



KIER+WRIGHT

PRELIMINARY HYDROLOGY STUDY

FOR

Mojave 68 Warehouse
Mojave Rd & Mesa Linda Ave
Victorville, CA 92394

Prepared for:

Industrial Property Group, Inc.
10515 20th Street Southeast
Lake Stevens, WA 98258

Prepared By:

Kier + Wright
163 Technology Drive, Suite 150
Irvine, CA 92618
(949) 508-0202

January 2023



TABLE OF CONTENTS

Introduction	1
Site Discussion	1
Methodology.....	3
Results.....	4
Conclusion.....	5

APPENDIX:

APPENDIX A: RAINFALL DATA & SOIL MAP

APPENDIX B: VICTORVILLE MASTER PLAN OF DRAINAGE

APPENDIX C: EXISTING & PROPOSED HYDROLOGY MAPS

APPENDIX D: EXISTING HYDROLOGY CALCULATIONS

APPENDIX E: PROPOSED HYDROLOGY CALCULATIONS

APPENDIX F: TOPOGRAPHY MAP AND ALTA

INTRODUCTION

Address

Northwest corner of Mojave Drive & Mesa Linda Avenue

Developer

Industrial Property Group, Inc.
10515 20th Street Southeast
Lake Stevens, WA 98258

Engineer

Kier + Wright
163 Technology Drive, Suite 150
Irvine, CA 92618
(949) 508-0202

Project Size

282,496 SF (64.85 AC)

Priority Project

This site is a "Priority Project" that will require a fully executed WQMP during the plan check process. This project will provide storm water quality treatment in accordance with the NPDES General Permit. A separate preliminary WQMP will determine the Low-Impact Development (LID) design capture volume for the site.

SITE DISCUSSION

Existing Conditions

The existing site is undeveloped land located north of Mojave Drive, between the unpaved Mesa Linda Avenue, Cactus Road, and Onyx Road. The elevation ranges from approximately 3020 feet in the southwest corner to 2993 feet in the northeast corner above sea level.

There are two existing 48" culverts beneath Mojave Drive which outlet into a natural channel on the project site.

Proposed Conditions

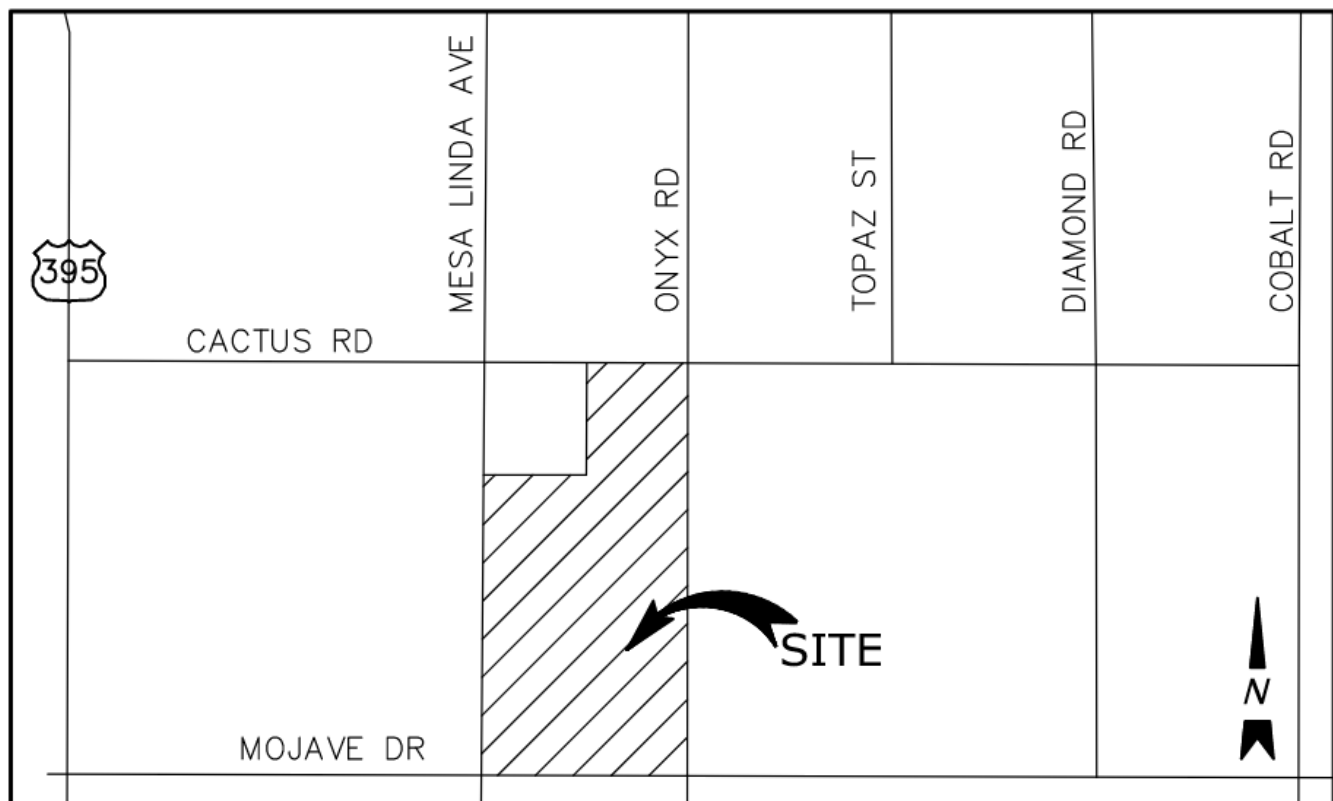
The site will consist of one approximately 1.097 million square foot building containing a warehouse and office space. It will be containing a truck loading dock and truck parking on the east and west sides of the building with auto parking on the north and south. The site also includes additional truck parking and an infiltration basin in the northeast. The existing Mojave Drive will be widened to a super arterial and the remaining three perimeter streets will be constructed to their ultimate half widths. Catch basins and storm drains will collect runoff from the roof and the impervious areas throughout and will convey stormwater to the infiltration basin at the low end of the site.

A reinforced concrete storm drain is proposed to convey stormwater from the existing two 48" culverts to and will outlet to an existing channel east of Onyx Road. This storm drain will outlet through a headwall and will remain within the City of Victorville right-of-way.

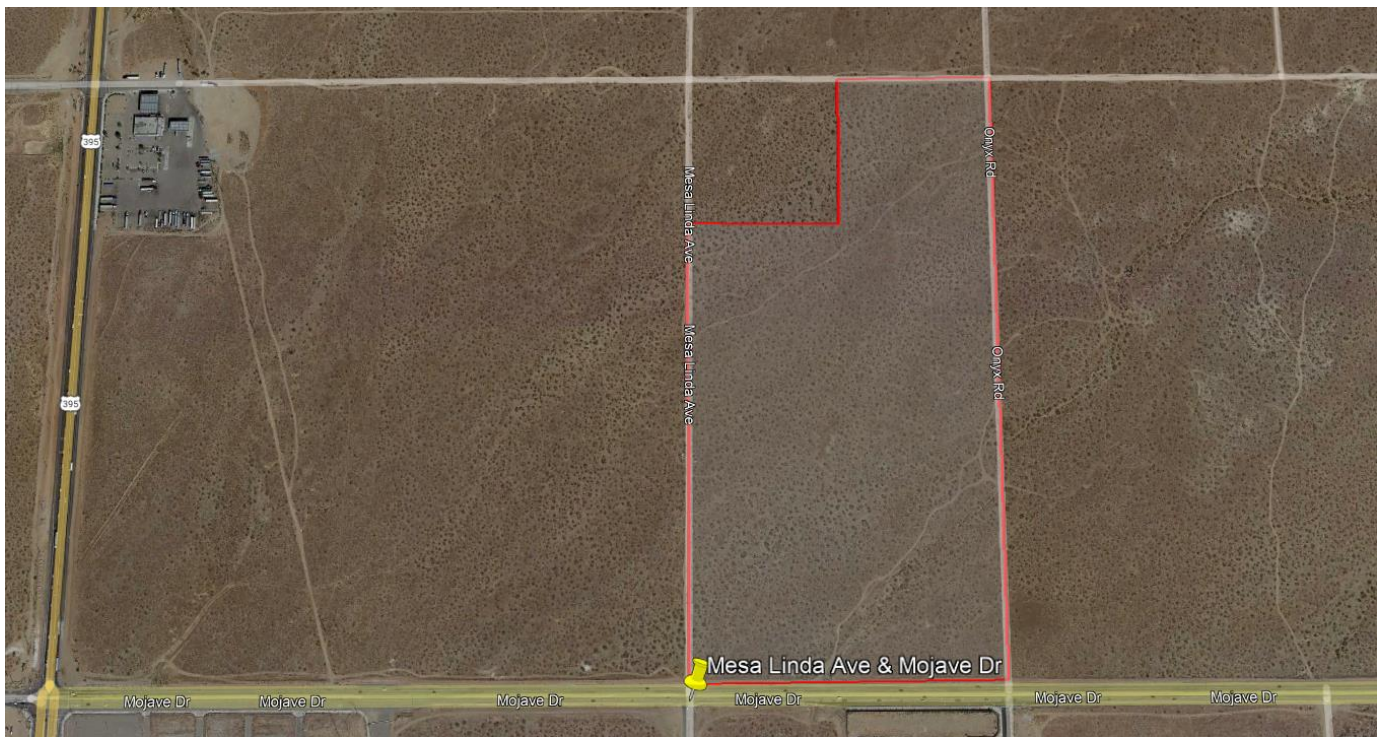
Purpose & Scope

This study will:

1. Estimate the pre- and post-development peak flow rate for a 10-year 24-hour storm and a 100-year 1-hour storm at the project site using the San Bernadino County Rational Method. This project will that ensure that the proposed development will not increase the stormwater runoff away from the site during these storm events.
2. Calculate the runoff volume for a 100-year storm over 24 hours in the pre-developed and post-developed conditions using the San Bernadino County Synthetic Unit Hydrograph Method. The difference between these volumes will determine the minimum infiltration basin requirements.
3. Quantify the existing off-site flows through the existing culverts beneath Mojave Drive and determine the size of the storm drain for the flows to bypass the site.
4. To determine the hydraulic capacities of the proposed storm drain system to convey stormwater in the post-development condition.



Vicinity Map



Aerial Map

METHODOLOGY

This hydrology analysis references the County of San Bernardino Hydrology Manual and the City of Victorville's Master Plan. NOAA Atlas 14 Point Precipitation Frequency Estimates were used to determine rainfall intensity (See Appendix A). The USDA Web Soil Survey was used to determine the soil classification of the site, Soil Group C (See Appendix A).

The San Bernardino County Rational Method was used to calculate peak 10-year flow rate (Q_{10}), peak 100-year flow rate (Q_{100}), and the time of concentration (T_c) in the pre- and post-developed condition using the CivilDesign program, Version 1. The San Bernardino County Synthetic Hydrograph Method was used to calculate the hydrograph runoff volume (V) for the 100-year storm over 24 hours in the pre- and post-developed condition. The proposed infiltration basin will be sized to prevent the difference in these two volumes from leaving the site.

SWMM was used to perform simple hydraulic capacity calculations in this preliminary design stage of the project of proposed onsite storm drain pipes and catch basins. This program was also used to size the proposed offsite storm drain, which will convey stormwater from the existing two 48" culverts to and will outlet to an existing channel east of Onyx Road.

The 25-year flow rate conveyed through the existing culverts was determined per the Victorville Master Plan of Drainage (See Appendix B), which is the flow rate used to size the offsite stormwater system.

RESULTS

The following tables show the pre-development and post-development peak flow rate and time of concentration for the project site at the following nodes.

HYDROLOGY SUMMARY: PRE-DEVELOPMENT ONSITE

SUBAREA	AREA (ac)	Q10 (cfs)	Tc for Q10 (min)	Q100 (cfs)	Tc for Q100 (min)
A	16.61	6.23	62.96	20.79	26.1
B	25.19	6.1	42.19	21.69	35.02
C	21.86	4.66	45.33	16.62	39.99

HYDROLOGY SUMMARY: POST-DEVELOPMENT ONSITE

SUBAREA	AREA (ac)	Q10 (cfs)	Tc for Q10 (min)	Q100 (cfs)	Tc for Q100 (min)
A	28.06	43.25	13.12	79.55	12.21
B	28.96	43.3	12.56	80.43	12.57
C	4.76	12.33	6.42	21.37	6.42

PRE -DEVELOPMENT VS POST-DEVELOPMENT

	Σ Q10 (cfs)	Σ Q100 (cfs)	V100 (ac-ft)
PRE	16.99	59.1	18.85
POST	98.88	181.35	20.15
DIFFERENCE	81.89	122.25	1.3
DIFFERENCE (%)	482%	207%	7%

The following table shows the offsite hydrology information:

HYDROLOGY SUMMARY: PRE-DEVELOPMENT OFFSITE

SUBAREA	AREA (ac)	Q10 (cfs)	Tc for Q10 (min)	Q100 (cfs)	Tc for Q100 (min)
D	19.98	7.52	26.75	23.56	24.55
E	4.56	2.74	19.88	6.67	19.88

CONCLUSION

The post-development 10-year flow rate will increase by 482 percent. The post-development peak 100-year flow rate will increase by 207 percent. The post-development runoff volume will increase by 7%. This 7% difference in volume will be compared to the Design Capture Volume (DCV) in the preliminary WQMP to determine the minimum size of the proposed infiltration basin. Stormwater from the entire site will be conveyed into this basin.

The existing offsite 100-year storm runoff was determined to be 23.56 cfs from the west and 6.67 cfs from the northwest. This flow will be separated and diverted from the onsite runoff in the proposed condition. The existing offsite runoff from south of the site was determined to be 375 cfs for the 25-year storm per the Victorville Master Plan of Drainage. This stormwater will be conveyed from the existing two 48" culverts through a proposed reinforced concrete storm drain within the right-of-way and outlet to in the existing natural channel east of Onyx Road.

See Appendix C for existing and proposed condition hydrology maps and Appendix D & E for detailed hydrology calculations.

APPENDIX A:

RAINFALL DATA & SOIL MAP

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 (if ESRI interactive map is not loading, try adding the host: https://js.arcgis.com/ to the firewall, or contact us at hdsc.questions@noaa.gov):

Map Terrain

Mesa Linda Ave

Mojave Dr

Alveda St

Berenda St

Botella St

calante Ct

aldri St

Orlita St

Onyx Rd

Rd

200m 600ft

+ -

a) Select location
Move crosshair or double click

b) Click on station icon
☐ Show stations on map

Location information:
Name: Victorville, California, USA*
Latitude: 34.5305°
Longitude: -117.3893°
Elevation: 3011.51 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	0.084 (0.070-0.103)	0.119 (0.098-0.145)	0.165 (0.136-0.203)	0.204 (0.167-0.253)	0.259 (0.205-0.332)	0.303 (0.234-0.396)	0.349 (0.263-0.467)	0.397 (0.292-0.547)	0.465 (0.328-0.668)	0.520 (0.354-0.772)
10-min	0.121 (0.100-0.148)	0.170 (0.140-0.208)	0.237 (0.195-0.291)	0.293 (0.239-0.362)	0.372 (0.293-0.475)	0.434 (0.336-0.567)	0.500 (0.377-0.669)	0.570 (0.418-0.784)	0.667 (0.470-0.957)	0.745 (0.507-1.11)
15-min	0.146 (0.121-0.179)	0.206 (0.170-0.252)	0.286 (0.235-0.351)	0.354 (0.289-0.438)	0.449 (0.355-0.575)	0.525 (0.406-0.686)	0.605 (0.456-0.810)	0.689 (0.506-0.948)	0.807 (0.568-1.16)	0.901 (0.613-1.34)
30-min	0.206 (0.170-0.252)	0.289 (0.238-0.354)	0.403 (0.331-0.494)	0.498 (0.406-0.616)	0.632 (0.499-0.809)	0.739 (0.571-0.965)	0.850 (0.642-1.14)	0.969 (0.711-1.33)	1.14 (0.799-1.63)	1.27 (0.862-1.88)
60-min	0.256 (0.211-0.313)	0.359 (0.296-0.440)	0.500 (0.412-0.614)	0.619 (0.505-0.766)	0.785 (0.620-1.00)	0.918 (0.710-1.20)	1.06 (0.798-1.42)	1.20 (0.884-1.66)	1.41 (0.993-2.02)	1.58 (1.07-2.34)
2-hr	0.357 (0.295-0.436)	0.482 (0.398-0.590)	0.654 (0.538-0.803)	0.800 (0.653-0.991)	1.01 (0.796-1.29)	1.18 (0.909-1.54)	1.35 (1.02-1.81)	1.54 (1.13-2.12)	1.80 (1.27-2.59)	2.02 (1.37-2.99)

3-hr	0.435 (0.359-0.532)	0.580 (0.478-0.710)	0.780 (0.642-0.958)	0.952 (0.777-1.18)	1.20 (0.945-1.53)	1.40 (1.08-1.82)	1.60 (1.21-2.15)	1.83 (1.34-2.52)	2.14 (1.51-3.07)	2.40 (1.63-3.56)
6-hr	0.587 (0.485-0.718)	0.778 (0.642-0.953)	1.04 (0.857-1.28)	1.27 (1.03-1.57)	1.59 (1.26-2.04)	1.86 (1.43-2.42)	2.13 (1.61-2.86)	2.44 (1.79-3.35)	2.86 (2.02-4.11)	3.21 (2.18-4.76)
12-hr	0.735 (0.607-0.899)	0.999 (0.824-1.22)	1.36 (1.12-1.67)	1.67 (1.36-2.07)	2.11 (1.67-2.70)	2.47 (1.91-3.22)	2.84 (2.14-3.81)	3.24 (2.38-4.47)	3.81 (2.68-5.47)	4.27 (2.91-6.34)
24-hr	0.970 (0.860-1.12)	1.36 (1.20-1.57)	1.89 (1.67-2.19)	2.34 (2.05-2.73)	2.98 (2.52-3.58)	3.49 (2.89-4.29)	4.02 (3.26-5.07)	4.60 (3.62-5.95)	5.41 (4.09-7.30)	6.06 (4.43-8.47)
2-day	1.07 (0.948-1.23)	1.51 (1.34-1.74)	2.12 (1.87-2.44)	2.63 (2.30-3.06)	3.36 (2.84-4.04)	3.94 (3.27-4.84)	4.56 (3.69-5.74)	5.22 (4.11-6.76)	6.15 (4.65-8.30)	6.91 (5.04-9.65)
3-day	1.15 (1.02-1.32)	1.63 (1.44-1.87)	2.29 (2.02-2.64)	2.85 (2.49-3.32)	3.64 (3.08-4.38)	4.27 (3.55-5.25)	4.95 (4.01-6.23)	5.67 (4.46-7.34)	6.69 (5.06-9.03)	7.53 (5.50-10.5)
4-day	1.23 (1.09-1.41)	1.73 (1.54-2.00)	2.44 (2.16-2.82)	3.04 (2.66-3.54)	3.88 (3.29-4.67)	4.56 (3.78-5.60)	5.28 (4.27-6.65)	6.04 (4.76-7.83)	7.13 (5.39-9.63)	8.01 (5.85-11.2)
7-day	1.31 (1.16-1.50)	1.84 (1.63-2.12)	2.59 (2.29-2.99)	3.22 (2.82-3.75)	4.11 (3.48-4.95)	4.82 (4.00-5.92)	5.56 (4.50-7.00)	6.34 (5.00-8.21)	7.45 (5.63-10.1)	8.32 (6.08-11.6)
10-day	1.38 (1.22-1.59)	1.95 (1.72-2.24)	2.73 (2.41-3.16)	3.39 (2.97-3.95)	4.33 (3.67-5.22)	5.08 (4.22-6.24)	5.86 (4.74-7.38)	6.68 (5.26-8.65)	7.83 (5.92-10.6)	8.74 (6.38-12.2)
20-day	1.60 (1.42-1.84)	2.28 (2.02-2.62)	3.22 (2.85-3.73)	4.03 (3.53-4.70)	5.19 (4.39-6.24)	6.11 (5.07-7.51)	7.08 (5.73-8.91)	8.09 (6.38-10.5)	9.50 (7.18-12.8)	10.6 (7.75-14.8)
30-day	1.82 (1.61-2.09)	2.59 (2.30-2.99)	3.70 (3.26-4.27)	4.65 (4.07-5.41)	6.03 (5.11-7.26)	7.13 (5.92-8.77)	8.29 (6.72-10.4)	9.52 (7.50-12.3)	11.2 (8.48-15.1)	12.5 (9.16-17.5)
45-day	2.11 (1.87-2.43)	3.01 (2.67-3.47)	4.31 (3.81-4.98)	5.45 (4.78-6.35)	7.13 (6.04-8.58)	8.50 (7.06-10.5)	9.94 (8.05-12.5)	11.5 (9.04-14.9)	13.6 (10.3-18.4)	15.3 (11.2-21.4)
60-day	2.34 (2.07-2.69)	3.31 (2.94-3.82)	4.76 (4.20-5.50)	6.04 (5.29-7.03)	7.93 (6.72-9.55)	9.51 (7.89-11.7)	11.2 (9.06-14.1)	13.0 (10.2-16.8)	15.5 (11.7-20.9)	17.5 (12.8-24.4)

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.

