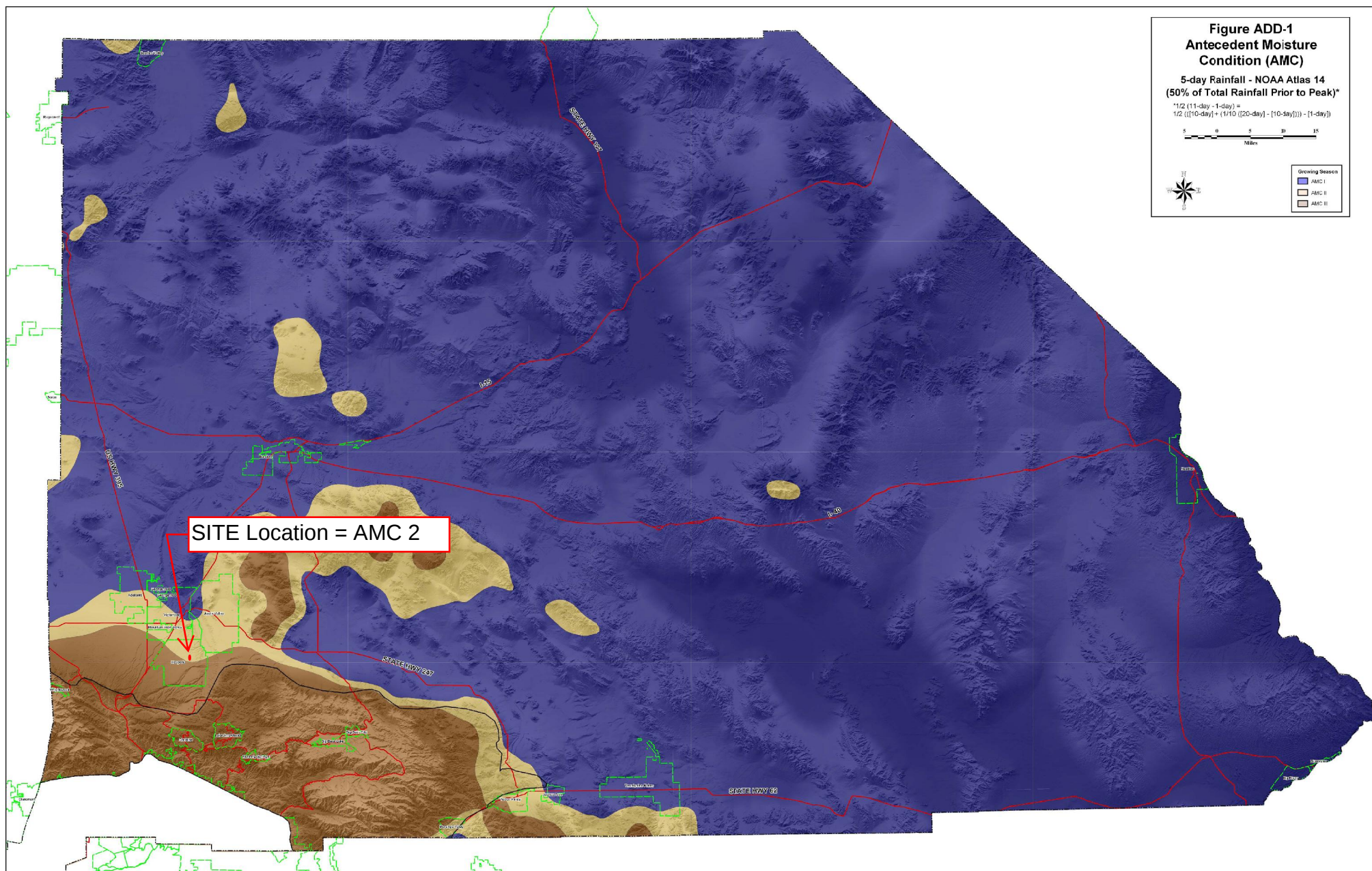


The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/16/2024 at 2:29 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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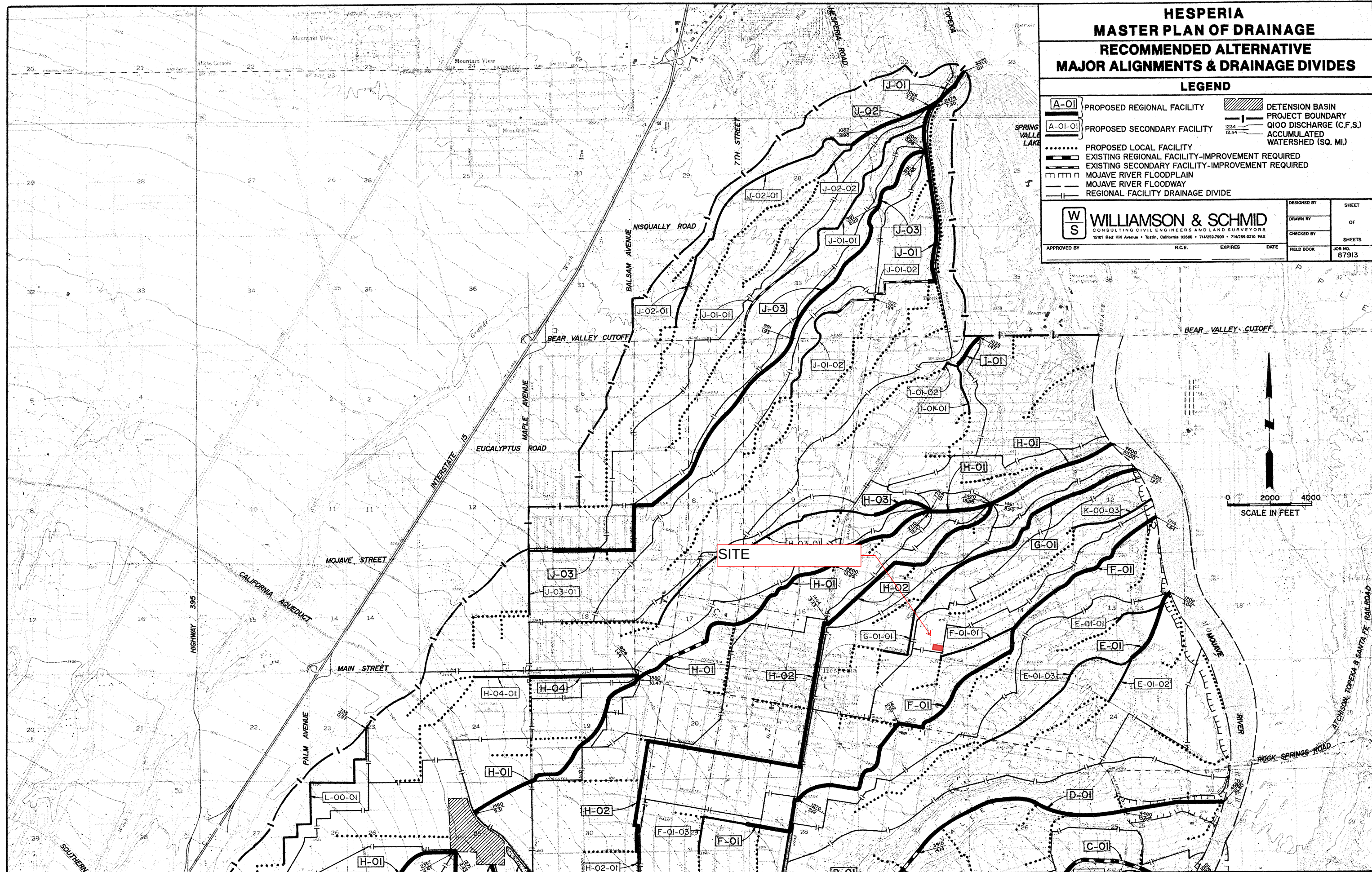
**HESPERIA
MASTER PLAN OF DRAINAGE
RECOMMENDED ALTERNATIVE
MAJOR ALIGNMENTS & DRAINAGE DIVIDES**

LEGEND

- | | | |
|----------------|--|---------------------------------|
| A-01 | PROPOSED REGIONAL FACILITY | DETENTION BASIN |
| A-01-01 | PROPOSED SECONDARY FACILITY | PROJECT BOUNDARY |
| | PROPOSED LOCAL FACILITY | Q100 DISCHARGE (C.F.S.) |
| | EXISTING REGIONAL FACILITY-IMPROVEMENT REQUIRED | ACCUMULATED WATERSHED (SQ. MI.) |
| | EXISTING SECONDARY FACILITY-IMPROVEMENT REQUIRED | |
| | MOJAVE RIVER FLOODPLAIN | |
| | MOJAVE RIVER FLOODWAY | |
| | REGIONAL FACILITY DRAINAGE DIVIDE | |