San Bernardino County, California, Mojave River Area

106—BRYMAN LOAMY FINE SAND, 2 TO 5 PERCENT SLOPES

Map Unit Setting

National map unit symbol: hkrb

Elevation: 3,000 to 3,400 feet

Mean annual precipitation: 3 to 6 inches

Mean annual air temperature: 59 to 63 degrees F

Frost-free period: 180 to 280 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Bryman and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bryman

Setting

Landform: Fan remnants

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from granite sources

Typical profile

H1 - 0 to 9 inches: loamy fine sand

H2 - 9 to 43 inches: sandy clay loam

H3 - 43 to 60 inches: sandy loam

Properties and qualities

Slope: 2 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water

(Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: C
Ecological site: R030XF012CA - Sandy
Hydric soil rating: No

Minor Components

Cajon, loamy surface

Percent of map unit: 5 percent
Hydric soil rating: No

Mohave variant

Percent of map unit: 5 percent
Hydric soil rating: No

Helendale

Percent of map unit: 5 percent
Hydric soil rating: No

Bryman, gravelly surface

Percent of map unit: 5 percent

Data Source Information

Soil Survey Area: San Bernardino County, California, Mojave River Area
Survey Area Data: Version 14, Sep 1, 2022

APPENDIX B:

VICTORVILLE MASTER PLAN OF DRAINAGE

PROJECT SITE

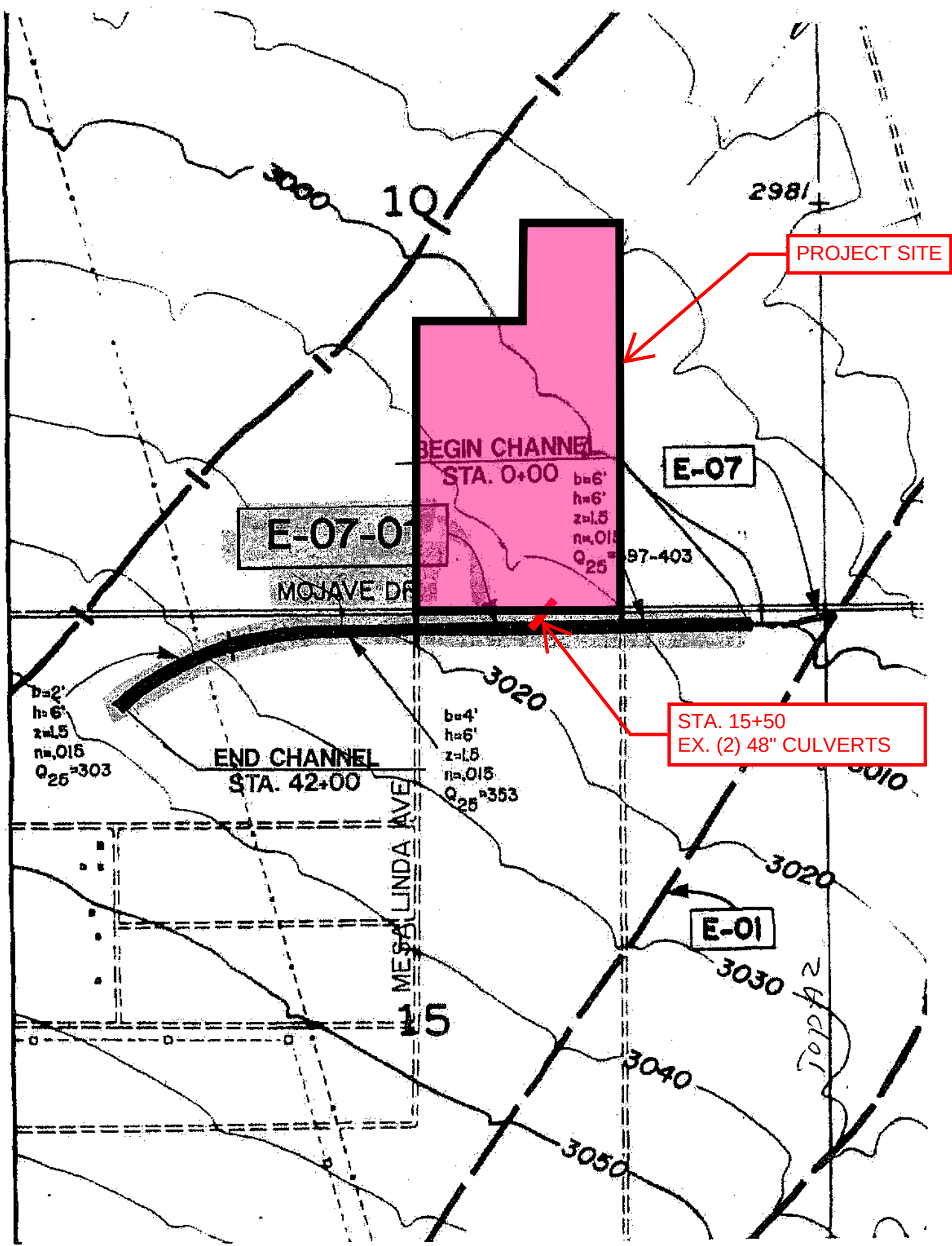


VICTORVILLE MASTER PLAN OF DRAINAGE
RECOMMENDED ALTERNATIVE MAJOR ALIGNMENTS & DRAINAGE DIVIDES

LEGEND

[A-01]	PROPOSED REGIONAL FACILITY	[---]	DETENTION BASIN SITE
[A-01-01]	PROPOSED SECONDARY FACILITY	[---]	PROJECT BOUNDARY
[A-01-01-01]	PROPOSED LOCAL FACILITY	[---]	REGIONAL FACILITY
[---]	EXISTING FACILITY-ADEQUATE	[---]	DRAINAGE DIVIDE
[---]	EXISTING FACILITY-IMPROVEMENT REQUIRED	[---]	FLOODPLAIN
[---]		[---]	ACCUMULATED WATERSHED (50 M)

WILLIAMSON & SCHMID
CIVIL ENGINEERS
1000 N. GATEWAY BLVD., SUITE 100
VICTORVILLE, CA 92083
TEL: (760) 941-1111
FAX: (760) 941-1112
WWW.WS-CALIF.COM



PROJECT SITE

STA. 15+50
EX. (2) 48" CULVERTS

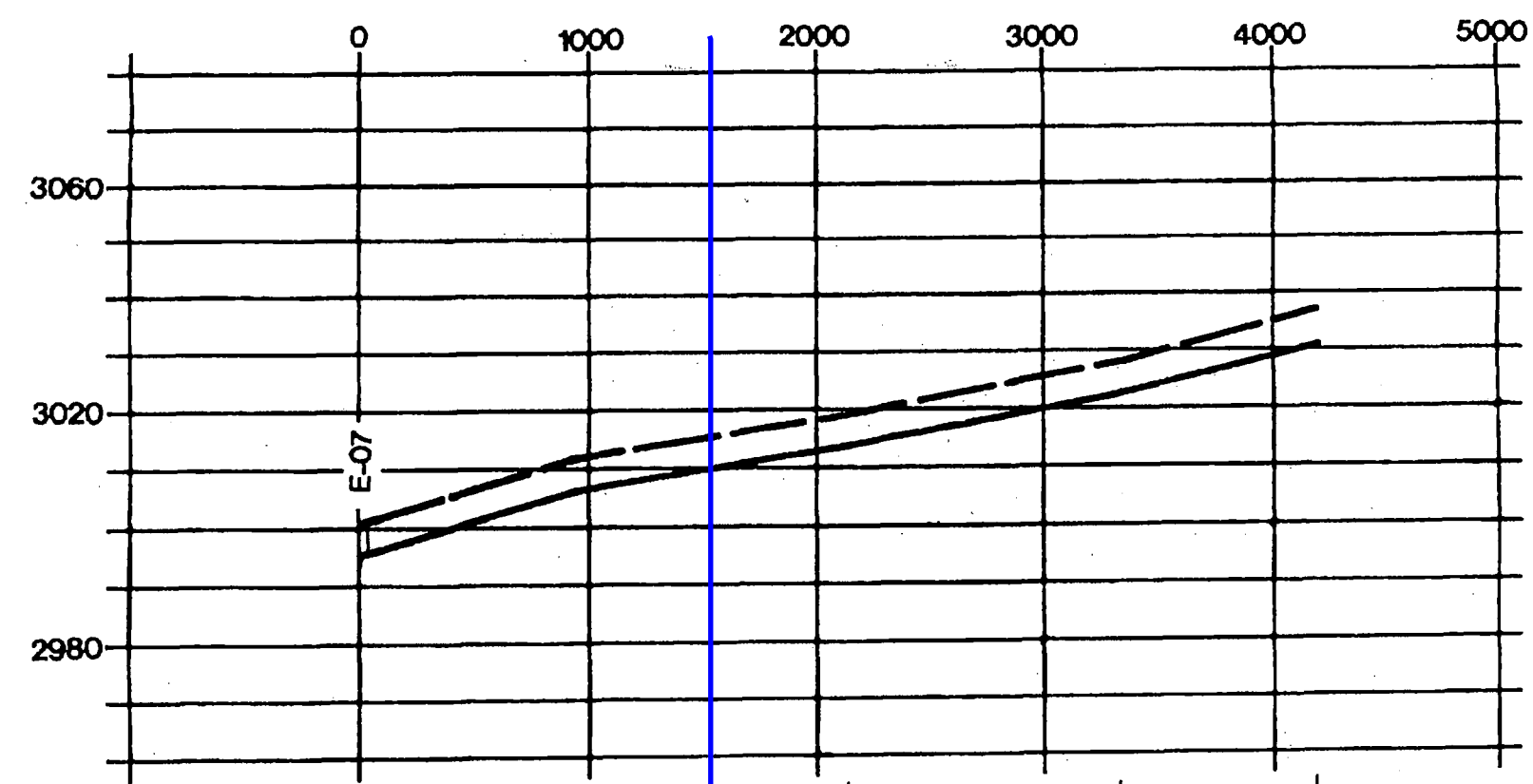
- | | | | | |
|--------|--|--------------------------|--|-----------------|
| LEGEND | | PROPOSED FACILITY | | FLOODPLAIN |
| | | FACILITY SHOWN ELSEWHERE | | FLOODWAY |
| | | WATERSHED BOUNDARY | | DETENTION BASIN |

VICTORVILLE
MASTER PLAN
OF DRAINAGE

COMPREHENSIVE STORM DRAIN PLAN
LINE E-07-01
SHEET 1 OF 1

SCALE
1"=1000'

WILLIAMSON & SCHMID



	BEGIN CHANNEL	UNNAMED ST	MESA LINDA AVE	END CHANNEL
	0+00	9+50	21+50	42+00
LENGTH	950	1200	1200	850
SLOPE	.012	.006	.008	.011
FLOW	$Q_{25}=403$	$Q_{25}=397$	$Q_{25}=353$	$Q_{25}=303$
SIZE	$b=6'$, $h=6'$, $z=1.5$		$b=4'$, $h=6'$, $z=1.5$	$b=2'$, $h=6'$, $z=1.5$
TYPE	CONCRETE TRAPEZOIDAL CHANNEL			

LEGEND	-----	LEVEE
	- . - . - .	NATURAL GROUND
	————	PROPOSED FLOWLINE

VICTORVILLE
MASTER PLAN
OF DRAINAGE

COMPREHENSIVE STORM DRAIN PLAN
LINE E-07-01
SHEET 1 OF 1


 SCALE
 H: 1"=1000'
 V: 1"=40'
 WILLIAMSON & SCHMID

E-05 and Tributaries

The E-05 facility drains a narrow area from Mojave Drive to Bear Valley Road. At its confluence with E-01, this facility has a 100-year peak discharge of 3760 cfs with 3140 acres contributing. From the confluence, E-05 follows a well defined natural drainage course to Seneca Road. This section is proposed to be a concrete lined trapezoidal section. Between Seneca Road and Palmdale Road, in the Mountain View development, flows follow a natural drainage course as labelled on the tract map. A concrete lined trapezoidal channel is proposed through this development. However, due to possible encroachment on existing buildings, a storm drain in Cobalt Road may be a preferable alternative.

From Palmdale Road, E-05 follows the natural alignment to La Mesa Road. A concrete section is again proposed in this reach. At this point, E-05-02, which is a facility in La Mesa Road, and E-05-03, which is a facility in Topaz Road, confluence to form E-05.

E-06 and Tributaries

E-06 collects flows east of Highway 395 and north of La Mesa Road. At its confluence with E-05, this facility conveys 1540 cfs with 970 acres contributing. From the confluence, E-06 follows two unidentified drainage easements through proposed development. These easements deviate from the natural flow path. However, the egress and ingress in the development remain the same as in the undeveloped condition. For this study, the drainage easements were utilized. A concrete trapezoidal channel is proposed through the easement. From this point, the facility follows the natural flow path to Palmdale Road in a concrete trapezoidal channel. Upstream of Palmdale Road is secondary facility E-06-01. This facility also collects flows in a natural flow path.

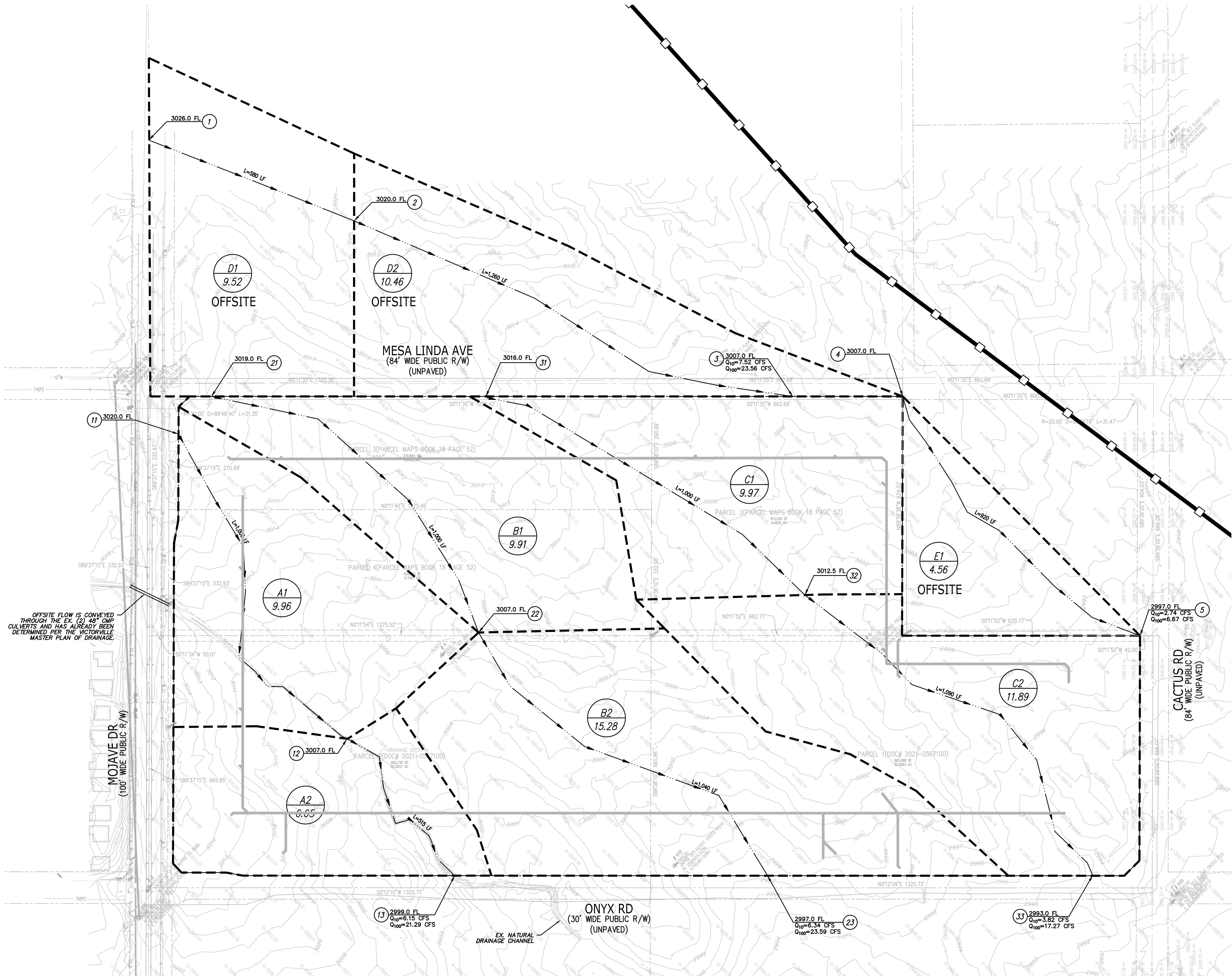
E-07 and Tributaries

E-07 drains an area near Highway 395, south of Mojave Drive and north of Seneca Road. At its confluence with E-01, this facility has a peak flow rate of 880 cfs with 500 acres contributing to the flow. From the confluence, E-07 extends 450 feet to the west in a concrete trapezoidal channel. Upstream of E-07 is secondary facility E-07-01 which parallels Mojave Drive.

APPENDIX C:

EXISTING & PROPOSED HYDROLOGY MAPS

Z:\2022\A22221\DWG\ENTITLEMENTS\VD PERMIT\A22221-HYDRO.dwg 10-27-22 04:23:08 PM lboucher



050100200300

Scale 1" = 100'

LEGEND

TRIBUTARY AREA LIMITS

PROJECT BOUNDARY

FLOW PATH

VICTORVILLE MASTER PLAN OF DRAINAGE BOUNDARY

XXXXX FL

#

FLOW LINE ELEVATION

TIME OF CONCENTRATION

PEAK FLOW RATE FOR 25 YR STORM EVENT

X

-

SUBAREA

ACREAGE

FLOW DIRECTION

NO

BY

REVISION

NO

BY

REVISION

DATE

OCTOBER, 2022

SCALE

AS SHOWN

DESIGNER

LB

DRAWN BY

LB

JOB NO.

A22221

SHEET

1

OF

2

SHEETS

PRELIMINARY EXISTING HYDROLOGY MAP

OF

MOJAVE DRIVE AT MESA LINDA AVENUE

FOR

INDUSTRIAL PROPERTY GROUP, INC.

VICTORVILLE,

CALIFORNIA

KIER+WRIGHT

163 Technology Drive
Irvine, CA 92620
Phone: (949) 506-0202
www.kierwright.com

NO

BY

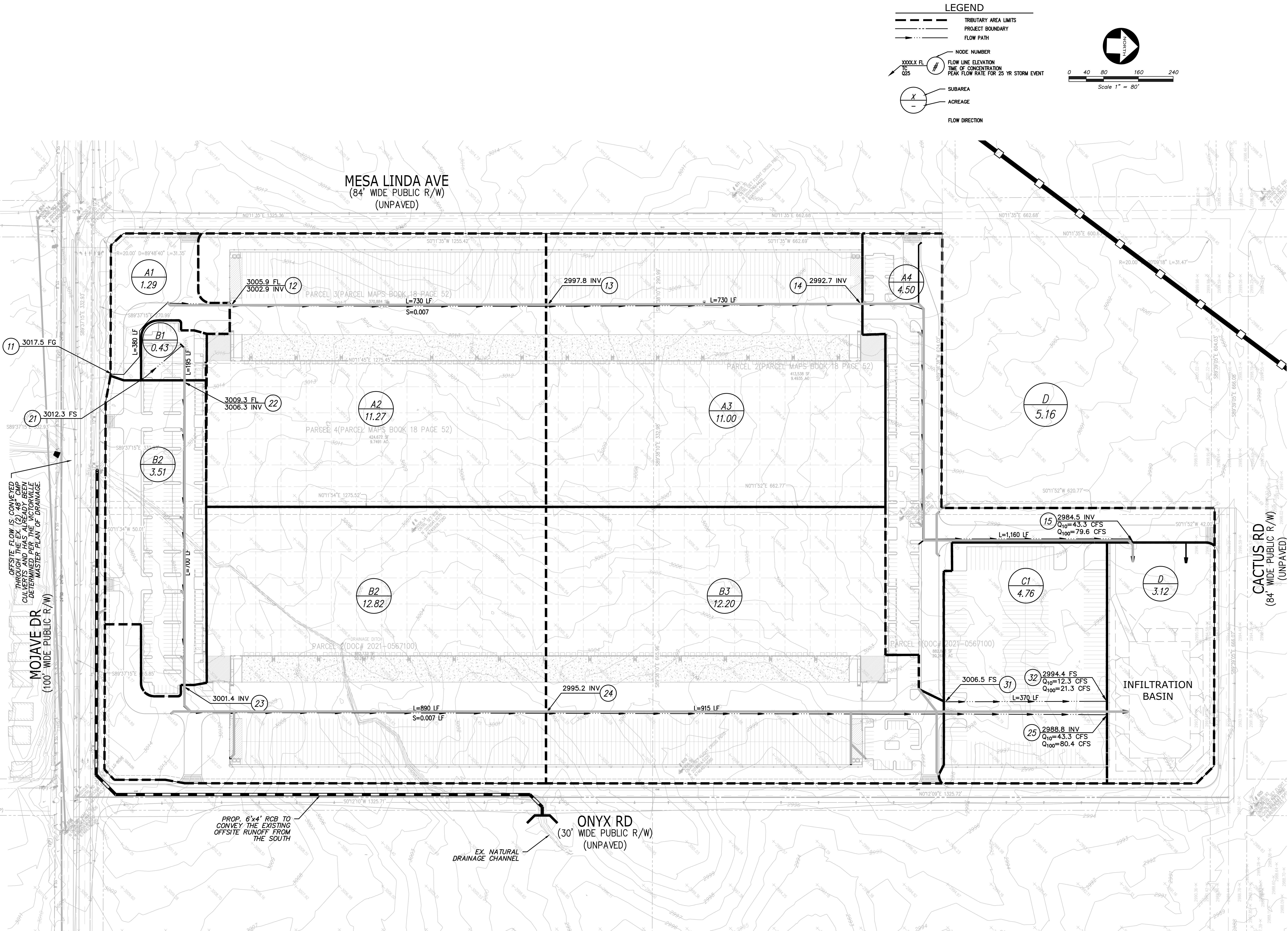
REVISION

NO

BY

REVISION

Z:\2022\A22221\DWG\ENTITLEMENTS\PD PERMIT\A22221-HYDRO.dwg 10-27-22 04:23:22 PM lboucher



REVISION		BY	NO.
			1
			2
			3
			4
			5
			6
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			9
			10
			11
			12
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			16
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APPENDIX D:

EXISTING HYDROLOGY CALCULATIONS

RATIONAL METHOD & SYNTHETIC UNIT HYDROGRAPH METHOD

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 10/26/22

MOJAVE 68

A22221 10 YEAR EXISTING

SUBAREA A

Program License Serial Number 6509

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.619 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

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

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 3020.000(Ft.)
Bottom (of initial area) elevation = 3007.000(Ft.)
Difference in elevation = 13.000(Ft.)
Slope = 0.01300 s(%)= 1.30
 $TC = k(0.525)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 19.832 min.
Rainfall intensity = 1.203(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.520
Subarea runoff = 6.232(CFS)
Total initial stream area = 9.960(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

+++++
Process from Point/Station 12.000 to Point/Station 13.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 3007.000(Ft.)
End of street segment elevation = 2999.000(Ft.)
Length of street segment = 515.000(Ft.)
Height of curb above gutter flowline = 2.0(In.)
Width of half street (curb to crown) = 30.000(Ft.)
Distance from crown to crossfall grade break = 15.000(Ft.)
Slope from gutter to grade break (v/hz) = -0.010
Slope from grade break to crown (v/hz) = -0.010
Street flow is on [2] side(s) of the street
Distance from curb to property line = 10.000(Ft.)
Slope from curb to property line (v/hz) = 0.000
Gutter width = 0.000(Ft.)
Gutter hike from flowline = 0.000(In.)
Manning's N in gutter = 0.5000
Manning's N from gutter to grade break = 0.5000
Manning's N from grade break to crown = 0.5000
Estimated mean flow rate at midpoint of street = 6.297(CFS)
Depth of flow = 0.625(Ft.), Average velocity = 0.199(Ft/s)
Warning: depth of flow exceeds top of curb
Note: depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 30.000(Ft.)
Flow velocity = 0.20(Ft/s)
Travel time = 43.13 min. TC = 62.96 min.
Adding area flow to street
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 1.404(CFS)
therefore the upstream flow rate of Q = 6.232(CFS) is being used
Rainfall intensity = 0.601(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.141
Subarea runoff = 0.000(CFS) for 6.650(Ac.)
Total runoff = 6.232(CFS)
Effective area this stream = 16.61(Ac.)
Total Study Area (Main Stream No. 1) = 16.61(Ac.)
Area averaged Fm value = 0.507(In/Hr)
Street flow at end of street = 6.232(CFS)
Half street flow at end of street = 3.116(CFS)
Depth of flow = 0.622(Ft.), Average velocity = 0.198(Ft/s)
Warning: depth of flow exceeds top of curb
Note: depth of flow exceeds top of street crown.
Flow width (from curb towards crown)= 30.000(Ft.)

End of computations, Total Study Area = 16.61 (Ac.)

The following figures may

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

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

Area averaged pervious area fraction(A_p) = 1.000

Area averaged SCS curve number = 86.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

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Rational Hydrology Study Date: 10/26/22

MOJAVE 68

A22221 10 YEAR EXISTING

SUBAREA B

Program License Serial Number 6509

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.619 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

+++++
Process from Point/Station 21.000 to Point/Station 22.000
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 3019.000(Ft.)
Bottom (of initial area) elevation = 3007.000(Ft.)
Difference in elevation = 12.000(Ft.)
Slope = 0.01200 s(%)= 1.20
 $TC = k(0.525)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 20.152 min.
Rainfall intensity = 1.191(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.517
Subarea runoff = 6.098(CFS)
Total initial stream area = 9.910(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

+++++
Process from Point/Station 22.000 to Point/Station 23.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 3007.000(Ft.)
End of street segment elevation = 2997.000(Ft.)
Length of street segment = 1040.000(Ft.)
Height of curb above gutter flowline = 2.0(In.)
Width of half street (curb to crown) = 30.000(Ft.)
Distance from crown to crossfall grade break = 15.000(Ft.)
Slope from gutter to grade break (v/hz) = -0.010
Slope from grade break to crown (v/hz) = -0.010
Street flow is on [2] side(s) of the street
Distance from curb to property line = 10.000(Ft.)
Slope from curb to property line (v/hz) = 0.000
Gutter width = 0.000(Ft.)
Gutter hike from flowline = 0.000(In.)
Manning's N in gutter = 0.0500
Manning's N from gutter to grade break = 0.0500
Manning's N from grade break to crown = 0.0500
Estimated mean flow rate at midpoint of street = 6.183(CFS)
Depth of flow = 0.280(Ft.), Average velocity = 0.786(Ft/s)
Note: depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 30.000(Ft.)
Flow velocity = 0.79(Ft/s)
Travel time = 22.04 min. **TC = 42.19 min.**
Adding area flow to street
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 5.830(CFS)
therefore the upstream flow rate of Q = 6.098(CFS) is being used
Rainfall intensity = 0.765(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.303
Subarea runoff = 0.000(CFS) for 15.280(Ac.)
Total runoff = 6.098(CFS)
Effective area this stream = 25.19(Ac.)
Total Study Area (Main Stream No. 1) = 25.19(Ac.)
Area averaged Fm value = 0.507(In/Hr)
Street flow at end of street = 6.098(CFS)
Half street flow at end of street = 3.049(CFS)
Depth of flow = 0.279(Ft.), Average velocity = 0.784(Ft/s)
Note: depth of flow exceeds top of street crown.
Flow width (from curb towards crown)= 30.000(Ft.)
End of computations, Total Study Area = 25.19 (Ac.)

The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 1.000

Area averaged SCS curve number = 86.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

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Rational Hydrology Study Date: 10/26/22

MOJAVE 68

A22221 10 YEAR EXISTING

SUBAREA C

Program License Serial Number 6509

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.619 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

+++++
Process from Point/Station 31.000 to Point/Station 32.000
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 3016.000(Ft.)
Bottom (of initial area) elevation = 3012.500(Ft.)
Difference in elevation = 3.500(Ft.)
Slope = 0.00350 s(%)= 0.35
 $TC = k(0.525)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 25.784 min.
Rainfall intensity = 1.027(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.456
Subarea runoff = 4.666(CFS)
Total initial stream area = 9.970(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

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+++++
Process from Point/Station      32.000 to Point/Station      33.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

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Top of street segment elevation = 3012.500(Ft.)
End of street segment elevation = 2993.000(Ft.)
Length of street segment = 1090.000(Ft.)
Height of curb above gutter flowline = 2.0(In.)
Width of half street (curb to crown) = 30.000(Ft.)
Distance from crown to crossfall grade break = 15.000(Ft.)
Slope from gutter to grade break (v/hz) = -0.010
Slope from grade break to crown (v/hz) = -0.010
Street flow is on [2] side(s) of the street
Distance from curb to property line = 10.000(Ft.)
Slope from curb to property line (v/hz) = 0.000
Gutter width = 0.000(Ft.)
Gutter hike from flowline = 0.000(In.)
Manning's N in gutter = 0.0500
Manning's N from gutter to grade break = 0.0500
Manning's N from grade break to crown = 0.0500
Estimated mean flow rate at midpoint of street = 4.756(CFS)
Depth of flow = 0.226(Ft.), Average velocity = 0.930(Ft/s)
Note: depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 30.000(Ft.)
Flow velocity = 0.93(Ft/s)
Travel time = 19.54 min. TC = 45.33 min.
Adding area flow to street
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 4.427(CFS)
therefore the upstream flow rate of Q = 4.666(CFS) is being used
Rainfall intensity = 0.732(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.276
Subarea runoff = 0.000(CFS) for 11.890(Ac.)
Total runoff = 4.666(CFS)
Effective area this stream = 21.86(Ac.)
Total Study Area (Main Stream No. 1) = 21.86(Ac.)
Area averaged Fm value = 0.507(In/Hr)
Street flow at end of street = 4.666(CFS)
Half street flow at end of street = 2.333(CFS)
Depth of flow = 0.225(Ft.), Average velocity = 0.925(Ft/s)
Note: depth of flow exceeds top of street crown.
Flow width (from curb towards crown)= 30.000(Ft.)
End of computations, Total Study Area = 21.86 (Ac.)

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The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 1.000

Area averaged SCS curve number = 86.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

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MOJAVE 68

A22221 10 YEAR EXISTING

SUBAREA D

Program License Serial Number 6509

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.619 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

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

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 78.00
Adjusted SCS curve number for AMC 1 = 60.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.671(In/Hr)
Initial subarea data:
Initial area flow distance = 580.000(Ft.)
Top (of initial area) elevation = 3026.000(Ft.)
Bottom (of initial area) elevation = 3020.000(Ft.)
Difference in elevation = 6.000(Ft.)
Slope = 0.01034 s(%)= 1.03
 $TC = k(0.525)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 16.695 min.
Rainfall intensity = 1.516(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.501
Subarea runoff = 7.233(CFS)
Total initial stream area = 9.520(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.671(In/Hr)

+++++
Process from Point/Station 2.000 to Point/Station 3.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 3020.000(Ft.)
End of street segment elevation = 3007.000(Ft.)
Length of street segment = 1260.000(Ft.)
Height of curb above gutter flowline = 2.0(In.)
Width of half street (curb to crown) = 30.000(Ft.)
Distance from crown to crossfall grade break = 15.000(Ft.)
Slope from gutter to grade break (v/hz) = -0.010
Slope from grade break to crown (v/hz) = -0.010
Street flow is on [2] side(s) of the street
Distance from curb to property line = 10.000(Ft.)
Slope from curb to property line (v/hz) = 0.000
Gutter width = 0.000(Ft.)
Gutter hike from flowline = 0.000(In.)
Manning's N in gutter = 0.0150
Manning's N from gutter to grade break = 0.0150
Manning's N from grade break to crown = 0.0150
Estimated mean flow rate at midpoint of street = 7.464(CFS)
Depth of flow = 0.189(Ft.), Average velocity = 2.088(Ft/s)
Note: depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 30.000(Ft.)
Flow velocity = 2.09(Ft/s)
Travel time = 10.06 min. **TC = 26.75 min.**
Adding area flow to street
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 78.00
Adjusted SCS curve number for AMC 1 = 60.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.671(In/Hr)
Rainfall intensity = 1.090(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.345
Subarea runoff = 0.286(CFS) for 10.460(Ac.)
Total runoff = 7.520(CFS)
Effective area this stream = 19.98(Ac.)
Total Study Area (Main Stream No. 1) = 19.98(Ac.)
Area averaged Fm value = 0.671(In/Hr)
Street flow at end of street = 7.520(CFS)
Half street flow at end of street = 3.760(CFS)
Depth of flow = 0.190(Ft.), Average velocity = 2.092(Ft/s)
Note: depth of flow exceeds top of street crown.
Flow width (from curb towards crown)= 30.000(Ft.)
End of computations, Total Study Area = 19.98 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area

effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 1.000

Area averaged SCS curve number = 78.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

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MOJAVE 68

A22221 10 YEAR EXISTING

SUBAREA E

Program License Serial Number 6509

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.619 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

+++++
Process from Point/Station 4.000 to Point/Station 5.000
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 78.00
Adjusted SCS curve number for AMC 1 = 60.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.671(In/Hr)
Initial subarea data:
Initial area flow distance = 920.000(Ft.)
Top (of initial area) elevation = 3007.000(Ft.)
Bottom (of initial area) elevation = 2997.000(Ft.)
Difference in elevation = 10.000(Ft.)
Slope = 0.01087 s(%)= 1.09
 $TC = k(0.525)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 19.881 min.
Rainfall intensity = 1.341(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.449
Subarea runoff = 2.749(CFS)
Total initial stream area = 4.560(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.671(In/Hr)

End of computations, Total Study Area = 4.56 (Ac.)

The following figures may

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

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

Area averaged pervious area fraction(A_p) = 1.000

Area averaged SCS curve number = 78.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

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MOJAVE 68

A22221 100 YEAR EXISTING

SUBAREA A

Program License Serial Number 6509

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.619(In.)
100 Year storm 1 hour rainfall = 1.060(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.060 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

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

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 3020.000(Ft.)
Bottom (of initial area) elevation = 3007.000(Ft.)
Difference in elevation = 13.000(Ft.)
Slope = 0.01300 s(%)= 1.30
 $TC = k(0.525)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 19.832 min.
Rainfall intensity = 2.301(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.701
Subarea runoff = 16.074(CFS)
Total initial stream area = 9.960(Ac.)
Pervious area fraction = 1.000

Initial area Fm value = 0.507(In/Hr)

+++++
Process from Point/Station 12.000 to Point/Station 13.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 3007.000(Ft.)
End of street segment elevation = 2999.000(Ft.)
Length of street segment = 515.000(Ft.)
Height of curb above gutter flowline = 2.0(In.)
Width of half street (curb to crown) = 30.000(Ft.)
Distance from crown to crossfall grade break = 15.000(Ft.)
Slope from gutter to grade break (v/hz) = -0.010
Slope from grade break to crown (v/hz) = -0.010
Street flow is on [2] side(s) of the street
Distance from curb to property line = 10.000(Ft.)
Slope from curb to property line (v/hz) = 0.000
Gutter width = 0.000(Ft.)
Gutter hike from flowline = 0.000(In.)
Manning's N in gutter = 0.0500
Manning's N from gutter to grade break = 0.0500
Manning's N from grade break to crown = 0.0500
Estimated mean flow rate at midpoint of street = 18.492(CFS)
Depth of flow = 0.375(Ft.), Average velocity = 1.369(Ft/s)
Note: depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 30.000(Ft.)
Flow velocity = 1.37(Ft/s)
Travel time = 6.27 min. TC = 26.10 min.
Adding area flow to street
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Rainfall intensity = 1.898(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.659
Subarea runoff = 4.715(CFS) for 6.650(Ac.)
Total runoff = 20.789(CFS)
Effective area this stream = 16.61(Ac.)
Total Study Area (Main Stream No. 1) = 16.61(Ac.)
Area averaged Fm value = 0.507(In/Hr)
Street flow at end of street = 20.789(CFS)
Half street flow at end of street = 10.395(CFS)
Depth of flow = 0.392(Ft.), Average velocity = 1.434(Ft/s)
Note: depth of flow exceeds top of street crown.
Flow width (from curb towards crown)= 30.000(Ft.)
End of computations, Total Study Area = 16.61 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

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

Area averaged pervious area fraction(A_p) = 1.000

Area averaged SCS curve number = 86.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

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Rational Hydrology Study Date: 10/26/22

MOJAVE 68
A22221 100 YEAR EXISTING
SUBAREA B

Program License Serial Number 6509

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.619(In.)
100 Year storm 1 hour rainfall = 1.060(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.060 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

+++++
Process from Point/Station 21.000 to Point/Station 22.000
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 3019.000(Ft.)
Bottom (of initial area) elevation = 3007.000(Ft.)
Difference in elevation = 12.000(Ft.)
Slope = 0.01200 s(%)= 1.20
 $TC = k(0.525)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 20.152 min.
Rainfall intensity = 2.040(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.676
Subarea runoff = 13.668(CFS)
Total initial stream area = 9.910(Ac.)

Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

+++++
Process from Point/Station 22.000 to Point/Station 23.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 3007.000(Ft.)
End of street segment elevation = 2997.000(Ft.)
Length of street segment = 1040.000(Ft.)
Height of curb above gutter flowline = 2.0(In.)
Width of half street (curb to crown) = 30.000(Ft.)
Distance from crown to crossfall grade break = 15.000(Ft.)
Slope from gutter to grade break (v/hz) = -0.010
Slope from grade break to crown (v/hz) = -0.010
Street flow is on [2] side(s) of the street
Distance from curb to property line = 10.000(Ft.)
Slope from curb to property line (v/hz) = 0.000
Gutter width = 0.000(Ft.)
Gutter hike from flowline = 0.000(In.)
Manning's N in gutter = 0.0500
Manning's N from gutter to grade break = 0.0500
Manning's N from grade break to crown = 0.0500
Estimated mean flow rate at midpoint of street = 17.758(CFS)
Depth of flow = 0.404(Ft.), Average velocity = 1.166(Ft/s)
Note: depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 30.000(Ft.)
Flow velocity = 1.17(Ft/s)
Travel time = 14.87 min. TC = 35.02 min.
Adding area flow to street
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Rainfall intensity = 1.464(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.588
Subarea runoff = 8.023(CFS) for 15.280(Ac.)
Total runoff = 21.690(CFS)
Effective area this stream = 25.19(Ac.)
Total Study Area (Main Stream No. 1) = 25.19(Ac.)
Area averaged Fm value = 0.507(In/Hr)
Street flow at end of street = 21.690(CFS)
Half street flow at end of street = 10.845(CFS)
Depth of flow = 0.436(Ft.), Average velocity = 1.262(Ft/s)
Note: depth of flow exceeds top of street crown.
Flow width (from curb towards crown)= 30.000(Ft.)
End of computations, Total Study Area = 25.19 (Ac.)
The following figures may

be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 1.000
Area averaged SCS curve number = 86.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

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Rational Hydrology Study Date: 10/26/22

MOJAVE 68

A22221 100 YEAR EXISTING

SUBAREA C

Program License Serial Number 6509

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

Rational hydrology study storm event year is 100.0

10 Year storm 1 hour rainfall = 0.619(In.)

100 Year storm 1 hour rainfall = 1.060(In.)

Computed rainfall intensity:

Storm year = 100.00 1 hour rainfall = 1.060 (In.)

Slope used for rainfall intensity curve b = 0.6000

Soil antecedent moisture condition (AMC) = 1

+++++
Process from Point/Station 31.000 to Point/Station 32.000
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (poor cover) subarea

Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 0.000

Decimal fraction soil group C = 1.000

Decimal fraction soil group D = 0.000

SCS curve number for soil(AMC 2) = 86.00

Adjusted SCS curve number for AMC 1 = 71.60

Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)

Initial subarea data:

Initial area flow distance = 1000.000(Ft.)

Top (of initial area) elevation = 3016.000(Ft.)

Bottom (of initial area) elevation = 3012.500(Ft.)

Difference in elevation = 3.500(Ft.)

Slope = 0.00350 s(%)= 0.35

TC = $k(0.525)*[(\text{length}^3)/(\text{elevation change})]^{0.2}$

Initial area time of concentration = 25.784 min.

Rainfall intensity = 1.759(In/Hr) for a 100.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.640

Subarea runoff = 11.235(CFS)

Total initial stream area = 9.970(Ac.)

Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

+++++
Process from Point/Station 32.000 to Point/Station 33.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 3012.500(Ft.)
End of street segment elevation = 2993.000(Ft.)
Length of street segment = 1090.000(Ft.)
Height of curb above gutter flowline = 2.0(In.)
Width of half street (curb to crown) = 30.000(Ft.)
Distance from crown to crossfall grade break = 15.000(Ft.)
Slope from gutter to grade break (v/hz) = -0.010
Slope from grade break to crown (v/hz) = -0.010
Street flow is on [2] side(s) of the street
Distance from curb to property line = 10.000(Ft.)
Slope from curb to property line (v/hz) = 0.000
Gutter width = 0.000(Ft.)
Gutter hike from flowline = 0.000(In.)
Manning's N in gutter = 0.0500
Manning's N from gutter to grade break = 0.0500
Manning's N from grade break to crown = 0.0500
Estimated mean flow rate at midpoint of street = 14.017(CFS)
Depth of flow = 0.333(Ft.), Average velocity = 1.279(Ft/s)
Note: depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 30.000(Ft.)
Flow velocity = 1.28(Ft/s)
Travel time = 14.21 min. **TC = 39.99 min.**
Adding area flow to street
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Rainfall intensity = 1.352(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.562
Subarea runoff = 5.384(CFS) for 11.890(Ac.)
Total runoff = 16.619(CFS)
Effective area this stream = 21.86(Ac.)
Total Study Area (Main Stream No. 1) = 21.86(Ac.)
Area averaged Fm value = 0.507(In/Hr)
Street flow at end of street = 16.619(CFS)
Half street flow at end of street = 8.309(CFS)
Depth of flow = 0.352(Ft.), Average velocity = 1.369(Ft/s)
Note: depth of flow exceeds top of street crown.
Flow width (from curb towards crown)= 30.000(Ft.)
End of computations, Total Study Area = 21.86 (Ac.)
The following figures may

be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 1.000
Area averaged SCS curve number = 86.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

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Rational Hydrology Study Date: 10/25/22

MOJAVE 68

A22221 100 YEAR EXISTING

SUBAREA D

Program License Serial Number 6509

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

Rational hydrology study storm event year is 100.0

10 Year storm 1 hour rainfall = 0.619(In.)

100 Year storm 1 hour rainfall = 1.060(In.)

Computed rainfall intensity:

Storm year = 100.00 1 hour rainfall = 1.060 (In.)

Slope used for rainfall intensity curve b = 0.7000

Soil antecedent moisture condition (AMC) = 1

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

UNDEVELOPED (poor cover) subarea

Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 1.000

Decimal fraction soil group C = 0.000

Decimal fraction soil group D = 0.000

SCS curve number for soil(AMC 2) = 78.00

Adjusted SCS curve number for AMC 1 = 60.60

Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.671(In/Hr)

Initial subarea data:

Initial area flow distance = 580.000(Ft.)

Top (of initial area) elevation = 3026.000(Ft.)

Bottom (of initial area) elevation = 3020.000(Ft.)

Difference in elevation = 6.000(Ft.)

Slope = 0.01034 s(%)= 1.03

TC = $k(0.525)*[(\text{length}^3)/(\text{elevation change})]^{0.2}$

Initial area time of concentration = 16.695 min.

Rainfall intensity = 2.595(In/Hr) for a 100.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.667

Subarea runoff = 16.485(CFS)

Total initial stream area = 9.520(Ac.)

Pervious area fraction = 1.000
Initial area Fm value = 0.671(In/Hr)

++++
Process from Point/Station 2.000 to Point/Station 3.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 3020.000(Ft.)
End of street segment elevation = 3007.000(Ft.)
Length of street segment = 1260.000(Ft.)
Height of curb above gutter flowline = 2.0(In.)
Width of half street (curb to crown) = 30.000(Ft.)
Distance from crown to crossfall grade break = 15.000(Ft.)
Slope from gutter to grade break (v/hz) = -0.010
Slope from grade break to crown (v/hz) = -0.010
Street flow is on [2] side(s) of the street
Distance from curb to property line = 10.000(Ft.)
Slope from curb to property line (v/hz) = 0.000
Gutter width = 0.000(Ft.)
Gutter hike from flowline = 0.000(In.)
Manning's N in gutter = 0.0150
Manning's N from gutter to grade break = 0.0150
Manning's N from grade break to crown = 0.0150
Estimated mean flow rate at midpoint of street = 20.079(CFS)
Depth of flow = 0.274(Ft.), Average velocity = 2.674(Ft/s)
Note: depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 30.000(Ft.)
Flow velocity = 2.67(Ft/s)
Travel time = 7.85 min. TC = 24.55 min.
Adding area flow to street
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 78.00
Adjusted SCS curve number for AMC 1 = 60.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.671(In/Hr)
Rainfall intensity = 1.982(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method)(Q=KCIA) is C = 0.595
Subarea runoff = 7.075(CFS) for 10.460(Ac.)
Total runoff = 23.560(CFS)
Effective area this stream = 19.98(Ac.)
Total Study Area (Main Stream No. 1) = 19.98(Ac.)
Area averaged Fm value = 0.671(In/Hr)
Street flow at end of street = 23.560(CFS)
Half street flow at end of street = 11.780(CFS)
Depth of flow = 0.291(Ft.), Average velocity = 2.783(Ft/s)
Note: depth of flow exceeds top of street crown.
Flow width (from curb towards crown)= 30.000(Ft.)
End of computations, Total Study Area = 19.98 (Ac.)
The following figures may

be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 1.000
Area averaged SCS curve number = 78.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 10/25/22

MOJAVE 68
A22221 100 YEAR EXISTING
SUBAREA E

Program License Serial Number 6509

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.619(In.)
100 Year storm 1 hour rainfall = 1.060(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.060 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

+++++
Process from Point/Station 4.000 to Point/Station 5.000
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 78.00
Adjusted SCS curve number for AMC 1 = 60.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.671(In/Hr)
Initial subarea data:
Initial area flow distance = 920.000(Ft.)
Top (of initial area) elevation = 3007.000(Ft.)
Bottom (of initial area) elevation = 2997.000(Ft.)
Difference in elevation = 10.000(Ft.)
Slope = 0.01087 s(%)= 1.09
 $TC = k(0.525)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 19.881 min.
Rainfall intensity = 2.297(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.637
Subarea runoff = 6.670(CFS)
Total initial stream area = 4.560(Ac.)

Pervious area fraction = 1.000
Initial area Fm value = 0.671(In/Hr)
End of computations, Total Study Area = 4.56 (Ac.)

The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 1.000
Area averaged SCS curve number = 78.0

Unit Hydrograph Analysis

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Study date 10/26/22

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San Bernardino County Synthetic Unit Hydrology Method

Manual date - August 1986

Program License Serial Number 6509

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 100		
63.66	1	1.06

Rainfall data for year 100		
63.66	6	2.13

Rainfall data for year 100		
63.66	24	4.02

+++++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
82.8	95.7	63.66	1.000	0.085	1.000	0.085

Area-averaged adjusted loss rate Fm (In/Hr) = 0.085

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
63.66	1.000	82.8	95.7	0.45	0.877

Area-averaged catchment yield fraction, Y = 0.877

Area-averaged low loss fraction, Yb = 0.123

User entry of time of concentration = 0.378 (hours)

+++++

Watershed area = 63.66(Ac.)

Catchment Lag time = 0.302 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 27.5573

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.085(In/Hr)

Average low loss rate fraction (Yb) = 0.123 (decimal)

DESERT S-Graph Selected

Computed peak 5-minute rainfall = 0.349(In)

Computed peak 30-minute rainfall = 0.850(In)

Specified peak 1-hour rainfall = 1.060(In)

Computed peak 3-hour rainfall = 1.600(In)

Specified peak 6-hour rainfall = 2.130(In)

Specified peak 24-hour rainfall = 4.020(In)

Note: user specified rainfall values used.

Rainfall depth area reduction factors:

Using a total area of 63.66(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.348(In)

30-minute factor = 0.997 Adjusted rainfall = 0.847(In)

1-hour factor = 0.997 Adjusted rainfall = 1.057(In)

3-hour factor = 1.000 Adjusted rainfall = 1.599(In)

6-hour factor = 1.000 Adjusted rainfall = 2.130(In)

24-hour factor = 1.000 Adjusted rainfall = 4.020(In)

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

+++++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
--------------------	--------------------------	----------------------------

(K = 769.89 (CFS))

1	1.551	11.942
2	7.891	48.810
3	25.247	133.624
4	47.409	170.622
5	60.693	102.268
6	68.805	62.455
7	74.681	45.238
8	79.149	34.399
9	82.589	26.483

10	85.431	21.885
11	87.845	18.579
12	89.712	14.379
13	91.280	12.072
14	92.649	10.535
15	93.849	9.243
16	94.823	7.495
17	95.710	6.832
18	96.439	5.608
19	97.074	4.894
20	97.572	3.835
21	97.949	2.901
22	98.226	2.133
23	98.540	2.419
24	98.871	2.546
25	99.202	2.546
26	99.504	2.328
27	99.689	1.424
28	99.861	1.326
29	100.000	1.067

Total soil rain loss = 0.43(In)
Total effective rainfall = 3.59(In)
Peak flow rate in flood hydrograph = 101.84(CFS)

+++++

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0005	0.07	Q				
0+10	0.0028	0.34	Q				
0+15	0.0103	1.09	Q				
0+20	0.0245	2.05	Q				
0+25	0.0426	2.63	Q				
0+30	0.0632	2.99	Q				
0+35	0.0856	3.25	Q				
0+40	0.1094	3.45	Q				
0+45	0.1343	3.61	Q				
0+50	0.1601	3.75	Q				
0+55	0.1866	3.86	Q				
1+ 0	0.2139	3.95	Q				
1+ 5	0.2417	4.03	Q				
1+10	0.2699	4.10	Q				
1+15	0.2986	4.17	Q				
1+20	0.3277	4.22	Q				
1+25	0.3571	4.27	Q				
1+30	0.3869	4.32	Q				
1+35	0.4169	4.36	Q				

1+40	0.4471	4.39	Q				
1+45	0.4776	4.42	QV				
1+50	0.5082	4.45	QV				
1+55	0.5391	4.48	QV				
2+ 0	0.5701	4.50	QV				
2+ 5	0.6013	4.53	QV				
2+10	0.6327	4.56	QV				
2+15	0.6643	4.58	QV				
2+20	0.6960	4.60	QV				
2+25	0.7278	4.62	QV				
2+30	0.7598	4.64	QV				
2+35	0.7918	4.65	QV				
2+40	0.8240	4.67	QV				
2+45	0.8563	4.69	QV				
2+50	0.8886	4.70	QV				
2+55	0.9211	4.72	QV				
3+ 0	0.9537	4.73	Q V				
3+ 5	0.9864	4.75	Q V				
3+10	1.0192	4.76	Q V				
3+15	1.0521	4.78	Q V				
3+20	1.0852	4.80	Q V				
3+25	1.1183	4.81	Q V				
3+30	1.1516	4.83	Q V				
3+35	1.1850	4.85	Q V				
3+40	1.2184	4.86	Q V				
3+45	1.2521	4.88	Q V				
3+50	1.2858	4.90	Q V				
3+55	1.3197	4.92	Q V				
4+ 0	1.3536	4.93	Q V				
4+ 5	1.3877	4.95	Q V				
4+10	1.4220	4.97	Q V				
4+15	1.4563	4.99	Q V				
4+20	1.4908	5.01	Q V				
4+25	1.5254	5.02	Q V				
4+30	1.5601	5.04	Q V				
4+35	1.5950	5.06	Q V				
4+40	1.6300	5.08	Q V				
4+45	1.6651	5.10	Q V				
4+50	1.7004	5.12	Q V				
4+55	1.7358	5.14	Q V				
5+ 0	1.7714	5.16	Q V				
5+ 5	1.8071	5.18	Q V				
5+10	1.8429	5.20	Q V				
5+15	1.8789	5.22	Q V				
5+20	1.9150	5.24	Q V				
5+25	1.9512	5.27	Q V				
5+30	1.9877	5.29	Q V				
5+35	2.0242	5.31	Q V				
5+40	2.0609	5.33	Q V				
5+45	2.0978	5.35	Q V				
5+50	2.1348	5.38	Q V				
5+55	2.1720	5.40	Q V				
6+ 0	2.2094	5.42	Q V				
6+ 5	2.2469	5.45	Q V				
6+10	2.2845	5.47	Q V				

6+15	2.3224	5.49	Q	V					
6+20	2.3604	5.52	Q	V					
6+25	2.3985	5.54	Q	V					
6+30	2.4369	5.57	Q	V					
6+35	2.4754	5.59	Q	V					
6+40	2.5141	5.62	Q	V					
6+45	2.5530	5.64	Q	V					
6+50	2.5920	5.67	Q	V					
6+55	2.6313	5.70	Q	V					
7+ 0	2.6707	5.72	Q	V					
7+ 5	2.7103	5.75	Q	V					
7+10	2.7501	5.78	Q	V					
7+15	2.7901	5.81	Q	V					
7+20	2.8303	5.84	Q	V					
7+25	2.8707	5.87	Q	V					
7+30	2.9113	5.89	Q	V					
7+35	2.9521	5.92	Q	V					
7+40	2.9931	5.95	Q	V					
7+45	3.0343	5.99	Q	V					
7+50	3.0758	6.02	Q	V					
7+55	3.1174	6.05	Q	V					
8+ 0	3.1593	6.08	Q	V					
8+ 5	3.2014	6.11	Q	V					
8+10	3.2437	6.15	Q	V					
8+15	3.2863	6.18	Q	V					
8+20	3.3291	6.21	Q	V					
8+25	3.3721	6.25	Q	V					
8+30	3.4154	6.28	Q	V					
8+35	3.4589	6.32	Q	V					
8+40	3.5027	6.36	Q	V					
8+45	3.5467	6.39	Q	V					
8+50	3.5910	6.43	Q	V					
8+55	3.6355	6.47	Q	V					
9+ 0	3.6804	6.51	Q	V					
9+ 5	3.7254	6.55	Q	V					
9+10	3.7708	6.59	Q	V					
9+15	3.8165	6.63	Q	V					
9+20	3.8624	6.67	Q	V					
9+25	3.9086	6.71	Q	V					
9+30	3.9552	6.76	Q	V					
9+35	4.0020	6.80	Q	V					
9+40	4.0491	6.84	Q	V					
9+45	4.0966	6.89	Q	V					
9+50	4.1444	6.94	Q	V					
9+55	4.1925	6.98	Q	V					
10+ 0	4.2409	7.03	Q	V					
10+ 5	4.2897	7.08	Q	V					
10+10	4.3388	7.13	Q	V					
10+15	4.3883	7.18	Q	V					
10+20	4.4381	7.24	Q	V					
10+25	4.4883	7.29	Q	V					
10+30	4.5389	7.35	Q	V					
10+35	4.5899	7.40	Q	V					
10+40	4.6412	7.46	Q	V					
10+45	4.6930	7.52	Q	V					

10+50	4.7452	7.58	Q	V			
10+55	4.7978	7.64	Q	V			
11+ 0	4.8508	7.70	Q	V			
11+ 5	4.9043	7.77	Q	V			
11+10	4.9583	7.83	Q	V			
11+15	5.0127	7.90	Q	V			
11+20	5.0675	7.97	Q	V			
11+25	5.1229	8.04	Q	V			
11+30	5.1787	8.11	Q	V			
11+35	5.2351	8.19	Q	V			
11+40	5.2920	8.26	Q	V			
11+45	5.3495	8.34	Q	V			
11+50	5.4075	8.42	Q	V			
11+55	5.4660	8.50	Q	V			
12+ 0	5.5252	8.59	Q	V			
12+ 5	5.5849	8.66	Q	V			
12+10	5.6448	8.70	Q	V			
12+15	5.7042	8.63	Q	V			
12+20	5.7629	8.53	Q	V			
12+25	5.8215	8.51	Q	V			
12+30	5.8803	8.53	Q	V			
12+35	5.9394	8.59	Q	V			
12+40	5.9990	8.65	Q	V			
12+45	6.0592	8.73	Q	V			
12+50	6.1200	8.82	Q	V			
12+55	6.1814	8.92	Q	V			
13+ 0	6.2436	9.03	Q	V			
13+ 5	6.3066	9.14	Q	V			
13+10	6.3704	9.27	Q	V			
13+15	6.4351	9.39	Q	V			
13+20	6.5007	9.53	Q	V			
13+25	6.5673	9.67	Q	V			
13+30	6.6350	9.83	Q	V			
13+35	6.7038	9.99	Q	V			
13+40	6.7737	10.16	Q	V			
13+45	6.8449	10.34	Q	V			
13+50	6.9174	10.52	Q	V			
13+55	6.9913	10.72	Q	V			
14+ 0	7.0666	10.93	Q	V			
14+ 5	7.1433	11.14	Q	V			
14+10	7.2211	11.30	Q	V			
14+15	7.2994	11.37	Q	V			
14+20	7.3779	11.39	Q	V			
14+25	7.4573	11.53	Q	V			
14+30	7.5381	11.74	Q	V			
14+35	7.6208	12.00	Q	V			
14+40	7.7055	12.30	Q	V			
14+45	7.7925	12.63	Q	V			
14+50	7.8820	13.01	Q	V			
14+55	7.9745	13.42	Q	V			
15+ 0	8.0701	13.89	Q	V			
15+ 5	8.1693	14.40	Q	V			
15+10	8.2725	14.98	Q	V			
15+15	8.3802	15.63	Q	V			
15+20	8.4929	16.37	Q	V			