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DESIGNED BY	SHEET
DRAWN BY	OF
CHECKED BY	SHEETS
APPROVED BY	JOB NO.
R.C.E.	87913
EXPIRES	
DATE	
FIELD BOOK	



Predeveloped Condition 100 Year Storm Event

*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

TOTAL 24-HOUR DURATION RAINFALL DEPTH = 4.42 (inches)

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	2.82	100.00	86.	0.272	0.663

TOTAL AREA (Acres) = 2.82

AREA-AVERAGED LOSS RATE, Fm (in./hr.) = 0.272

AREA-AVERAGED LOW LOSS FRACTION, Y = 0.337

RATIONAL METHOD CALIBRATION COEFFICIENT = 1.00

TOTAL CATCHMENT AREA(ACRES) = 2.82

SOIL-LOSS RATE, Fm,(INCH/HR) = 0.272

LOW LOSS FRACTION = 0.337

TIME OF CONCENTRATION(MIN.) = 16.43

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) = 0.35

30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.86

1-HOUR POINT RAINFALL VALUE(INCHES) = 1.13

3-HOUR POINT RAINFALL VALUE(INCHES) = 1.73

6-HOUR POINT RAINFALL VALUE(INCHES) = 2.32

24-HOUR POINT RAINFALL VALUE(INCHES) = 4.42

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.72

TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.32

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
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0.04	0.0000	0.00 Q	.	.	.	.	.
------	--------	--------	---	---	---	---	---

0.27	0.0015	0.16 Q	.	.	.	.	.
------	--------	--------	---	---	---	---	---

0.50	0.0046	0.16 Q	.	.	.	.
0.72	0.0076	0.16 Q	.	.	.	.
0.95	0.0107	0.16 Q	.	.	.	.
1.18	0.0138	0.17 Q	.	.	.	.
1.41	0.0169	0.17 Q	.	.	.	.
1.64	0.0201	0.17 Q	.	.	.	.
1.86	0.0233	0.17 Q	.	.	.	.
2.09	0.0265	0.17 Q	.	.	.	.
2.32	0.0297	0.17 Q	.	.	.	.
2.55	0.0330	0.17 Q	.	.	.	.
2.78	0.0363	0.18 Q	.	.	.	.
3.00	0.0396	0.18 Q	.	.	.	.
3.23	0.0430	0.18 Q	.	.	.	.
3.46	0.0464	0.18 Q	.	.	.	.
3.69	0.0498	0.18 Q	.	.	.	.
3.92	0.0533	0.18 Q	.	.	.	.
4.14	0.0568	0.19 Q	.	.	.	.
4.37	0.0603	0.19 Q	.	.	.	.
4.60	0.0639	0.19 Q	.	.	.	.
4.83	0.0675	0.19 Q	.	.	.	.
5.06	0.0711	0.19 Q	.	.	.	.
5.28	0.0748	0.20 Q	.	.	.	.
5.51	0.0785	0.20 Q	.	.	.	.
5.74	0.0823	0.20 Q	.	.	.	.
5.97	0.0861	0.20 Q	.	.	.	.
6.20	0.0900	0.21 Q	.	.	.	.
6.42	0.0939	0.21 Q	.	.	.	.
6.65	0.0978	0.21 Q	.	.	.	.
6.88	0.1018	0.21 Q	.	.	.	.
7.11	0.1059	0.22 Q	.	.	.	.
7.34	0.1100	0.22 Q	.	.	.	.
7.56	0.1142	0.22 Q	.	.	.	.
7.79	0.1184	0.23 Q	.	.	.	.
8.02	0.1227	0.23 Q	.	.	.	.
8.25	0.1270	0.23 Q	.	.	.	.
8.48	0.1315	0.24 Q	.	.	.	.
8.70	0.1360	0.24 Q	.	.	.	.
8.93	0.1405	0.25 Q	.	.	.	.
9.16	0.1452	0.25 Q	.	.	.	.
9.39	0.1499	0.25 .Q	.	.	.	.
9.62	0.1547	0.26 .Q	.	.	.	.
9.84	0.1596	0.26 .Q	.	.	.	.
10.07	0.1646	0.27 .Q	.	.	.	.
10.30	0.1697	0.27 .Q	.	.	.	.
10.53	0.1749	0.28 .Q	.	.	.	.
10.76	0.1802	0.29 .Q	.	.	.	.
10.98	0.1857	0.29 .Q	.	.	.	.

11.21	0.1912	0.30	.Q	.	.	.	.
11.44	0.1969	0.31	.Q	.	.	.	.
11.67	0.2028	0.32	.Q	.	.	.	.
11.90	0.2088	0.32	.Q	.	.	.	.
12.12	0.2149	0.33	.Q	.	.	.	.
12.35	0.2209	0.31	.Q	.	.	.	.
12.58	0.2269	0.33	.Q	.	.	.	.
12.81	0.2332	0.34	.Q	.	.	.	.
13.04	0.2396	0.35	.Q	.	.	.	.
13.26	0.2464	0.36	.Q	.	.	.	.
13.49	0.2535	0.39	.Q	.	.	.	.
13.72	0.2609	0.40	.Q	.	.	.	.
13.95	0.2687	0.43	.Q	.	.	.	.
14.18	0.2770	0.44	.Q	.	.	.	.
14.40	0.2855	0.45	.Q	.	.	.	.
14.63	0.2943	0.48	.Q	.	.	.	.
14.86	0.3039	0.55	.Q	.	.	.	.
15.09	0.3146	0.59	.Q	.	.	.	.
15.32	0.3269	0.71	.Q	.	.	.	.
15.54	0.3413	0.81	.Q	.	.	.	.
15.77	0.3607	1.25	.Q	.	.	.	.
16.00	0.3933	2.22	.Q	.	.	.	.
16.23	0.4745	6.41	.	.	.Q	.	.
16.46	0.5439	0.96	.Q	.	.	.	.
16.68	0.5590	0.64	.Q	.	.	.	.
16.91	0.5699	0.51	.Q	.	.	.	.
17.14	0.5788	0.43	.Q	.	.	.	.
17.37	0.5867	0.42	.Q	.	.	.	.
17.60	0.5942	0.38	.Q	.	.	.	.
17.82	0.6010	0.34	.Q	.	.	.	.
18.05	0.6072	0.32	.Q	.	.	.	.
18.28	0.6133	0.33	.Q	.	.	.	.
18.51	0.6193	0.31	.Q	.	.	.	.
18.74	0.6250	0.30	.Q	.	.	.	.
18.96	0.6305	0.28	.Q	.	.	.	.
19.19	0.6357	0.27	.Q	.	.	.	.
19.42	0.6407	0.26	.Q	.	.	.	.
19.65	0.6455	0.25	.Q	.	.	.	.
19.88	0.6501	0.24	Q	.	.	.	.
20.10	0.6546	0.23	Q	.	.	.	.
20.33	0.6590	0.23	Q	.	.	.	.
20.56	0.6632	0.22	Q	.	.	.	.
20.79	0.6673	0.22	Q	.	.	.	.
21.02	0.6713	0.21	Q	.	.	.	.
21.24	0.6753	0.20	Q	.	.	.	.
21.47	0.6791	0.20	Q	.	.	.	.
21.70	0.6828	0.20	Q	.	.	.	.

21.93	0.6864	0.19 Q	.	.	.	.		
22.16	0.6900	0.19 Q	.	.	.	.		
22.38	0.6935	0.18 Q	.	.	.	.		
22.61	0.6969	0.18 Q	.	.	.	.		
22.84	0.7003	0.18 Q	.	.	.	.		
23.07	0.7036	0.17 Q	.	.	.	.		
23.30	0.7068	0.17 Q	.	.	.	.		
23.52	0.7100	0.17 Q	.	.	.	.		
23.75	0.7131	0.16 Q	.	.	.	.		
23.98	0.7162	0.16 Q	.	.	.	.		
24.21	0.7193	0.16 Q	.	.	.	.		
24.44	0.7208	0.00 Q	.	.	.	.	31398.05	28258.24

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%	1450.1
10%	95.8
20%	27.4
30%	27.4
40%	13.7
50%	13.7
60%	13.7
70%	13.7
80%	13.7
90%	13.7

Proposed Condition 100 Year Storm Event

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*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

TOTAL 24-HOUR DURATION RAINFALL DEPTH = 4.42 (inches)

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	0.30	100.00	91.	0.180	0.774
2	2.52	0.00	98.	0.000	0.947

TOTAL AREA (Acres) = 2.82

—
AREA-AVERAGED LOSS RATE, Fm (in./hr.) = 0.019

—
AREA-AVERAGED LOW LOSS FRACTION, Y = 0.072

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RATIONAL METHOD CALIBRATION COEFFICIENT = 1.00
TOTAL CATCHMENT AREA(ACRES) = 2.82
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.019
LOW LOSS FRACTION = 0.072
TIME OF CONCENTRATION(MIN.) = 7.06
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) = 0.35
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.86
1-HOUR POINT RAINFALL VALUE(INCHES) = 1.13
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.73
6-HOUR POINT RAINFALL VALUE(INCHES) = 2.32
24-HOUR POINT RAINFALL VALUE(INCHES) = 4.42

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.97
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.07

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	5.0	10.0	15.0	20.0
--------------	-------------	---------	----	-----	------	------	------

0.07	0.0007	0.22 Q	.	.	.	.	.
0.15	0.0022	0.22 Q	.	.	.	.	.
0.24	0.0038	0.23 Q	.	.	.	.	.
0.32	0.0054	0.23 Q	.	.	.	.	.
0.41	0.0069	0.23 Q	.	.	.	.	.
0.49	0.0085	0.23 Q	.	.	.	.	.
0.58	0.0101	0.23 Q	.	.	.	.	.
0.66	0.0117	0.23 Q	.	.	.	.	.
0.74	0.0133	0.23 Q	.	.	.	.	.
0.83	0.0149	0.23 Q	.	.	.	.	.
0.91	0.0165	0.23 Q	.	.	.	.	.
1.00	0.0181	0.23 Q	.	.	.	.	.
1.08	0.0197	0.23 Q	.	.	.	.	.
1.17	0.0213	0.23 Q	.	.	.	.	.
1.25	0.0230	0.23 Q	.	.	.	.	.
1.33	0.0246	0.23 Q	.	.	.	.	.
1.42	0.0262	0.24 Q	.	.	.	.	.
1.50	0.0279	0.24 Q	.	.	.	.	.
1.59	0.0295	0.24 Q	.	.	.	.	.
1.67	0.0311	0.24 Q	.	.	.	.	.
1.76	0.0328	0.24 Q	.	.	.	.	.
1.84	0.0345	0.24 Q	.	.	.	.	.
1.92	0.0361	0.24 Q	.	.	.	.	.
2.01	0.0378	0.24 Q	.	.	.	.	.
2.09	0.0395	0.24 Q	.	.	.	.	.
2.18	0.0412	0.24 Q	.	.	.	.	.
2.26	0.0428	0.24 Q	.	.	.	.	.
2.35	0.0445	0.24 Q	.	.	.	.	.
2.43	0.0462	0.24 Q	.	.	.	.	.
2.51	0.0479	0.24 Q	.	.	.	.	.
2.60	0.0496	0.25 Q	.	.	.	.	.
2.68	0.0514	0.25 Q	.	.	.	.	.
2.77	0.0531	0.25 Q	.	.	.	.	.
2.85	0.0548	0.25 Q	.	.	.	.	.
2.94	0.0565	0.25 Q	.	.	.	.	.
3.02	0.0583	0.25 Q	.	.	.	.	.
3.10	0.0600	0.25 Q	.	.	.	.	.
3.19	0.0618	0.25 Q	.	.	.	.	.
3.27	0.0635	0.25 Q	.	.	.	.	.
3.36	0.0653	0.25 Q	.	.	.	.	.
3.44	0.0670	0.25 Q	.	.	.	.	.
3.53	0.0688	0.26 Q	.	.	.	.	.
3.61	0.0706	0.26 Q	.	.	.	.	.
3.69	0.0724	0.26 Q	.	.	.	.	.

3.78	0.0742	0.26 Q	.	.	.	.
3.86	0.0760	0.26 Q	.	.	.	.
3.95	0.0778	0.26 Q	.	.	.	.
4.03	0.0796	0.26 Q	.	.	.	.
4.12	0.0814	0.26 Q	.	.	.	.
4.20	0.0833	0.26 Q	.	.	.	.
4.28	0.0851	0.26 Q	.	.	.	.
4.37	0.0869	0.26 Q	.	.	.	.
4.45	0.0888	0.27 Q	.	.	.	.
4.54	0.0906	0.27 Q	.	.	.	.
4.62	0.0925	0.27 Q	.	.	.	.
4.71	0.0944	0.27 Q	.	.	.	.
4.79	0.0963	0.27 Q	.	.	.	.
4.87	0.0981	0.27 Q	.	.	.	.
4.96	0.1000	0.27 Q	.	.	.	.
5.04	0.1019	0.27 Q	.	.	.	.
5.13	0.1038	0.27 Q	.	.	.	.
5.21	0.1058	0.28 Q	.	.	.	.
5.30	0.1077	0.28 Q	.	.	.	.
5.38	0.1096	0.28 Q	.	.	.	.
5.46	0.1116	0.28 Q	.	.	.	.
5.55	0.1135	0.28 Q	.	.	.	.
5.63	0.1155	0.28 Q	.	.	.	.
5.72	0.1174	0.28 Q	.	.	.	.
5.80	0.1194	0.28 Q	.	.	.	.
5.89	0.1214	0.29 Q	.	.	.	.
5.97	0.1234	0.29 Q	.	.	.	.
6.05	0.1254	0.29 Q	.	.	.	.
6.14	0.1274	0.29 Q	.	.	.	.
6.22	0.1294	0.29 Q	.	.	.	.
6.31	0.1314	0.29 Q	.	.	.	.
6.39	0.1335	0.29 Q	.	.	.	.
6.48	0.1355	0.29 Q	.	.	.	.
6.56	0.1376	0.30 Q	.	.	.	.
6.64	0.1396	0.30 Q	.	.	.	.
6.73	0.1417	0.30 Q	.	.	.	.
6.81	0.1438	0.30 Q	.	.	.	.
6.90	0.1459	0.30 Q	.	.	.	.
6.98	0.1480	0.30 Q	.	.	.	.
7.07	0.1501	0.30 Q	.	.	.	.
7.15	0.1523	0.31 Q	.	.	.	.
7.23	0.1544	0.31 Q	.	.	.	.
7.32	0.1566	0.31 Q	.	.	.	.
7.40	0.1587	0.31 Q	.	.	.	.
7.49	0.1609	0.31 Q	.	.	.	.

7.57	0.1631	0.31 Q	.	.	.	.
7.66	0.1653	0.32 Q	.	.	.	.
7.74	0.1675	0.32 Q	.	.	.	.
7.82	0.1697	0.32 Q	.	.	.	.
7.91	0.1719	0.32 Q	.	.	.	.
7.99	0.1742	0.32 Q	.	.	.	.
8.08	0.1764	0.32 Q	.	.	.	.
8.16	0.1787	0.33 Q	.	.	.	.
8.25	0.1810	0.33 Q	.	.	.	.
8.33	0.1833	0.33 Q	.	.	.	.
8.41	0.1856	0.33 Q	.	.	.	.
8.50	0.1879	0.33 Q	.	.	.	.
8.58	0.1902	0.34 Q	.	.	.	.
8.67	0.1926	0.34 Q	.	.	.	.
8.75	0.1950	0.34 Q	.	.	.	.
8.84	0.1973	0.34 Q	.	.	.	.
8.92	0.1997	0.34 Q	.	.	.	.
9.00	0.2021	0.35 Q	.	.	.	.
9.09	0.2046	0.35 Q	.	.	.	.
9.17	0.2070	0.35 Q	.	.	.	.
9.26	0.2095	0.35 Q	.	.	.	.
9.34	0.2119	0.36 Q	.	.	.	.
9.43	0.2144	0.36 Q	.	.	.	.
9.51	0.2169	0.36 Q	.	.	.	.
9.59	0.2195	0.36 Q	.	.	.	.
9.68	0.2220	0.37 Q	.	.	.	.
9.76	0.2246	0.37 Q	.	.	.	.
9.85	0.2271	0.37 Q	.	.	.	.
9.93	0.2297	0.37 Q	.	.	.	.
10.02	0.2323	0.38 Q	.	.	.	.
10.10	0.2350	0.38 Q	.	.	.	.
10.18	0.2376	0.38 Q	.	.	.	.
10.27	0.2403	0.39 Q	.	.	.	.
10.35	0.2430	0.39 Q	.	.	.	.
10.44	0.2457	0.39 Q	.	.	.	.
10.52	0.2485	0.40 Q	.	.	.	.
10.61	0.2512	0.40 Q	.	.	.	.
10.69	0.2540	0.40 Q	.	.	.	.
10.77	0.2568	0.40 Q	.	.	.	.
10.86	0.2597	0.41 Q	.	.	.	.
10.94	0.2625	0.41 Q	.	.	.	.
11.03	0.2654	0.42 Q	.	.	.	.
11.11	0.2683	0.42 Q	.	.	.	.
11.20	0.2712	0.42 Q	.	.	.	.
11.28	0.2742	0.43 Q	.	.	.	.