15+25	8.6112	17.17	Q		V			
15+30	8.7347	17.93	Q		V			
15+35	8.8619	18.47	Q		V			
15+40	8.9932	19.06	Q		V			
15+45	9.1348	20.56	Q		V			
15+50	9.2975	23.62	Q		V			
15+55	9.5027	29.80	Q		V			
16+ 0	9.7704	38.87		Q	V			
16+ 5	10.1278	51.90		Q	V			
16+10	10.6193	71.36			Q	V		
16+15	11.2844	96.56			Q	V		
16+20	11.9857	101.84			Q	V		
16+25	12.5165	77.07			Q	V		
16+30	12.9155	57.93		Q		V		
16+35	13.2422	47.44		Q		V		
16+40	13.5218	40.60		Q		V		
16+45	13.7648	35.28		Q		V		
16+50	13.9806	31.33		Q		V		
16+55	14.1743	28.12		Q		V		
17+ 0	14.3470	25.08		Q		V		
17+ 5	14.5041	22.81		Q		V		
17+10	14.6490	21.04		Q		V		
17+15	14.7840	19.61		Q		V		
17+20	14.9098	18.27		Q		V		
17+25	15.0281	17.17		Q		V		
17+30	15.1382	16.00		Q		V		
17+35	15.2416	15.01		Q		V		
17+40	15.3381	14.02		Q		V		
17+45	15.4288	13.17		Q		V		
17+50	15.5148	12.49		Q		V		
17+55	15.5983	12.12		Q		V		
18+ 0	15.6792	11.74		Q		V		
18+ 5	15.7571	11.32		Q		V		
18+10	15.8319	10.85		Q		V		
18+15	15.9032	10.35		Q		V		
18+20	15.9727	10.09		Q		V		
18+25	16.0398	9.75		Q		V		
18+30	16.1034	9.23		Q		V		
18+35	16.1654	9.00		Q		V		
18+40	16.2261	8.81		Q		V		
18+45	16.2856	8.64		Q		V		
18+50	16.3439	8.47		Q		V		
18+55	16.4012	8.32		Q		V		
19+ 0	16.4574	8.17		Q		V		
19+ 5	16.5127	8.03		Q		V		
19+10	16.5671	7.89		Q		V		
19+15	16.6206	7.77		Q		V		
19+20	16.6732	7.64		Q		V		
19+25	16.7250	7.53		Q		V		
19+30	16.7761	7.41		Q		V		
19+35	16.8264	7.30		Q		V		
19+40	16.8759	7.20		Q		V		
19+45	16.9248	7.09		Q		V		
19+50	16.9730	7.00		Q		V		
19+55	17.0205	6.90		Q		V		

20+ 0	17.0674	6.81	Q					V	
20+ 5	17.1137	6.73	Q					V	
20+10	17.1595	6.64	Q					V	
20+15	17.2047	6.56	Q					V	
20+20	17.2493	6.48	Q					V	
20+25	17.2934	6.41	Q					V	
20+30	17.3370	6.33	Q					V	
20+35	17.3802	6.26	Q					V	
20+40	17.4228	6.19	Q					V	
20+45	17.4650	6.12	Q					V	
20+50	17.5067	6.06	Q					V	
20+55	17.5480	5.99	Q					V	
21+ 0	17.5888	5.93	Q					V	
21+ 5	17.6292	5.87	Q					V	
21+10	17.6693	5.81	Q					V	
21+15	17.7089	5.76	Q					V	
21+20	17.7482	5.70	Q					V	
21+25	17.7871	5.65	Q					V	
21+30	17.8257	5.60	Q					V	
21+35	17.8639	5.55	Q					V	
21+40	17.9017	5.50	Q					V	
21+45	17.9393	5.45	Q					V	
21+50	17.9765	5.40	Q					V	
21+55	18.0134	5.36	Q					V	
22+ 0	18.0499	5.31	Q					V	
22+ 5	18.0862	5.27	Q					V	
22+10	18.1222	5.23	Q					V	
22+15	18.1579	5.18	Q					V	
22+20	18.1933	5.14	Q					V	
22+25	18.2285	5.10	Q					V	
22+30	18.2633	5.06	Q					V	
22+35	18.2980	5.03	Q					V	
22+40	18.3323	4.99	Q					V	
22+45	18.3664	4.95	Q					V	
22+50	18.4003	4.92	Q					V	
22+55	18.4339	4.88	Q					V	
23+ 0	18.4673	4.85	Q					V	
23+ 5	18.5004	4.81	Q					V	
23+10	18.5334	4.78	Q					V	
23+15	18.5661	4.75	Q					V	
23+20	18.5985	4.72	Q					V	
23+25	18.6308	4.69	Q					V	
23+30	18.6629	4.65	Q					V	
23+35	18.6947	4.62	Q					V	
23+40	18.7264	4.60	Q					V	
23+45	18.7578	4.57	Q					V	
23+50	18.7891	4.54	Q					V	
23+55	18.8201	4.51	Q					V	
24+ 0	18.8510	4.48	Q					V	

APPENDIX E:

PROPOSED HYDROLOGY CALCULATIONS

RATIONAL METHOD & SYNTHETIC UNIT HYDROGRAPH METHOD

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 10/26/22

MOJAVE 68

A22221 10 YEAR PROPOSED

SUBAREA A

Program License Serial Number 6509

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.619 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

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

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Adjusted SCS curve number for AMC 1 = 49.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.081(In/Hr)
Initial subarea data:
Initial area flow distance = 380.000(Ft.)
Top (of initial area) elevation = 3017.500(Ft.)
Bottom (of initial area) elevation = 3005.900(Ft.)
Difference in elevation = 11.600(Ft.)
Slope = 0.03053 s(%)= 3.05
 $TC = k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 6.574 min.
Rainfall intensity = 2.910(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.875
Subarea runoff = 3.284(CFS)
Total initial stream area = 1.290(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.081(In/Hr)

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

Upstream point/station elevation = 3002.900(Ft.)
Downstream point/station elevation = 2997.800(Ft.)
Pipe length = 730.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.284(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 3.284(CFS)
Normal flow depth in pipe = 8.45(In.)
Flow top width inside pipe = 14.88(In.)
Critical Depth = 8.75(In.)
Pipe flow velocity = 4.61(Ft/s)
Travel time through pipe = 2.64 min.
Time of concentration (TC) = 9.21 min.

+++++
Process from Point/Station 12.000 to Point/Station 13.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Adjusted SCS curve number for AMC 1 = 49.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.081(In/Hr)
Time of concentration = 9.21 min.
Rainfall intensity = 2.298(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method)(Q=KCIA) is C = 0.868
Subarea runoff = 21.776(CFS) for 11.270(Ac.)
Total runoff = 25.060(CFS)
Effective area this stream = 12.56(Ac.)
Total Study Area (Main Stream No. 1) = 12.56(Ac.)
Area averaged Fm value = 0.081(In/Hr)

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

Upstream point/station elevation = 2997.800(Ft.)
Downstream point/station elevation = 2992.700(Ft.)
Pipe length = 730.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 25.060(CFS)
Nearest computed pipe diameter = 27.00(In.)
Calculated individual pipe flow = 25.060(CFS)
Normal flow depth in pipe = 21.38(In.)
Flow top width inside pipe = 21.93(In.)

Critical Depth = 20.99(In.)
Pipe flow velocity = 7.42(Ft/s)
Travel time through pipe = 1.64 min.
Time of concentration (TC) = 10.85 min.

+++++
Process from Point/Station 13.000 to Point/Station 14.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Adjusted SCS curve number for AMC 1 = 49.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.081(In/Hr)
Time of concentration = 10.85 min.
Rainfall intensity = 2.049(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.864
Subarea runoff = 16.666(CFS) for 11.000(Ac.)
Total runoff = 41.727(CFS)
Effective area this stream = 23.56(Ac.)
Total Study Area (Main Stream No. 1) = 23.56(Ac.)
Area averaged Fm value = 0.081(In/Hr)

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

Upstream point/station elevation = 2992.700(Ft.)
Downstream point/station elevation = 2984.500(Ft.)
Pipe length = 1160.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 41.727(CFS)
Nearest computed pipe diameter = 33.00(In.)
Calculated individual pipe flow = 41.727(CFS)
Normal flow depth in pipe = 25.41(In.)
Flow top width inside pipe = 27.78(In.)
Critical Depth = 25.76(In.)
Pipe flow velocity = 8.51(Ft/s)
Travel time through pipe = 2.27 min.
Time of concentration (TC) = 13.12 min.

+++++
Process from Point/Station 14.000 to Point/Station 15.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000

Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 69.00
 Adjusted SCS curve number for AMC 1 = 49.80
 Pervious ratio(A_p) = 0.1000 Max loss rate(F_m)= 0.081(In/Hr)
 Time of concentration = 13.12 min.
 Rainfall intensity = 1.794(In/Hr) for a 10.0 year storm
 Effective runoff coefficient used for area, (total area with modified
 rational method)($Q=KCIA$) is $C = 0.859$
 Subarea runoff = 1.524(CFS) for 4.500(Ac.)
 Total runoff = 43.250(CFS)
 Effective area this stream = 28.06(Ac.)
 Total Study Area (Main Stream No. 1) = 28.06(Ac.)
 Area averaged F_m value = 0.081(In/Hr)
 End of computations, Total Study Area = 28.06 (Ac.)
 The following figures may
 be used for a unit hydrograph study of the same area.
 Note: These figures do not consider reduced effective area
 effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 0.100
 Area averaged SCS curve number = 69.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 10/26/22

MOJAVE 68

A22221 10 YEAR PROPOSED

SUBAREA B

Program License Serial Number 6509

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.619 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

+++++
Process from Point/Station 21.000 to Point/Station 22.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Adjusted SCS curve number for AMC 1 = 49.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.081(In/Hr)
Initial subarea data:
Initial area flow distance = 195.000(Ft.)
Top (of initial area) elevation = 3012.300(Ft.)
Bottom (of initial area) elevation = 3009.300(Ft.)
Difference in elevation = 3.000(Ft.)
Slope = 0.01538 s(%)= 1.54
 $TC = k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 5.774 min.
Rainfall intensity = 3.187(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.877
Subarea runoff = 1.202(CFS)
Total initial stream area = 0.430(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.081(In/Hr)

+++++
Process from Point/Station 22.000 to Point/Station 23.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 3006.300(Ft.)
Downstream point/station elevation = 3001.400(Ft.)
Pipe length = 700.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.202(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 1.202(CFS)
Normal flow depth in pipe = 6.48(In.)
Flow top width inside pipe = 8.08(In.)
Critical Depth = 6.05(In.)
Pipe flow velocity = 3.53(Ft/s)
Travel time through pipe = 3.31 min.
Time of concentration (TC) = 9.08 min.

+++++
Process from Point/Station 22.000 to Point/Station 23.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Adjusted SCS curve number for AMC 1 = 49.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.081(In/Hr)
Time of concentration = 9.08 min.
Rainfall intensity = 2.321(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method)(Q=KCIA) is C = 0.869
Subarea runoff = 6.741(CFS) for 3.510(Ac.)
Total runoff = 7.943(CFS)
Effective area this stream = 3.94(Ac.)
Total Study Area (Main Stream No. 1) = 3.94(Ac.)
Area averaged Fm value = 0.081(In/Hr)

+++++
Process from Point/Station 23.000 to Point/Station 24.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 3001.400(Ft.)
Downstream point/station elevation = 2995.200(Ft.)
Pipe length = 890.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 7.943(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 7.943(CFS)
Normal flow depth in pipe = 13.43(In.)
Flow top width inside pipe = 15.67(In.)

Critical Depth = 13.09(In.)
Pipe flow velocity = 5.62(Ft/s)
Travel time through pipe = 2.64 min.
Time of concentration (TC) = 11.72 min.

+++++
Process from Point/Station 23.000 to Point/Station 24.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Adjusted SCS curve number for AMC 1 = 49.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.081(In/Hr)
Time of concentration = 11.72 min.
Rainfall intensity = 1.942(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.862
Subarea runoff = 20.118(CFS) for 12.820(Ac.)
Total runoff = 28.061(CFS)
Effective area this stream = 16.76(Ac.)
Total Study Area (Main Stream No. 1) = 16.76(Ac.)
Area averaged Fm value = 0.081(In/Hr)

+++++
Process from Point/Station 24.000 to Point/Station 25.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2995.200(Ft.)
Downstream point/station elevation = 2988.800(Ft.)
Pipe length = 915.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 28.061(CFS)
Nearest computed pipe diameter = 30.00(In.)
Calculated individual pipe flow = 28.061(CFS)
Normal flow depth in pipe = 20.63(In.)
Flow top width inside pipe = 27.81(In.)
Critical Depth = 21.68(In.)
Pipe flow velocity = 7.79(Ft/s)
Travel time through pipe = 1.96 min.
Time of concentration (TC) = 13.68 min.

+++++
Process from Point/Station 24.000 to Point/Station 25.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000

Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 69.00
 Adjusted SCS curve number for AMC 1 = 49.80
 Pervious ratio(A_p) = 0.1000 Max loss rate(F_m)= 0.081(In/Hr)
 Time of concentration = 13.68 min.
 Rainfall intensity = 1.743(In/Hr) for a 10.0 year storm
 Effective runoff coefficient used for area, (total area with modified
 rational method)($Q=KCIA$) is $C = 0.858$
 Subarea runoff = 15.243(CFS) for 12.200(Ac.)
 Total runoff = 43.304(CFS)
 Effective area this stream = 28.96(Ac.)
 Total Study Area (Main Stream No. 1) = 28.96(Ac.)
 Area averaged F_m value = 0.081(In/Hr)
 End of computations, Total Study Area = 28.96 (Ac.)
 The following figures may
 be used for a unit hydrograph study of the same area.
 Note: These figures do not consider reduced effective area
 effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 0.100
 Area averaged SCS curve number = 69.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 10/26/22

MOJAVE 68

A22221 10 YEAR PROPOSED

SUBAREA C

Program License Serial Number 6509

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.619 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

+++++
Process from Point/Station 31.000 to Point/Station 32.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Adjusted SCS curve number for AMC 1 = 49.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.081(In/Hr)
Initial subarea data:
Initial area flow distance = 370.000(Ft.)
Top (of initial area) elevation = 3006.500(Ft.)
Bottom (of initial area) elevation = 2994.400(Ft.)
Difference in elevation = 12.100(Ft.)
Slope = 0.03270 s(%)= 3.27
 $TC = k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 6.416 min.
Rainfall intensity = 2.960(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.875
Subarea runoff = 12.334(CFS)
Total initial stream area = 4.760(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.081(In/Hr)

End of computations, Total Study Area = 4.76 (Ac.)

The following figures may

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

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

Area averaged pervious area fraction(A_p) = 0.100

Area averaged SCS curve number = 69.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 10/26/22

MOJAVE 68

A22221 100 YEAR PROPOSED

SUBAREA A

Program License Serial Number 6509

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

Rational hydrology study storm event year is 100.0

10 Year storm 1 hour rainfall = 0.619(In.)

100 Year storm 1 hour rainfall = 1.060(In.)

Computed rainfall intensity:

Storm year = 100.00 1 hour rainfall = 1.060 (In.)

Slope used for rainfall intensity curve b = 0.7000

Soil antecedent moisture condition (AMC) = 1

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

COMMERCIAL subarea type

Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 0.000

Decimal fraction soil group C = 1.000

Decimal fraction soil group D = 0.000

SCS curve number for soil(AMC 2) = 69.00

Adjusted SCS curve number for AMC 1 = 49.80

Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.081(In/Hr)

Initial subarea data:

Initial area flow distance = 380.000(Ft.)

Top (of initial area) elevation = 3017.500(Ft.)

Bottom (of initial area) elevation = 3005.900(Ft.)

Difference in elevation = 11.600(Ft.)

Slope = 0.03053 s(%)= 3.05

TC = $k(0.304)*[(\text{length}^3)/(\text{elevation change})]^{0.2}$

Initial area time of concentration = 6.574 min.

Rainfall intensity = 4.983(In/Hr) for a 100.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.885

Subarea runoff = 5.691(CFS)

Total initial stream area = 1.290(Ac.)

Pervious area fraction = 0.100
Initial area Fm value = 0.081(In/Hr)

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

Upstream point/station elevation = 3002.900(Ft.)
Downstream point/station elevation = 2997.800(Ft.)
Pipe length = 730.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 5.691(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 5.691(CFS)
Normal flow depth in pipe = 10.55(In.)
Flow top width inside pipe = 17.73(In.)
Critical Depth = 11.04(In.)
Pipe flow velocity = 5.29(Ft/s)
Travel time through pipe = 2.30 min.
Time of concentration (TC) = 8.88 min.

+++++
Process from Point/Station 12.000 to Point/Station 13.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Adjusted SCS curve number for AMC 1 = 49.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.081(In/Hr)
Time of concentration = 8.88 min.
Rainfall intensity = 4.039(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method)(Q=KCIA) is C = 0.882
Subarea runoff = 39.045(CFS) for 11.270(Ac.)
Total runoff = 44.736(CFS)
Effective area this stream = 12.56(Ac.)
Total Study Area (Main Stream No. 1) = 12.56(Ac.)
Area averaged Fm value = 0.081(In/Hr)

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

Upstream point/station elevation = 2997.800(Ft.)
Downstream point/station elevation = 2992.700(Ft.)
Pipe length = 730.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 44.736(CFS)
Nearest computed pipe diameter = 36.00(In.)
Calculated individual pipe flow = 44.736(CFS)

Normal flow depth in pipe = 24.42(In.)
Flow top width inside pipe = 33.63(In.)
Critical Depth = 26.13(In.)
Pipe flow velocity = 8.77(Ft/s)
Travel time through pipe = 1.39 min.
Time of concentration (TC) = 10.26 min.

+++++
Process from Point/Station 13.000 to Point/Station 14.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Adjusted SCS curve number for AMC 1 = 49.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.081(In/Hr)
Time of concentration = 10.26 min.
Rainfall intensity = 3.648(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method)(Q=KCIA) is C = 0.880
Subarea runoff = 30.901(CFS) for 11.000(Ac.)
Total runoff = 75.637(CFS)
Effective area this stream = 23.56(Ac.)
Total Study Area (Main Stream No. 1) = 23.56(Ac.)
Area averaged Fm value = 0.081(In/Hr)

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

Upstream point/station elevation = 2992.700(Ft.)
Downstream point/station elevation = 2984.500(Ft.)
Pipe length = 1160.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 75.637(CFS)
Nearest computed pipe diameter = 42.00(In.)
Calculated individual pipe flow = 75.637(CFS)
Normal flow depth in pipe = 30.98(In.)
Flow top width inside pipe = 36.95(In.)
Critical Depth = 32.65(In.)
Pipe flow velocity = 9.94(Ft/s)
Travel time through pipe = 1.94 min.
Time of concentration (TC) = 12.21 min.