11.36	0.2772	0.43	Q	.	.	.	.
11.45	0.2802	0.43	Q	.	.	.	.
11.53	0.2833	0.44	Q	.	.	.	.
11.62	0.2863	0.44	Q	.	.	.	.
11.70	0.2894	0.45	Q	.	.	.	.
11.79	0.2926	0.45	Q	.	.	.	.
11.87	0.2958	0.46	Q	.	.	.	.
11.95	0.2990	0.46	Q	.	.	.	.
12.04	0.3022	0.46	Q	.	.	.	.
12.12	0.3053	0.43	Q	.	.	.	.
12.21	0.3083	0.44	Q	.	.	.	.
12.29	0.3114	0.44	Q	.	.	.	.
12.38	0.3145	0.45	Q	.	.	.	.
12.46	0.3176	0.45	Q	.	.	.	.
12.54	0.3208	0.46	Q	.	.	.	.
12.63	0.3241	0.47	Q	.	.	.	.
12.71	0.3273	0.48	Q	.	.	.	.
12.80	0.3307	0.48	Q	.	.	.	.
12.88	0.3340	0.49	Q	.	.	.	.
12.97	0.3375	0.49	Q	.	.	.	.
13.05	0.3409	0.51	.Q	.	.	.	.
13.13	0.3445	0.51	.Q	.	.	.	.
13.22	0.3481	0.52	.Q	.	.	.	.
13.30	0.3517	0.53	.Q	.	.	.	.
13.39	0.3555	0.54	.Q	.	.	.	.
13.47	0.3593	0.55	.Q	.	.	.	.
13.56	0.3631	0.56	.Q	.	.	.	.
13.64	0.3671	0.57	.Q	.	.	.	.
13.72	0.3711	0.58	.Q	.	.	.	.
13.81	0.3752	0.59	.Q	.	.	.	.
13.89	0.3794	0.61	.Q	.	.	.	.
13.98	0.3837	0.62	.Q	.	.	.	.
14.06	0.3879	0.61	.Q	.	.	.	.
14.15	0.3921	0.60	.Q	.	.	.	.
14.23	0.3964	0.62	.Q	.	.	.	.
14.31	0.4007	0.63	.Q	.	.	.	.
14.40	0.4052	0.66	.Q	.	.	.	.
14.48	0.4098	0.67	.Q	.	.	.	.
14.57	0.4146	0.70	.Q	.	.	.	.
14.65	0.4195	0.72	.Q	.	.	.	.
14.74	0.4247	0.76	.Q	.	.	.	.
14.82	0.4301	0.78	.Q	.	.	.	.
14.90	0.4357	0.83	.Q	.	.	.	.
14.99	0.4415	0.86	.Q	.	.	.	.
15.07	0.4477	0.92	.Q	.	.	.	.

15.16	0.4543	0.96	.Q	.	.	.	.
15.24	0.4612	1.04	.Q	.	.	.	.
15.33	0.4686	1.09	.Q	.	.	.	.
15.41	0.4767	1.22	.Q	.	.	.	.
15.49	0.4855	1.30	.Q	.	.	.	.
15.58	0.4952	1.48	.Q	.	.	.	.
15.66	0.5059	1.61	.Q	.	.	.	.
15.75	0.5200	2.44	.Q	.	.	.	.
15.83	0.5381	2.74	.Q	.	.	.	.
15.92	0.5605	3.71	.Q	.	.	.	.
16.00	0.5903	4.84	.Q	.	.	.	.
16.08	0.6480	11.72	.	.	.Q	.	.
16.17	0.6997	3.12	.Q	.	.	.	.
16.25	0.7167	1.76	.Q	.	.	.	.
16.34	0.7276	1.38	.Q	.	.	.	.
16.42	0.7364	1.14	.Q	.	.	.	.
16.51	0.7439	1.00	.Q	.	.	.	.
16.59	0.7504	0.89	.Q	.	.	.	.
16.67	0.7563	0.80	.Q	.	.	.	.
16.76	0.7617	0.74	.Q	.	.	.	.
16.84	0.7667	0.69	.Q	.	.	.	.
16.93	0.7713	0.64	.Q	.	.	.	.
17.01	0.7757	0.61	.Q	.	.	.	.
17.10	0.7800	0.63	.Q	.	.	.	.
17.18	0.7843	0.60	.Q	.	.	.	.
17.26	0.7884	0.58	.Q	.	.	.	.
17.35	0.7923	0.55	.Q	.	.	.	.
17.43	0.7961	0.53	.Q	.	.	.	.
17.52	0.7998	0.52	.Q	.	.	.	.
17.60	0.8033	0.50	Q	.	.	.	.
17.69	0.8067	0.48	Q	.	.	.	.
17.77	0.8100	0.47	Q	.	.	.	.
17.85	0.8133	0.46	Q	.	.	.	.
17.94	0.8164	0.45	Q	.	.	.	.
18.02	0.8195	0.43	Q	.	.	.	.
18.11	0.8226	0.47	Q	.	.	.	.
18.19	0.8258	0.46	Q	.	.	.	.
18.28	0.8290	0.45	Q	.	.	.	.
18.36	0.8321	0.44	Q	.	.	.	.
18.44	0.8351	0.43	Q	.	.	.	.
18.53	0.8380	0.42	Q	.	.	.	.
18.61	0.8409	0.41	Q	.	.	.	.
18.70	0.8438	0.41	Q	.	.	.	.
18.78	0.8466	0.40	Q	.	.	.	.
18.87	0.8494	0.39	Q	.	.	.	.

18.95	0.8521	0.39 Q	.	.	.	.
19.03	0.8548	0.38 Q	.	.	.	.
19.12	0.8574	0.38 Q	.	.	.	.
19.20	0.8600	0.37 Q	.	.	.	.
19.29	0.8626	0.36 Q	.	.	.	.
19.37	0.8651	0.36 Q	.	.	.	.
19.46	0.8676	0.36 Q	.	.	.	.
19.54	0.8700	0.35 Q	.	.	.	.
19.62	0.8725	0.35 Q	.	.	.	.
19.71	0.8749	0.34 Q	.	.	.	.
19.79	0.8772	0.34 Q	.	.	.	.
19.88	0.8796	0.33 Q	.	.	.	.
19.96	0.8819	0.33 Q	.	.	.	.
20.05	0.8841	0.33 Q	.	.	.	.
20.13	0.8864	0.32 Q	.	.	.	.
20.21	0.8886	0.32 Q	.	.	.	.
20.30	0.8908	0.32 Q	.	.	.	.
20.38	0.8930	0.31 Q	.	.	.	.
20.47	0.8952	0.31 Q	.	.	.	.
20.55	0.8973	0.31 Q	.	.	.	.
20.64	0.8994	0.30 Q	.	.	.	.
20.72	0.9015	0.30 Q	.	.	.	.
20.80	0.9036	0.30 Q	.	.	.	.
20.89	0.9057	0.29 Q	.	.	.	.
20.97	0.9077	0.29 Q	.	.	.	.
21.06	0.9097	0.29 Q	.	.	.	.
21.14	0.9117	0.29 Q	.	.	.	.
21.23	0.9137	0.28 Q	.	.	.	.
21.31	0.9157	0.28 Q	.	.	.	.
21.39	0.9176	0.28 Q	.	.	.	.
21.48	0.9196	0.28 Q	.	.	.	.
21.56	0.9215	0.27 Q	.	.	.	.
21.65	0.9234	0.27 Q	.	.	.	.
21.73	0.9253	0.27 Q	.	.	.	.
21.82	0.9271	0.27 Q	.	.	.	.
21.90	0.9290	0.27 Q	.	.	.	.
21.98	0.9308	0.26 Q	.	.	.	.
22.07	0.9327	0.26 Q	.	.	.	.
22.15	0.9345	0.26 Q	.	.	.	.
22.24	0.9363	0.26 Q	.	.	.	.
22.32	0.9381	0.26 Q	.	.	.	.
22.41	0.9398	0.25 Q	.	.	.	.
22.49	0.9416	0.25 Q	.	.	.	.
22.57	0.9434	0.25 Q	.	.	.	.
22.66	0.9451	0.25 Q	.	.	.	.

22.74	0.9468	0.25 Q	.	.	.	.
22.83	0.9485	0.25 Q	.	.	.	.
22.91	0.9502	0.24 Q	.	.	.	.
23.00	0.9519	0.24 Q	.	.	.	.
23.08	0.9536	0.24 Q	.	.	.	.
23.16	0.9553	0.24 Q	.	.	.	.
23.25	0.9569	0.24 Q	.	.	.	.
23.33	0.9586	0.24 Q	.	.	.	.
23.42	0.9602	0.23 Q	.	.	.	.
23.50	0.9619	0.23 Q	.	.	.	.
23.59	0.9635	0.23 Q	.	.	.	.
23.67	0.9651	0.23 Q	.	.	.	.
23.75	0.9667	0.23 Q	.	.	.	.
23.84	0.9683	0.23 Q	.	.	.	.
23.92	0.9699	0.23 Q	.	.	.	.
24.01	0.9714	0.23 Q	.	.	.	.
24.09	0.9722	0.00 Q	.	.	.	.
						42349.03 14090.79

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%	1441.2
10%	60.7
20%	30.3
30%	15.2
40%	10.1
50%	5.1
60%	5.1
70%	5.1
80%	5.1
90%	5.1

Proposed Condition 100 Year Storm Event Routed

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FLOW-THROUGH DETENTION BASIN MODEL

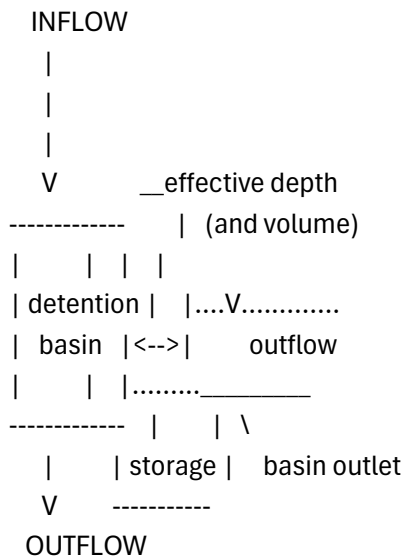
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:

CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 5.062

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 = 3

*BASIN-DEPTH STORAGE OUTFLOW **BASIN-DEPTH STORAGE OUTFLOW *

* (FEET) (ACRE-FEET) (CFS) ** (FEET) (ACRE-FEET) (CFS) *

* 0.000 0.000 0.000** 3.000 0.160 0.000*

* 6.000 0.320 8.000**

=====

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 3.00 0.16000 0.16000

3 6.00 0.29211 0.34789

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 DEAD-STORAGE INFLOW EFFECTIVE OUTFLOW EFFECTIVE
(HRS) FILLED(AF) (CFS) DEPTH(FT) (CFS) VOLUME(AF)

0.055	0.000	0.22	0.03	0.00	0.002
0.139	0.000	0.22	0.06	0.00	0.003
0.223	0.000	0.23	0.09	0.00	0.005
0.308	0.000	0.23	0.12	0.00	0.006
0.392	0.000	0.23	0.15	0.00	0.008
0.477	0.000	0.23	0.18	0.00	0.009
0.561	0.000	0.23	0.21	0.00	0.011
0.645	0.000	0.23	0.24	0.00	0.013
0.730	0.000	0.23	0.27	0.00	0.014
0.814	0.000	0.23	0.30	0.00	0.016
0.898	0.000	0.23	0.33	0.00	0.017
0.983	0.000	0.23	0.36	0.00	0.019
1.067	0.000	0.23	0.39	0.00	0.021
1.151	0.000	0.23	0.42	0.00	0.022
1.236	0.000	0.23	0.45	0.00	0.024
1.320	0.000	0.23	0.48	0.00	0.026
1.405	0.000	0.23	0.51	0.00	0.027
1.489	0.000	0.24	0.54	0.00	0.029
1.573	0.000	0.24	0.57	0.00	0.030
1.658	0.000	0.24	0.60	0.00	0.032
1.742	0.000	0.24	0.63	0.00	0.034
1.826	0.000	0.24	0.66	0.00	0.035
1.911	0.000	0.24	0.70	0.00	0.037
1.995	0.000	0.24	0.73	0.00	0.039
2.080	0.000	0.24	0.76	0.00	0.040
2.164	0.000	0.24	0.79	0.00	0.042
2.248	0.000	0.24	0.82	0.00	0.044
2.333	0.000	0.24	0.85	0.00	0.046
2.417	0.000	0.24	0.89	0.00	0.047
2.501	0.000	0.24	0.92	0.00	0.049
2.586	0.000	0.25	0.95	0.00	0.051
2.670	0.000	0.25	0.98	0.00	0.052
2.754	0.000	0.25	1.01	0.00	0.054
2.839	0.000	0.25	1.05	0.00	0.056
2.923	0.000	0.25	1.08	0.00	0.058
3.008	0.000	0.25	1.11	0.00	0.059

3.092	0.000	0.25	1.14	0.00	0.061
3.176	0.000	0.25	1.18	0.00	0.063
3.261	0.000	0.25	1.21	0.00	0.065
3.345	0.000	0.25	1.24	0.00	0.066
3.429	0.000	0.25	1.28	0.00	0.068
3.514	0.000	0.25	1.31	0.00	0.070
3.598	0.000	0.26	1.34	0.00	0.072
3.682	0.000	0.26	1.38	0.00	0.073
3.767	0.000	0.26	1.41	0.00	0.075
3.851	0.000	0.26	1.44	0.00	0.077
3.936	0.000	0.26	1.48	0.00	0.079
4.020	0.000	0.26	1.51	0.00	0.081
4.104	0.000	0.26	1.55	0.00	0.083
4.189	0.000	0.26	1.58	0.00	0.084
4.273	0.000	0.26	1.62	0.00	0.086
4.357	0.000	0.26	1.65	0.00	0.088
4.442	0.000	0.27	1.69	0.00	0.090
4.526	0.000	0.27	1.72	0.00	0.092
4.611	0.000	0.27	1.76	0.00	0.094
4.695	0.000	0.27	1.79	0.00	0.095
4.779	0.000	0.27	1.83	0.00	0.097
4.864	0.000	0.27	1.86	0.00	0.099
4.948	0.000	0.27	1.90	0.00	0.101
5.032	0.000	0.27	1.93	0.00	0.103
5.117	0.000	0.27	1.97	0.00	0.105
5.201	0.000	0.28	2.00	0.00	0.107
5.285	0.000	0.28	2.04	0.00	0.109
5.370	0.000	0.28	2.08	0.00	0.111
5.454	0.000	0.28	2.11	0.00	0.113
5.539	0.000	0.28	2.15	0.00	0.115
5.623	0.000	0.28	2.19	0.00	0.117
5.707	0.000	0.28	2.22	0.00	0.119
5.792	0.000	0.28	2.26	0.00	0.121
5.876	0.000	0.29	2.30	0.00	0.123
5.960	0.000	0.29	2.34	0.00	0.125
6.045	0.000	0.29	2.37	0.00	0.127
6.129	0.000	0.29	2.41	0.00	0.129
6.213	0.000	0.29	2.45	0.00	0.131
6.298	0.000	0.29	2.49	0.00	0.133
6.382	0.000	0.29	2.53	0.00	0.135
6.467	0.000	0.29	2.56	0.00	0.137
6.551	0.000	0.30	2.60	0.00	0.139
6.635	0.000	0.30	2.64	0.00	0.141
6.720	0.000	0.30	2.68	0.00	0.143
6.804	0.000	0.30	2.72	0.00	0.145