+++++
Process from Point/Station 14.000 to Point/Station 15.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 1.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 69.00
 Adjusted SCS curve number for AMC 1 = 49.80
 Pervious ratio(A_p) = 0.1000 Max loss rate(F_m)= 0.081(In/Hr)
 Time of concentration = 12.21 min.
 Rainfall intensity = 3.231(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area, (total area with modified rational method)($Q=KCIA$) is $C = 0.877$
 Subarea runoff = 3.910(CFS) for 4.500(Ac.)
 Total runoff = 79.547(CFS)
 Effective area this stream = 28.06(Ac.)
 Total Study Area (Main Stream No. 1) = 28.06(Ac.)
 Area averaged F_m value = 0.081(In/Hr)
 End of computations, Total Study Area = 28.06 (Ac.)
 The following figures may
 be used for a unit hydrograph study of the same area.
 Note: These figures do not consider reduced effective area effects caused by confluences in the rational equation.

 Area averaged pervious area fraction(A_p) = 0.100
 Area averaged SCS curve number = 69.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 10/26/22

MOJAVE 68

A22221 100 YEAR PROPOSED

SUBAREA B

Program License Serial Number 6509

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

Rational hydrology study storm event year is 100.0

10 Year storm 1 hour rainfall = 0.619(In.)

100 Year storm 1 hour rainfall = 1.060(In.)

Computed rainfall intensity:

Storm year = 100.00 1 hour rainfall = 1.060 (In.)

Slope used for rainfall intensity curve b = 0.7000

Soil antecedent moisture condition (AMC) = 1

+++++
Process from Point/Station 21.000 to Point/Station 22.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type

Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 0.000

Decimal fraction soil group C = 1.000

Decimal fraction soil group D = 0.000

SCS curve number for soil(AMC 2) = 69.00

Adjusted SCS curve number for AMC 1 = 49.80

Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.081(In/Hr)

Initial subarea data:

Initial area flow distance = 195.000(Ft.)

Top (of initial area) elevation = 3012.300(Ft.)

Bottom (of initial area) elevation = 3009.300(Ft.)

Difference in elevation = 3.000(Ft.)

Slope = 0.01538 s(%)= 1.54

TC = $k(0.304)*[(\text{length}^3)/(\text{elevation change})]^{0.2}$

Initial area time of concentration = 5.774 min.

Rainfall intensity = 5.457(In/Hr) for a 100.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.887

Subarea runoff = 2.081(CFS)

Total initial stream area = 0.430(Ac.)

Pervious area fraction = 0.100
Initial area Fm value = 0.081(In/Hr)

+++++
Process from Point/Station 22.000 to Point/Station 23.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 3006.300(Ft.)
Downstream point/station elevation = 3001.400(Ft.)
Pipe length = 700.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.081(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 2.081(CFS)
Normal flow depth in pipe = 7.38(In.)
Flow top width inside pipe = 11.68(In.)
Critical Depth = 7.40(In.)
Pipe flow velocity = 4.10(Ft/s)
Travel time through pipe = 2.84 min.
Time of concentration (TC) = 8.62 min.

+++++
Process from Point/Station 22.000 to Point/Station 23.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Adjusted SCS curve number for AMC 1 = 49.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.081(In/Hr)
Time of concentration = 8.62 min.
Rainfall intensity = 4.124(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method)(Q=KCIA) is C = 0.882
Subarea runoff = 12.254(CFS) for 3.510(Ac.)
Total runoff = 14.334(CFS)
Effective area this stream = 3.94(Ac.)
Total Study Area (Main Stream No. 1) = 3.94(Ac.)
Area averaged Fm value = 0.081(In/Hr)

+++++
Process from Point/Station 23.000 to Point/Station 24.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 3001.400(Ft.)
Downstream point/station elevation = 2995.200(Ft.)
Pipe length = 890.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 14.334(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 14.334(CFS)

Normal flow depth in pipe = 15.63(In.)
Flow top width inside pipe = 22.87(In.)
Critical Depth = 16.37(In.)
Pipe flow velocity = 6.61(Ft/s)
Travel time through pipe = 2.24 min.
Time of concentration (TC) = 10.86 min.

+++++
Process from Point/Station 23.000 to Point/Station 24.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Adjusted SCS curve number for AMC 1 = 49.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.081(In/Hr)
Time of concentration = 10.86 min.
Rainfall intensity = 3.507(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method)(Q=KCIA) is C = 0.879
Subarea runoff = 37.338(CFS) for 12.820(Ac.)
Total runoff = 51.672(CFS)
Effective area this stream = 16.76(Ac.)
Total Study Area (Main Stream No. 1) = 16.76(Ac.)
Area averaged Fm value = 0.081(In/Hr)

+++++
Process from Point/Station 24.000 to Point/Station 25.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2995.200(Ft.)
Downstream point/station elevation = 2988.800(Ft.)
Pipe length = 915.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 51.672(CFS)
Nearest computed pipe diameter = 36.00(In.)
Calculated individual pipe flow = 51.672(CFS)
Normal flow depth in pipe = 27.38(In.)
Flow top width inside pipe = 30.73(In.)
Critical Depth = 28.04(In.)
Pipe flow velocity = 8.96(Ft/s)
Travel time through pipe = 1.70 min.
Time of concentration (TC) = 12.56 min.

+++++
Process from Point/Station 24.000 to Point/Station 25.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 1.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 69.00
 Adjusted SCS curve number for AMC 1 = 49.80
 Pervious ratio(A_p) = 0.1000 Max loss rate(F_m)= 0.081(In/Hr)
 Time of concentration = 12.56 min.
 Rainfall intensity = 3.167(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area, (total area with modified rational method)($Q=KCIA$) is $C = 0.877$
 Subarea runoff = 28.758(CFS) for 12.200(Ac.)
 Total runoff = 80.430(CFS)
 Effective area this stream = 28.96(Ac.)
 Total Study Area (Main Stream No. 1) = 28.96(Ac.)
 Area averaged F_m value = 0.081(In/Hr)
 End of computations, Total Study Area = 28.96 (Ac.)
 The following figures may
 be used for a unit hydrograph study of the same area.
 Note: These figures do not consider reduced effective area effects caused by confluences in the rational equation.

 Area averaged pervious area fraction(A_p) = 0.100
 Area averaged SCS curve number = 69.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 10/26/22

MOJAVE 68

A22221 100 YEAR PROPOSED

SUBAREA C

Program License Serial Number 6509

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.619(In.)
100 Year storm 1 hour rainfall = 1.060(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.060 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

+++++
Process from Point/Station 31.000 to Point/Station 32.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Adjusted SCS curve number for AMC 1 = 49.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.081(In/Hr)
Initial subarea data:
Initial area flow distance = 370.000(Ft.)
Top (of initial area) elevation = 3006.500(Ft.)
Bottom (of initial area) elevation = 2994.400(Ft.)
Difference in elevation = 12.100(Ft.)
Slope = 0.03270 s(%)= 3.27
TC = $k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 6.416 min.
Rainfall intensity = 5.069(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.886
Subarea runoff = 21.369(CFS)
Total initial stream area = 4.760(Ac.)

Pervious area fraction = 0.100
Initial area Fm value = 0.081(In/Hr)
End of computations, Total Study Area = 4.76 (Ac.)

The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 0.100
Area averaged SCS curve number = 69.0

Unit Hydrograph Analysis

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Study date 10/26/22

+++++

San Bernardino County Synthetic Unit Hydrology Method

Manual date - August 1986

Program License Serial Number 6509

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 100		
63.66	1	1.06

Rainfall data for year 100		
63.66	6	2.13

Rainfall data for year 100		
63.66	24	4.02

+++++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
82.8	95.7	63.66	1.000	0.085	0.150	0.013

Area-averaged adjusted loss rate Fm (In/Hr) = 0.013

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
9.55	0.150	82.8	95.7	0.45	0.877
54.11	0.850	98.0	98.0	0.20	0.942

Area-averaged catchment yield fraction, Y = 0.932

Area-averaged low loss fraction, Yb = 0.068

User entry of time of concentration = 0.204 (hours)

+++++

Watershed area = 63.66(Ac.)

Catchment Lag time = 0.163 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 51.0621

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.013(In/Hr)

Average low loss rate fraction (Yb) = 0.068 (decimal)

DESERT S-Graph Selected

Computed peak 5-minute rainfall = 0.349(In)

Computed peak 30-minute rainfall = 0.850(In)

Specified peak 1-hour rainfall = 1.060(In)

Computed peak 3-hour rainfall = 1.600(In)

Specified peak 6-hour rainfall = 2.130(In)

Specified peak 24-hour rainfall = 4.020(In)

Note: user specified rainfall values used.

Rainfall depth area reduction factors:

Using a total area of 63.66(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.348(In)

30-minute factor = 0.997 Adjusted rainfall = 0.847(In)

1-hour factor = 0.997 Adjusted rainfall = 1.057(In)

3-hour factor = 1.000 Adjusted rainfall = 1.599(In)

6-hour factor = 1.000 Adjusted rainfall = 2.130(In)

24-hour factor = 1.000 Adjusted rainfall = 4.020(In)

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

+++++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
--------------------	--------------------------	----------------------------

(K = 769.89 (CFS))

1	4.106	31.608
2	31.755	212.873
3	61.498	228.986
4	74.480	99.947
5	82.012	57.985
6	87.099	39.164
7	90.569	26.716
8	93.131	19.730

9	95.050	14.770
10	96.503	11.192
11	97.540	7.980
12	98.175	4.891
13	98.759	4.496
14	99.360	4.622
15	99.753	3.025
16	100.000	1.905

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3480	0.3480
2	0.4910	0.1430
3	0.6006	0.1096
4	0.6928	0.0923
5	0.7741	0.0812
6	0.8475	0.0734
7	0.8901	0.0427
8	0.9288	0.0387
9	0.9643	0.0355
10	0.9972	0.0329
11	1.0279	0.0307
12	1.0568	0.0289
13	1.0892	0.0324
14	1.1201	0.0309
15	1.1496	0.0295
16	1.1780	0.0283
17	1.2052	0.0272
18	1.2315	0.0263
19	1.2568	0.0254
20	1.2814	0.0246
21	1.3052	0.0238
22	1.3283	0.0231
23	1.3507	0.0225
24	1.3726	0.0219
25	1.3939	0.0213
26	1.4147	0.0208
27	1.4349	0.0203
28	1.4548	0.0198
29	1.4741	0.0194
30	1.4931	0.0190
31	1.5117	0.0186
32	1.5299	0.0182
33	1.5478	0.0179
34	1.5653	0.0175
35	1.5825	0.0172
36	1.5994	0.0169
37	1.6176	0.0182
38	1.6355	0.0179
39	1.6532	0.0176
40	1.6705	0.0174
41	1.6877	0.0171
42	1.7045	0.0169
43	1.7212	0.0166
44	1.7376	0.0164

45	1.7538	0.0162
46	1.7698	0.0160
47	1.7856	0.0158
48	1.8012	0.0156
49	1.8166	0.0154
50	1.8318	0.0152
51	1.8469	0.0150
52	1.8617	0.0149
53	1.8764	0.0147
54	1.8910	0.0145
55	1.9054	0.0144
56	1.9196	0.0142
57	1.9337	0.0141
58	1.9476	0.0139
59	1.9614	0.0138
60	1.9751	0.0137
61	1.9886	0.0135
62	2.0020	0.0134
63	2.0153	0.0133
64	2.0285	0.0132
65	2.0415	0.0130
66	2.0544	0.0129
67	2.0672	0.0128
68	2.0799	0.0127
69	2.0925	0.0126
70	2.1049	0.0125
71	2.1173	0.0124
72	2.1296	0.0123
73	2.1431	0.0135
74	2.1565	0.0134
75	2.1698	0.0133
76	2.1830	0.0132
77	2.1961	0.0131
78	2.2091	0.0130
79	2.2221	0.0129
80	2.2349	0.0128
81	2.2477	0.0128
82	2.2604	0.0127
83	2.2729	0.0126
84	2.2855	0.0125
85	2.2979	0.0124
86	2.3102	0.0123
87	2.3225	0.0123
88	2.3347	0.0122
89	2.3468	0.0121
90	2.3589	0.0120
91	2.3708	0.0120
92	2.3827	0.0119
93	2.3946	0.0118
94	2.4063	0.0118
95	2.4180	0.0117
96	2.4297	0.0116
97	2.4412	0.0116
98	2.4527	0.0115
99	2.4642	0.0114

100	2.4755	0.0114
101	2.4869	0.0113
102	2.4981	0.0113
103	2.5093	0.0112
104	2.5204	0.0111
105	2.5315	0.0111
106	2.5425	0.0110
107	2.5535	0.0110
108	2.5644	0.0109
109	2.5753	0.0109
110	2.5861	0.0108
111	2.5968	0.0107
112	2.6075	0.0107
113	2.6182	0.0106
114	2.6287	0.0106
115	2.6393	0.0105
116	2.6498	0.0105
117	2.6602	0.0104
118	2.6706	0.0104
119	2.6810	0.0103
120	2.6913	0.0103
121	2.7015	0.0103
122	2.7117	0.0102
123	2.7219	0.0102
124	2.7320	0.0101
125	2.7421	0.0101
126	2.7521	0.0100
127	2.7621	0.0100
128	2.7721	0.0099
129	2.7820	0.0099
130	2.7918	0.0099
131	2.8016	0.0098
132	2.8114	0.0098
133	2.8212	0.0097
134	2.8309	0.0097
135	2.8405	0.0097
136	2.8501	0.0096
137	2.8597	0.0096
138	2.8693	0.0095
139	2.8788	0.0095
140	2.8883	0.0095
141	2.8977	0.0094
142	2.9071	0.0094
143	2.9165	0.0094
144	2.9258	0.0093
145	2.9351	0.0093
146	2.9443	0.0093
147	2.9536	0.0092
148	2.9628	0.0092
149	2.9719	0.0092
150	2.9810	0.0091
151	2.9901	0.0091
152	2.9992	0.0091
153	3.0082	0.0090
154	3.0172	0.0090

155	3.0262	0.0090
156	3.0351	0.0089
157	3.0440	0.0089
158	3.0529	0.0089
159	3.0617	0.0088
160	3.0705	0.0088
161	3.0793	0.0088
162	3.0880	0.0087
163	3.0968	0.0087
164	3.1055	0.0087
165	3.1141	0.0087
166	3.1228	0.0086
167	3.1314	0.0086
168	3.1399	0.0086
169	3.1485	0.0086
170	3.1570	0.0085
171	3.1655	0.0085
172	3.1740	0.0085
173	3.1824	0.0084
174	3.1908	0.0084
175	3.1992	0.0084
176	3.2076	0.0084
177	3.2159	0.0083
178	3.2242	0.0083
179	3.2325	0.0083
180	3.2408	0.0083
181	3.2490	0.0082
182	3.2573	0.0082
183	3.2654	0.0082
184	3.2736	0.0082
185	3.2817	0.0081
186	3.2899	0.0081
187	3.2980	0.0081
188	3.3060	0.0081
189	3.3141	0.0080
190	3.3221	0.0080
191	3.3301	0.0080
192	3.3381	0.0080
193	3.3460	0.0080
194	3.3540	0.0079
195	3.3619	0.0079
196	3.3698	0.0079
197	3.3776	0.0079
198	3.3855	0.0078
199	3.3933	0.0078
200	3.4011	0.0078
201	3.4089	0.0078
202	3.4167	0.0078
203	3.4244	0.0077
204	3.4321	0.0077
205	3.4398	0.0077
206	3.4475	0.0077
207	3.4552	0.0077
208	3.4628	0.0076
209	3.4704	0.0076

210	3.4780	0.0076
211	3.4856	0.0076
212	3.4932	0.0076
213	3.5007	0.0075
214	3.5082	0.0075
215	3.5157	0.0075
216	3.5232	0.0075
217	3.5307	0.0075
218	3.5381	0.0074
219	3.5455	0.0074
220	3.5530	0.0074
221	3.5603	0.0074
222	3.5677	0.0074
223	3.5751	0.0074
224	3.5824	0.0073
225	3.5897	0.0073
226	3.5970	0.0073
227	3.6043	0.0073
228	3.6116	0.0073
229	3.6188	0.0073
230	3.6261	0.0072
231	3.6333	0.0072
232	3.6405	0.0072
233	3.6477	0.0072
234	3.6548	0.0072
235	3.6620	0.0071
236	3.6691	0.0071
237	3.6762	0.0071
238	3.6833	0.0071
239	3.6904	0.0071
240	3.6975	0.0071
241	3.7045	0.0071
242	3.7116	0.0070
243	3.7186	0.0070
244	3.7256	0.0070
245	3.7326	0.0070
246	3.7396	0.0070
247	3.7465	0.0070
248	3.7535	0.0069
249	3.7604	0.0069
250	3.7673	0.0069
251	3.7742	0.0069
252	3.7811	0.0069
253	3.7880	0.0069
254	3.7948	0.0069
255	3.8016	0.0068
256	3.8085	0.0068
257	3.8153	0.0068
258	3.8221	0.0068
259	3.8289	0.0068
260	3.8356	0.0068
261	3.8424	0.0068
262	3.8491	0.0067
263	3.8558	0.0067
264	3.8626	0.0067

265	3.8693	0.0067
266	3.8759	0.0067
267	3.8826	0.0067
268	3.8893	0.0067
269	3.8959	0.0066
270	3.9025	0.0066
271	3.9092	0.0066
272	3.9158	0.0066
273	3.9223	0.0066
274	3.9289	0.0066
275	3.9355	0.0066
276	3.9420	0.0066
277	3.9486	0.0065
278	3.9551	0.0065
279	3.9616	0.0065
280	3.9681	0.0065
281	3.9746	0.0065
282	3.9811	0.0065
283	3.9875	0.0065
284	3.9940	0.0065
285	4.0004	0.0064
286	4.0069	0.0064
287	4.0133	0.0064
288	4.0197	0.0064

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0064	0.0004	0.0060
2	0.0064	0.0004	0.0060
3	0.0064	0.0004	0.0060
4	0.0065	0.0004	0.0060
5	0.0065	0.0004	0.0060
6	0.0065	0.0004	0.0060
7	0.0065	0.0004	0.0061
8	0.0065	0.0004	0.0061
9	0.0066	0.0004	0.0061
10	0.0066	0.0004	0.0061
11	0.0066	0.0004	0.0061
12	0.0066	0.0005	0.0062
13	0.0066	0.0005	0.0062
14	0.0066	0.0005	0.0062
15	0.0067	0.0005	0.0062
16	0.0067	0.0005	0.0062
17	0.0067	0.0005	0.0063
18	0.0067	0.0005	0.0063
19	0.0068	0.0005	0.0063
20	0.0068	0.0005	0.0063
21	0.0068	0.0005	0.0063
22	0.0068	0.0005	0.0063
23	0.0068	0.0005	0.0064
24	0.0069	0.0005	0.0064
25	0.0069	0.0005	0.0064
26	0.0069	0.0005	0.0064