6.888	0.000	0.30	2.76	0.00	0.147
6.973	0.000	0.30	2.80	0.00	0.149
7.057	0.000	0.30	2.84	0.00	0.151
7.142	0.000	0.31	2.88	0.00	0.154
7.226	0.000	0.31	2.92	0.00	0.156
7.310	0.000	0.31	2.96	0.00	0.158
7.395	0.000	0.31	3.00	0.00	0.160
7.479	0.000	0.31	3.03	0.05	0.162
7.563	0.000	0.31	3.06	0.13	0.163
7.648	0.000	0.32	3.08	0.18	0.164
7.732	0.000	0.32	3.09	0.22	0.165
7.816	0.000	0.32	3.10	0.25	0.165
7.901	0.000	0.32	3.10	0.27	0.166
7.985	0.000	0.32	3.11	0.29	0.166
8.070	0.000	0.32	3.11	0.30	0.166
8.154	0.000	0.33	3.12	0.31	0.166
8.238	0.000	0.33	3.12	0.31	0.166
8.323	0.000	0.33	3.12	0.32	0.166
8.407	0.000	0.33	3.12	0.32	0.166
8.491	0.000	0.33	3.12	0.32	0.167
8.576	0.000	0.34	3.12	0.33	0.167
8.660	0.000	0.34	3.12	0.33	0.167
8.744	0.000	0.34	3.13	0.33	0.167
8.829	0.000	0.34	3.13	0.34	0.167
8.913	0.000	0.34	3.13	0.34	0.167
8.998	0.000	0.35	3.13	0.34	0.167
9.082	0.000	0.35	3.13	0.34	0.167
9.166	0.000	0.35	3.13	0.34	0.167
9.251	0.000	0.35	3.13	0.35	0.167
9.335	0.000	0.36	3.13	0.35	0.167
9.419	0.000	0.36	3.13	0.35	0.167
9.504	0.000	0.36	3.13	0.35	0.167
9.588	0.000	0.36	3.13	0.36	0.167
9.673	0.000	0.37	3.14	0.36	0.167
9.757	0.000	0.37	3.14	0.36	0.167
9.841	0.000	0.37	3.14	0.36	0.167
9.926	0.000	0.37	3.14	0.37	0.167
10.010	0.000	0.38	3.14	0.37	0.167
10.094	0.000	0.38	3.14	0.37	0.167
10.179	0.000	0.38	3.14	0.37	0.168
10.263	0.000	0.38	3.14	0.38	0.168
10.347	0.000	0.39	3.14	0.38	0.168
10.432	0.000	0.39	3.14	0.38	0.168
10.516	0.000	0.40	3.15	0.39	0.168
10.601	0.000	0.40	3.15	0.39	0.168

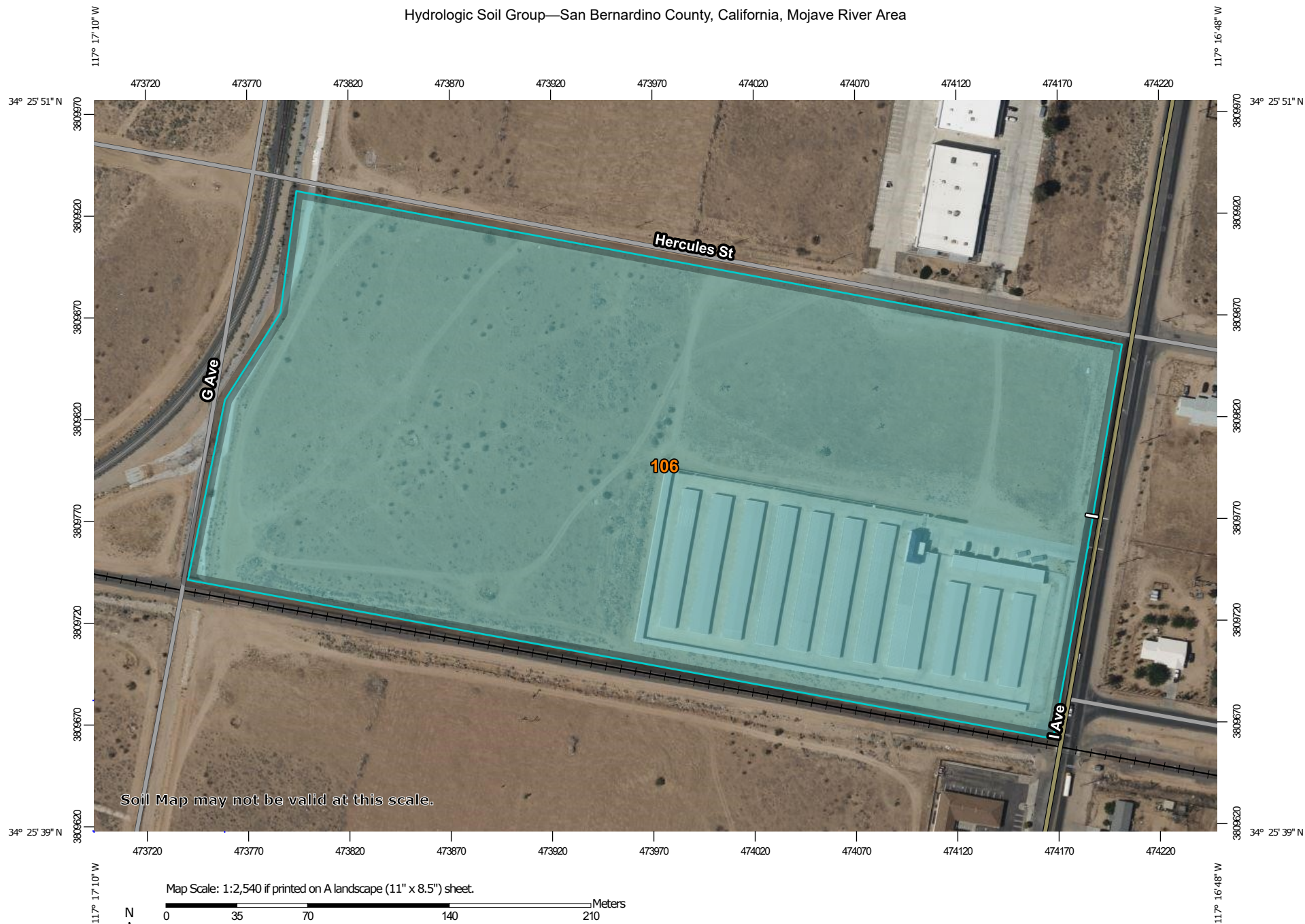
10.685	0.000	0.40	3.15	0.39	0.168
10.769	0.000	0.40	3.15	0.40	0.168
10.854	0.000	0.41	3.15	0.40	0.168
10.938	0.000	0.41	3.15	0.40	0.168
11.022	0.000	0.42	3.15	0.41	0.168
11.107	0.000	0.42	3.15	0.41	0.168
11.191	0.000	0.42	3.16	0.41	0.168
11.275	0.000	0.43	3.16	0.42	0.168
11.360	0.000	0.43	3.16	0.42	0.168
11.444	0.000	0.43	3.16	0.42	0.169
11.529	0.000	0.44	3.16	0.43	0.169
11.613	0.000	0.44	3.16	0.43	0.169
11.697	0.000	0.45	3.16	0.44	0.169
11.782	0.000	0.45	3.17	0.44	0.169
11.866	0.000	0.46	3.17	0.45	0.169
11.950	0.000	0.46	3.17	0.45	0.169
12.035	0.000	0.46	3.17	0.45	0.169
12.119	0.000	0.43	3.17	0.45	0.169
12.204	0.000	0.44	3.17	0.45	0.169
12.288	0.000	0.44	3.17	0.44	0.169
12.372	0.000	0.45	3.17	0.44	0.169
12.457	0.000	0.45	3.17	0.45	0.169
12.541	0.000	0.46	3.17	0.45	0.169
12.625	0.000	0.47	3.17	0.45	0.169
12.710	0.000	0.47	3.17	0.46	0.169
12.794	0.000	0.48	3.18	0.46	0.169
12.878	0.000	0.49	3.18	0.47	0.169
12.963	0.000	0.49	3.18	0.48	0.170
13.047	0.000	0.50	3.18	0.48	0.170
13.132	0.000	0.51	3.19	0.49	0.170
13.216	0.000	0.52	3.19	0.50	0.170
13.300	0.000	0.53	3.19	0.51	0.170
13.385	0.000	0.54	3.19	0.51	0.170
13.469	0.000	0.55	3.20	0.52	0.171
13.553	0.000	0.56	3.20	0.53	0.171
13.638	0.000	0.57	3.21	0.54	0.171
13.722	0.000	0.58	3.21	0.55	0.171
13.806	0.000	0.59	3.21	0.56	0.171
13.891	0.000	0.61	3.22	0.57	0.172
13.975	0.000	0.62	3.22	0.59	0.172
14.060	0.000	0.61	3.22	0.59	0.172
14.144	0.000	0.60	3.22	0.60	0.172
14.228	0.000	0.62	3.23	0.60	0.172
14.313	0.000	0.63	3.23	0.61	0.172
14.397	0.000	0.66	3.23	0.62	0.172