27	0.0069	0.0005	0.0065
28	0.0069	0.0005	0.0065
29	0.0070	0.0005	0.0065
30	0.0070	0.0005	0.0065
31	0.0070	0.0005	0.0065
32	0.0070	0.0005	0.0066
33	0.0071	0.0005	0.0066
34	0.0071	0.0005	0.0066
35	0.0071	0.0005	0.0066
36	0.0071	0.0005	0.0066
37	0.0072	0.0005	0.0067
38	0.0072	0.0005	0.0067
39	0.0072	0.0005	0.0067
40	0.0072	0.0005	0.0067
41	0.0073	0.0005	0.0068
42	0.0073	0.0005	0.0068
43	0.0073	0.0005	0.0068
44	0.0073	0.0005	0.0068
45	0.0074	0.0005	0.0069
46	0.0074	0.0005	0.0069
47	0.0074	0.0005	0.0069
48	0.0074	0.0005	0.0069
49	0.0075	0.0005	0.0070
50	0.0075	0.0005	0.0070
51	0.0075	0.0005	0.0070
52	0.0076	0.0005	0.0070
53	0.0076	0.0005	0.0071
54	0.0076	0.0005	0.0071
55	0.0077	0.0005	0.0071
56	0.0077	0.0005	0.0072
57	0.0077	0.0005	0.0072
58	0.0077	0.0005	0.0072
59	0.0078	0.0005	0.0073
60	0.0078	0.0005	0.0073
61	0.0078	0.0005	0.0073
62	0.0079	0.0005	0.0073
63	0.0079	0.0005	0.0074
64	0.0079	0.0005	0.0074
65	0.0080	0.0005	0.0074
66	0.0080	0.0005	0.0075
67	0.0080	0.0005	0.0075
68	0.0081	0.0006	0.0075
69	0.0081	0.0006	0.0076
70	0.0081	0.0006	0.0076
71	0.0082	0.0006	0.0076
72	0.0082	0.0006	0.0077
73	0.0083	0.0006	0.0077
74	0.0083	0.0006	0.0077
75	0.0083	0.0006	0.0078
76	0.0084	0.0006	0.0078
77	0.0084	0.0006	0.0078
78	0.0084	0.0006	0.0079
79	0.0085	0.0006	0.0079
80	0.0085	0.0006	0.0079
81	0.0086	0.0006	0.0080

82	0.0086	0.0006	0.0080
83	0.0087	0.0006	0.0081
84	0.0087	0.0006	0.0081
85	0.0087	0.0006	0.0082
86	0.0088	0.0006	0.0082
87	0.0088	0.0006	0.0082
88	0.0089	0.0006	0.0083
89	0.0089	0.0006	0.0083
90	0.0090	0.0006	0.0084
91	0.0090	0.0006	0.0084
92	0.0091	0.0006	0.0084
93	0.0091	0.0006	0.0085
94	0.0092	0.0006	0.0085
95	0.0092	0.0006	0.0086
96	0.0093	0.0006	0.0086
97	0.0093	0.0006	0.0087
98	0.0094	0.0006	0.0087
99	0.0094	0.0006	0.0088
100	0.0095	0.0006	0.0088
101	0.0095	0.0007	0.0089
102	0.0096	0.0007	0.0089
103	0.0097	0.0007	0.0090
104	0.0097	0.0007	0.0090
105	0.0098	0.0007	0.0091
106	0.0098	0.0007	0.0092
107	0.0099	0.0007	0.0092
108	0.0099	0.0007	0.0093
109	0.0100	0.0007	0.0093
110	0.0101	0.0007	0.0094
111	0.0102	0.0007	0.0095
112	0.0102	0.0007	0.0095
113	0.0103	0.0007	0.0096
114	0.0103	0.0007	0.0096
115	0.0104	0.0007	0.0097
116	0.0105	0.0007	0.0098
117	0.0106	0.0007	0.0099
118	0.0106	0.0007	0.0099
119	0.0107	0.0007	0.0100
120	0.0108	0.0007	0.0101
121	0.0109	0.0007	0.0102
122	0.0110	0.0007	0.0102
123	0.0111	0.0008	0.0103
124	0.0111	0.0008	0.0104
125	0.0113	0.0008	0.0105
126	0.0113	0.0008	0.0105
127	0.0114	0.0008	0.0107
128	0.0115	0.0008	0.0107
129	0.0116	0.0008	0.0108
130	0.0117	0.0008	0.0109
131	0.0118	0.0008	0.0110
132	0.0119	0.0008	0.0111
133	0.0120	0.0008	0.0112
134	0.0121	0.0008	0.0113
135	0.0123	0.0008	0.0114
136	0.0123	0.0008	0.0115

137	0.0125	0.0009	0.0117
138	0.0126	0.0009	0.0117
139	0.0128	0.0009	0.0119
140	0.0128	0.0009	0.0120
141	0.0130	0.0009	0.0121
142	0.0131	0.0009	0.0122
143	0.0133	0.0009	0.0124
144	0.0134	0.0009	0.0125
145	0.0123	0.0008	0.0114
146	0.0124	0.0008	0.0115
147	0.0126	0.0009	0.0117
148	0.0127	0.0009	0.0118
149	0.0129	0.0009	0.0120
150	0.0130	0.0009	0.0121
151	0.0133	0.0009	0.0124
152	0.0134	0.0009	0.0125
153	0.0137	0.0009	0.0127
154	0.0138	0.0009	0.0129
155	0.0141	0.0010	0.0131
156	0.0142	0.0010	0.0133
157	0.0145	0.0010	0.0136
158	0.0147	0.0010	0.0137
159	0.0150	0.0010	0.0140
160	0.0152	0.0010	0.0142
161	0.0156	0.0011	0.0145
162	0.0158	0.0011	0.0147
163	0.0162	0.0011	0.0151
164	0.0164	0.0011	0.0154
165	0.0169	0.0011	0.0158
166	0.0171	0.0011	0.0161
167	0.0176	0.0011	0.0166
168	0.0179	0.0011	0.0169
169	0.0169	0.0011	0.0158
170	0.0172	0.0011	0.0161
171	0.0179	0.0011	0.0168
172	0.0182	0.0011	0.0171
173	0.0190	0.0011	0.0179
174	0.0194	0.0011	0.0183
175	0.0203	0.0011	0.0192
176	0.0208	0.0011	0.0197
177	0.0219	0.0011	0.0208
178	0.0225	0.0011	0.0214
179	0.0238	0.0011	0.0227
180	0.0246	0.0011	0.0235
181	0.0263	0.0011	0.0252
182	0.0272	0.0011	0.0262
183	0.0295	0.0011	0.0285
184	0.0309	0.0011	0.0298
185	0.0289	0.0011	0.0278
186	0.0307	0.0011	0.0297
187	0.0355	0.0011	0.0344
188	0.0387	0.0011	0.0376
189	0.0734	0.0011	0.0723
190	0.0812	0.0011	0.0802
191	0.1096	0.0011	0.1085

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0013	0.19	Q					
0+10	0.0113	1.46	Q					
0+15	0.0308	2.83	Q					
0+20	0.0545	3.43	Q					
0+25	0.0805	3.79	Q					
0+30	0.1083	4.03	Q					
0+35	0.1373	4.20	Q					
0+40	0.1671	4.33	Q					
0+45	0.1976	4.43	Q					
0+50	0.2287	4.51	Q					
0+55	0.2602	4.57	Q					
1+ 0	0.2920	4.62	Q					
1+ 5	0.3241	4.66	Q					
1+10	0.3564	4.70	Q					
1+15	0.3890	4.73	Q					
1+20	0.4218	4.76	Q					
1+25	0.4546	4.77	Q					
1+30	0.4876	4.79	Q					
1+35	0.5206	4.80	QV					
1+40	0.5538	4.81	QV					
1+45	0.5870	4.83	QV					
1+50	0.6204	4.84	QV					
1+55	0.6539	4.86	QV					
2+ 0	0.6875	4.87	QV					
2+ 5	0.7211	4.89	QV					
2+10	0.7549	4.91	QV					
2+15	0.7888	4.92	QV					
2+20	0.8228	4.94	QV					
2+25	0.8569	4.95	QV					
2+30	0.8912	4.97	QV					
2+35	0.9255	4.99	QV					
2+40	0.9600	5.00	Q					
2+45	0.9945	5.02	Q					
2+50	1.0292	5.04	QV					
2+55	1.0640	5.05	QV					
3+ 0	1.0989	5.07	QV					
3+ 5	1.1340	5.09	QV					
3+10	1.1691	5.10	QV					
3+15	1.2044	5.12	QV					
3+20	1.2398	5.14	QV					
3+25	1.2753	5.16	QV					
3+30	1.3110	5.18	QV					
3+35	1.3467	5.19	QV					
3+40	1.3826	5.21	QV					
3+45	1.4187	5.23	QV					
3+50	1.4548	5.25	QV					
3+55	1.4911	5.27	QV					
4+ 0	1.5276	5.29	Q V					
4+ 5	1.5641	5.31	Q V					
4+10	1.6008	5.33	Q V					
4+15	1.6377	5.35	Q V					
4+20	1.6746	5.37	Q V					
4+25	1.7117	5.39	Q V					

4+30	1.7490	5.41	Q V				
4+35	1.7864	5.43	Q V				
4+40	1.8239	5.45	Q V				
4+45	1.8616	5.47	Q V				
4+50	1.8995	5.49	Q V				
4+55	1.9374	5.52	Q V				
5+ 0	1.9756	5.54	Q V				
5+ 5	2.0139	5.56	Q V				
5+10	2.0523	5.58	Q V				
5+15	2.0909	5.61	Q V				
5+20	2.1297	5.63	Q V				
5+25	2.1686	5.65	Q V				
5+30	2.2077	5.68	Q V				
5+35	2.2469	5.70	Q V				
5+40	2.2864	5.72	Q V				
5+45	2.3259	5.75	Q V				
5+50	2.3657	5.77	Q V				
5+55	2.4056	5.80	Q V				
6+ 0	2.4457	5.82	Q V				
6+ 5	2.4860	5.85	Q V				
6+10	2.5265	5.87	Q V				
6+15	2.5671	5.90	Q V				
6+20	2.6079	5.93	Q V				
6+25	2.6489	5.95	Q V				
6+30	2.6901	5.98	Q V				
6+35	2.7315	6.01	Q V				
6+40	2.7731	6.04	Q V				
6+45	2.8149	6.07	Q V				
6+50	2.8569	6.09	Q V				
6+55	2.8990	6.12	Q V				
7+ 0	2.9414	6.15	Q V				
7+ 5	2.9840	6.18	Q V				
7+10	3.0268	6.21	Q V				
7+15	3.0698	6.25	Q V				
7+20	3.1130	6.28	Q V				
7+25	3.1565	6.31	Q V				
7+30	3.2002	6.34	Q V				
7+35	3.2440	6.37	Q V				
7+40	3.2882	6.41	Q V				
7+45	3.3325	6.44	Q V				
7+50	3.3771	6.47	Q V				
7+55	3.4219	6.51	Q V				
8+ 0	3.4670	6.54	Q V				
8+ 5	3.5123	6.58	Q V				
8+10	3.5579	6.62	Q V				
8+15	3.6037	6.65	Q V				
8+20	3.6498	6.69	Q V				
8+25	3.6962	6.73	Q V				
8+30	3.7428	6.77	Q V				
8+35	3.7897	6.81	Q V				
8+40	3.8368	6.85	Q V				
8+45	3.8843	6.89	Q V				
8+50	3.9320	6.93	Q V				
8+55	3.9800	6.97	Q V				
9+ 0	4.0284	7.02	Q V				

9+ 5	4.0770	7.06	Q	V				
9+10	4.1259	7.10	Q	V				
9+15	4.1752	7.15	Q	V				
9+20	4.2247	7.20	Q	V				
9+25	4.2746	7.24	Q	V				
9+30	4.3248	7.29	Q	V				
9+35	4.3754	7.34	Q	V				
9+40	4.4263	7.39	Q	V				
9+45	4.4775	7.44	Q	V				
9+50	4.5291	7.49	Q	V				
9+55	4.5811	7.54	Q	V				
10+ 0	4.6334	7.60	Q	V				
10+ 5	4.6861	7.65	Q	V				
10+10	4.7392	7.71	Q	V				
10+15	4.7927	7.77	Q	V				
10+20	4.8466	7.83	Q	V				
10+25	4.9009	7.89	Q	V				
10+30	4.9556	7.95	Q	V				
10+35	5.0108	8.01	Q	V				
10+40	5.0664	8.07	Q	V				
10+45	5.1224	8.14	Q	V				
10+50	5.1790	8.21	Q	V				
10+55	5.2359	8.27	Q	V				
11+ 0	5.2934	8.35	Q	V				
11+ 5	5.3514	8.42	Q	V				
11+10	5.4099	8.49	Q	V				
11+15	5.4688	8.57	Q	V				
11+20	5.5284	8.64	Q	V				
11+25	5.5885	8.72	Q	V				
11+30	5.6491	8.81	Q	V				
11+35	5.7103	8.89	Q	V				
11+40	5.7721	8.98	Q	V				
11+45	5.8346	9.06	Q	V				
11+50	5.8976	9.16	Q	V				
11+55	5.9613	9.25	Q	V				
12+ 0	6.0257	9.35	Q	V				
12+ 5	6.0905	9.41	Q	V				
12+10	6.1541	9.24	Q	V				
12+15	6.2165	9.06	Q	V				
12+20	6.2788	9.05	Q	V				
12+25	6.3414	9.08	Q	V				
12+30	6.4044	9.15	Q	V				
12+35	6.4681	9.24	Q	V				
12+40	6.5323	9.34	Q	V				
12+45	6.5974	9.44	Q	V				
12+50	6.6633	9.56	Q	V				
12+55	6.7300	9.69	Q	V				
13+ 0	6.7977	9.83	Q	V				
13+ 5	6.8663	9.97	Q	V				
13+10	6.9360	10.12	Q	V				
13+15	7.0068	10.28	Q	V				
13+20	7.0788	10.45	Q	V				
13+25	7.1519	10.62	Q	V				
13+30	7.2263	10.81	Q	V				
13+35	7.3021	11.00	Q	V				

13+40	7.3794	11.22	Q		V				
13+45	7.4582	11.44	Q		V				
13+50	7.5387	11.69	Q		V				
13+55	7.6209	11.94	Q		V				
14+ 0	7.7050	12.21	Q		V				
14+ 5	7.7907	12.44	Q		V				
14+10	7.8762	12.41	Q		V				
14+15	7.9613	12.36	Q		V				
14+20	8.0477	12.55	Q		V				
14+25	8.1360	12.81	Q		V				
14+30	8.2265	13.14	Q		V				
14+35	8.3196	13.52	Q		V				
14+40	8.4156	13.95	Q		V				
14+45	8.5149	14.41	Q		V				
14+50	8.6178	14.94	Q		V				
14+55	8.7246	15.52	Q		V				
15+ 0	8.8361	16.18	Q		V				
15+ 5	8.9524	16.89	Q		V				
15+10	9.0745	17.72	Q		V				
15+15	9.2028	18.64	Q		V				
15+20	9.3387	19.72	Q		V				
15+25	9.4818	20.78	Q		V				
15+30	9.6275	21.16	Q		V				
15+35	9.7768	21.67	Q		V				
15+40	9.9371	23.28	Q		V				
15+45	10.1189	26.40	Q		V				
15+50	10.3628	35.41	Q		V				
15+55	10.6840	46.64	Q		V				
16+ 0	11.0934	59.45	Q		V				
16+ 5	11.6627	82.65		Q		V			
16+10	12.5630	130.73				V	Q		
16+15	13.4448	128.04					QV		
16+20	14.0176	83.17			Q			V	
16+25	14.4231	58.87		Q				V	
16+30	14.7444	46.66		Q				V	
16+35	15.0108	38.68		Q				V	
16+40	15.2365	32.78		Q				V	
16+45	15.4309	28.23		Q				V	
16+50	15.6005	24.62		Q				V	
16+55	15.7491	21.57		Q				V	
17+ 0	15.8801	19.02	Q					V	
17+ 5	16.0003	17.45	Q					V	
17+10	16.1139	16.49	Q					V	
17+15	16.2190	15.26	Q					V	
17+20	16.3155	14.02	Q					V	
17+25	16.4035	12.77	Q					V	
17+30	16.4869	12.11	Q					V	
17+35	16.5669	11.61	Q					V	
17+40	16.6437	11.16	Q					V	
17+45	16.7179	10.76	Q					V	
17+50	16.7895	10.40	Q					V	
17+55	16.8588	10.07	Q					V	
18+ 0	16.9261	9.76	Q					V	
18+ 5	16.9917	9.52	Q					V	
18+10	17.0573	9.53	Q					V	

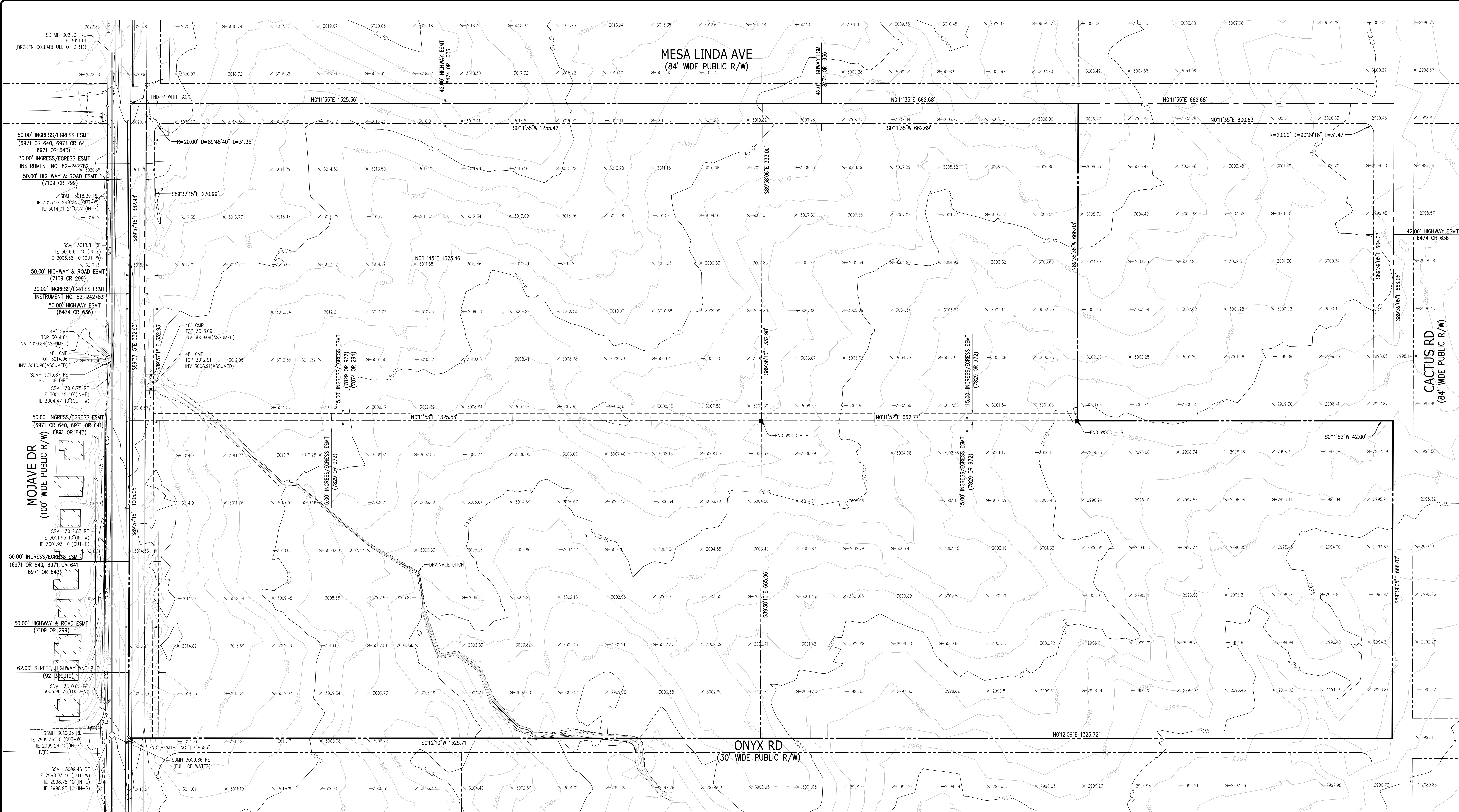
18+15	17.1233	9.58	Q				V	
18+20	17.1885	9.48	Q				V	
18+25	17.2528	9.33	Q				V	
18+30	17.3161	9.18	Q				V	
18+35	17.3782	9.02	Q				V	
18+40	17.4393	8.87	Q				V	
18+45	17.4993	8.72	Q				V	
18+50	17.5584	8.57	Q				V	
18+55	17.6164	8.43	Q				V	
19+ 0	17.6736	8.29	Q				V	
19+ 5	17.7297	8.16	Q				V	
19+10	17.7851	8.03	Q				V	
19+15	17.8396	7.91	Q				V	
19+20	17.8932	7.79	Q				V	
19+25	17.9461	7.68	Q				V	
19+30	17.9983	7.57	Q				V	
19+35	18.0497	7.46	Q				V	
19+40	18.1004	7.36	Q				V	
19+45	18.1504	7.26	Q				V	
19+50	18.1997	7.17	Q				V	
19+55	18.2485	7.08	Q				V	
20+ 0	18.2966	6.99	Q				V	
20+ 5	18.3442	6.91	Q				V	
20+10	18.3912	6.82	Q				V	
20+15	18.4376	6.75	Q				V	
20+20	18.4836	6.67	Q				V	
20+25	18.5290	6.59	Q				V	
20+30	18.5739	6.52	Q				V	
20+35	18.6184	6.45	Q				V	
20+40	18.6623	6.39	Q				V	
20+45	18.7059	6.32	Q				V	
20+50	18.7490	6.26	Q				V	
20+55	18.7916	6.19	Q				V	
21+ 0	18.8339	6.13	Q				V	
21+ 5	18.8757	6.08	Q				V	
21+10	18.9172	6.02	Q				V	
21+15	18.9582	5.96	Q				V	
21+20	18.9989	5.91	Q				V	
21+25	19.0393	5.86	Q				V	
21+30	19.0793	5.81	Q				V	
21+35	19.1189	5.76	Q				V	
21+40	19.1582	5.71	Q				V	
21+45	19.1972	5.66	Q				V	
21+50	19.2359	5.61	Q				V	
21+55	19.2742	5.57	Q				V	
22+ 0	19.3122	5.52	Q				V	
22+ 5	19.3500	5.48	Q				V	
22+10	19.3874	5.44	Q				V	
22+15	19.4246	5.40	Q				V	
22+20	19.4615	5.35	Q				V	
22+25	19.4981	5.32	Q				V	
22+30	19.5344	5.28	Q				V	
22+35	19.5705	5.24	Q				V	
22+40	19.6063	5.20	Q				V	
22+45	19.6418	5.16	Q				V	