14.481	0.000	0.67	3.24	0.63	0.173
14.566	0.000	0.70	3.25	0.65	0.173
14.650	0.000	0.72	3.25	0.67	0.174
14.734	0.000	0.76	3.26	0.69	0.174
14.819	0.000	0.78	3.27	0.71	0.174
14.903	0.000	0.83	3.28	0.74	0.175
14.988	0.000	0.86	3.29	0.77	0.176
15.072	0.000	0.92	3.31	0.81	0.177
15.156	0.000	0.96	3.32	0.84	0.177
15.241	0.000	1.04	3.34	0.89	0.178
15.325	0.000	1.09	3.36	0.94	0.179
15.409	0.000	1.22	3.39	1.00	0.181
15.494	0.000	1.30	3.42	1.08	0.182
15.578	0.000	1.48	3.46	1.17	0.185
15.663	0.000	1.60	3.50	1.28	0.187
15.747	0.000	2.44	3.62	1.50	0.193
15.831	0.000	2.74	3.74	1.82	0.200
15.916	0.000	3.71	3.94	2.24	0.210
16.000	0.000	4.84	4.20	2.84	0.224
16.084	0.000	11.72	5.15	4.46	0.274
16.169	0.000	3.12	4.86	5.34	0.259
16.253	0.000	1.75	4.50	4.48	0.240
16.337	0.000	1.38	4.21	3.61	0.224
16.422	0.000	1.14	3.98	2.92	0.212
16.506	0.000	0.99	3.80	2.37	0.203
16.591	0.000	0.89	3.66	1.94	0.195
16.675	0.000	0.80	3.55	1.62	0.190
16.759	0.000	0.74	3.47	1.37	0.185
16.844	0.000	0.68	3.41	1.17	0.182
16.928	0.000	0.64	3.36	1.02	0.179
17.012	0.000	0.61	3.32	0.90	0.177
17.097	0.000	0.63	3.29	0.82	0.176
17.181	0.000	0.60	3.27	0.76	0.175
17.266	0.000	0.58	3.26	0.71	0.174
17.350	0.000	0.55	3.24	0.67	0.173
17.434	0.000	0.53	3.23	0.63	0.172
17.519	0.000	0.52	3.22	0.60	0.172
17.603	0.000	0.50	3.21	0.57	0.171
17.687	0.000	0.48	3.20	0.55	0.171
17.772	0.000	0.47	3.19	0.53	0.170
17.856	0.000	0.46	3.19	0.51	0.170
17.940	0.000	0.45	3.18	0.49	0.170
18.025	0.000	0.43	3.18	0.48	0.169
18.109	0.000	0.47	3.18	0.47	0.169
18.194	0.000	0.46	3.17	0.47	0.169

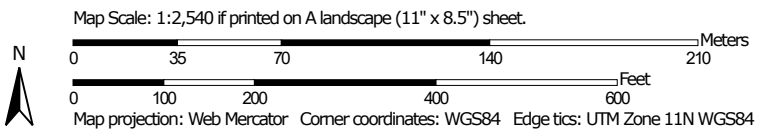
18.278	0.000	0.45	3.17	0.46	0.169
18.362	0.000	0.44	3.17	0.46	0.169
18.447	0.000	0.43	3.17	0.45	0.169
18.531	0.000	0.42	3.16	0.44	0.169
18.615	0.000	0.41	3.16	0.43	0.169
18.700	0.000	0.41	3.16	0.43	0.168
18.784	0.000	0.40	3.16	0.42	0.168
18.868	0.000	0.39	3.15	0.41	0.168
18.953	0.000	0.39	3.15	0.41	0.168
19.037	0.000	0.38	3.15	0.40	0.168
19.122	0.000	0.38	3.15	0.39	0.168
19.206	0.000	0.37	3.14	0.39	0.168
19.290	0.000	0.36	3.14	0.38	0.168
19.375	0.000	0.36	3.14	0.38	0.167
19.459	0.000	0.35	3.14	0.37	0.167
19.543	0.000	0.35	3.14	0.36	0.167
19.628	0.000	0.35	3.13	0.36	0.167
19.712	0.000	0.34	3.13	0.36	0.167
19.797	0.000	0.34	3.13	0.35	0.167
19.881	0.000	0.33	3.13	0.35	0.167
19.965	0.000	0.33	3.13	0.34	0.167
20.050	0.000	0.33	3.13	0.34	0.167
20.134	0.000	0.32	3.12	0.33	0.167
20.218	0.000	0.32	3.12	0.33	0.167
20.303	0.000	0.32	3.12	0.33	0.166
20.387	0.000	0.31	3.12	0.32	0.166
20.471	0.000	0.31	3.12	0.32	0.166
20.556	0.000	0.31	3.12	0.32	0.166
20.640	0.000	0.30	3.12	0.31	0.166
20.725	0.000	0.30	3.12	0.31	0.166
20.809	0.000	0.30	3.11	0.31	0.166
20.893	0.000	0.29	3.11	0.30	0.166
20.978	0.000	0.29	3.11	0.30	0.166
21.062	0.000	0.29	3.11	0.30	0.166
21.146	0.000	0.29	3.11	0.29	0.166
21.231	0.000	0.28	3.11	0.29	0.166
21.315	0.000	0.28	3.11	0.29	0.166
21.399	0.000	0.28	3.11	0.29	0.166
21.484	0.000	0.28	3.11	0.28	0.166
21.568	0.000	0.27	3.10	0.28	0.166
21.653	0.000	0.27	3.10	0.28	0.166
21.737	0.000	0.27	3.10	0.28	0.165
21.821	0.000	0.27	3.10	0.27	0.165
21.906	0.000	0.27	3.10	0.27	0.165
21.990	0.000	0.26	3.10	0.27	0.165

22.074	0.000	0.26	3.10	0.27	0.165
22.159	0.000	0.26	3.10	0.27	0.165
22.243	0.000	0.26	3.10	0.26	0.165
22.328	0.000	0.26	3.10	0.26	0.165
22.412	0.000	0.25	3.10	0.26	0.165
22.496	0.000	0.25	3.10	0.26	0.165
22.581	0.000	0.25	3.10	0.26	0.165
22.665	0.000	0.25	3.09	0.25	0.165
22.749	0.000	0.25	3.09	0.25	0.165
22.834	0.000	0.25	3.09	0.25	0.165
22.918	0.000	0.24	3.09	0.25	0.165
23.002	0.000	0.24	3.09	0.25	0.165
23.087	0.000	0.24	3.09	0.25	0.165
23.171	0.000	0.24	3.09	0.24	0.165
23.256	0.000	0.24	3.09	0.24	0.165
23.340	0.000	0.24	3.09	0.24	0.165
23.424	0.000	0.23	3.09	0.24	0.165
23.509	0.000	0.23	3.09	0.24	0.165
23.593	0.000	0.23	3.09	0.24	0.165
23.677	0.000	0.23	3.09	0.23	0.165
23.762	0.000	0.23	3.09	0.23	0.165
23.846	0.000	0.23	3.09	0.23	0.165
23.930	0.000	0.23	3.09	0.23	0.165
24.015	0.000	0.22	3.09	0.23	0.165
24.099	0.000	0.00	3.06	0.19	0.163

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



Soil Map may not be valid at this scale.