22+50	19.6772	5.13	Q				V	
22+55	19.7122	5.09	Q				V	
23+ 0	19.7471	5.06	Q				V	
23+ 5	19.7817	5.02	Q				V	
23+10	19.8161	4.99	Q				V	
23+15	19.8502	4.96	Q				V	
23+20	19.8841	4.93	Q				V	
23+25	19.9178	4.90	Q				V	
23+30	19.9513	4.86	Q				V	
23+35	19.9846	4.83	Q				V	
23+40	20.0177	4.80	Q				V	
23+45	20.0506	4.77	Q				V	
23+50	20.0833	4.75	Q				V	
23+55	20.1158	4.72	Q				V	
24+ 0	20.1481	4.69	Q				V	

APPENDIX F:

TOPOGRAPHY MAP AND ALTA

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NOTES

- THIS PLOT WAS PREPARED FROM INFORMATION FURNISHED IN THE FOLLOWING PRELIMINARY TITLE REPORTS:
 - ORDER NUMBER 7102202266-00
 - ORDER NUMBER 22000480500
 - ORDER NUMBER 22000480638
 - ORDER NUMBER 22000480519
- NO LIABILITY IS ASSUMED FOR MATTERS OF RECORD NOT STATED IN SAID PRELIMINARY TITLE REPORT THAT MAY AFFECT THE TITLE LINES, OR EXCEPTIONS, OR EASEMENTS OF THE PROPERTY.
- THIS IS NOT A BOUNDARY SURVEY. NO LIABILITY IS ASSUMED, BY KIER & WRIGHT, FOR THE EXISTENCE OF ANY EASEMENTS, ENCUMBRANCES, IN BOUNDARY, OR TITLE DEFECTS NOT MENTIONED IN SAID DOCUMENTS AND THEREFORE NOT SHOWN ON THIS DRAWING. PROPERTY LINE PLOT ONLY (NO EASEMENTS SHOWN).
- ALL DISTANCES AND ELEVATIONS SHOWN HEREON ARE IN FEET AND DECIMALS THEREOF.
- THE TYPES, LOCATIONS, SIZES AND/OR DEPTHS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS TOPOGRAPHIC SURVEY WERE OBTAINED FROM SOURCES OF VARYING RELIABILITY. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE TYPES, EXTENT, SIZES, LOCATIONS AND DEPTHS OF SUCH UNDERGROUND UTILITIES. (A REASONABLE EFFORT HAS BEEN MADE TO LOCATE AND DELINEATE ALL KNOWN UNDERGROUND UTILITIES). HOWEVER, THE ENGINEER CAN ASSUME NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF ITS DELINEATION OF SUCH UNDERGROUND UTILITIES WHICH MAY BE ENCOUNTERED, BUT WHICH ARE NOT SHOWN ON THESE DRAWINGS.
- THIS SURVEY DOES NOT SHOW THE LOCATIONS OF THE FOLLOWING UNDERGROUND UTILITY LINES DUE TO THE FACT THAT THE CLIENT HAS NOT FURNISHED KIER & WRIGHT CIVIL ENGINEERS & SURVEYORS, INC. WITH ANY PLANS THAT DELINEATE THEIR LOCATIONS: ELECTRIC LINES, GAS LINES, TELEPHONE LINES, NITROGEN LINES, (IF ANY) FIBER OPTIC LINES (IF ANY). ALL PARTIES SHOULD CONSIDER THIS SURVEY AS PRELIMINARY WITH REGARDS TO THE LOCATION OF THE UTILITY FACILITIES. UPON RECEIPT OF THIS INFORMATION KIER & WRIGHT WILL UPDATE THIS SURVEY AND REISSUE IT.
- THE SUBJECT PROPERTY IS SHOWN ON THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) FOR SAN BERNARDINO COUNTY, CALIFORNIA, MAP NUMBER 06071C5795H FOR COMMUNITY NUMBER 065068 CITY OF VICTORVILLE, WITH AN EFFECTIVE DATE OF AUGUST 28, 2008, AS BEING LOCATED IN FLOOD ZONE "X". ACCORDING TO FEMA THE DEFINITION OF ZONE "X" IS: AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN BOUNDARY.

FEMA BASE FLOOD ELEVATIONS ARE BASED ON NAVD83 DATUM. SEE BENCHMARK NOTE FOR DATUM CONVERSIONS.

- BENCHMARK:

THE STATION IS STAMPED:---ELAN 1977---524 FEET NORTH POST MILE 15.00, 232.0 FEET NORTH-NORTHEAST OF NORTHEAST LEG TOWER 1621, 91.7 FEET WEST OF CENTERLINE 395, 89.3 FEET EAST-SOUTHEAST OF POWER POLE 363470, 4 FEET NORTH OF A METAL WITNESS POST, 0.6 FOOT LOWER THAN CENTERLINE 395, PROJECTS 0.3 FOOT ABOVE GROUND, 1 INCH X 30 INCH STEEL PIPE IN CONCRETE POST.
- BASIS OF BEARINGS:

THE BEARING OF SOUTH 89° 37' 15" EAST TAKEN ON THE CENTER LINE OF MOJAVE DR AS SHOWN ON THAT CERTAIN PARCEL MAP NUMBER 2092 FILED FOR RECORD ON AUGUST 13, 1974, IN BOOK 18 OF MAPS AT PAGE 52, OFFICIAL RECORDS OF SAN BERNARDINO COUNTY WAS TAKEN AS THE BASIS FOR ALL BEARINGS SHOWN HEREON.
- CORNER RECORD NOTE:

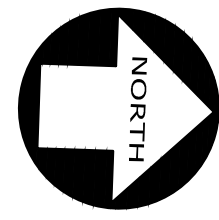
THE DEVELOPER AND/OR CONTRACTOR SHALL BE RESPONSIBLE FOR THE PREPARATION AND FILING OF PRE-CONSTRUCTION AND POST-CONSTRUCTION CORNER RECORDS FOR ANY MONUMENTS OR PROPERTY CORNERS SHOWN HEREON THAT MAY BE DESTROYED DURING IMPROVEMENTS TO THE SUBJECT PROPERTY AS DEFINED IN SECTION 8771(B) OF THE PROFESSIONAL LAND SURVEYORS ACT.
- THIS MAP WAS PRODUCED ACCORDING TO PROCEDURES THAT COMPLY WITH NATIONAL STANDARD FOR SPATIAL ACCURACY (NSSDA) FOR A CONTOUR INTERVAL OF 1 FOOT AND A MAP SCALE OF 1"=80'. CONTOURS WITHIN VEGETATED AREAS AND SHADOW OUTLINED AREA MAY NOT MEET MAPPING STANDARDS AND SHOULD BE FIELD CHECKED. THIS COMPUTER PLOTTED MAP WAS GENERATED BY PHOTOGRAMMETRIC METHODS BY KIER+WRIGHT. JOB NUMBER 42221. DATE OF PHOTOGRAPHY 06-21-2022.

LEGEND

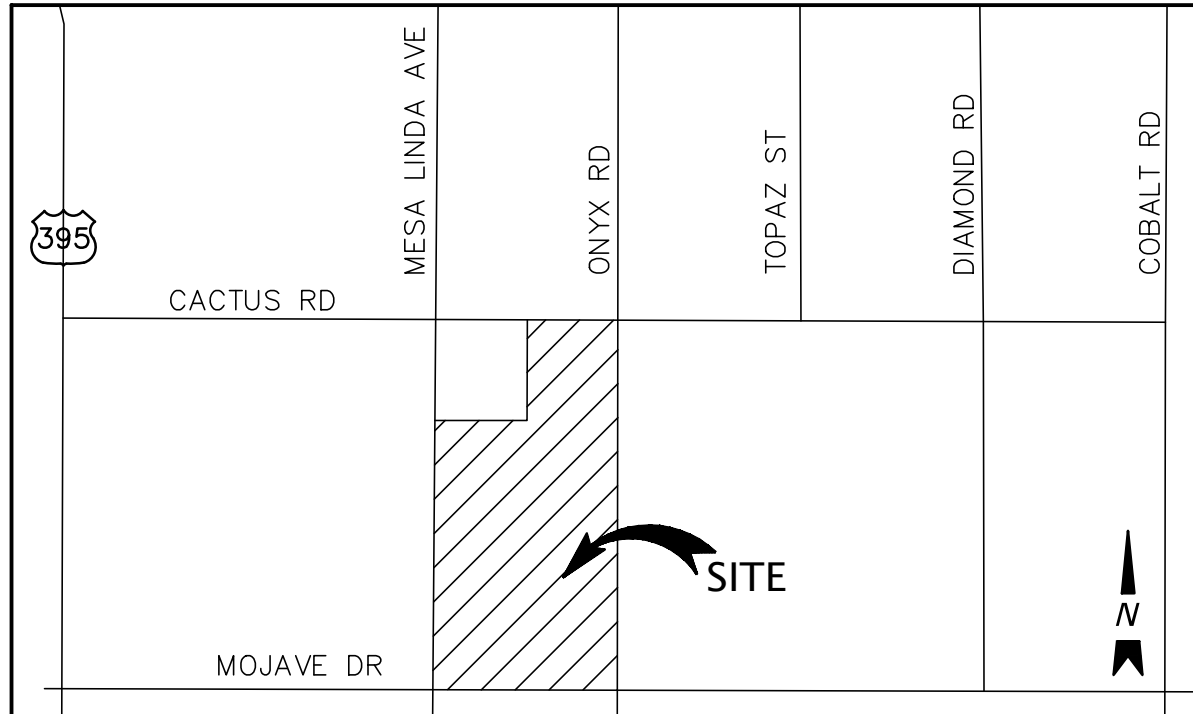
- CONCRETE CURB
- MAJOR CONTOUR LINE
- MINOR CONTOUR LINE
- EASEMENT LINE
- EDGE OF PAVEMENT
- EDGE OF WATER/FLOWLINE
- LOT LINE
- MONUMENT/MONUMENT LINE
- PROPERTY LINE
- SANITARY SEWER LINE-MANHOLE & CLEANOUT
- SANITARY SEWER LINE OVER 24" DIAMETER
- STORM DRAIN LINE-MANHOLE & CATCH BASIN
- STORM DRAIN LINE-MANHOLE & CATCH BASIN
- STORM DRAIN LINE OVER 24" DIAMETER
- TELEPHONE LINE
- WATER LINE & VALVE
- WATER LINE OVER 24" DIAMETER
- AREA DRAIN
- ELECTROFLUOR
- FIRE HYDRANT
- GUY ANCHOR
- HUB & TACK FOUND
- POWER POLE/JOINT POLE
- RAILROAD SPIKE FOUND
- REBAR FOUND
- SURVEY CONTROL POINT
- TRAFFIC SIGN
- UTILITY BOX
- UTILITY LINE MARKER
- WATER VALVE

ABBREVIATIONS

- ESMT
- OR
- (P)
- PER PLAN
- PUE
- RM
- RE
- SD
- SS
- SMH
- SS
- SMH
- IV
- W

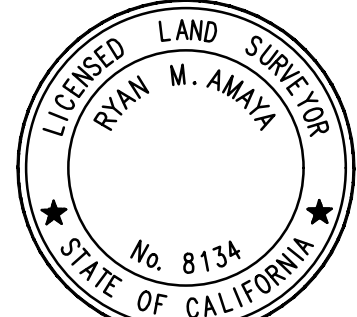


0 40 80 160 240
Scale 1" = 80'



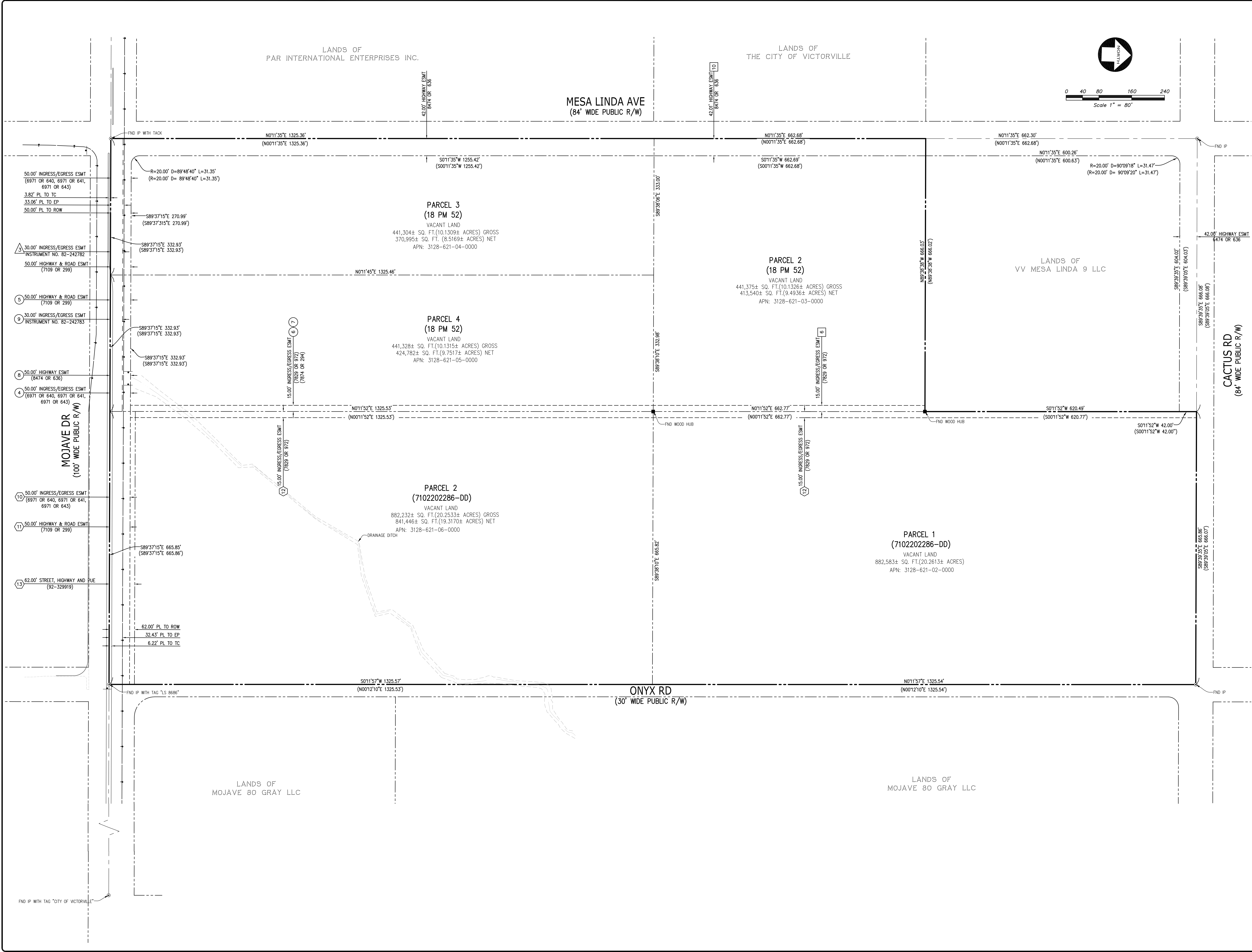
VICINITY MAP
NOT TO SCALE

7-21-2022
DATE
PREPARED BY OR UNDER THE SUPERVISION OF
RYAN M. AMAYA P.L.S. 8134
RYAN@KIERWRIGHT.COM



TOPOGRAPHIC SURVEY		FOR		INDUSTRIAL PROPERTY GROUP INC		VICTORVILLE, CALIFORNIA	
OF		MOJAVE DR					
BY		NO.		NO.		NO.	
REVISION		REVISION		REVISION		REVISION	
DATE		JULY, 2022		DATE		JULY, 2022	
SCALE		1" = 80'		SCALE		1" = 80'	
SURVEYOR		JSK		SURVEYOR		JSK	
DRAWN BY		JSK		DRAWN BY		JSK	
JOB NO.		A22221		JOB NO.		A22221	
SHEET		1		SHEET		1	
OF		1		OF		1	

Z:\2022\A22221\DWG\SURVEY\ALTA\A22221-AS.dwg 10-25-22 08:42:16 PM jwrenry



ALTA/NSPS LAND TITLE SURVEY				KIER+WRIGHT			
OF				3330 Scott Boulevard, Building 22 San Jose, California 95041			
FOR				Phone: (408) 727-6665 www.kierwright.com			
INDUSTRIAL PROPERTY GROUP, INC				CALIFORNIA			
VICTORVILLE,							
DATE	OCTOBER, 2022	BY	NO.	REVISION	BY	NO.	
SCALE	1"=80'						
SURVEYOR	JSK						
DRAWN BY	JSK						
JOB NO.	A22221						
SHEET	2						
OF 2 SHEETS							