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

10/15/2024
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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: San Bernardino County, California, Mojave River Area
Survey Area Data: Version 16, Aug 30, 2024

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

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

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
106	BRYMAN LOAMY FINE SAND, 2 TO 5 PERCENT SLOPES	C	20.8	100.0%
Totals for Area of Interest			20.8	100.0%

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

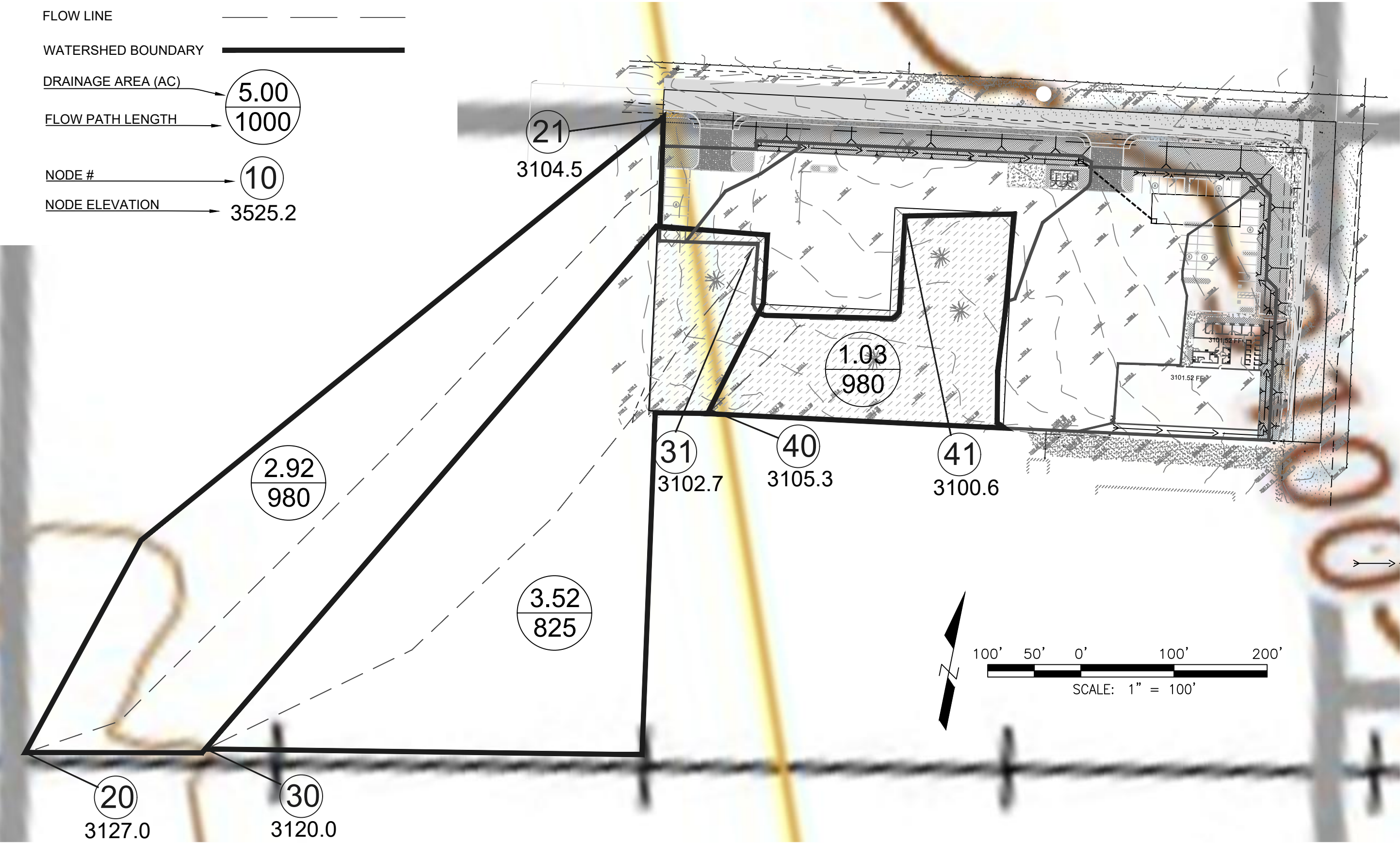
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

OFFSITE CONDITION HYDROLOGY EXHIBIT

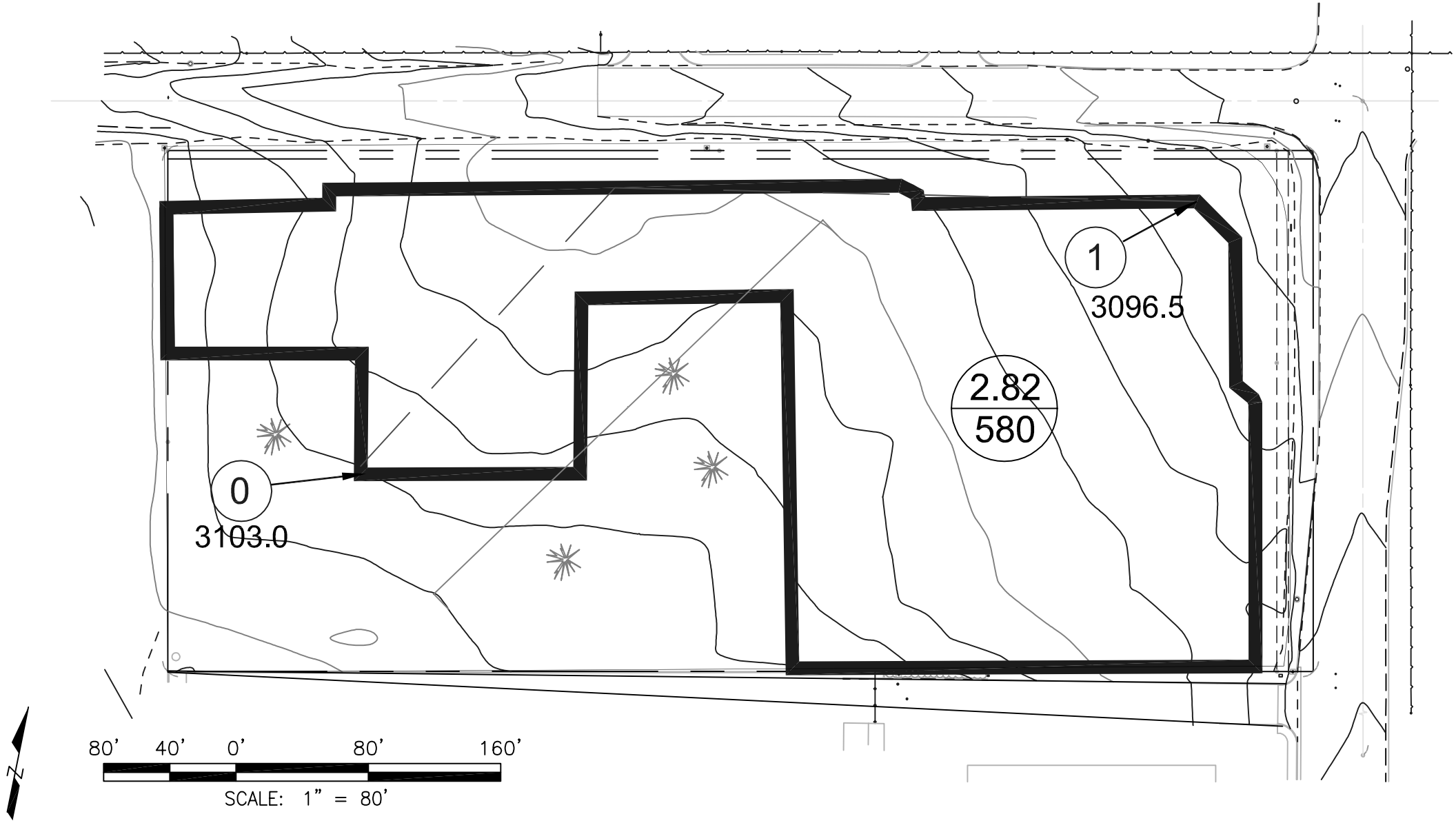
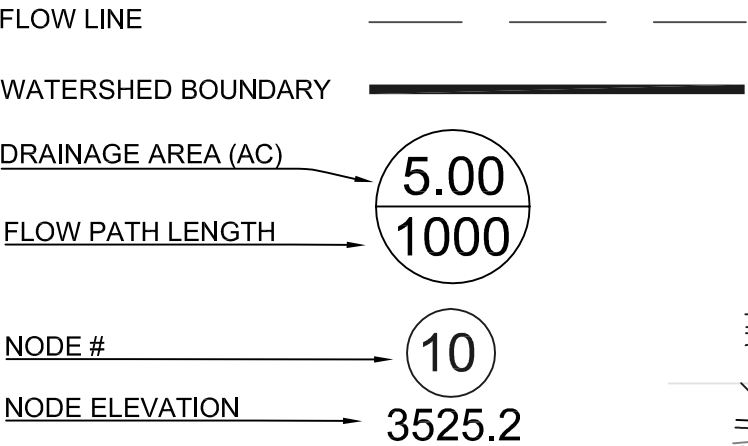
DRAINAGE LEGEND

- FLOW LINE
- WATERSHED BOUNDARY
- DRAINAGE AREA (AC) 5.00
- FLOW PATH LENGTH 1000
- NODE # 10
- NODE ELEVATION 3525.2



EXISTING CONDITION HYDROLOGY EXHIBIT

DRAINAGE LEGEND



CONCEPTUAL DRAINAGE IMPROVEMENTS EXHIBIT

DRAINAGE LEGEND

